NISSAN

MODEL K12 SERIES

QUICK REFERENCE INDEX

A GENERAL INFORMATION	GI	General Information
B ENGINE	EM	Engine Mechanical
	LU	Engine Lubrication System
	CO	Engine Cooling System
	EC	Engine Control System – CR engine
	EC	Engine Control System – K9K engine
	FL	Fuel System
	EX	Exhaust System
	ACC	Accelerator Control System
C TRANSMISSION/ TRANSAXLE	CL	Clutch
	MT	Manual Transaxle
	AT	Automatic Transaxle
D DRIVELINE/AXLE	FAX	Front Axle
	RAX	Rear Axle
E SUSPENSION	FSU	Front Suspension
	RSU	Rear Suspension
	WT	Road Wheels & Tires
F BRAKES	BR	Brake System
	PB	Parking Brake System
	BRC	Brake Control System
G STEERING	PS	Power Steering System
	STC	Steering Control System
H RESTRAINTS	SB	Seat Belts
	SRS	Supplemental Restraint System (SRS)
I BODY	BL	Body, Lock & Security System
	GW	Glasses, Window System & Mirrors
	RF	Roof
	EI	Exterior & Interior
	IP	Instrument Panel
	SE	Seat
J AIR CONDITIONER	ATC	Automatic Air Conditioner
	MTC	Manual Air Conditioner
K ELECTRICAL	SC	Starting & Charging System
	LT	Lighting System
	DI	Driver Information System
	WW	Wiper, Washer & Horn
	BCS	Body Control System
	LAN	LAN System
	AV	Audio, Visual & Telephone System
	PG	Power Supply, Ground & Circuit Elements
L MAINTENANCE	MA	Maintenance
M INDEX	IDX	Alphabetical Index

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FOREWORD

This manual contains maintenance and repair procedures for the NISSAN MICRA, model K12 series.

In order to assure your safety and the efficient functioning of the vehicle, this manual should be read thoroughly. It is especially important that the PRECAUTIONS in the GI section be completely understood before starting any repair task.

All information in this manual is based on the latest product information at the time of publication. The right is reserved to make changes in specifications and methods at any time without notice.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the technician and the efficient functioning of the vehicle.
The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.
Service varies with the procedures used, the skills of the technician and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first be completely satisfied that neither personal safety nor the vehicle's safety will be jeopardized by the service method selected.

NISSAN EUROPE S.A.S.

Service Engineering Section

Paris, France

SECTION ACC
ACCELERATOR CONTROL SYSTEM

CONTENTS

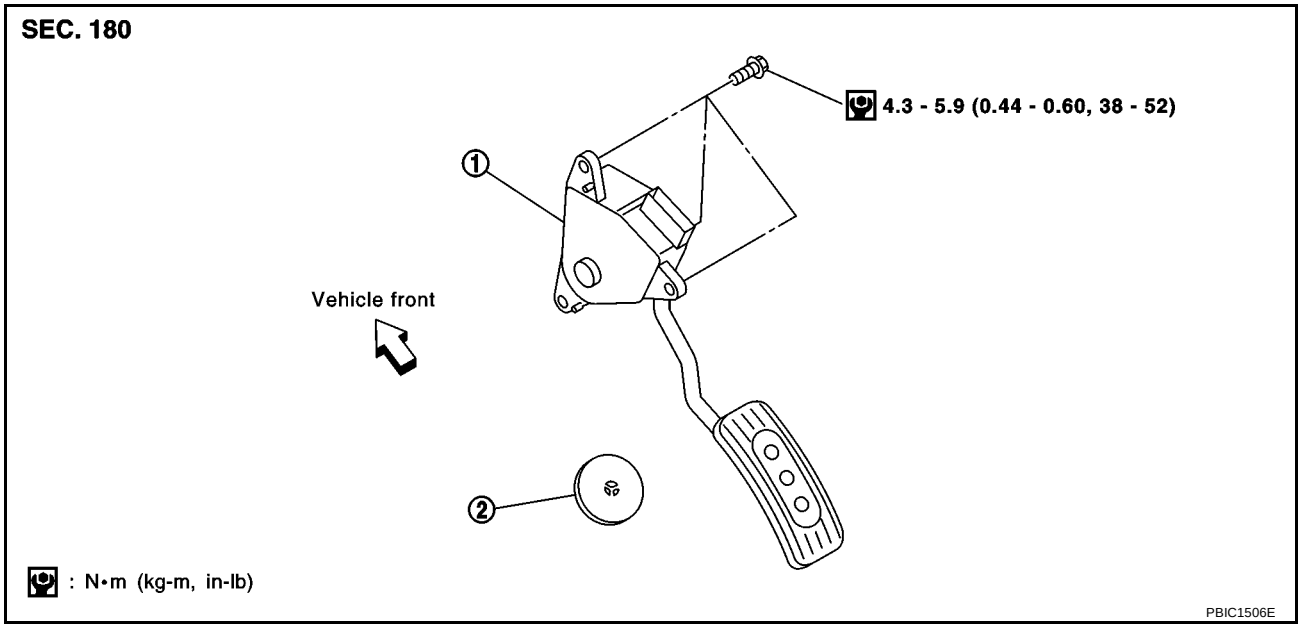
ACCELERATOR CONTROL SYSTEM 2
Removal and Installation 2
REMOVAL 2
INSTALLATION 2
INSPECTION AFTER INSTALLATION 2
SERVICE DATA AND SPECIFICATIONS (SDS) 3
Tightening Torque 3

ACCELERATOR CONTROL SYSTEM

PFP:18005

Removal and Installation

EBS00OJF



1. Accelerator pedal assembly
2. Accelerator pedal stopper (Underfloor carpet)

REMOVAL

1. Remove harness connector.
2. Remove mounting bolts, and remove accelerator assembly.

CAUTION:

- **Do not disassemble accelerator pedal assembly and remove sensors.**
- **Handle them carefully without subjecting them to impacts such as dropping.**
- **Be careful not to get it wet.**

3. Fold the floor carpet and remove accelerator pedal stopper.
   - Remove pedal stopper by turning it counterclockwise with fingers.

INSTALLATION

Install in the reverse order of removal. be careful of the following:

- Insert locating pin into vehicle side to position accelerator pedal assembly. Install mounting bolt to accelerator pedal assembly.
- Align the stud bolt on the floor with the thread hole to insert accelerator pedal stopper until it contacts the face.

INSPECTION AFTER INSTALLATION

- Check that the accelerator pedal moves smoothly within the whole operation range.
- Check that the accelerator pedal securely returns to the original position.
- For the electrical inspection of the accelerator pedal assembly, refer to EC-233, "DTC P0226 APP SENSOR" (CR WITH EURO-OBD), EC-621, "DTC P0226 APP SENSOR" (CR WITHOUT EURO-OBD) or “Interpretation”, “DIESEL INJECTION” in EC section(K9K).
- When accelerator electrical connector is disconnected, perform EC-42, "Accelerator Pedal Released Position Learning" (WITH EURO-OBD), EC-503, "Accelerator Pedal Released Position Learning" (WITHOUT EURO-OBD).

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Tightening Torque

EBS00OJG

Unit: N·m (kg-m, in-lb)

Accelerator pedal assembly	4.3 - 5.9 (0.44 - 0.60, 38 - 52)

SECTION AT
AUTOMATIC TRANSAXLE

CONTENTS

PRECAUTIONS 5
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 5
Precautions for On Board Diagnostic (EURO-OBD) System of A/T and Engine — Euro-OBD — 5
Precautions for Trouble Diagnosis 5
Precautions for Harness Repair 5
Precautions 6
Service Notice or Precautions 7
Wiring Diagrams and Trouble Diagnosis 8
PREPARATION 9
Special Service Tools 9
Commercial Service Tools 11
A/T FLUID 12
Checking A/T Fluid 12
Changing A/T Fluid 12
OVERALL SYSTEM 13
A/T Electrical Parts Location 13
Circuit Diagram 14
Cross-Sectional View 15
Hydraulic Control Circuit 16
Shift Mechanism 17
Control System 26
Control Mechanism 27
Control Valve 32

EURO-OBD

TROUBLE DIAGNOSIS — INDEX 33
Alphabetical & P No. Index for DTC 33
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION 35
Introduction 35
EURO-OBD Function for A/T System 35
One or Two Trip Detection Logic of EURO-OBD ... 35
EURO-OBD Diagnostic Trouble Code (DTC) 35
Malfunction Indicator lamp (MIL) 39
CONSULT-II Function (A/T) 39
Diagnostic Procedure Without CONSULT-II 48
TROUBLE DIAGNOSIS — INTRODUCTION 54
Introduction 54
Work Flow 58
TROUBLE DIAGNOSIS — BASIC INSPECTION ... 61
A/T Fluid Check 61
Stall Test 62
Line Pressure Test 65
Road Test 66
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION 83
Symptom Chart 83
TCM Terminals and Reference Value 104
CAN COMMUNICATION 107
CAN Communication 107
CAN Communication Unit 107
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH 114
Description 114
Wiring Diagram — AT — PNP/SW 116
Diagnostic Procedure 117
Component Inspection 119
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT 120
Description 120
Wiring Diagram — AT — FTS 122
Diagnostic Procedure 123
Component Inspection 125
DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) 126
Description 126
Wiring Diagram — AT — VSSA/T 128
Diagnostic Procedure 129
DTC P0725 ENGINE SPEED SIGNAL 131
Description 131
Wiring Diagram — AT — ENGSS 132
Diagnostic Procedure 133
DTC P0731 A/T 1ST GEAR FUNCTION 135
Description 135
Wiring Diagram — AT — 1ST 138

Diagnostic Procedure 139
Component Inspection 140
DTC P0732 A/T 2ND GEAR FUNCTION 141
Description 141
Wiring Diagram — AT — 2ND 144
Diagnostic Procedure 145
Component Inspection 146
DTC P0733 A/T 3RD GEAR FUNCTION 147
Description 147
Wiring Diagram — AT — 3RD 150
Diagnostic Procedure 151
Component Inspection 152
DTC P0734 A/T 4TH GEAR FUNCTION 153
Description 153
Wiring Diagram — AT — 4TH 156
Diagnostic Procedure 157
Component Inspection 160
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE 161
Description 161
Wiring Diagram — AT — TCV 163
Diagnostic Procedure 164
Component Inspection 165
DTC P0745 LINE PRESSURE SOLENOID VALVE. 166
Description 166
Wiring Diagram — AT — LPSV 168
Diagnostic Procedure 169
Component Inspection 171
DTC P0750 SHIFT SOLENOID VALVE A 173
Description 173
Wiring Diagram — AT — SSV/A 175
Diagnostic Procedure 176
Component Inspection 177
DTC P0755 SHIFT SOLENOID VALVE B 178
Description 178
Wiring Diagram — AT — SSV/B 180
Diagnostic Procedure 181
Component Inspection 182
DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR 183
Description 183
Wiring Diagram — AT — TPS 185
Diagnostic Procedure 186
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE 188
Description 188
Wiring Diagram — AT — OVRCSV 190
Diagnostic Procedure 191
Component Inspection 192
DTC U1000 CAN COMMUNICATION LINE 193
Description 193
On Board Diagnosis Logic 193
DTC Confirmation Procedure 193
Wiring Diagram — AT — CAN 194
Diagnostic Procedure 195
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE). 196
Description 196
Wiring Diagram — AT — BA/FTS 198
Diagnostic Procedure 199
Component Inspection 201
DTC VEHICLE SPEED SENSOR MTR 202
Description 202
Wiring Diagram — AT — VSSMTR 204
Diagnostic Procedure 205
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM) 206
Description 206
Diagnostic Procedure 206
DTC CONTROL UNIT(EEPROM) 208
Description 208
Diagnostic Procedure 209
TROUBLE DIAGNOSES FOR SYMPTOMS 210
Wiring Diagram — AT — NONDTC 210
O/D OFF Indicator Lamp Does Not Come On 212
Engine Cannot Be Started In “P” and “N” Position. 214
In “P” Position, Vehicle Moves Forward Or Backward When Pushed 215
In “N” Position, Vehicle Moves 216
Large Shock. “N” → “R” Position 217
Vehicle Does Not Creep Backward In “R” Position. 218
Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position 220
Vehicle Cannot Be Started From D_1 222
A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$ 225
A/T Does Not Shift: $D_2 \rightarrow D_3$ 227
A/T Does Not Shift: $D_3 \rightarrow D_4$ 229
A/T Does Not Perform Lock-up 232
A/T Does Not Hold Lock-up Condition 233
Lock-up Is Not Released 235
Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$) 236
Vehicle Does Not Start From D_1 238
A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF” 241
A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position 242
A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” Position 243
Vehicle Does Not Decelerate By Engine Brake ... 245
TCM Self-diagnosis Does Not Activate 247

EXC.F/EURO-OBD

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION 251
CONSULT-II Function (A/T) 251
Diagnostic Procedure Without CONSULT-II 257
TROUBLE DIAGNOSIS — INTRODUCTION 262
Introduction 262
Work Flow 266
TROUBLE DIAGNOSIS — BASIC INSPECTION .. 268
A/T Fluid Check 268
Stall Test 269
Line Pressure Test 272
Road Test 273
TROUBLE DIAGNOSIS — GENERAL DESCRIP-

TION 291
Symptom Chart 291
TCM Terminals and Reference Value 311
CAN COMMUNICATION 314
CAN Communication 314
CAN Communication Unit 314
TROUBLE DIAGNOSES FOR SYMPTOMS 321
Wiring Diagram — AT — NONDTC 321
O/D OFF Indicator Lamp Does Not Come On 323
Engine Cannot Be Started In “P” and “N” Position 325
In “P” Position, Vehicle Moves Forward Or Backward When Pushed 326
In “N” Position, Vehicle Moves 327
Large Shock. “N” → “R” Position 328
Vehicle Does Not Creep Backward In “R” Position 329
Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position 331
Vehicle Cannot Be Started From D1 333
A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2 336
A/T Does Not Shift: D2 → D3 338
A/T Does Not Shift: D3 → D4 340
A/T Does Not Perform Lock-up 343
A/T Does Not Hold Lock-up Condition 344
Lock-up Is Not Released 346
Engine Speed Does Not Return To Idle (Light Braking D4 → D3) 347
Vehicle Does Not Start From D1 349
A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch “ON” → “OFF” 352
A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position 353
A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position 354
Vehicle Does Not Decelerate By Engine Brake .. 356
TCM Self-diagnosis Does Not Activate 358
VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) 362
Description 362
Wiring Diagram — AT — VSSA/T 364
Diagnostic Procedure 365
DTC VEHICLE SPEED SENSOR MTR 367
Description 367
Wiring Diagram — AT — VSSMTR 369
Diagnostic Procedure 370
ACCELE RATOR PEDAL POSITION (APP) SENSOR 371
Description 371
Wiring Diagram — AT — TPS 373
Diagnostic Procedure 374
SHIFT SOLENOID VALVE A 376
Description 376
Wiring Diagram — AT — SSV/A 378
Diagnostic Procedure 379
Component Inspection 379
SHIFT SOLENOID VALVE B 381
Description 381
Wiring Diagram — AT — SSV/B 383
Diagnostic Procedure 384
Component Inspection 384
OVERRUN CLUTCH SOLENOID VALVE 386
Description 386
Wiring Diagram — AT — OVRCSV 387
Diagnostic Procedure 388
Component Inspection 388
TORQUE CONVERTER CLUTCH SOLENOID VALVE 390
Description 390
Wiring Diagram — AT — TCV 392
Diagnostic Procedure 393
Component Inspection 393
BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE) 395
Description 395
Wiring Diagram — AT — BA/FTS 397
Diagnostic Procedure 398
Component Inspection 400
ENGINE SPEED SIGNAL 401
Description 401
Wiring Diagram — AT — ENGSS 402
Diagnostic Procedure 403
LINE PRESSURE SOLENOID VALVE 405
Description 405
Wiring Diagram — AT — LPSV 407
Diagnostic Procedure 408
Component Inspection 410
CAN COMMUNICATION LINE 412
Description 412
On Board Diagnosis Logic 412
Self-Diagnosis Code Confirmation Procedure 412
Wiring Diagram — AT — CAN 413
Diagnostic Procedure 414

ALL

MAIN POWER SUPPLY AND GROUND CIRCUIT. 415
Wiring Diagram — AT — MAIN 415
Diagnostic Procedure 416
A/T SHIFT LOCK SYSTEM 418
Description 418
Shift Lock System Electrical Parts Location 418
Wiring Diagram — AT — SHIFT 419
Diagnostic Procedure 420
KEY INTERLOCK CABLE 423
Components 423
Removal 423
Installation 424
ON-VEHICLE SERVICE 426
Control Valve Assembly and Accumulators 426
Control Cable Adjustment 427
Park/Neutral Position (PNP) Switch Adjustment . 428
Differential Side Oil Seal Replacement 428
Revolution Sensor Replacement 429
REMOVAL AND INSTALLATION 430
Removal 430
Installation 431

OVERHAUL 433
Components 433
Oil Channel 436
Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings 437
DISASSEMBLY 438
Disassembly 438
REPAIR FOR COMPONENT PARTS 450
Manual Shaft 450
Oil Pump 453
Control Valve Assembly 457
Control Valve Upper Body 466
Control Valve Lower Body 470
Reverse Clutch 472
High Clutch 477
Forward and Overrun Clutches 482
Low & Reverse Brake 489
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub 493
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer 497
Band Servo Piston Assembly 503
Final Drive 508
ASSEMBLY 513
Assembly (1) 513
Adjustment (1) 514
Assembly (2) 519
Adjustment (2) 523
Assembly (3) 527
SERVICE DATA AND SPECIFICATIONS (SDS) ...534
General Specifications 534
Shift Schedule 534
Stall Revolution 535
Line Pressure 535
Control Valves 535
Clutch and Brakes 536
Clutch and Brake Return Springs 537
Oil Pump 538
Input Shaft 538
Planetary carrier 538
Final Drive 538
Reduction Pinion Gear 539
Output Shaft 541
Bearing Retainer 542
Total End Play 542
Reverse Clutch End Play 542
Accumulator 543
Band Servo 543
Removal and Installation 543
Shift Solenoid Valves 543
Solenoid Valves 543
A/T Fluid Temperature Sensor 543
Revolution Sensor 544
Dropping Resistor 544

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

ECS008MZ

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions for On Board Diagnostic (EURO-OBD) System of A/T and Engine — Euro-OBD —

ECS008N0

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- **Be sure to turn the ignition switch “OFF” and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. Will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. May cause the MIL to light up due to a short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EGR system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

Precautions for Trouble Diagnosis

ECS008N1

CAN SYSTEM

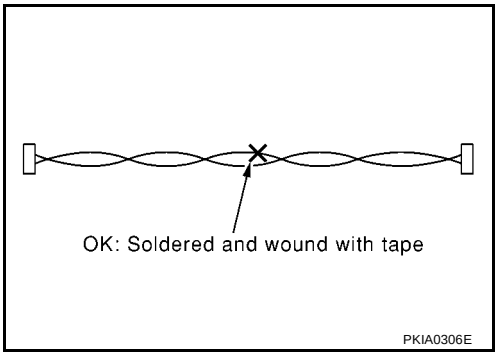
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.

Precautions for Harness Repair

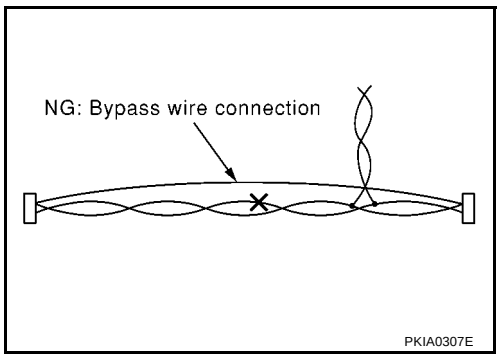
ECS008N2

CAN SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



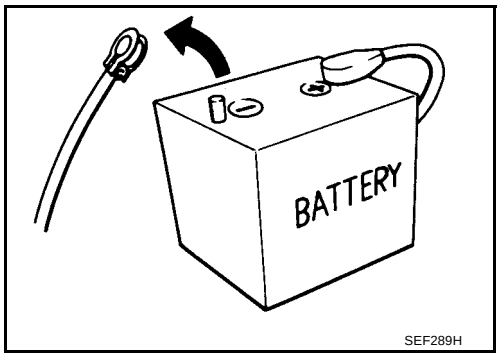
- Do not perform bypass wire connections for the repair parts.(The spliced wire will become separated and the characteristics of twisted line will be lost.)



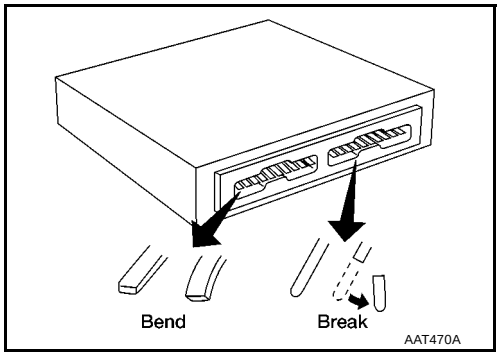
Precautions

ECS008N3

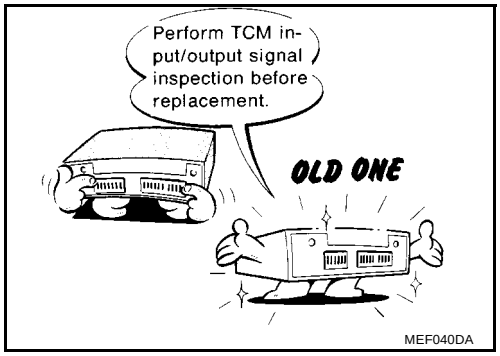
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**



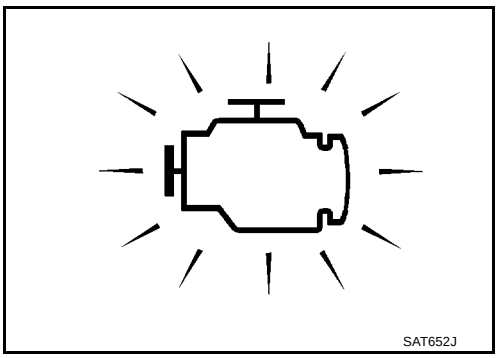
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-104, "TCM Terminals and Reference Value".)**



- **After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE".**
  The DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE" if the repair is completed.
- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.


SAT652J

- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. Will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
  Always follow the procedures under "Changing A/T Fluid" in the AT section when changing A/T fluid. Refer to "Changing A/T Fluid", AT-12, "A/T FLUID" .

Service Notice or Precautions

ECS008N4

FAIL-SAFE

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.
Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of "1", "2" or "D". The customer may complain of sluggish or poor acceleration.
When the ignition key is turned "ON" following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" (EXCEPT FOR EURO-OBD) or AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" (EURO-OBD).
The blinking of the O/D OFF indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions.
Always follow the "WORK FLOW", refer to AT-266, "Work Flow" (EXCEPT FOR Euro-OBD) or AT-58, "Work Flow" (Euro-OBD).
The SELF-DIAGNOSIS results will be as follows:

- The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.
- During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)

- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.

The torque converter should not be replaced if:

- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- Transaxle failure did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

EURO-OBD SELF-DIAGNOSIS — EURO-OBD —

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the O/D OFF indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-40, "SELF-DIAGNOSTIC RESULT TEST MODE" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure “HOW TO ERASE DTC” on AT-37, "HOW TO ERASE DTC" to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the O/D OFF indicator lamp does not indicate any malfunctions.

– PNP switch
– A/T 1st, 2nd, 3rd, or 4th gear function

*: For details of EURO-OBD, refer to EC-47, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

- **Certain systems and components, especially those related to EURO-OBD, may use a new style slide-locking type harness connector.**
  For description and how to disconnect, refer to PG-99, "HARNESS CONNECTOR" .

Wiring Diagrams and Trouble Diagnosis

ECS008N5

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-4, "POWER SUPPLY ROUTING"

When you perform trouble diagnosis, refer to the following:

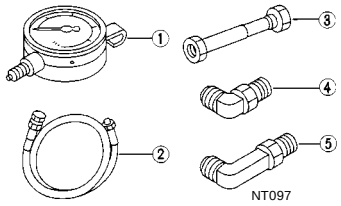
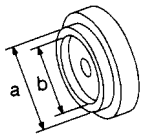
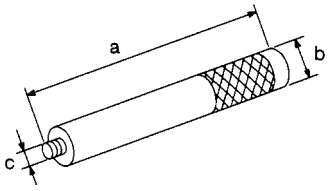
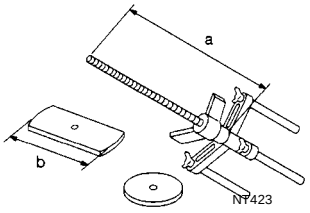
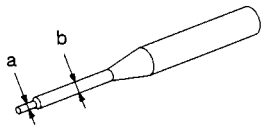
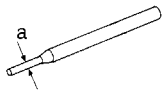
- GI-10, "How to Follow Trouble Diagnoses"
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"

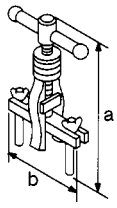
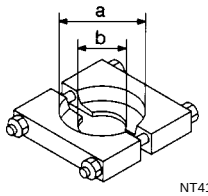
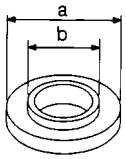
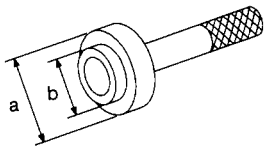
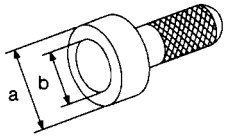
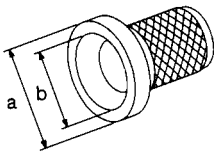
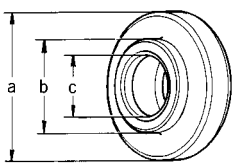
PREPARATION

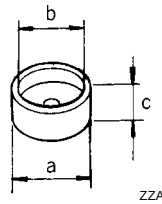
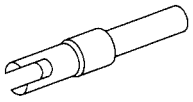
PFP:00100

Special Service Tools

ECS008N6

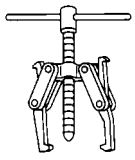
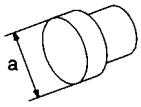
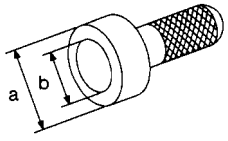
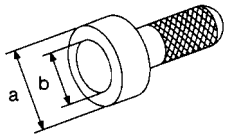
Tool number Tool name	Description
ST2505S001 Oil pressure gauge set 1. ST25051001 Oil pressure gauge 2. ST25052000 Hose 3. ST25053000 Joint pipe 4. ST25054000 Adapter 5. ST25055000 Adapter	● Measuring line pressure  NT097
KV31103000 Drift	● Installing differential oil seal (Use with ST35325000.) **a: 59 mm (2.32 in) dia.** **b: 49 mm (1.93 in) dia.**  NT105
ST35325000 Drift	● Installing differential oil seal (Use with KV31103000.) **a: 215 mm (8.46 in)** **b: 25 mm (0.98 in) dia.** **c: M12 x 1.5P**  NT417
KV31103200 Clutch spring compresssor	● Removing and installing clutch return spring **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**  NT423
ST23540000 Pin punch	● Removing and installing parking rod plate and manual plate pins **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**  NT442
KV32101000 Pin punch	● Removing and installing differential pinion mate shaft **a: 4 mm (0.16 in) dia.**  NT410

Tool number Tool name	Description	
KV381054S0 Puller	 NT414	● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST30031000 Puller	 NT411	● Removing reduction gear bearing inner race **a: 90 mm (3.54 in) dia.** **b: 50 mm (1.97 in) dia.**
ST35272000 Drift	 NT426	● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race **a: 72 mm (2.83 in) dia.** **b: 35.5 mm (1.398 in) dia.**
ST37830000 Drift	 NT427	● Installing idler gear bearing outer race **a: 72 mm (2.83 in) dia.** **b: 35.5 mm (1.398 in) dia.**
ST35271000 Drift	 NT115	● Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
ST3340001 Drift	 NT086	● Installing oil pump housing oil seal **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
ST36723000 Drift	 ZZA0978D	● Installing idler output shaft bearing **a: 70 mm (2.76 in) dia.** **b: 40 mm (1.57 in) dia.** **c: 31 mm (1.22 in) dia.**

Tool number Tool name	Description	
KV40104840 Drift	 ZZA1133D	● Installing idler output shaft bearing outer race **a: 49 mm (1.93 in) dia.** **b: 42 mm (1.65 in) dia.** **c: 25 mm (0.98 in) dia.**
KV38105710 Preload adapter	 NT087	● Measuring clearance between side gear and differential case

Commercial Service Tools

ECS008N7

Tool name	Description	
Puller	 NT077	● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Drift	 NT109	● Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift	 NT115	● Installing differential left side bearing **a: 86 mm (3.39 in) dia.** **b: 80 mm (3.15 in) dia.**
Drift	 NT115	● Installing differential right side bearing **a: 46 mm (1.81 in) dia.** **b: 40 mm (1.57 in) dia.**

A/T FLUID

PFP:KLE40

Checking A/T Fluid

ECS008N8

1. Warm up engine.
2. Check for fluid leakage.
3. Before driving, fluid level can be checked at fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on dipstick.

a. Park vehicle on level surface and set parking brake.

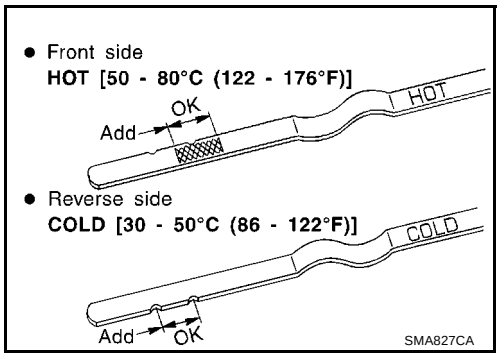
b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.

c. Check fluid level with engine idling.

d. Remove dipstick and note reading. If level is at low side of either range, and fluid to the charging pipe.

e. Re-insert dipstick into charging pipe as far as it will go.

f. Remove dipstick and note reading. If reading is at low side of range, add fluid to the charging pipe.



Do not overfill.

4. Drive vehicle for approximately 5 minutes in urban areas.
5. Re-check fluid level at fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on dipstick.
6. Check fluid condition.
   - If fluid is very dark or smells burned, refer to AT section for checking operation of A/T. Flush cooling system after repair of A/T.
   - If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-11, "RADIATOR" , CO-17, "RADIATOR (ALUMINUM TYPE)" .

Changing A/T Fluid

ECS008N9

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid from drain plug and refill with new A/T fluid. Always refill same volume with drained fluid.

Fluid grade:

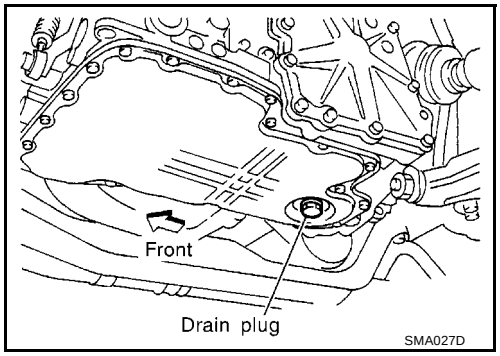
Genuine Nissan ATF or equivalent. Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Fluid capacity (With torque converter):

Approx. 7.7 ℓ (6-3/4 Imp qt)

Drain plug:

: 29 - 39 N·m (3.0 - 3.9 kg-m, 22 - 28 ft-lb)



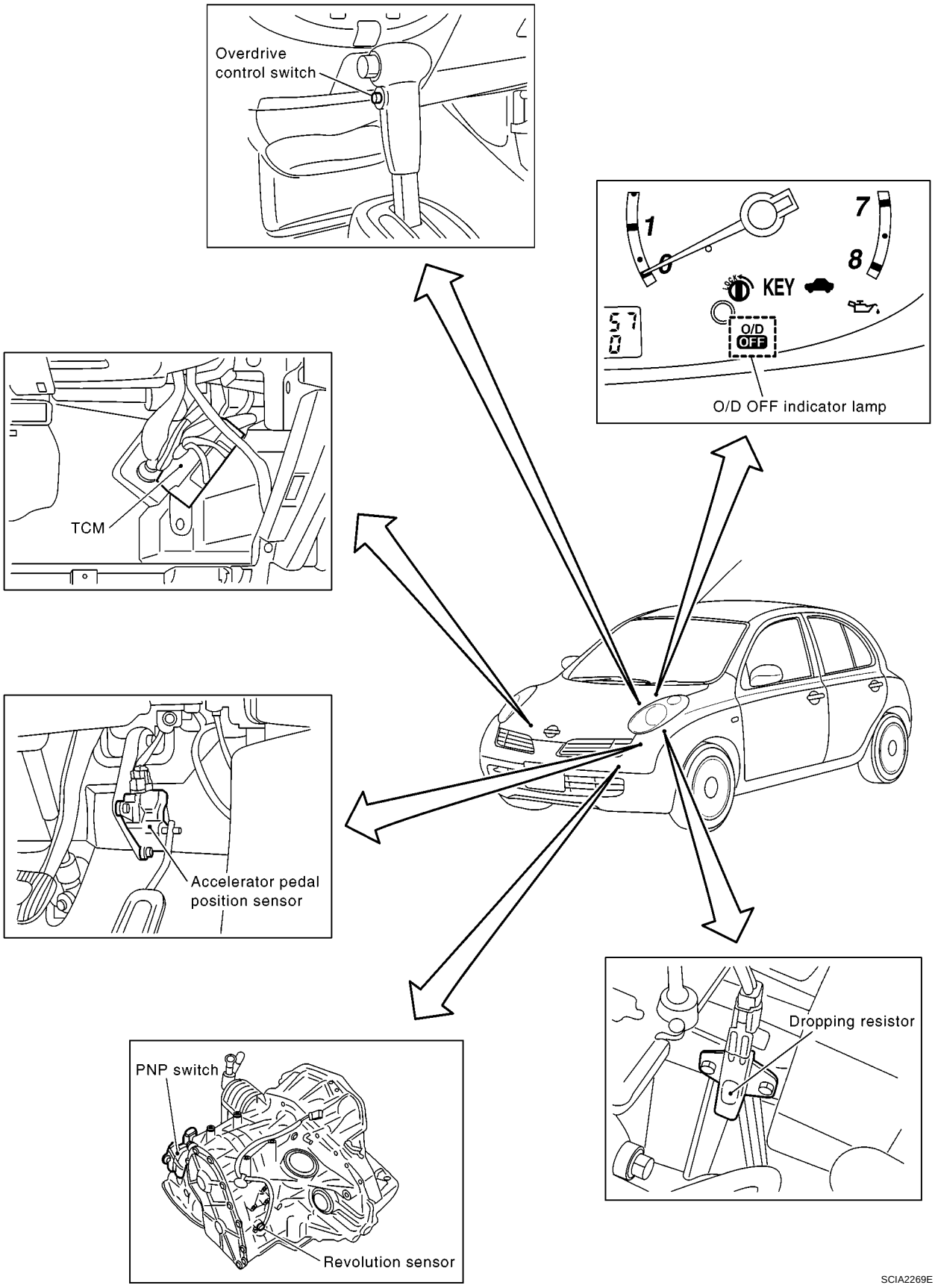
4. Run engine at idle speed for five minutes.
5. Check fluid level and condition. Refer to “Checking A/T Fluid”. If fluid is still dirty, repeat steps 2 through 5.

OVERALL SYSTEM

PFP:00000

A/T Electrical Parts Location

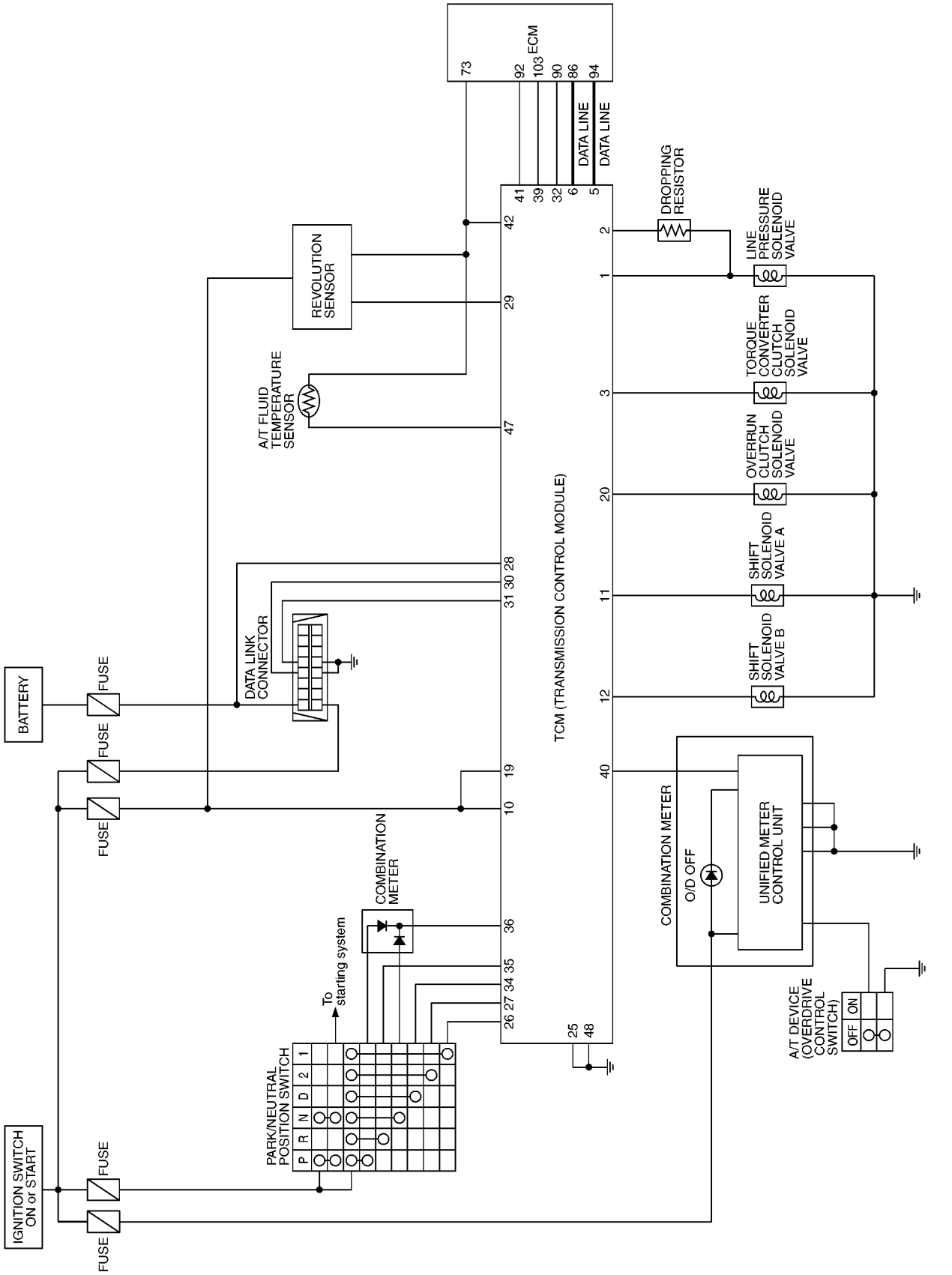
ECS008NA



SCIA2269E

Circuit Diagram

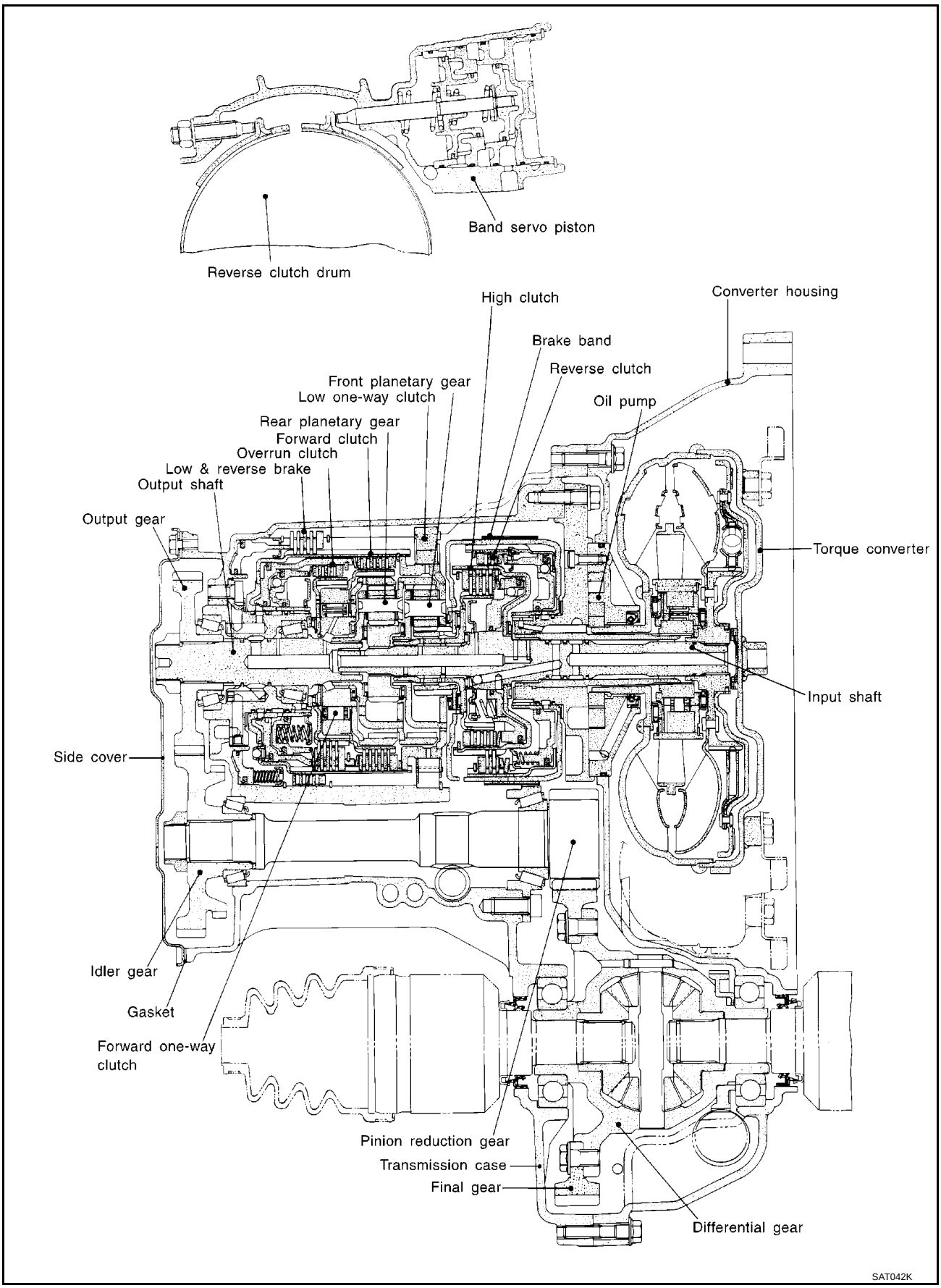
ECS008NB



MCWA0070E

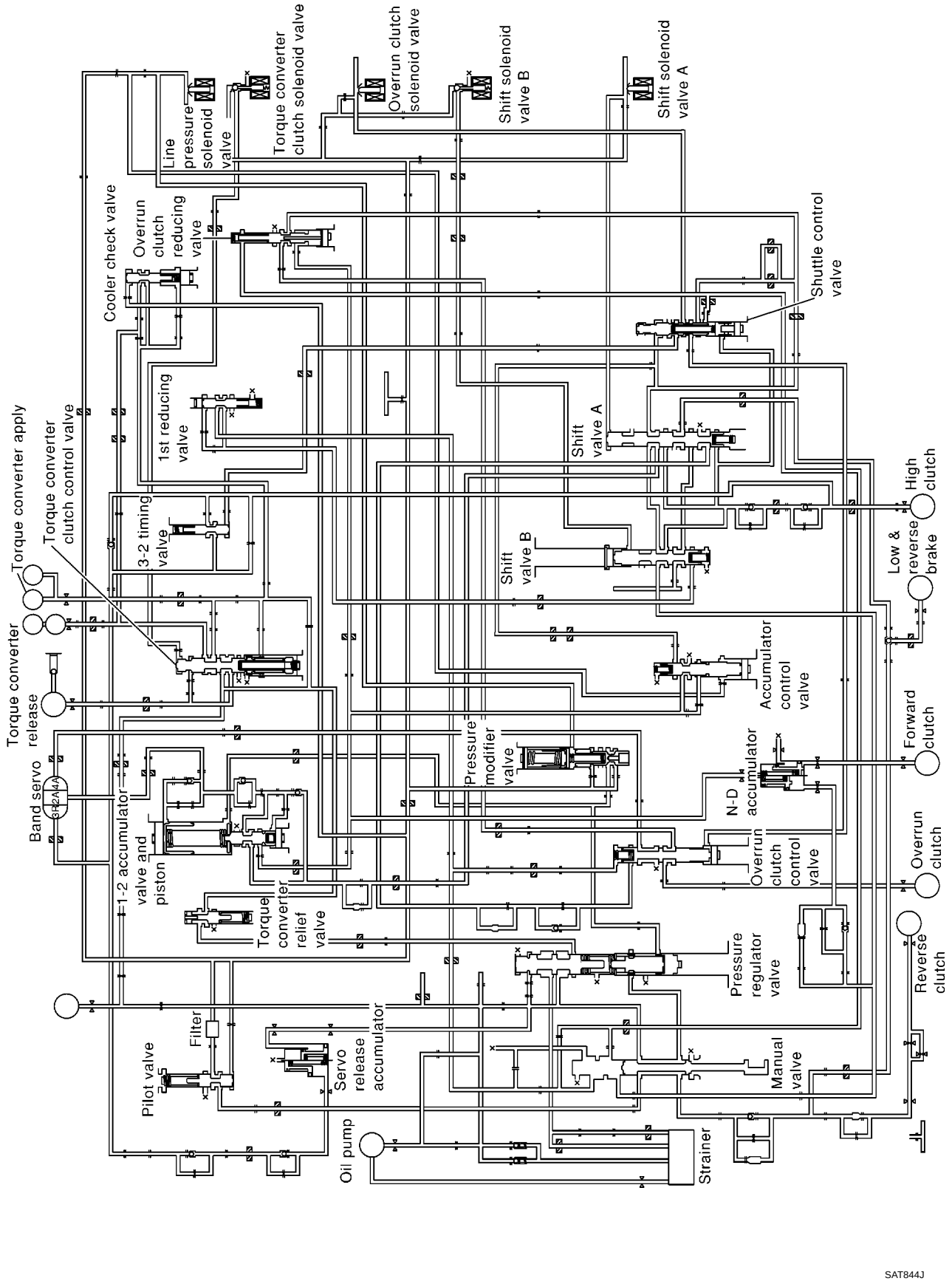
Cross-Sectional View

ECS008NC



Hydraulic Control Circuit

ECS008ND

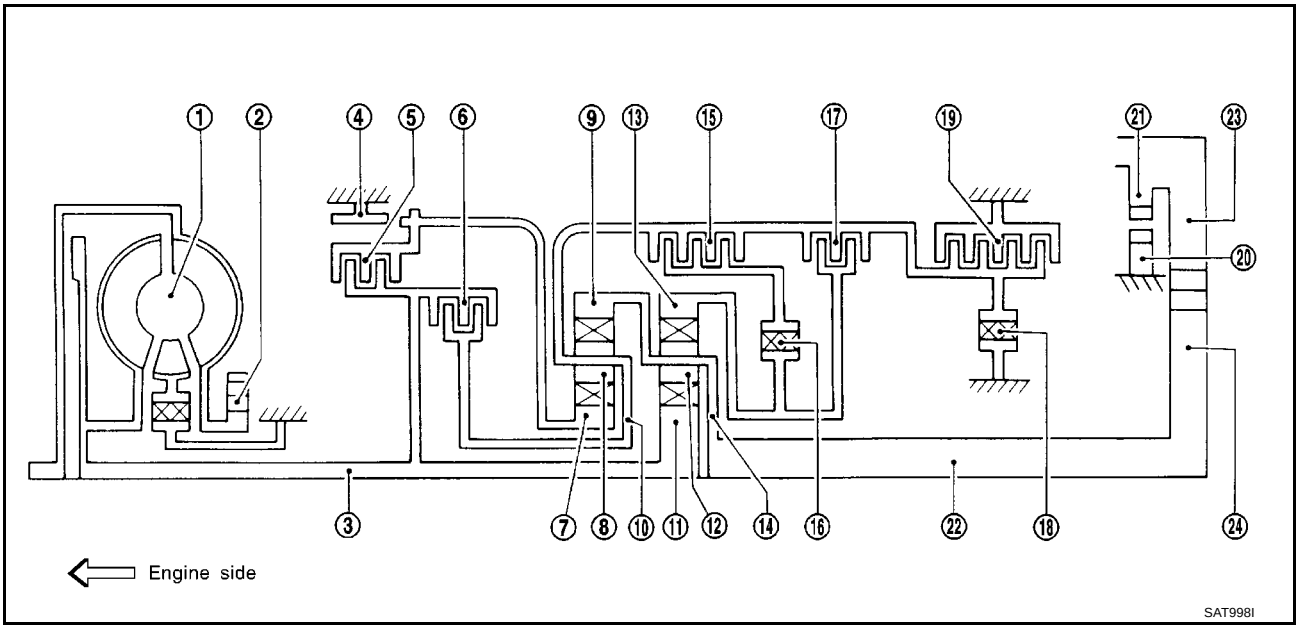


SAT844J

Shift Mechanism

ECS008NE

CONSTRUCTION



1. Torque converter	2. Oil pump	3. Input shaft
4. Brake band	5. Reverse clutch	6. High clutch
7. Front sun gear	8. Front pinion gear	9. Front internal gear
10. Front planetary carrier	11. Rear sun gear	12. Rear pinion gear
13. Rear internal gear	14. Rear planetary carrier	15. Forward clutch
16. Forward one-way clutch	17. Overrun clutch	18. Low one-way clutch
19. Low & reverse brake	20. Parking pawl	21. Parking gear
22. Output shaft	23. Idle gear	24. Output gear

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
5 Reverse clutch	R/C	To transmit input power to front sun gear **7** .
6 High clutch	H/C	To transmit input power to front planetary carrier **10** .
15 Forward clutch	F/C	To connect front planetary carrier **10** with forward one-way clutch **16** .
17 Overrun clutch	O/C	To connect front planetary carrier **10** with rear internal gear **13** .
4 Brake band	B/B	To lock front sun gear **7** .
16 Forward one-way clutch	F/O.C	When forward clutch **15** is engaged, to stop rear internal gear **13** from rotating in opposite direction against engine revolution.
18 Low one-way clutch	L/O.C	To stop front planetary carrier **10** from rotating in opposite direction against engine revolution.
19 Low & reverse brake	L & R/B	To lock front planetary carrier **10** .

CLUTCH AND BAND CHART

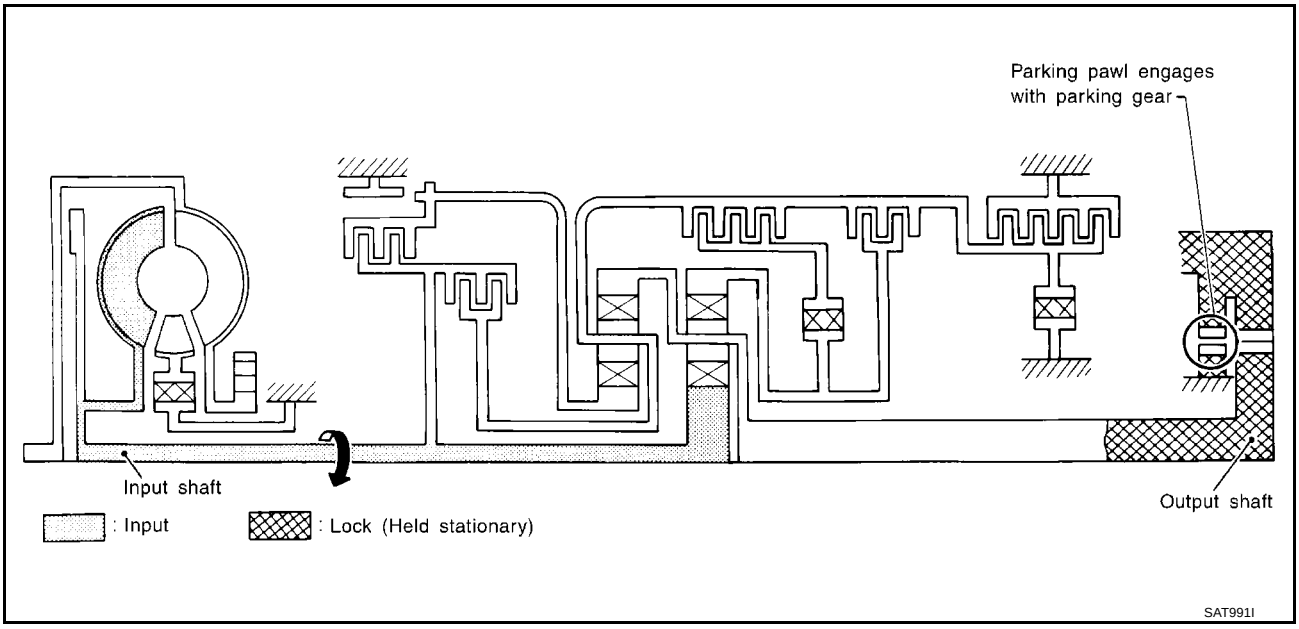
Shift position		Reverse clutch **5**	High clutch **6**	Forward clutch **15**	Overrun clutch **17**	Band servo			Forward one-way clutch **16**	Low one-way clutch **18**	Low & reverse brake **19**	Lock-up	Remarks
						2nd apply	3rd release	4th apply					
P													PARK POSITION
R		○									○		REVERSE POSITION
N													NEUTRAL POSITION
D*4	1st			○	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd			○	*1A	○			B				
	3rd		○	○	*1A	*2C	C		B			*1○	
	4th		○	C		*3C	C	○				○	
2	1st			○	○				B	B			Automatic shift 1 ⇔ 2
	2nd			○	○	○			B				
1	1st			○	○				B		○		Locks (held stationary) in 1st speed 1 ⇐ 2
	2nd			○	○	○			B				

- *1: Operates when overdrive control switch is set in “OFF” position.
- *2: Oil pressure is applied to both 2nd “apply” side and 3rd “release” side of band servo piston. However, brake band does not contract because oil pressure area on the “release” side is greater than that on the “apply” side.
- *3: Oil pressure is applied to 4th “apply” side in condition *2 above, and brake band contracts.
- *4: A/T will not shift to 4th when overdrive control switch is set in “OFF” position.
- ○: Operates.
- A: Operates when throttle opening is less than 3/16, activating engine brake.
- B: Operates during “progressive” acceleration.
- C: Operates but does not affect power transmission.
- D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

POWER TRANSMISSION

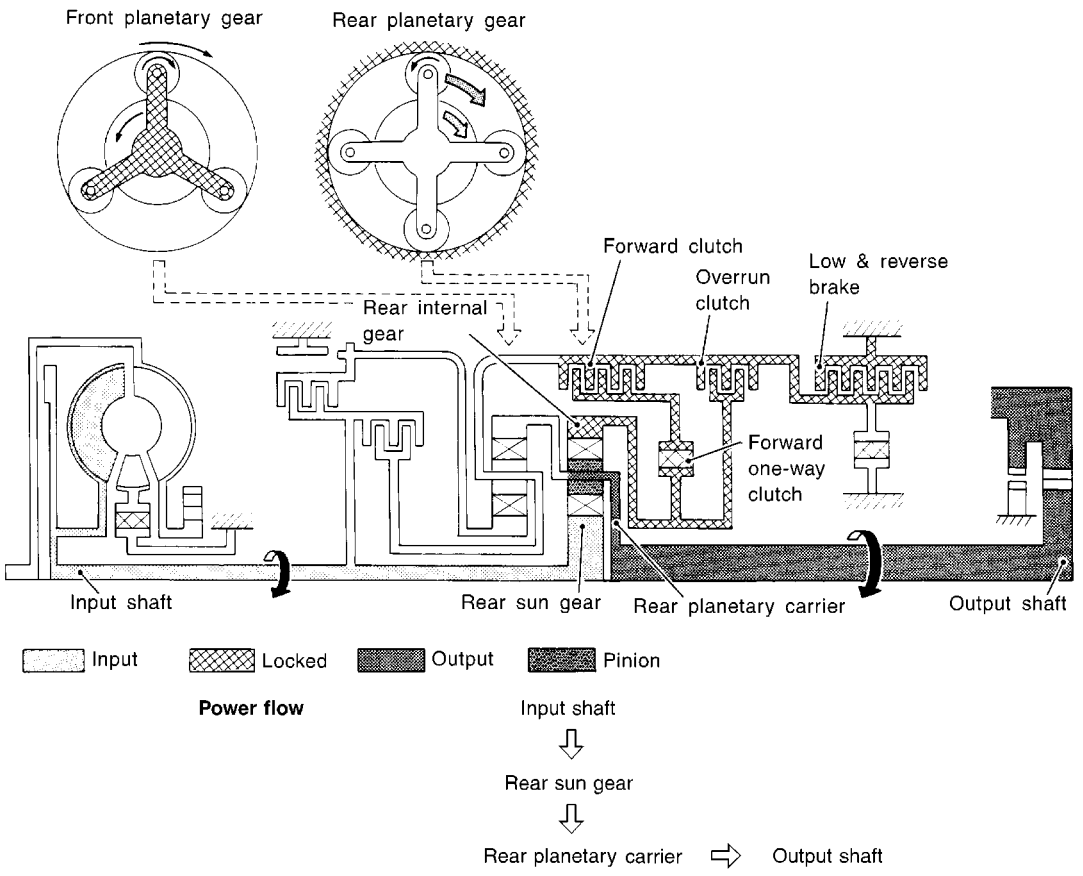
“N” and “P” Positions

- “N” position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position
  Similar to the “N” position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.



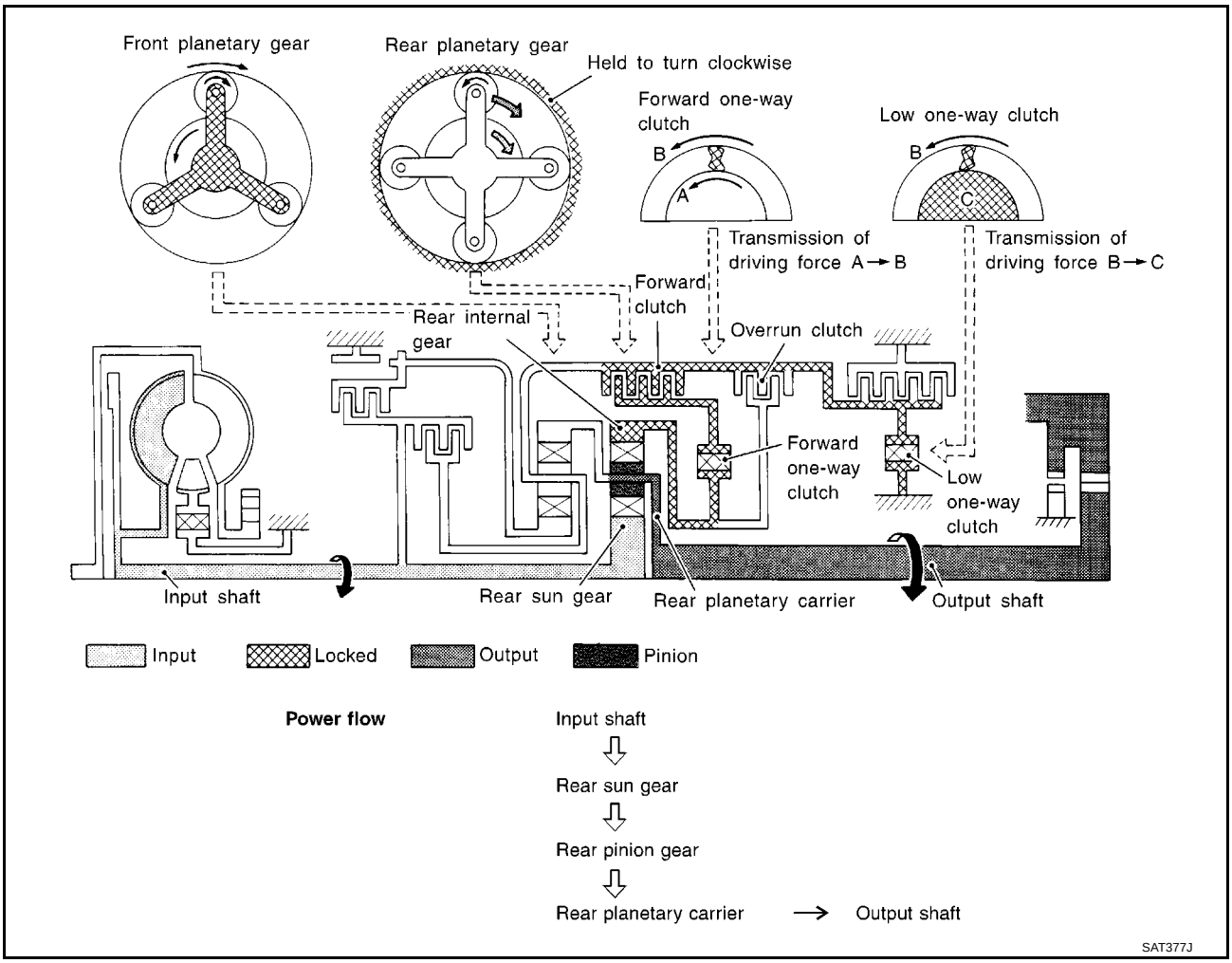
“1₁ ” Position

● **Forward clutch** ● **Forward one-way clutch** ● **Overrun clutch** ● **Low and reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D1 and 21 .
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



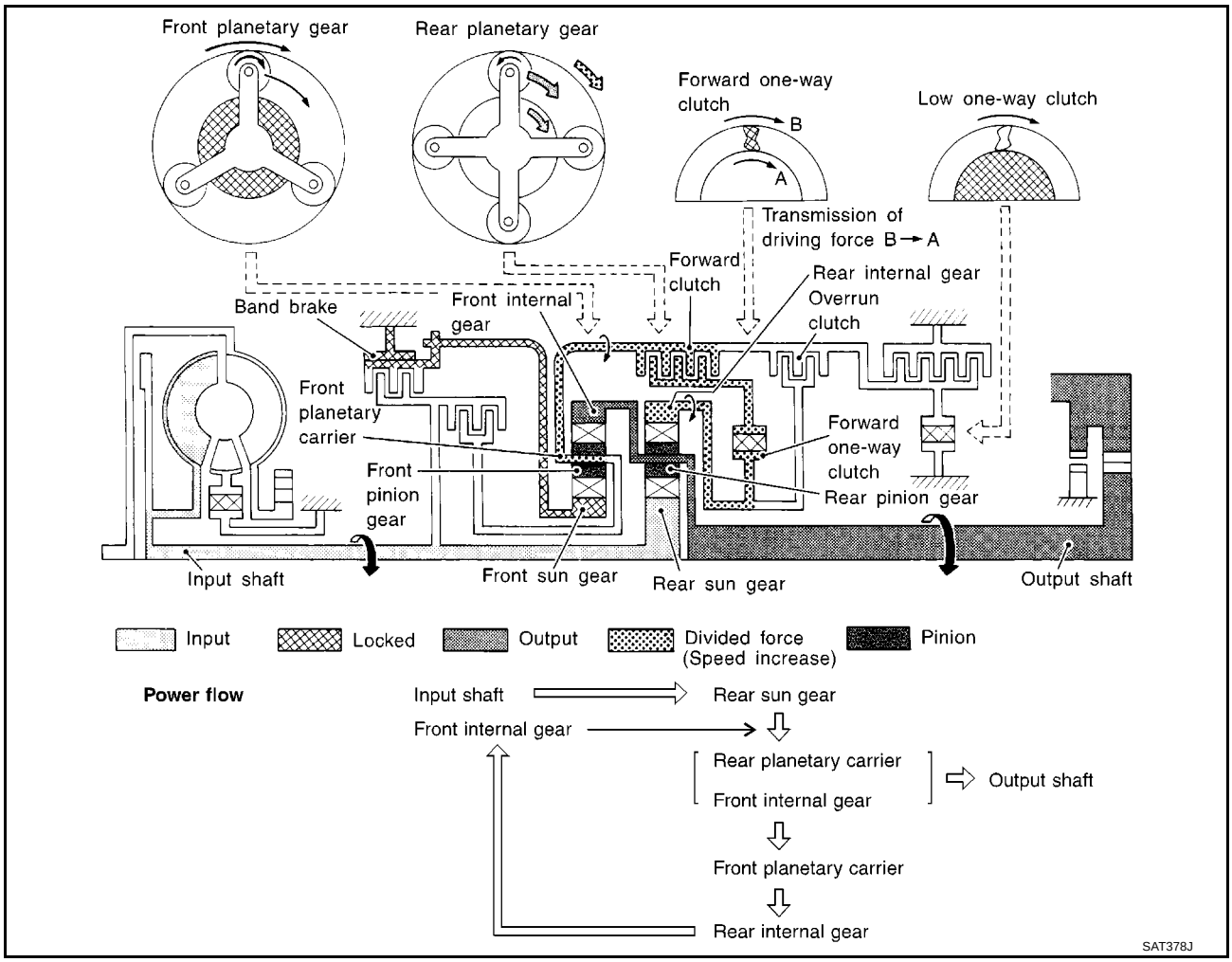
“D1 ” and “21 ” Positions

● **Forward one-way clutch** ● **Forward clutch** ● **Low one-way clutch**	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D1 : Overdrive control switch “OFF” and throttle opening is less than 3/16 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.



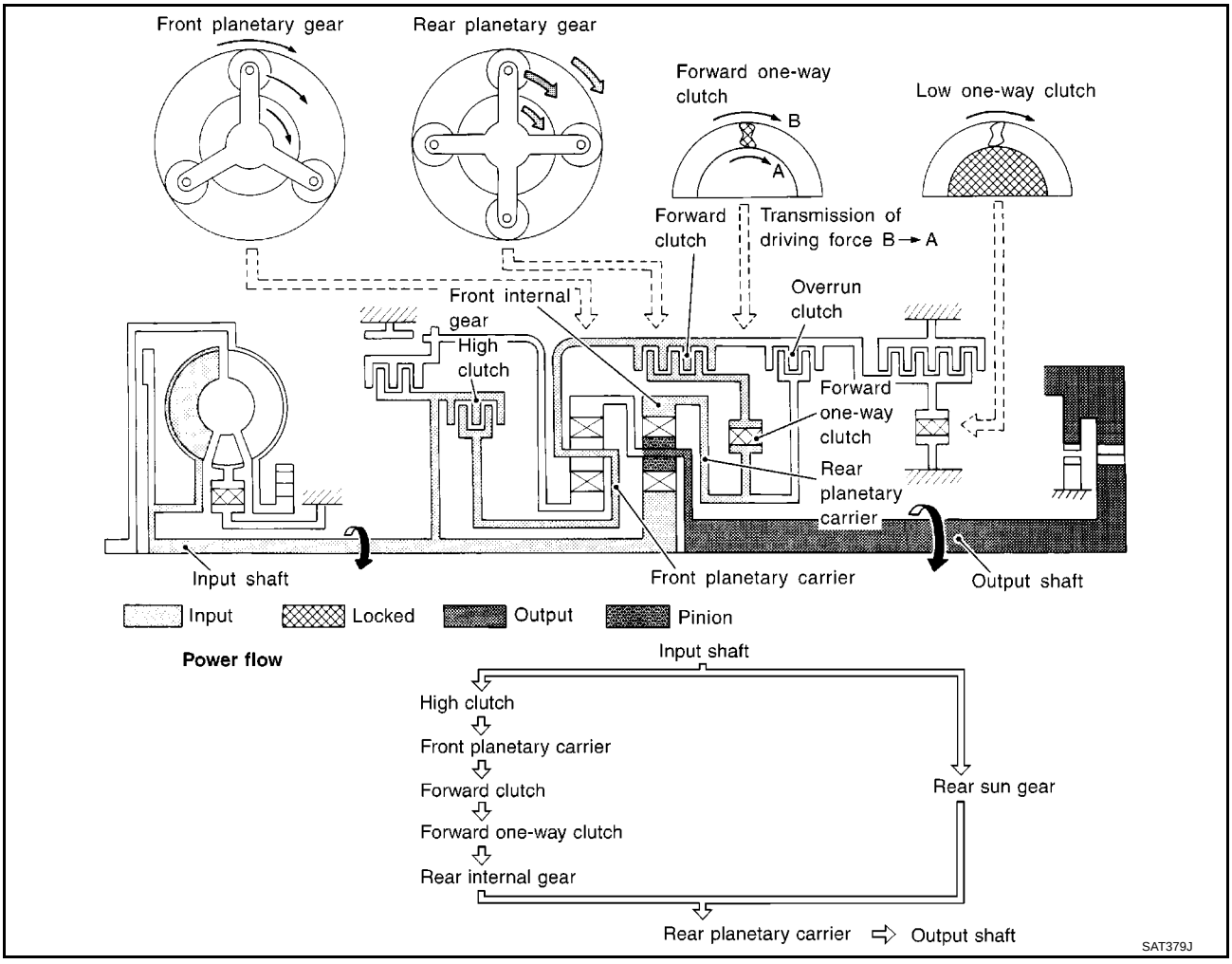
“D2 ”, “22 ” and “12 ” Positions

● **Forward clutch** ● **Forward one-way clutch** ● **Brake band**	Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.
Overrun clutch engagement conditions	D2 : Overdrive control switch “OFF” and throttle opening is less than 3/16 22 and 12 : Always engaged



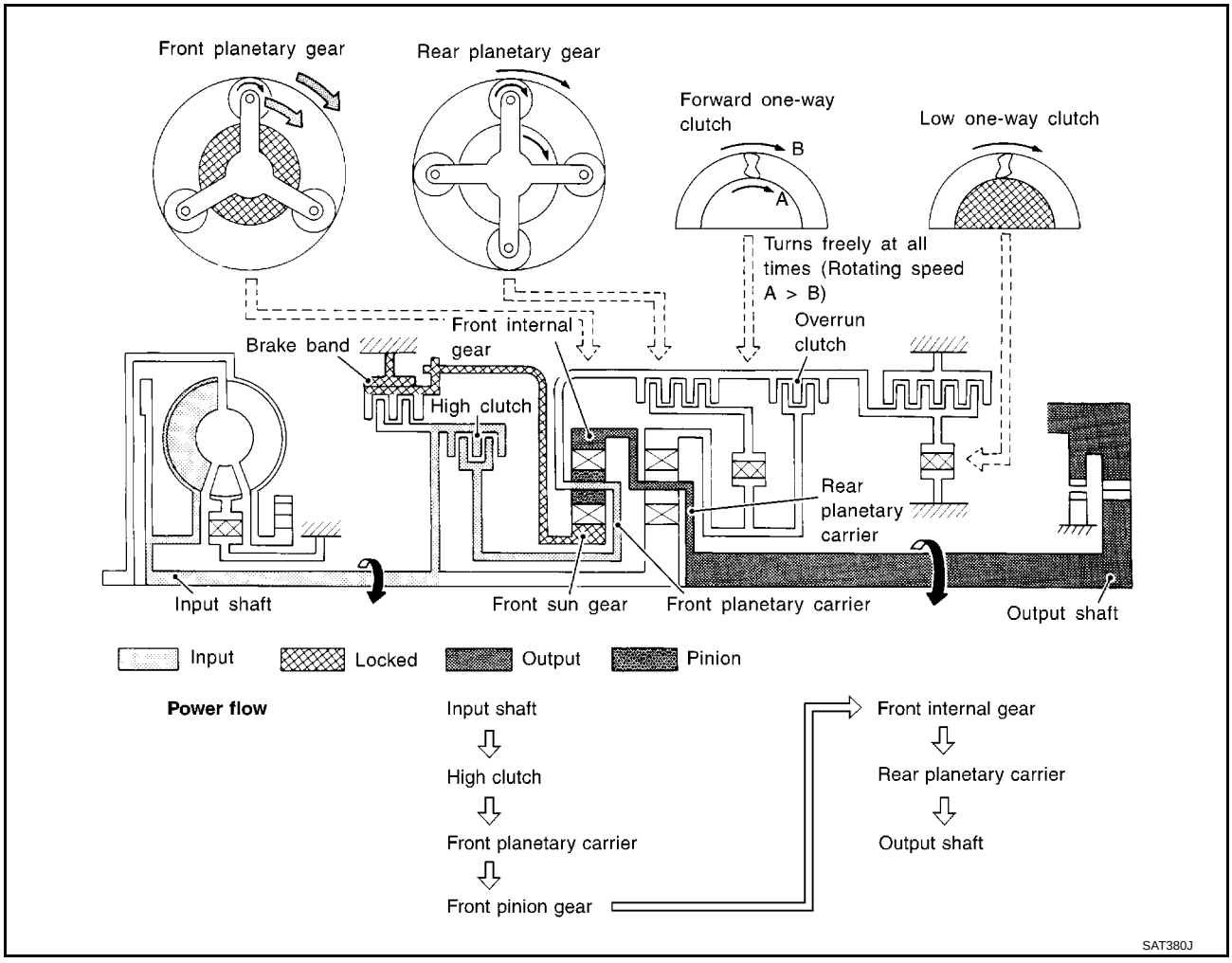
“D3 ” Position

● **High clutch** ● **Forward clutch** ● **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3 : Overdrive control switch “OFF” and throttle opening is less than 3/16



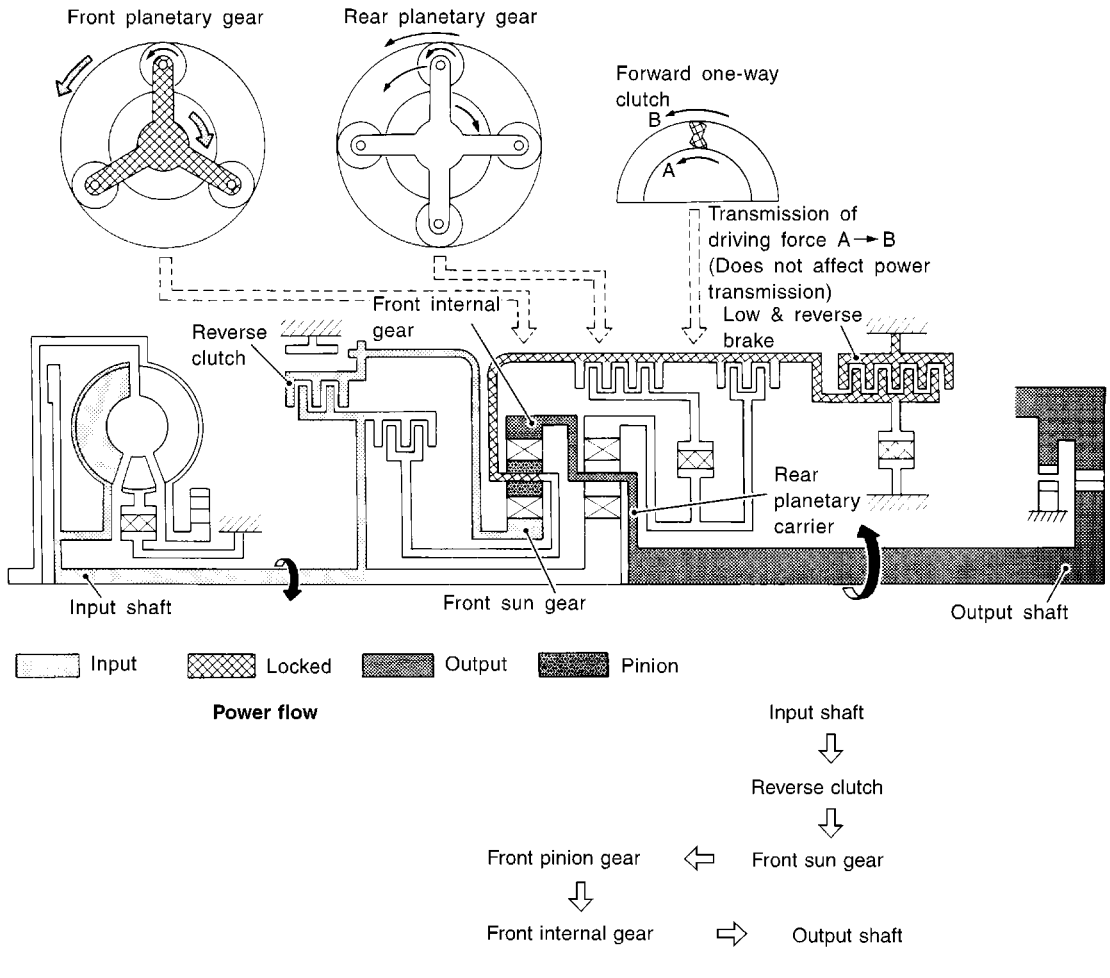
"D4 " (OD) Position

● **High clutch** ● **Brake band** ● **Forward clutch** (Does not affect power transmission)	Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.
Engine brake	At D4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.



“R” Position

● **Reverse clutch** ● **Low and reverse brake**	Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.
Engine brake	As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.



Control System

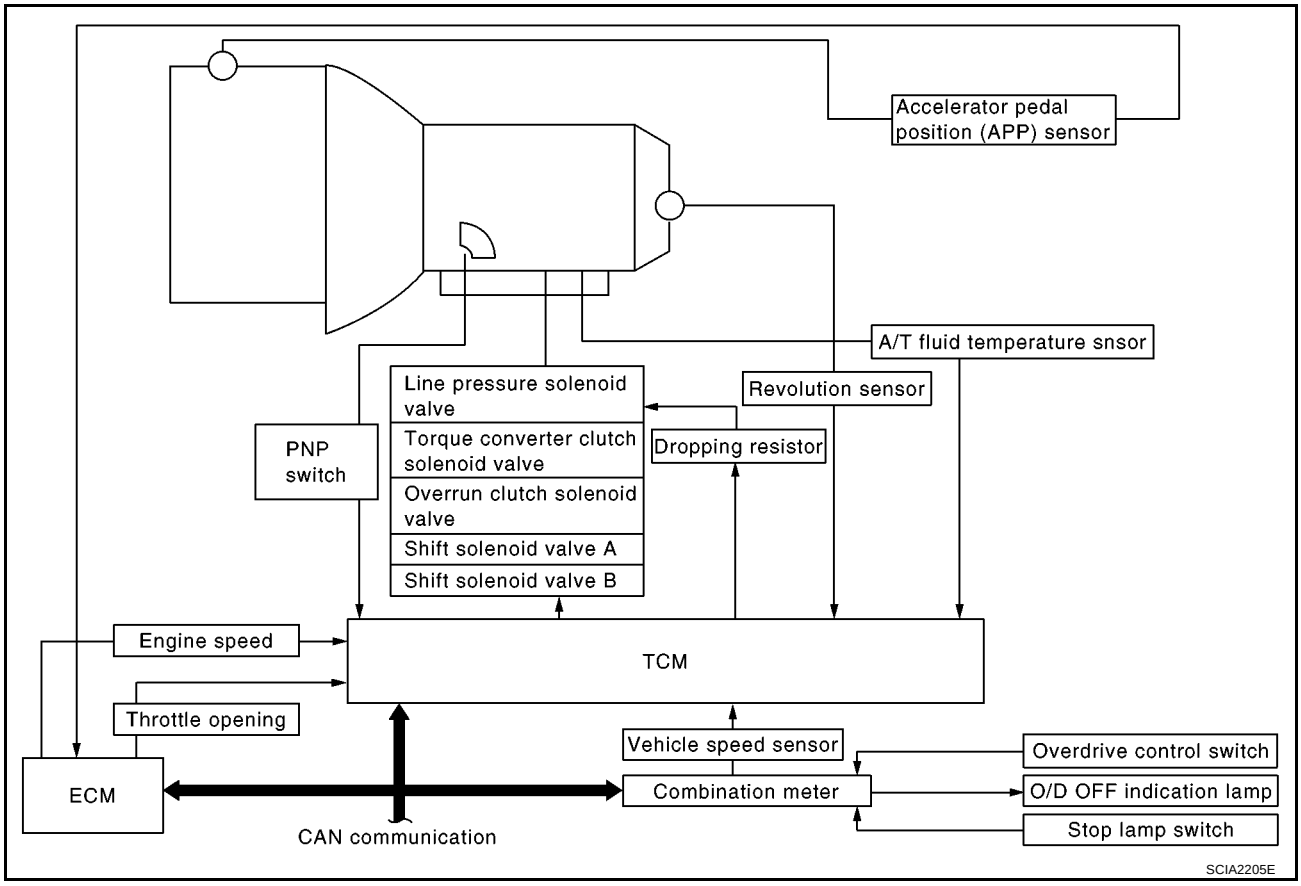
ECS008NF

OUTLINE

The automatic transaxle senses vehicle operating conditions through various switches and sensors. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SWITCHES & SENSORS		TCM		ACTUATORS
PNP switch Accelerator pedal position (APP) sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch Stop lamp switch	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp

CONTROL SYSTEM



TCM FUNCTION

The function of the TCM is to:

- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

INPUT/OUTPUT SIGNAL OF TCM

	Sensors, switches and solenoid valves	Function
Input	PNP switch	Detects select lever position and sends a signal to TCM.
	Accelerator pedal position (APP) sensor	Detects accelerator pedal position sensor as throttle position signal and sends a signal from ECM to TCM.
	Closed throttle position signal	Detects throttle valve's fully-closed position and sends a signal from ECM to TCM.
	Wide open throttle position signal	Detects a throttle valve position of greater than 1/2 of full throttle and sends a signal from ECM to TCM.
	Engine speed signal	From ECM.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.
	Overdrive control switch	Sends a signal, which prohibits a shift to "D4 " (overdrive) position, to the TCM.
	Stop lamp switch	Releases lock-up system when depressing pedal in lock-up condition.
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.
	O/D OFF indicator lamp	Shows TCM faults when A/T control components malfunction.

Control Mechanism

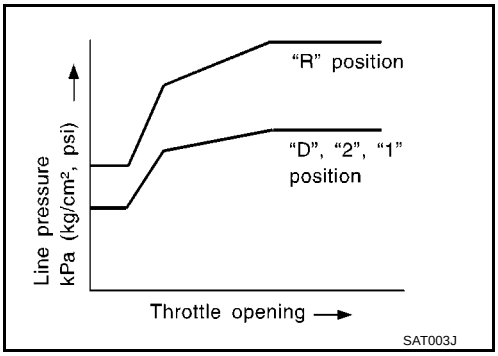
ECS008NG

LINE PRESSURE CONTROL

TCM has various line pressure control characteristics to match the driving conditions.
An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.

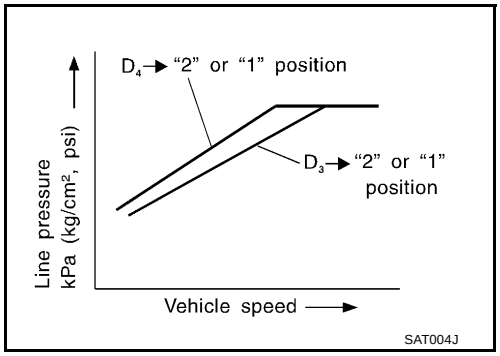
Normal Control

The line pressure to throttle opening characteristics is set for suitable clutch operation.



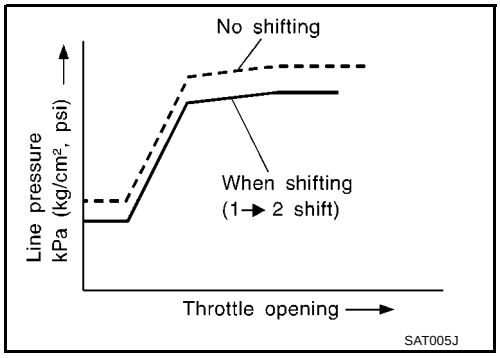
Back-up Control (Engine Brake)

If the selector lever is shifted to “2” position while driving in D_4 (OD) or D_3 , great driving force is applied to the clutch inside the transmission. Clutch operating pressure (line pressure) must be increased to deal with this driving force.



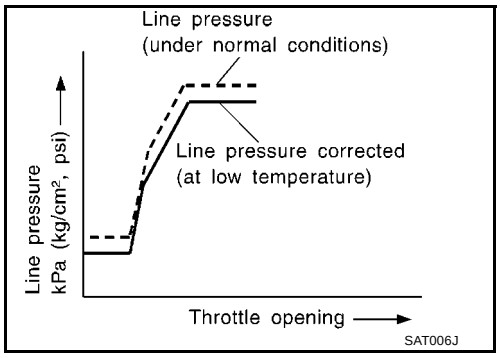
During Shift Change

The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.

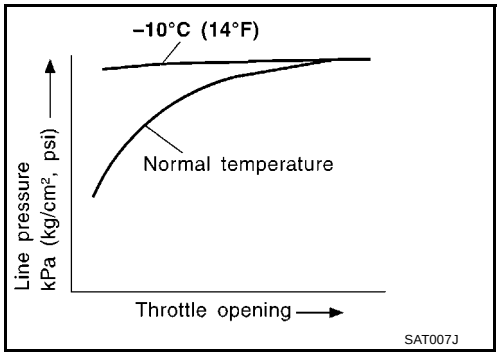


At Low Fluid Temperature

- Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize shifting quality.
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of automatic transmission fluid when temperature is low.



- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to −10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.

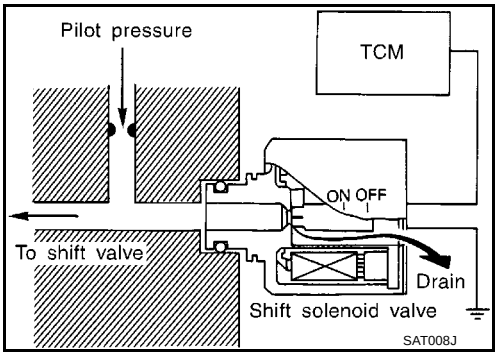


SHIFT CONTROL

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and throttle position sensor. This results in improved acceleration performance and fuel economy.

Control of Shift Solenoid Valves A and B

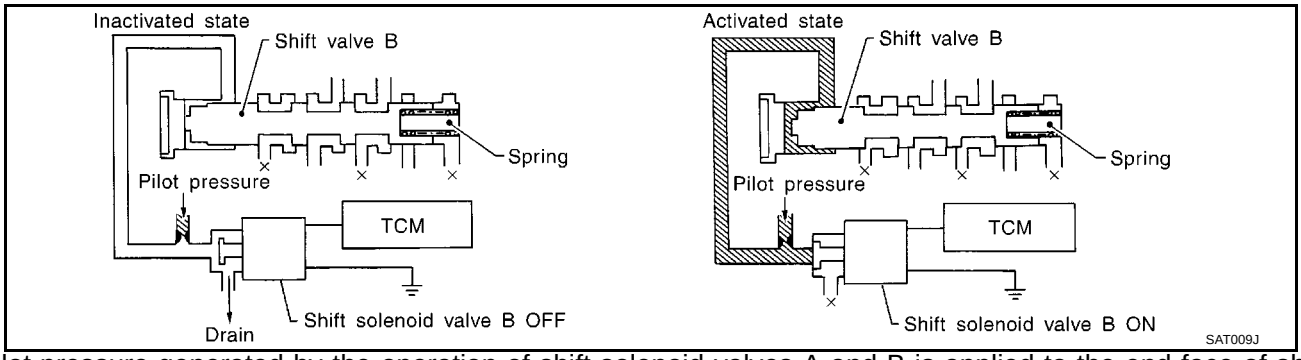
The TCM activates shift solenoid valves A and B according to signals from the throttle position sensor and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.
The shift solenoid valve performs simple ON-OFF operation. When set to “ON”, the drain circuit closes and pilot pressure is applied to the shift valve.



Relation Between Shift Solenoid Valves A and B and Gear Positions

Shift solenoid valve	Gear position				
	D_1 , 2_1 , 1_1	D_2 , 2_2 , 1_2	D_3	D_4 (OD)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

Control of Shift Valves A and B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.
The drawing above shows the operation of shift valve B. When the shift solenoid valve is “ON”, pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

LOCK-UP CONTROL

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the torque converter clutch piston.

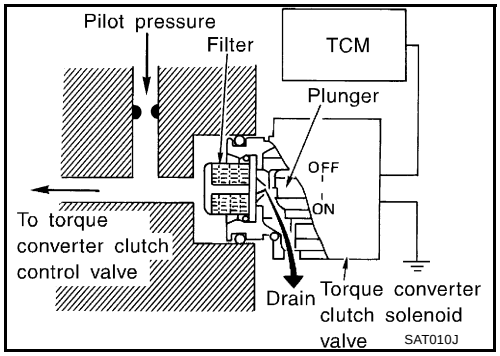
Conditions for Lock-Up Operation

When vehicle is driven in 3rd and 4th gear position, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

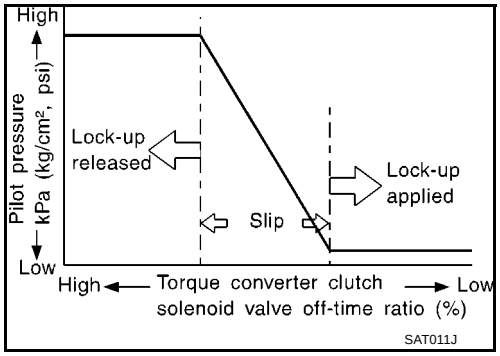
Overdrive control switch	ON	OFF
Selector lever	“D” position	
Gear position	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

Torque Converter Clutch Solenoid Valve Control

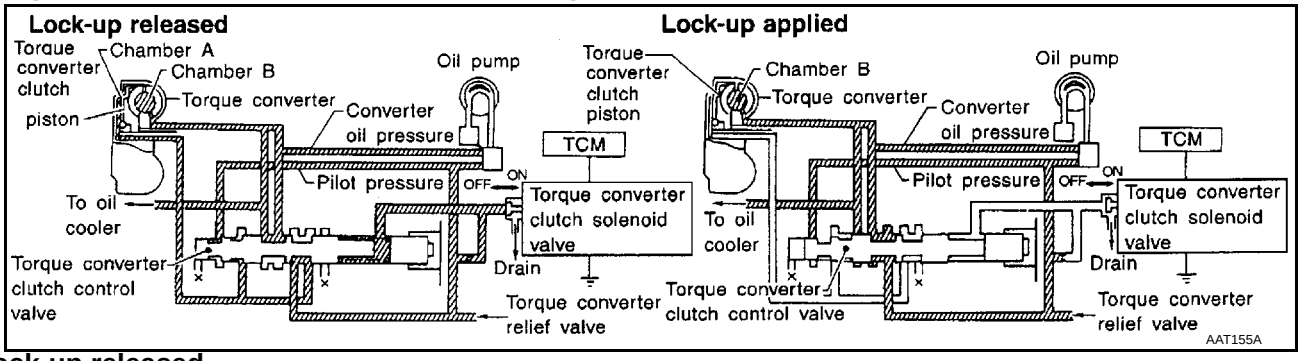
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the “OFF” period, and opens the circuit during the “ON” period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.
The torque converter clutch position is designed to slip to adjust the ratio of ON–OFF, thereby reducing lock-up shock.



The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.
OFF-time INCREASING
↓
Amount of drain DECREASING
↓
Pilot pressure HIGH
↓
Lock-up RELEASING



Torque Converter Clutch Control Valve Operation



Lock-up released
The OFF-duration of the torque converter clutch solenoid valve is long, and pilot pressure is high. The pilot pressure pushes the end face of the torque converter clutch control valve in combination with spring force to move the valve to the left. As a result, converter pressure is applied to chamber A (torque converter clutch piston release side). Accordingly, the torque converter clutch piston remains unlocked.

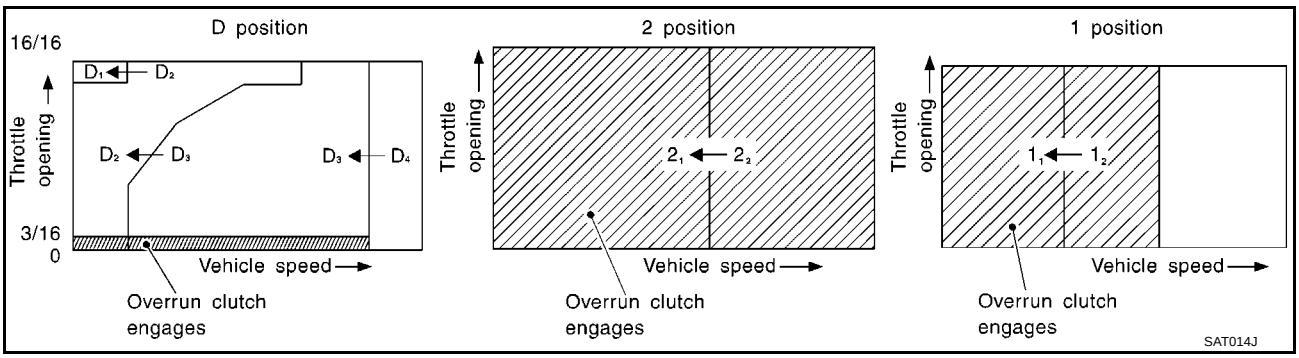
Lock-up applied
When the OFF-duration of the torque converter clutch solenoid valve is short, pilot pressure drains and becomes low. Accordingly, the control valve moves to the right by the pilot pressure of the other circuit and converter pressure. As a result, converter pressure is applied to chamber B, keeping the torque converter clutch piston applied.
Also smooth lock-up is provided by transient application and release of the lock-up.

OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.
The overrun clutch operates when the engine brake is needed.

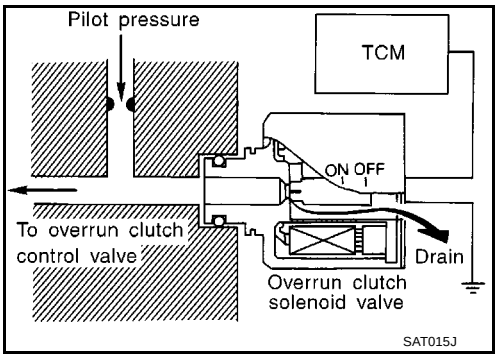
Overrun Clutch Operating Conditions

Selector lever position	Gear position	Throttle opening
“D” position	D1 , D2 , D3 gear position	Less than 3/16
“2” position	21 , 22 gear position	At any position
“1” position	11 , 12 gear position	



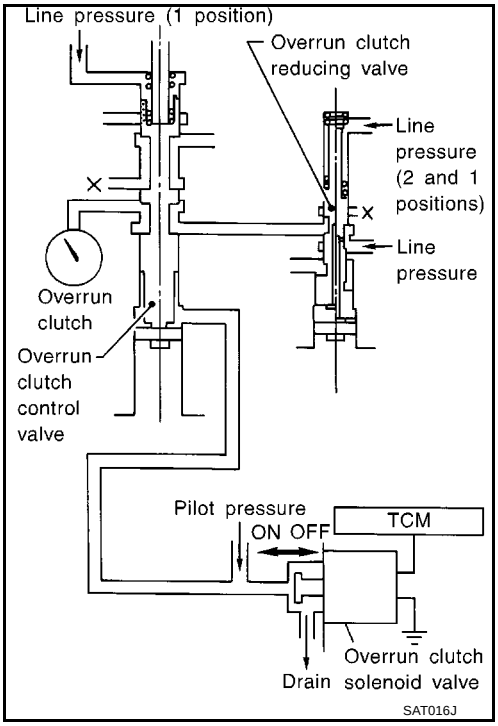
Overrun Clutch Solenoid Valve Control

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).
When this solenoid valve is “ON”, the pilot pressure drain port closes. When it is “OFF”, the drain port opens.
During the solenoid valve “ON” pilot pressure is applied to the end face of the overrun clutch control valve.



Overrun Clutch Control Valve Operation

When the solenoid valve is “ON”, pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage.
When the solenoid valve is “OFF”, pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. This causes the overrun clutch to engage.
In the 1 position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.



Control Valve

ECS008NH

FUNCTION OF CONTROL VALVES

Valve name	Function
Pressure regulator valve, plug and sleeve	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches four oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches three oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4 . (Interlocking occurs if the overrun clutch engages during D_4 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting from the “1” position 1_2 to 1_1 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In “1” and “2” positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches oil pressure with 3-2 timing valve according to throttle opening.
Shuttle control valve	Reduces shock when down-shifting from 3rd to 2nd and regulates overrun clutch.
Cooler check valve	Regulates oil pressure which causes lock-up when driving at low speeds.

TROUBLE DIAGNOSIS — INDEX

PFP:00000

Alphabetical & P No. Index for DTC

ECS008NI

ALPHABETICAL INDEX FOR DTC

Check if the vehicle is a model with Euro-OBD system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

Type approval number	Model
Available	With Euro-OBD system
Not available (blank)	Without Euro-OBD system

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-135, "DTC P0731 A/T 1ST GEAR FUNCTION"
A/T 2ND GR FNCTN	P0732	AT-141, "DTC P0732 A/T 2ND GEAR FUNCTION"
A/T 3RD GR FNCTN	P0733	AT-147, "DTC P0733 A/T 3RD GEAR FUNCTION"
A/T 4TH GR FNCTN	P0734	AT-153, "DTC P0734 A/T 4TH GEAR FUNCTION"
ATF TEMP SEN/CIRC	P0710	AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"
CAN COMM CIRCUIT	U1000	AT-193, "DTC U1000 CAN COMMUNICATION LINE"
ENGINE SPEED SIG	P0725	AT-131, "DTC P0725 ENGINE SPEED SIGNAL"
L/PRESS SOL/CIRC	P0745	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
O/R CLTCH SOL/CIRC	P1760	AT-188, "DTC P1760 OVER-RUN CLUTCH SOLENOID VALVE"
PNP SW/CIRC	P0705	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
SFT SOL A/CIRC*2	P0750	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
SFT SOL B/CIRC*2	P0755	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
TCC SOLENOID/CIRC	P0740	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
TP SEN/CIRC A/T*2	P1705	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
VEH SPD SEN/CIR AT*3	P0720	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"

- *1: These numbers are prescribed by SAE J2012.
- *2: When the fail-safe operation occurs, the MIL illuminates.
- *3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

P NO. INDEX FOR DTC

Check if the vehicle is a model with Euro-OBD system or not by the “Type approval number” on the identification plate. Refer to GI-47, "IDENTIFICATION PLATE" .

Type approval number	Model
Available	With Euro-OBD system
Not available (blank)	Without Euro-OBD system

DTC CONSULT-II GST*1	Items (CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
P0710	ATF TEMP SEN/CIRC	AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"
P0720	VEH SPD SEN/CIR AT*3	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
P0725	ENGINE SPEED SIG	AT-131, "DTC P0725 ENGINE SPEED SIGNAL"
P0731	A/T 1ST GR FNCTN	AT-135, "DTC P0731 A/T 1ST GEAR FUNCTION"
P0732	A/T 2ND GR FNCTN	AT-141, "DTC P0732 A/T 2ND GEAR FUNCTION"
P0733	A/T 3RD GR FNCTN	AT-147, "DTC P0733 A/T 3RD GEAR FUNCTION"
P0734	A/T 4TH GR FNCTN	AT-153, "DTC P0734 A/T 4TH GEAR FUNCTION"
P0740	TCC SOLENOID/CIRC	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
P0745	L/PRESS SOL/CIRC	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
P0750	SFT SOL A/CIRC*2	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
P0755	SFT SOL B/CIRC*2	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
P1705	TP SEN/CIRC A/T*2	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
P1760	O/R CLTCH SOL/CIRC	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
U1000	CAN COMM CIRCUIT	AT-193, "DTC U1000 CAN COMMUNICATION LINE"

- *1: These numbers are prescribed by SAE J2012.
- *2: When the fail-safe operation occurs, the MIL illuminates.
- *3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

Introduction

ECS008NJ

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (EURO-OBD) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with EURO-OBD self-diagnostic items. For detail, refer to AT-40, "SELF-DIAGNOSTIC RESULT TEST MODE" .

EURO-OBD Function for A/T System

ECS008NK

The ECM provides emission-related on board diagnostic (EURO-OBD) functions for the A/T system. One function is to receive a signal from the TCM used with EURO-OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding EURO-OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of EURO-OBD

ECS008NL

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — First Trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip
A/T-related parts for which the MIL illuminates during the first or second test drive are listed below.

Items	MIL	
	One trip detection	Two trip detection
Shift solenoid valve A — DTC: P0750	X	
Shift solenoid valve B — DTC: P0755	X	
Throttle position sensor — DTC: P1705	X	
Except above		X

The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

EURO-OBD Diagnostic Trouble Code (DTC)

ECS008NM

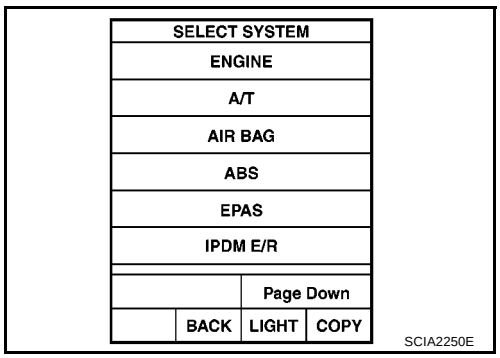
HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.

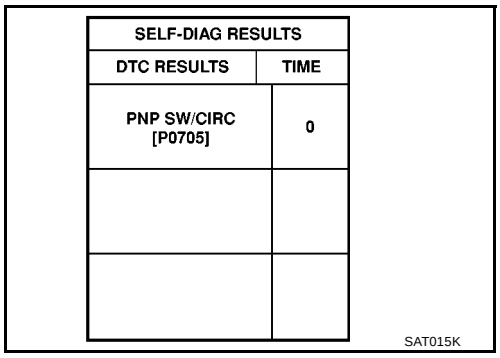
(With CONSULT-II or GST) GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT-II can identify them as shown below. Therefore, using CONSULT-II (if available) is recommended.

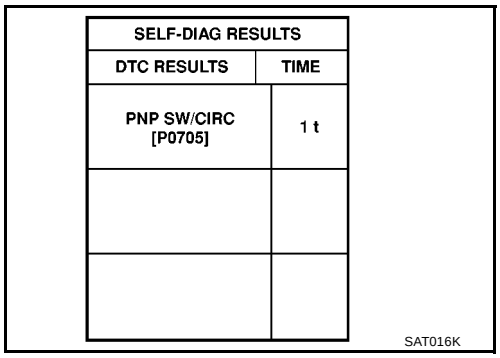
A sample of CONSULT-II display for DTC is shown in the following page. DTC or 1st trip DTC of a malfunction is displayed in SELF DIAGNOSIS mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.



If the DTC is being detected currently, the time data will be “0”.



If a 1st trip DTC is stored in the ECM, the time data will be “1t”.



Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-101, "CONSULT-II Function (ENGINE)" .
Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM.
The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as described following.

- **If the battery terminal is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-II or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to EURO-OBD. For details, refer to EC-48, "Emission-related Diagnostic Information" .

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT-II)

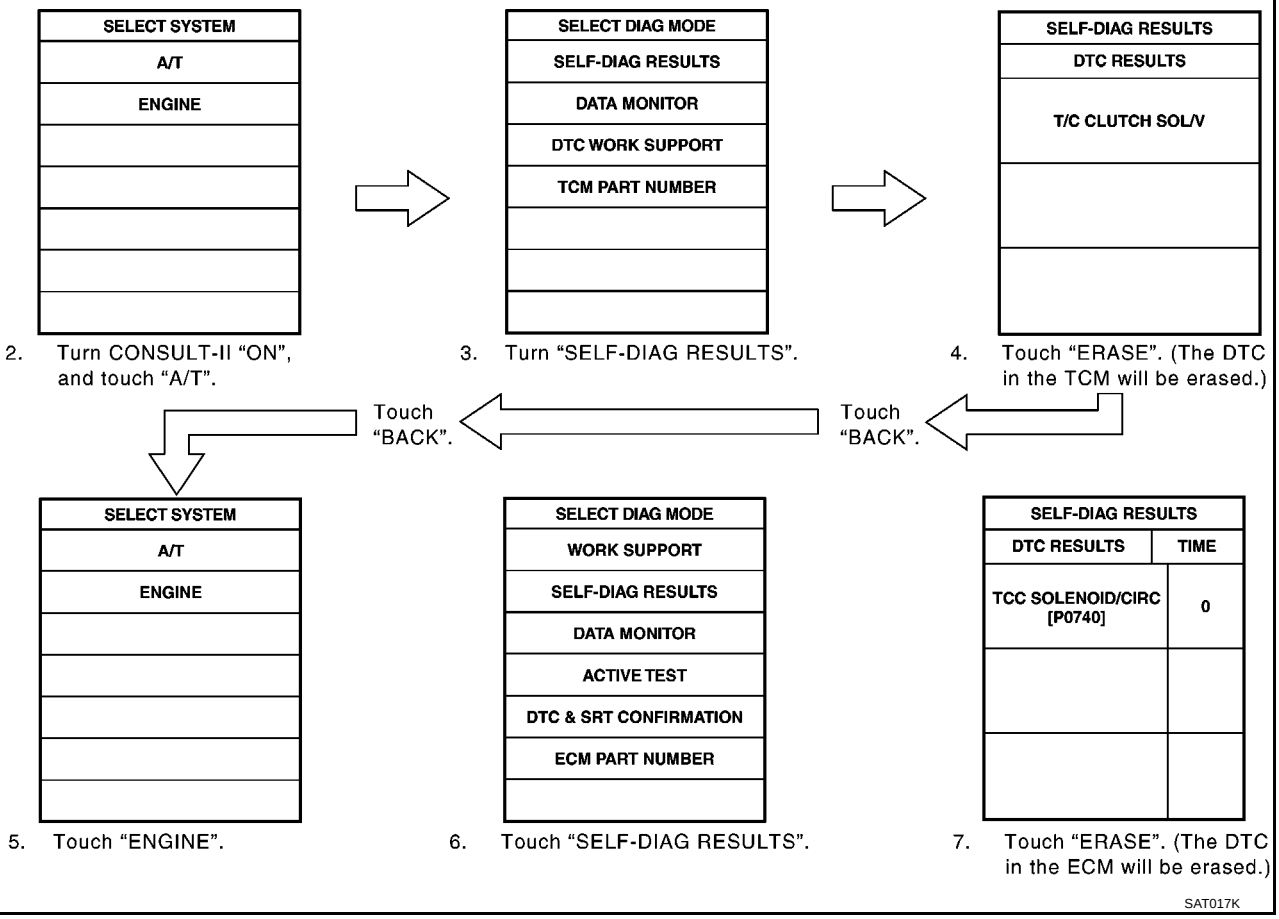
- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 5 seconds and then turn it “ON” (engine stopped) again.
2. Turn CONSULT-II “ON” and touch “A/T”.
3. Touch “SELF DIAGNOSIS”.
4. Touch “ERASE”. (The DTC in the TCM will be erased.) Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF DIAGNOSIS”.

7. Touch “ERASE”. (The DTC in the ECM will be erased.)

How to erase DTC (With CONSULT-II)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 5 seconds and then turn it “ON” (engine stopped) again.



HOW TO ERASE DTC (WITH GST)

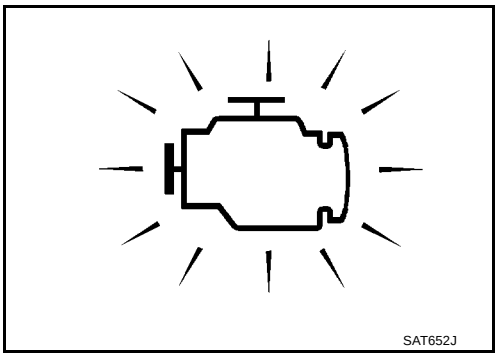
1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 5 seconds and then turn it “ON” (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-49 . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to EC-112, "Generic Scan Tool (GST) Function" .

HOW TO ERASE DTC (NO TOOLS)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 5 seconds and then turn it “ON” (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-49 . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform “EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-48 .

Malfunction Indicator lamp (MIL)

ECS008NN



1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
   - If the malfunction indicator does not light up, refer to DI-65, "Schematic" .
     (Or see MIL & CONSULT-II in EC section. Refer to EC-60, "Malfunction Indicator (MI)" , EC-101, "CONSULT-II Function (ENGINE)" .
2. When the engine is started, the malfunction indicator should go off.
   If the lamp remains on, the on board diagnostic system has detected an emission-related (EURO-OBD) malfunction. For detail, refer to EC-47, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

CONSULT-II Function (A/T)

ECS008NO

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the TCM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.
DTC work support	Select the operating condition to confirm Diagnostic Trouble Codes.
ECU part number	ECU part number can be read.

After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” AT-40 , place check marks for results on the “DIAGNOSTIC WORKSHEET”, AT-55 . Reference pages are provided following the items.

NOTICE:

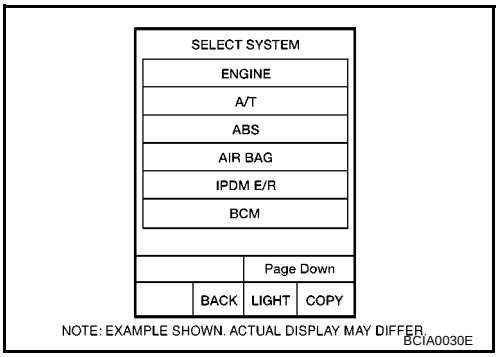
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.

3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

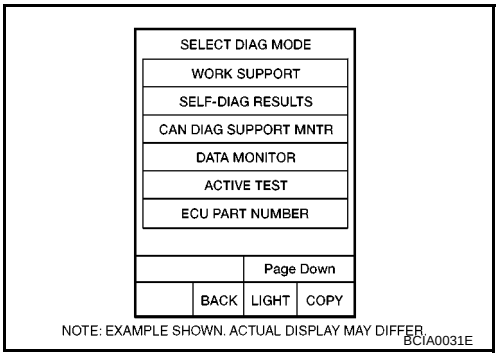
SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

1. Turn on CONSULT-II and touch “ENGINE” for EURO-OBD detected items or touch “A/T” for TCM self-diagnosis.
   If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-104, "TCM Terminals and Reference Value" . If result is NG, refer to PG-4, "POWER SUPPLY ROUTING" .



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0030E

2. Touch “SELF DIAGNOSIS”.
   Display shows malfunction experienced since the last erasing operation.
   CONSULT-II performs “real time diagnosis”.
   Also, any malfunction detected while in this mode will be displayed at real time.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0031E

SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, “SELF DIAGNOSIS” test mode)		Malfunction is detected when...	TCM self-diagnosis	EURO-OBD (DTC)
“A/T”	“ENGINE”		Available by O/D OFF indicator lamp	Available by malfunction indicator*2 , “ENGINE” on CONSULT-II or GST
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
Park/neutral position (PNP) switch circuit		● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—	PNP SW/CIRC			
Revolution sensor		● TCM does not receive the proper voltage signal from the sensor.	X	P0720
VHCL SPEED SEN·A/T	VEH SPD SEN/CIR			
Vehicle speed sensor (Meter)		● TCM does not receive the proper voltage signal from the sensor.	X	—
VHCL SPEED SEN·MTR	—			
A/T 1st gear function		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
A/T 1ST GR FNCTN	A/T 1ST GR FNCTN			
A/T 2nd gear function		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
A/T 2ND GR FNCTN	A/T 2ND GR FNCTN			

Detected items (Screen terms for CONSULT-II, “SELF DIAGNOSIS” test mode)		Malfunction is detected when...	TCM self-diagnosis	EURO-OBD (DTC)
“A/T”	“ENGINE”		Available by O/D OFF indicator lamp	Available by malfunction indicator*2, “ENGINE” on CONSULT-II or GST
A/T 3rd gear function		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
A/T 3RD GR FNCTN	A/T 3RD GR FNCTN			
A/T 4th gear function		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
A/T 4TH GR FNCTN	A/T 4TH GR FNCTN			
Shift solenoid valve A		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC			
Shift solenoid valve B		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC			
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/ CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC			
Accelerator pedal position (APP) sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC			
CAN communication		● When a malfunction is detected in CAN communication line	X	U1000
CAN COMM CIRCUIT	—			
TCM (RAM)		● TCM memory (RAM) is malfunctioning.	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		● TCM memory (ROM) is malfunctioning.	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			

X: Applicable
—: Not applicable
*1: These malfunctions cannot be displayed by MIL if another malfunction is assigned to lamp MIL.

*2: Refer to EC-60, "Malfunction Indicator (MI)" .

DATA MONITOR MODE (A/T)

Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of revolution sensor is displayed.	● When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	● Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Throttle position sensor	THRTL POS SEN [V]	X	—	▼	● Throttle position sensor signal voltage is displayed.	● Accelerator pedal position sensor signal
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	▼	● A/T fluid temperature sensor signal voltage is displayed. ● Signal voltage lowers as fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	X	—	▼	● Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	▼	● Engine speed, computed from engine speed signal, is displayed.	● Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Power train revolution sensor	TURBINE REV [rpm]	X	—	▼		● Not mounted but displayed.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of overdrive control SW is displayed.	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of PN position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of R position SW is displayed.	
D position switch	D POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of D position SW is displayed.	
2 position switch	2 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 2 position SW, is displayed.	
1 position switch	1 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 1 position SW, is displayed.	

Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	X	—	▼	● Status of ASCD cruise signal is displayed. ON... Cruising state OFF... Normal running state	● This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD·OD CUT [ON/OFF]	X	—	▼	● Status of ASCD OD release signal is displayed. ON... OD released OFF... OD not released	● This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of kick down SW, is displayed.	● This is displayed even when no kick down switch is equipped.
Closed throttle position signal	CLOSED THL/SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of closed throttle position signal, is displayed.	● This means closed throttle position signal input via CAN communication line.
Wide open throttle position signal	W/O THRL/P-SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of wide open throttle position signal, is displayed.	● This means wide open throttle position signal input via CAN communication line.
A/T mode switch	HOLD SW [ON/OFF]	X	—	▼		● Not mounted but displayed.
Gear position	GEAR	—	X	▼	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	X	▼	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	▼	● Vehicle speed data, used for computation by TCM, is displayed.	
A/T mode switch	POWER SHIFT SW [ON/OFF]	—	—	▼		● Not mounted but displayed.
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	▼	● Difference in revolution between input shaft revolution and input shaft revolution of torque converter	● Display doesn't indicate o rpm even if engine is stopped. But this isn't malfunction.
Throttle position	THROTTLE POSI [/8]	—	X	▼	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	▼	● ON/OFF status is displayed. ON... Brake pedal is depressed. OFF... Brake pedal is released.	

Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Line pressure duty	LINE PRES DTY [%]	—	X	▼	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	▼	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	▼	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	● Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	▼	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	▼	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	▼	● Control status of O/D OFF indicator lamp is displayed.	
Voltage [V]		—	—	▼	● Value measured by voltage probe is displayed.	
Frequency [Hz]		—	—	▼	● Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	
DUTY-HI		—	—	▼	● Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	▼		
PLS WIDTH-HI		—	—	▼	● Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	▼		

X: Applicable —: Not applicable ▼: Option

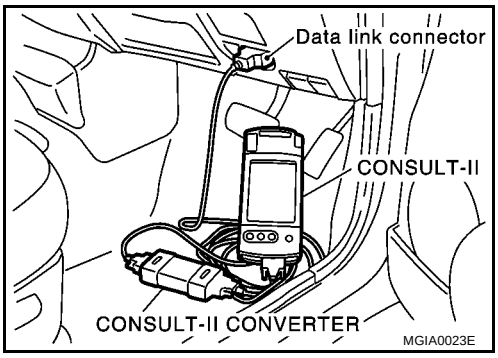
DTC WORK SUPPORT MODE WITH CONSULT-II

CONSULT-II Setting Procedure

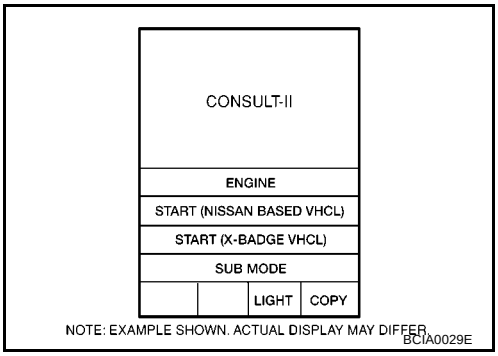
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

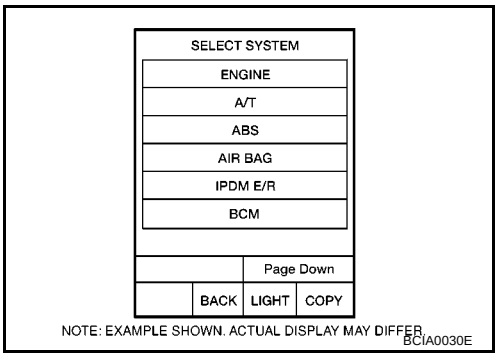
1. Turn ignition switch to “OFF” position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument lower panel on driver side.



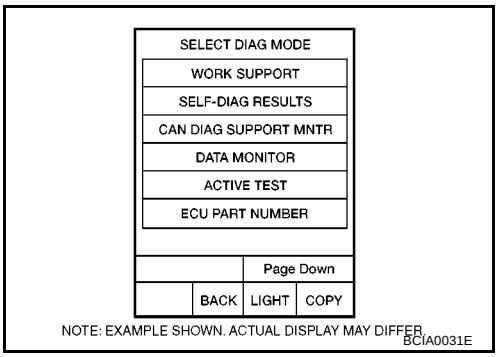
3. Turn ignition switch to “ON” position. (Do not start engine.)
4. Touch “START”.



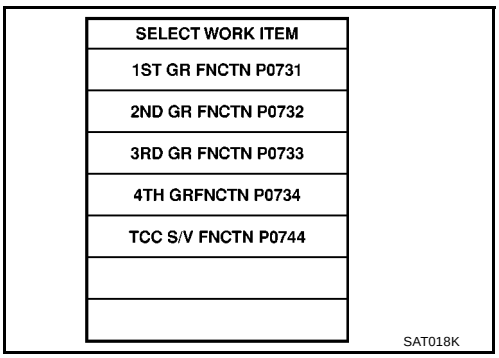
5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



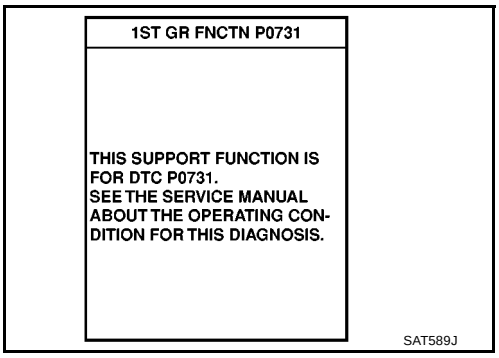
6. Touch “DTC WORK SUPPORT”.



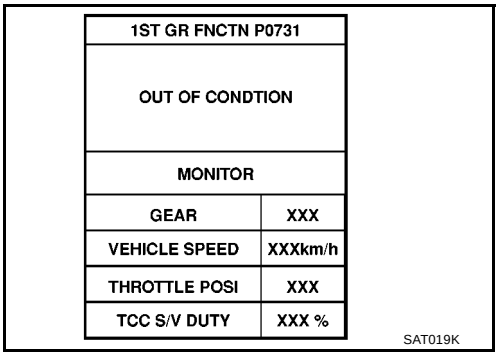
7. Touch select item menu (1ST, 2ND, etc.).



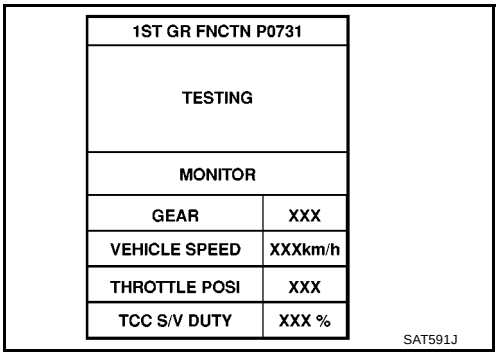
8. Touch “START”.



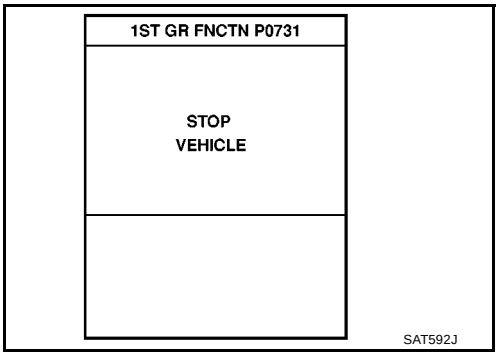
9. Perform driving test according to “DTC CONFIRMATION PROCEDURE” in “TROUBLE DIAGNOSIS FOR DTC”.

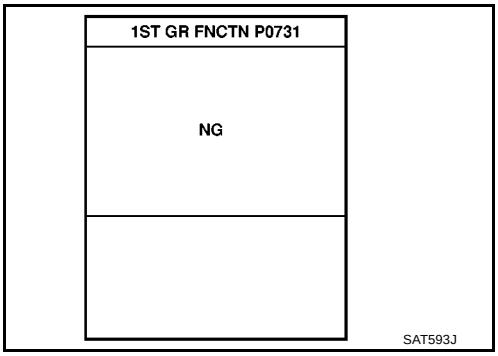


- **When testing conditions are satisfied, CONSULT-II screen changes from “OUT OF CONDITION” to “TESTING”.**

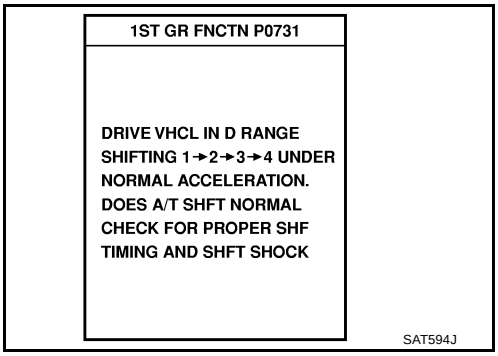


10. Stop vehicle. If “NG” appears on the screen, malfunction may exist. Go to “DIAGNOSTIC PROCEDURE”.

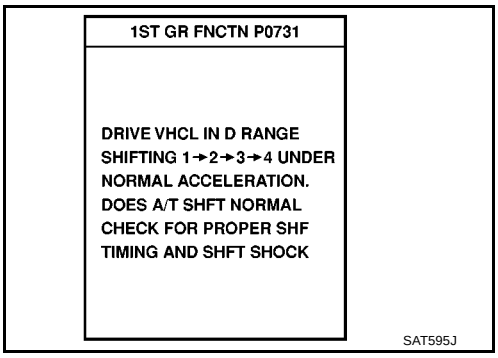




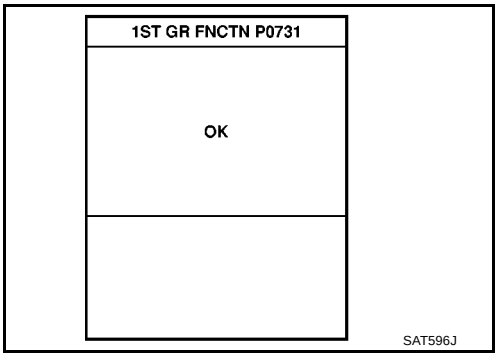
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.

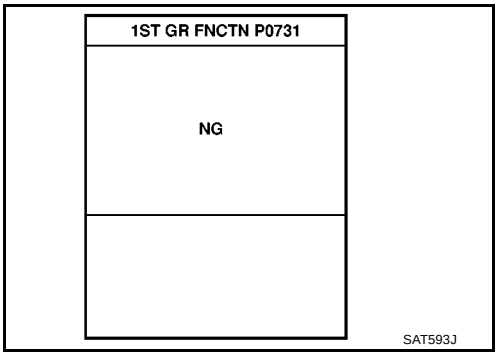


12. Touch “YES” or “NO”.



13. CONSULT-II procedure ended.





If “NG” appears on the screen, a malfunction may exist. Go to “DIAGNOSTIC PROCEDURE”.

DTC WORK SUPPORT MODE

DTC work support item	Description	Check items (Possible cause)
1ST GR FNCTN P0731	Following items for “A/T 1st gear function (P0731)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “A/T 2nd gear function (P0732)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “A/T 3rd gear function (P0733)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
4TH GR FNCTN P0734	Following items for “A/T 4th gear function (P0734)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II

ECS008NP

EURO-OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-112, "Generic Scan Tool (GST) Function" .

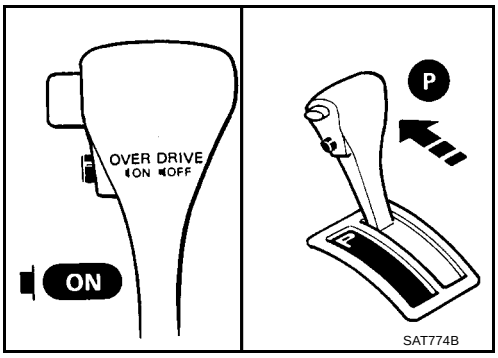
EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to EC-60, "Malfunction Indicator (MI)" .

⊗ TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK O/D OFF INDICATOR LAMP

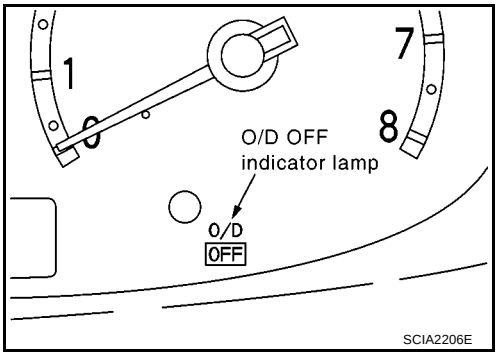
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch to “OFF” position.
   Wait 5 seconds.
3. Turn ignition switch to “ACC” position.
4. Set overdrive control switch to “ON” position.
5. Move selector lever to “P” position.
6. Turn ignition switch to “ON” position. (Do not start engine.)



7. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.
No >> Go to AT-212, "O/D OFF Indicator Lamp Does Not Come On" .

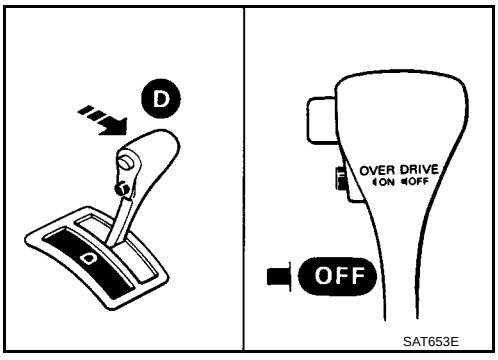


2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to “OFF” position.
2. Turn ignition switch to “ACC” position.
3. Move selector lever to “D” position.
4. Set overdrive control switch to “OFF” position.
5. Turn ignition switch to “ON” position. (Do not start engine.)

– Wait more than 2 seconds after turning ignition switch “ON”.

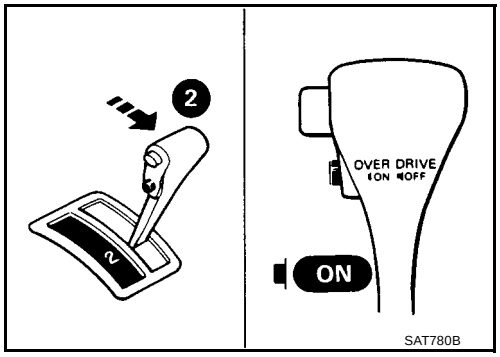
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to “2” position.
2. Set overdrive control switch to “ON” position.

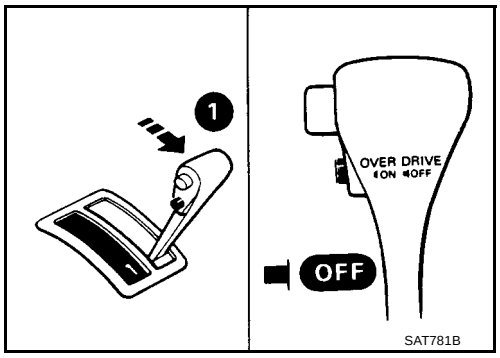
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

1. Move selector lever to “1” position.
2. Set overdrive control switch to “OFF” position.

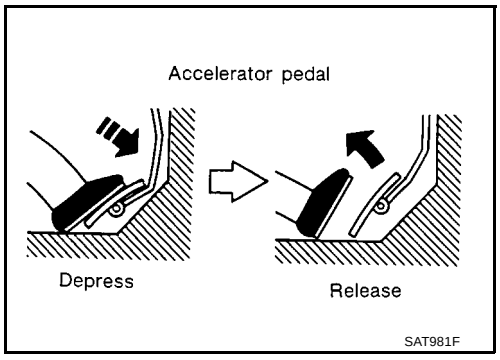
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

1. Depress accelerator pedal fully and release it.

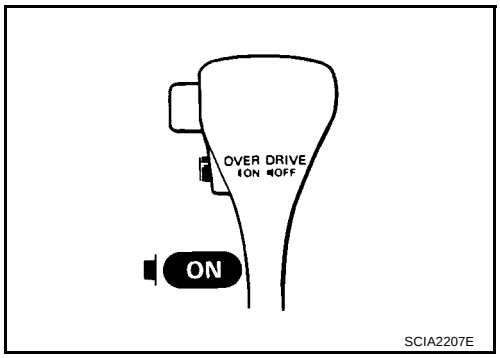
>> GO TO 6.



6. JUDGEMENT PROCEDURE STEP 5

1. Set overdrive control switch to “ON” position.

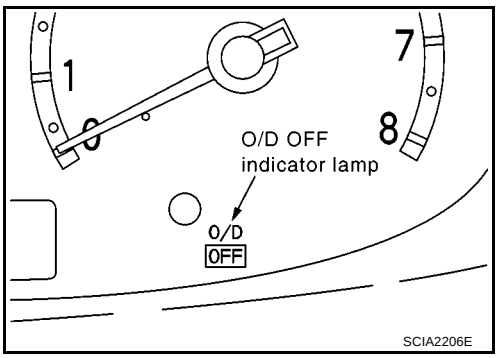
>> GO TO 7.



7. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to AT-51, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

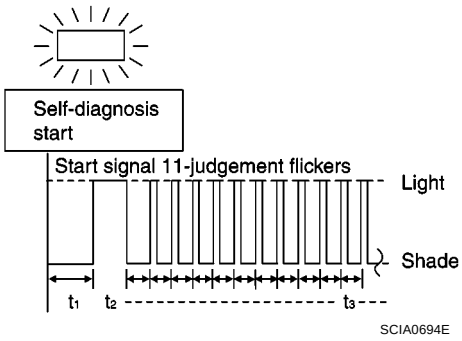
>> **DIAGNOSIS END**



JUDGEMENT OF SELF-DIAGNOSIS CODE

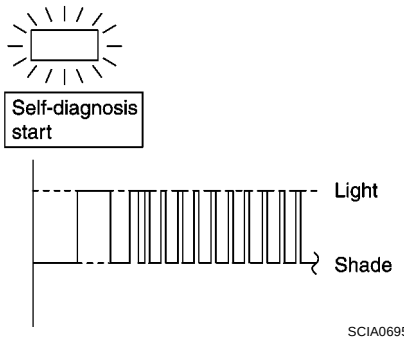
O/D OFF indicator lamp:

All judgement flickers are the same.



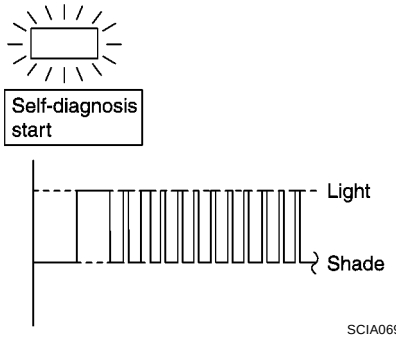
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



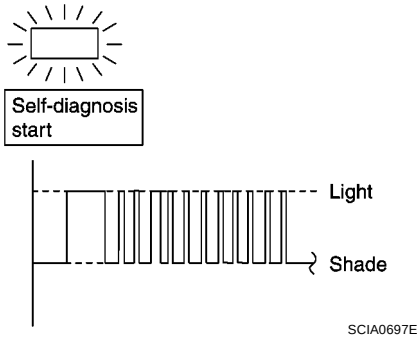
Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR).**
Refer to AT-126

2nd judgement flicker is longer than others.



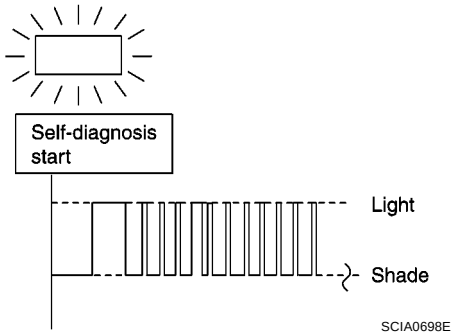
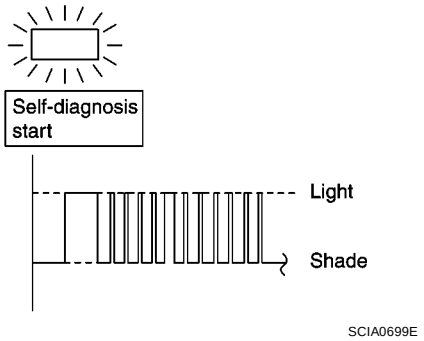
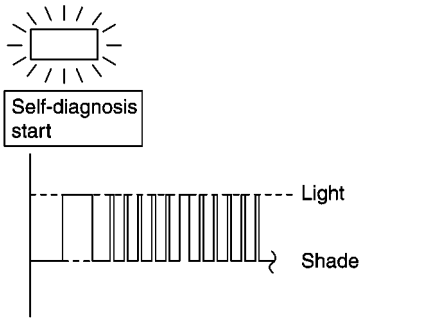
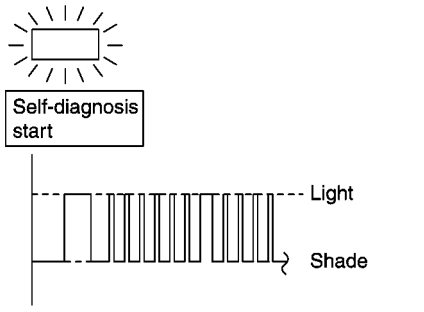
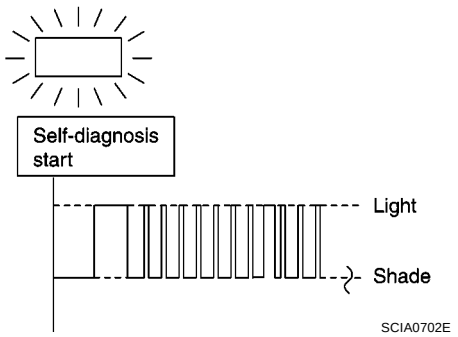
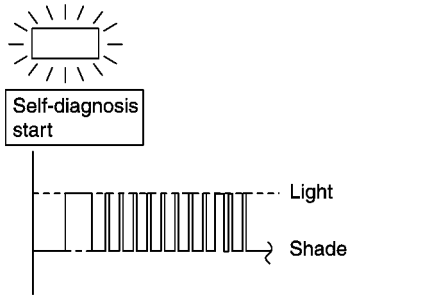
Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR.**
Refer to AT-202

3rd judgement flicker is longer than others.

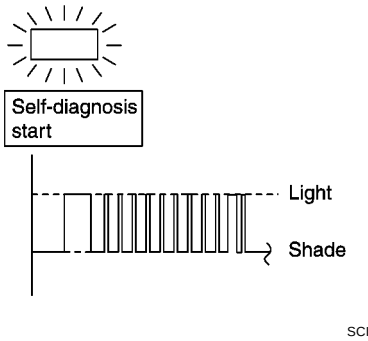
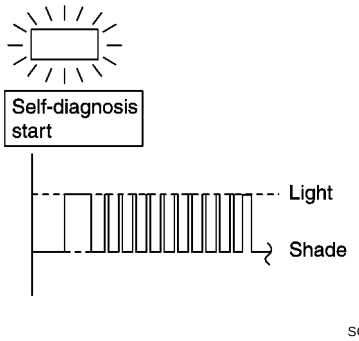
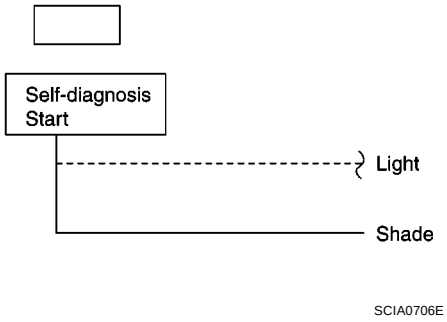
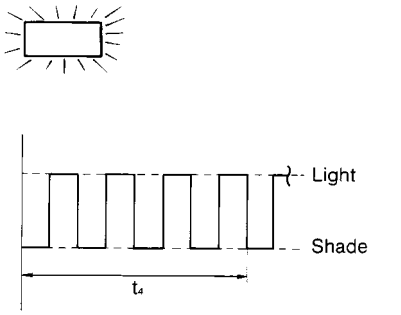


Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P1705 ACCELEPATOR PEDAL POSITION (APP) SENSOR.**
Refer to AT-183

O/D OFF indicator lamp:

4th judgement flicker is longer than others.  Shift solenoid valve A circuit is short-circuited or disconnected. ⇒ **Go to DTC P0750 SHIFT SOLENOID VALVE A.** Refer to AT-173	5th judgement flicker is longer than others.  Shift solenoid valve B circuit is short-circuited or disconnected. ⇒ **Go to DTC P0755 SHIFT SOLENOID VALVE B.** Refer to AT-178
6th judgement flicker is longer than others.  Overrun clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P1760 OVERRUN CLUTCH SOLENOID VALVE.** Refer to AT-188	7th judgement flicker is longer than others.  Torque converter clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE.** Refer to AT-161
8th judgement flicker is longer than others.  A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged. ⇒ **Go to DTC BATT/FLUID TEMP SEN A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE.** Refer to AT-196	9th judgement flicker is longer than others.  Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to DTC P0725 ENGINE SPEED SIGNAL.** Refer to AT-131

O/D OFF indicator lamp:

10th judgement flicker is longer than others.  SCIA0704E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0745 LINE PRESSURE SOLENOID VALVE.** Refer to AT-166	11th judgement flicker is longer than others.  SCIA0705E CAN communication line is damaged. ⇒**Go to DTC U1000 CAN COMMNICATION LINE.** Refer to AT-193
Lamp comes off.  SCIA0706E PNP switch, overdrive control switch, closed throttle position signal or wide-open throttle position signal circuit is disconnected or TCM is damaged. (Because closed throttle position signal and wide-open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.) ⇒ **Go to TCM Self-diagnosis Does Not Activate** Refer to AT-247	Flickers as shown below.  SAT804H Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors.—This is not a problem).

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 1.0 second

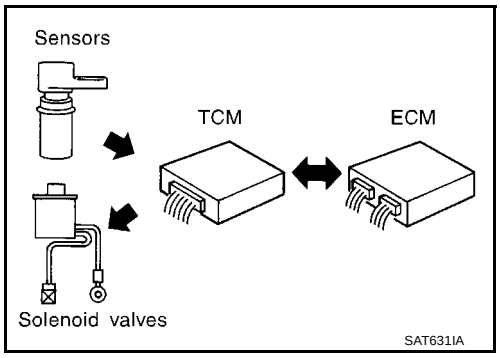
TROUBLE DIAGNOSIS — INTRODUCTION

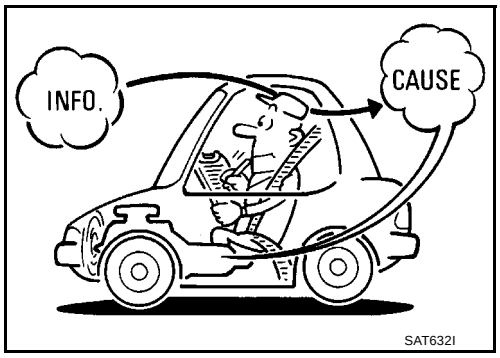
PFP:00000

Introduction

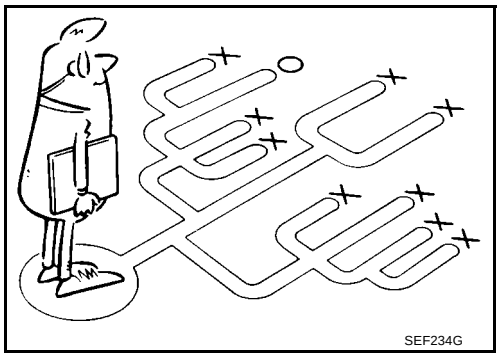
ECS008NQ

The TCM receives a signal from the vehicle speed sensor, throttle position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the EURO-OBD related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.
Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only, may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the “Work Flow”. Refer to AT-58, "Work Flow" .





Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drive ability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Worksheet” like the example (AT-55, "DIAGNOSTIC WORKSHEET") should be used.
Start your diagnosis by looking for “conventional” problems first. This will help troubleshoot drive ability problems on an electronically controlled engine vehicle.
Also check related Service bulletins for information.



DIAGNOSTIC WORKSHEET

Information from Customer

KEY POINTS

- **WHAT**..... Vehicle & A/T model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. model	Engine	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	❑ Continuous ❑ Intermittent (times a day)	
Symptoms	❑ Vehicle does not move. (❑ Any position ❑ Particular position)	
	❑ No up-shift (❑ 1st → 2nd ❑ 2nd → 3rd ❑ 3rd → O/D)	
	❑ No down-shift (❑ O/D → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lockup malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ Lockup ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
O/D OFF indicator lamp	Blinks for about 8 seconds.	
	❑ Continuously lit	❑ Not lit
Malfunction indicator lamp (MIL)	❑ Continuously lit	❑ Not lit

Diagnostic Worksheet

1.	❑ Read the Fail-safe and listen to customer complaints.		AT-55, "Information from Customer"
2.	❑ CHECK A/T FLUID		AT-61, "A/T Fluid Check"
	❑ Leakage (Follow specified procedure) ❑ Fluid condition ❑ Fluid level		
3.	❑ Perform STALL TEST and LINE PRESSURE TEST.		AT-62, "Stall Test", AT-65, "Line Pressure Test"
	❑ Stall test — Mark possible damaged components/others.		
	❑ Torque converter one-way clutch ❑ Reverse clutch ❑ Forward clutch ❑ Overrun clutch ❑ Forward one-way clutch	❑ Low & reverse brake ❑ Low one-way clutch ❑ Engine ❑ Line pressure is low ❑ Clutches and brakes except high clutch and brake band are OK	
	❑ Line Pressure test — Suspected parts:		
4.	❑ Perform all ROAD TEST and mark required procedures.		AT-66, "Road Test"
4-1.	Check before engine is started.		AT-68, "1. CHECK BEFORE ENGINE IS STARTED"
	❑ O/D OFF Indicator Lamp Does Not Come On, AT-212, "O/D OFF Indicator Lamp Does Not Come On" . ❑ SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE. — Mark detected items.		
	❑ PNP switch, AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . ❑ A/T fluid temperature sensor, AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . ❑ Vehicle speed sensor·A/T (Revolution sensor), AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" . ❑ Engine speed signal, AT-131, "DTC P0725 ENGINE SPEED SIGNAL" . ❑ Torque converter clutch solenoid valve, AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . ❑ Line pressure solenoid valve, AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . ❑ Shift solenoid valve A, AT-173, "DTC P0750 SHIFT SOLENOID VALVE A" . ❑ Shift solenoid valve B, AT-178, "DTC P0755 SHIFT SOLENOID VALVE B" . ❑ Accelerator pedal position (App) sensor, AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . ❑ Overrun clutch solenoid valve, AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . ❑ PNP & overdrive control switches, and throttle position sensor, AT-247, "TCM Self-diagnosis Does Not Activate" . ❑ Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . ❑ Vehicle speed sensor·MTR, AT-202, "DTC VEHICLE SPEED SENSOR MTR" . ❑ CAN communication line, AT-193, "DTC U1000 CAN COMMUNICATION LINE" . ❑ Control unit (RAM), control unit (ROM), AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❑ Control unit (EEP ROM), AT-208, "DTC CONTROL UNIT(EEPROM)" . ❑ Battery ❑ Others		
4-2.	Check at idle		AT-69, "2. CHECK AT IDLE"
	❑ Engine Cannot Be Started In “P” And “N” Position, AT-214, "Engine Cannot Be Started In “P” and “N” Position" . ❑ In “P” Position, Vehicle Moves Forward Or Backward When Pushed, AT-215, "In “P” Position, Vehicle Moves Forward Or Backward When Pushed" . ❑ In “N” Position, Vehicle Moves, AT-216, "In “N” Position, Vehicle Moves" . ❑ Large Shock. “N” → “R” Position, AT-217, "Large Shock. “N” → “R” Position" . ❑ Vehicle Does Not Creep Backward In “R” Position, AT-218, "Vehicle Does Not Creep Backward In “R” Position" . ❑ Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position, AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" .		

4.	4-3.	Cruise test	AT-72, "3. CRUISE TEST" AT-75, "Cruise Test — Part 1"
		Part-1	
		❑ Vehicle Cannot Be Started From D1 , AT-222, "Vehicle Cannot Be Started From D1" . ❑ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-225, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . ❑ A/T Does Not Shift: D2 → D3 , AT-227, "A/T Does Not Shift: D2 → D3" . ❑ A/T Does Not Shift: D3 → D4 , AT-229, "A/T Does Not Shift: D3 → D4" . ❑ A/T Does Not Perform Lock-up, AT-232, "A/T Does Not Perform Lock-up" . ❑ A/T Does Not Hold Lock-up Condition, AT-233, "A/T Does Not Hold Lock-up Condition" . ❑ Lock-up Is Not Released, AT-235, "Lock-up Is Not Released" . ❑ Engine Speed Does Not Return To Idle (Light Braking D4 → D3), AT-236, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" .	
		Part-2	AT-78, "Cruise Test — Part 2"
		❑ Vehicle Does Not Start From D1 , AT-238, "Vehicle Does Not Start From D1" . ❑ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-225, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . ❑ A/T Does Not Shift: D2 → D3 , AT-227, "A/T Does Not Shift: D2 → D3" . ❑ A/T Does Not Shift: D3 → D4 , AT-229, "A/T Does Not Shift: D3 → D4" .	
		Part-3	AT-80, "Cruise Test — Part 3"
		❑ A/T Does Not Shift: D4 → D3 When Overdrive Control Switch “ON” → “OFF”, AT-241, "A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch “ON” → “OFF”" . ❑ Engine Speed Does Not Return To Idle (Engine Brake In D3), AT-236, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . ❑ A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position, AT-242, "A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position" . ❑ Engine Speed Does Not Return To Idle (Engine Brake In 22), AT-236, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . ❑ A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position, AT-243, "A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position" . ❑ Vehicle Does Not Decelerate By Engine Brake, AT-245, "Vehicle Does Not Decelerate By Engine Brake" . ❑ TCM Self-diagnosis Does Not Activate (PNP & Overdrive control switches, and throttle position sensor circuit checks), AT-247, "TCM Self-diagnosis Does Not Activate" . ❑ SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE — Mark detected items.	
		❑ PNP switch, AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . ❑ A/T fluid temperature sensor, AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . ❑ Vehicle speed sensor·A/T (Revolution sensor), AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" . ❑ Engine speed signal, AT-131, "DTC P0725 ENGINE SPEED SIGNAL" . ❑ Torque converter clutch solenoid valve, AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . ❑ Line pressure solenoid valve, AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . ❑ Shift solenoid valve A, AT-173, "DTC P0750 SHIFT SOLENOID VALVE A" . ❑ Shift solenoid valve B, AT-178, "DTC P0755 SHIFT SOLENOID VALVE B" . ❑ Accelerator pedal position (App) sensor, AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . ❑ Overrun clutch solenoid valve, AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . ❑ PNP & overdrive control switches, and throttle position sensor, AT-247, "TCM Self-diagnosis Does Not Activate" . ❑ A/T fluid temperature sensor and TCM power source, AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . ❑ Vehicle speed sensor·MTR, AT-202, "DTC VEHICLE SPEED SENSOR MTR" . ❑ CAN communication line, AT-193, "DTC U1000 CAN COMMUNICATION LINE" . ❑ Control unit (RAM), control unit (ROM), AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❑ Control unit (EEP ROM), AT-208, "DTC CONTROL UNIT(EEPROM)" . ❑ Battery ❑ Others	

5.	❑ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-48, "Diagnostic Procedure Without CONSULT-II"
6.	❑ Perform all ROAD TEST and re-mark required procedures.	AT-66, "Road Test"
7.	❑ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items.	EC-48, "Emission-related Diagnostic Information"
	❑ DTC (P0731) A/T 1st gear function, AT-135, "DTC P0731 A/T 1ST GEAR FUNCTION" . ❑ DTC (P0732) A/T 2nd gear function, AT-141, "DTC P0732 A/T 2ND GEAR FUNCTION" . ❑ DTC (P0733) A/T 3rd gear function, AT-147, "DTC P0733 A/T 3RD GEAR FUNCTION" . ❑ DTC (P0734) A/T 4th gear function, AT-153, "DTC P0734 A/T 4TH GEAR FUNCTION" .	
8.	❑ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-83, "Symptom Chart"
9.	❑ Erase DTC from TCM and ECM memories.	AT-37, "HOW TO ERASE DTC"

Work Flow

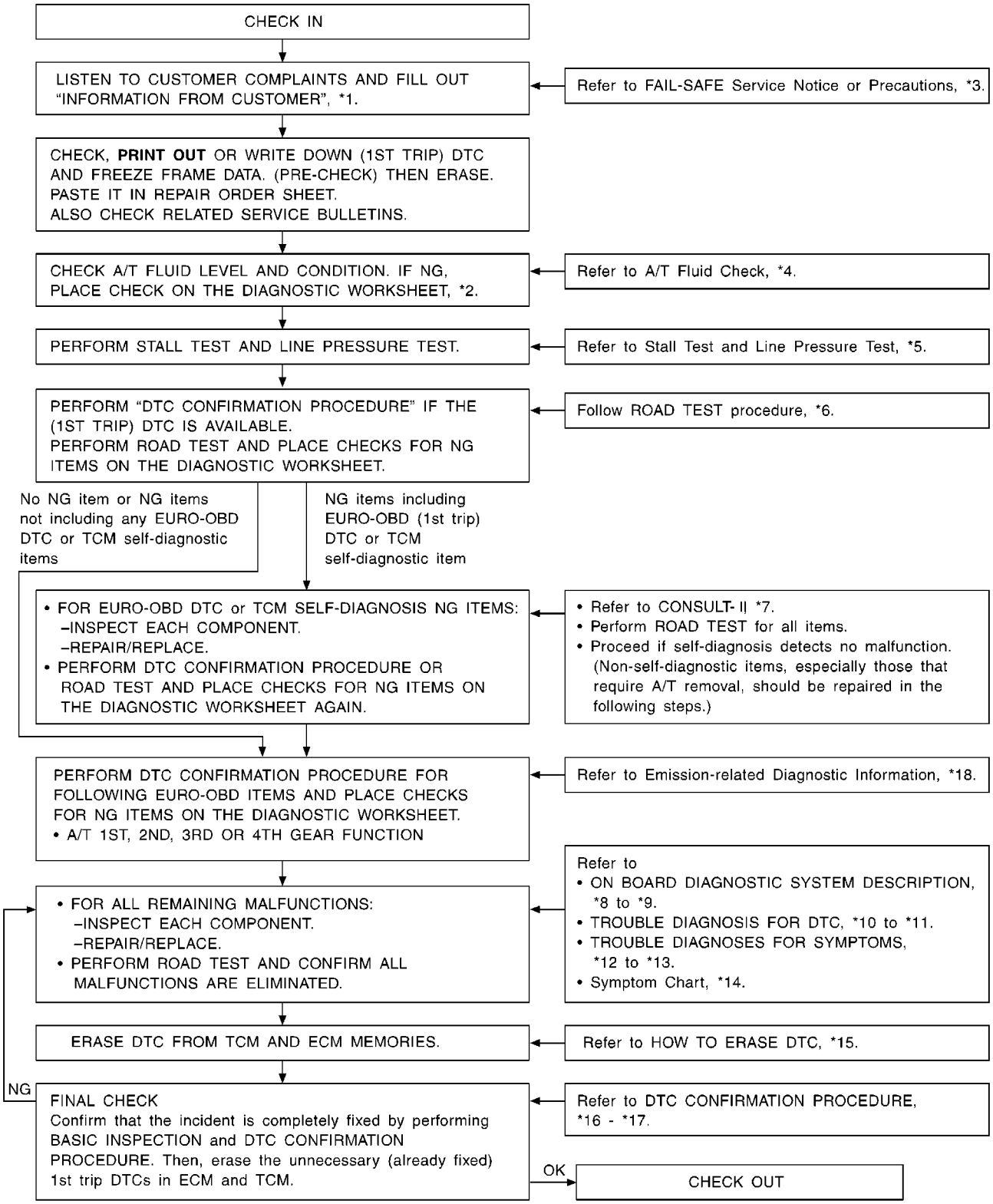
ECS008NR

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, “INFORMATION FROM CUSTOMER” (AT-55, "Information from Customer") and “DIAGNOSTIC WORKSHEET” (AT-56, "Diagnostic Worksheet"), to perform the best troubleshooting possible.

WORK FLOW CHART



SAT183K

*1:	AT-55, "Information from Customer"	*2:	AT-56, "Diagnostic Worksheet"	*3:	AT-7, "Service Notice or Precautions"
*4:	AT-61, "A/T Fluid Check"	*5:	AT-62, "Stall Test" and AT-65, "Line Pressure Test"	*6:	AT-66, "Road Test"
*7:	AT-39, "CONSULT-II Function (A/T)"	*8:	AT-35, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"	*9:	AT-48, "Diagnostic Procedure Without CONSULT-II"
*10:	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"	*11:	AT-202, "DTC VEHICLE SPEED SENSOR MTR" and AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" to AT-208, "DTC CONTROL UNIT(EEPROM)"	*12:	AT-212, "O/D OFF Indicator Lamp Does Not Come On"
*13:	AT-245, "Vehicle Does Not Decelerate By Engine Brake"	*14:	AT-83, "Symptom Chart"	*15:	AT-37, "HOW TO ERASE DTC"
*16:	AT-115, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"	*17:	AT-202, "DTC VEHICLE SPEED SENSOR MTR" and AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" to AT-208, "DTC CONTROL UNIT(EEPROM)"	*18:	EC section

TROUBLE DIAGNOSIS — BASIC INSPECTION

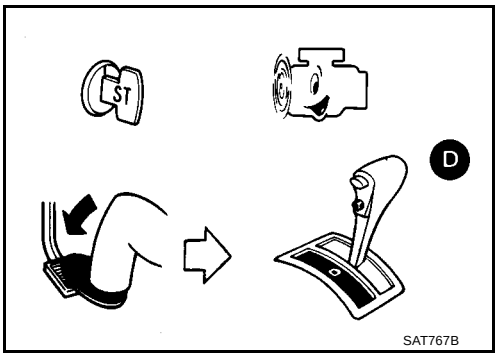
PFP:00000

A/T Fluid Check

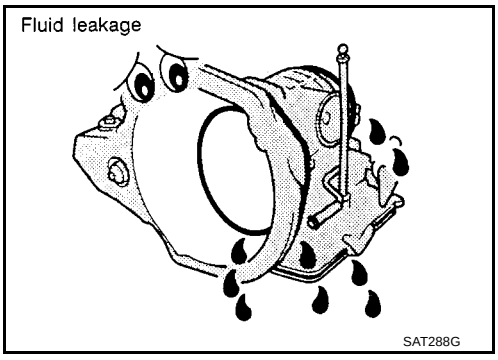
ECS008NS

FLUID LEAKAGE CHECK

1. Clean area suspected of leaking. — for example, mating surface of converter housing and transmission case.
2. Start engine, apply foot brake, place selector lever in “D” position and wait a few minutes.
3. Stop engine.



4. Check for fresh leakage.

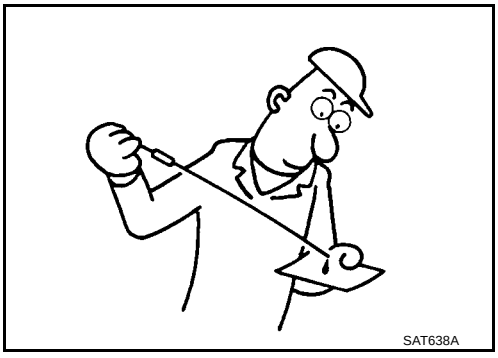


FLUID CONDITION CHECK

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating

FLUID LEVEL CHECK

Refer to AT-12, "Checking A/T Fluid" .



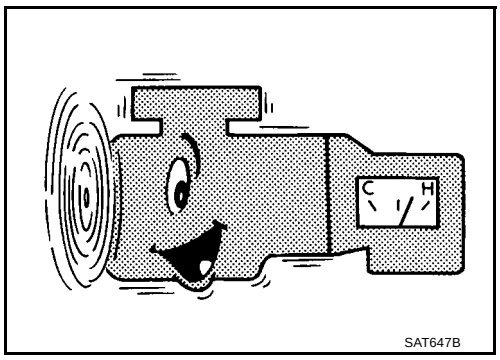
Stall Test

ECS008NT

STALL TEST PROCEDURE

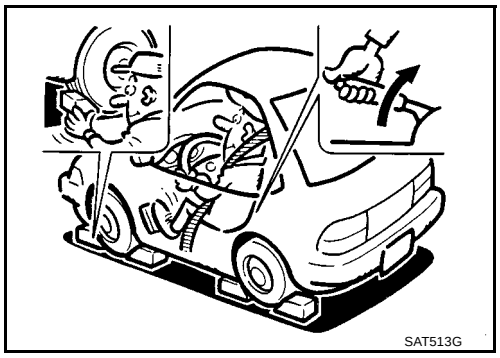
1. Check A/T fluid and engine oil levels. If necessary, add.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

ATF operating temperature:
50 - 80°C (122 - 176°F)

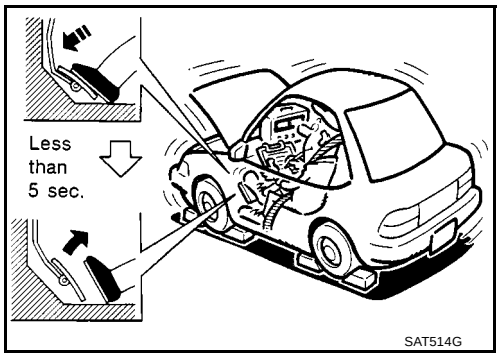


SAT647B

3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
   - **It is good practice to mark the point of specified engine rpm on indicator.**


SAT513G

5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   - **During test, never hold throttle wide open for more than 5 seconds.**

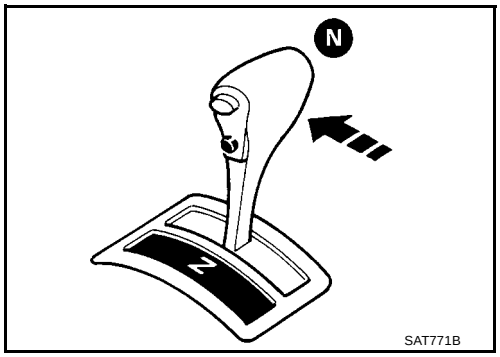


SAT514G

Stall revolution:

CR12DE	2,100 - 2,550 rpm
CR14DE	2,300 - 2,800 rpm

8. Move selector lever to “N” position.
9. Cool off ATF.
   - **Run engine at idle for at least one minute.**
10. Repeat steps 5 through 9 with selector lever in “2”, “1” and “R” positions.



SAT771B

JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations on next page.
In order to pinpoint the possible damaged components, follow the WORK FLOW shown in AT-58, "Work Flow".

NOTE:
Stall revolution is too high in “D”, “2” or “1” position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears..... Low one-way clutch slippage
- Slippage occurs in the following gears:
  1st through 3rd gears in “D” position and engine brake functions with overdrive control switch set to “OFF”.
  1st and 2nd gears in “2” position and engine brake functions with accelerator pedal released (fully closed throttle)..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

- Engine brake does not function in “1” position..... Low & reverse brake slippage
- Engine brake functions in “1” position..... Reverse clutch slippage

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50 MPH)..... One-way clutch seizure in torque converter housing

CAUTION:
Be careful since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in “D” position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in “D” position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in “D” position, 2nd gear in “2” position, and 1st gear in “1” position with overdrive control switch set to “OFF”..... Overrun clutch slippage

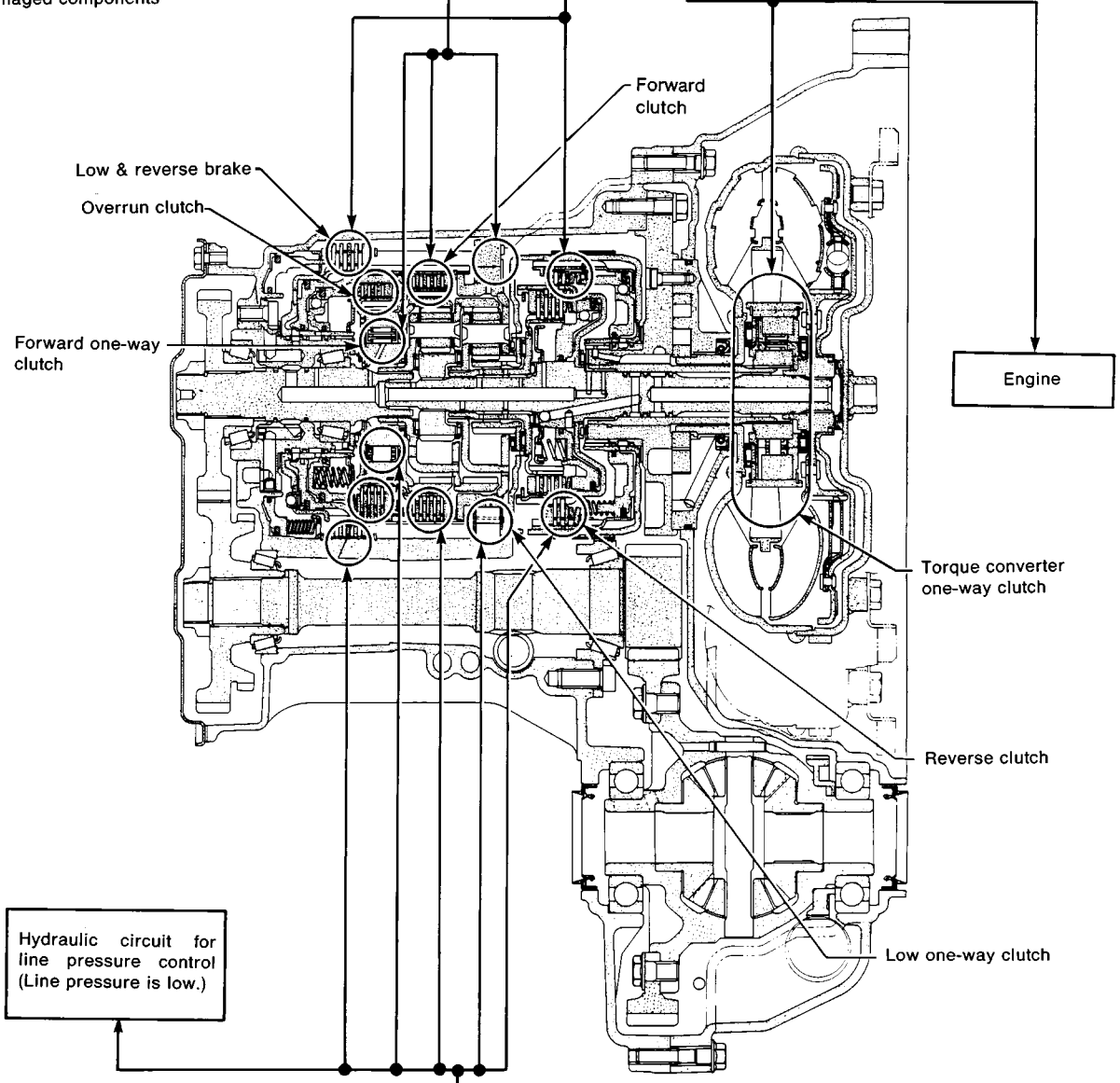
Stall revolution less than specifications:

- Poor acceleration during starts..... One-way clutch slippage in torque converter

Selector lever position	Judgement		
D	H	O	L
2	H	O	L
1	H	O	L
R	O	H	L

O : Stall revolution is normal.
H : Stall revolution is higher than specified.
L : Stall revolution is lower than specified.

Damaged components



Selector lever position	Judgement	
D	H	O
2	H	O
1	H	O
R	H	O

Clutches and brakes except high clutch and brake band are OK. (Condition of high clutch and brake band cannot be confirmed by stall test.)

SAT871HA

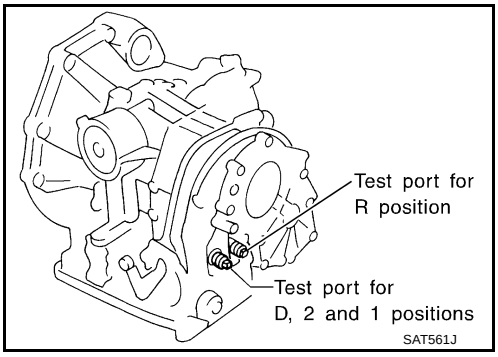
Line Pressure Test

ECS008NU

LINE PRESSURE TEST PORTS

Location of line pressure test ports are shown in the illustration.

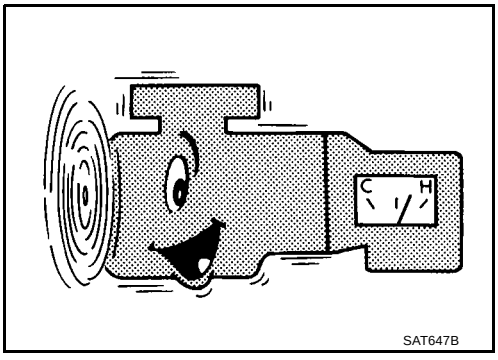
- **Always replace pressure plugs as they are self-sealing bolts.**



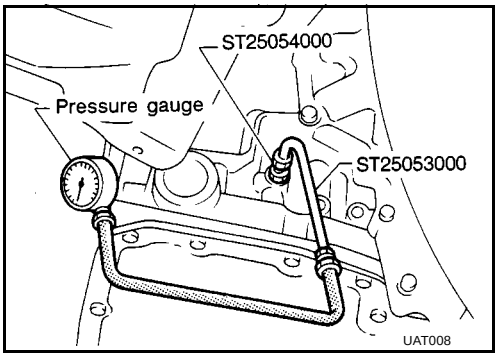
LINE PRESSURE TEST PROCEDURE

1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

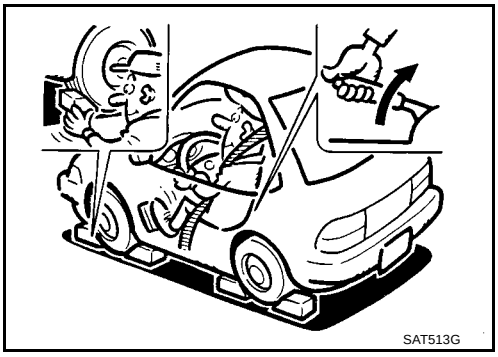
   ATF operating temperature: 50 - 80°C (122 -176°F)



3. Install pressure gauge to corresponding line pressure port.

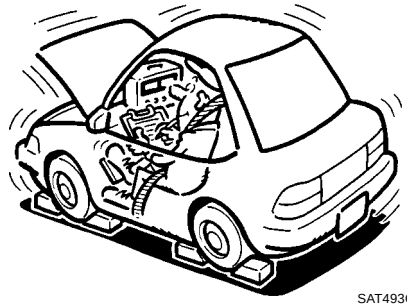


4. Set parking brake and block wheels.
   - **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**



5. Start engine and measure line pressure at idle and stall speed.
   - **When measuring line pressure at stall speed, follow the stall test procedure.**

Line pressure: Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .


SAT493G

JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: – Low in “R” and “1” positions, but – Normal in “D” and “2” positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-18, "CLUTCH AND BAND CHART" .
	Line pressure is high.	● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

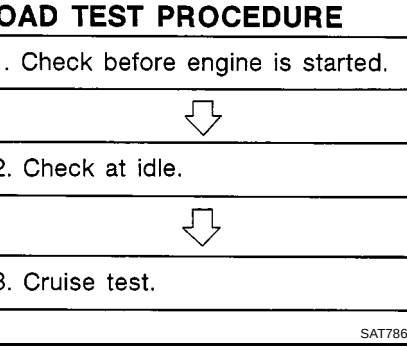
Road Test

ECS008NV

DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:

1. Check before engine is started
2. Check at idle



SAT786A

3. Cruise test

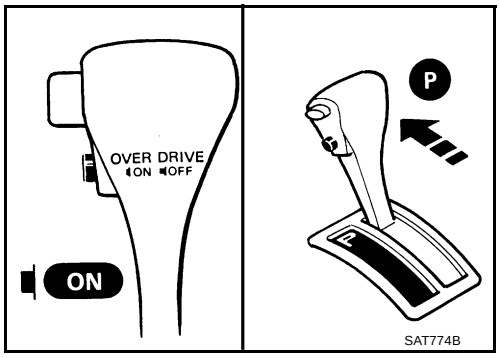
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to the following items.

	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
EURO-OBD	AT-35, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" to AT-48, "Diagnostic Procedure Without CONSULT-II"	AT-212, "O/D OFF Indicator Lamp Does Not Come On" to AT-247, "TCM Self-diagnosis Does Not Activate"

1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

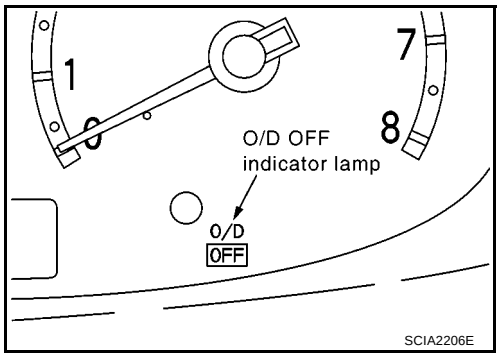
1. Park vehicle on flat surface.
2. Turn ignition switch to “OFF” position.
3. Move selector lever to “P” position.
4. Set overdrive control switch to “ON” position.
5. Turn ignition switch to “ON” position. (Do not start engine.)



6. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2
No >> Stop Road Test. Go to “O/D OFF Indicator Lamp Does Not Come On”, AT-212 .



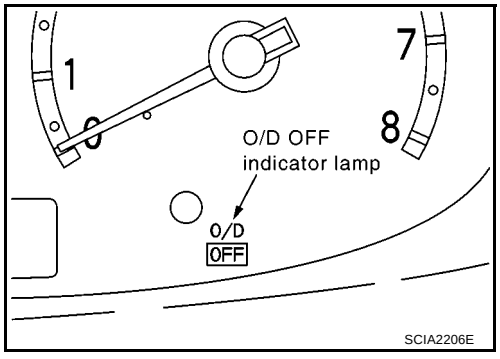
2. CHECK O/D OFF INDICATOR LAMP

Does O/D OFF indicator lamp flicker for about 8 seconds?

Yes or No

Yes >> TCM is under fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORK-SHEET, AT-55, "DIAGNOSTIC WORKSHEET" . Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

No >> 1. Turn ignition switch to “OFF” position.
2. Perform self-diagnosis and note NG items. Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .
3. Go to “2. CHECK AT IDLE”, AT-69 .



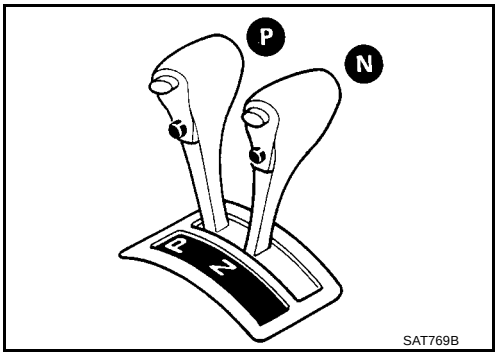
2. CHECK AT IDLE

1. CHECK ENGINE START

1. Park vehicle on flat surface.
2. Turn ignition switch to “OFF” position.
3. Move selector lever to “P” or “N” position.
4. Turn ignition switch to “START” position.
5. Is engine started?

Yes or No

Yes >> GO TO 2
No >> Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET.Go to “Engine Cannot Be Started In “P” and “N” Position” AT-214 .

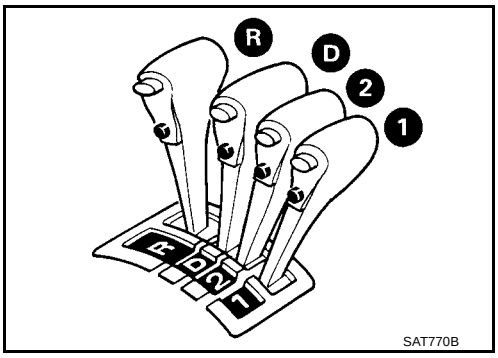


2. CHECK ENGINE START

1. Turn ignition switch to “OFF” position.
2. Move selector lever to “D”, “1”, “2” or “R” position.
3. Turn ignition switch to “START” position.
4. Is engine started?

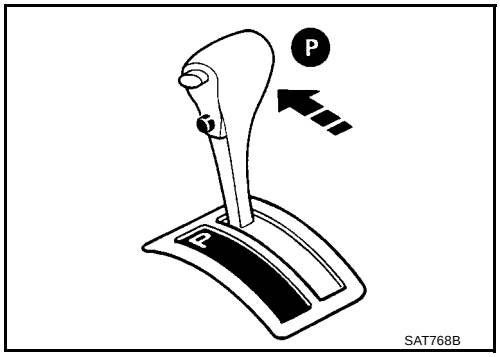
Yes or No

Yes >> Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Go To “Engine Cannot Be Started In “P” and “N” Position”, AT-214 . Continue Road Test.
No >> GO TO 3



3. CHECK VEHICLE MOVE

1. Turn ignition switch to “OFF” position.
2. Move selector lever to “P” position.
3. Release parking brake.
4. Push vehicle forward or backward.

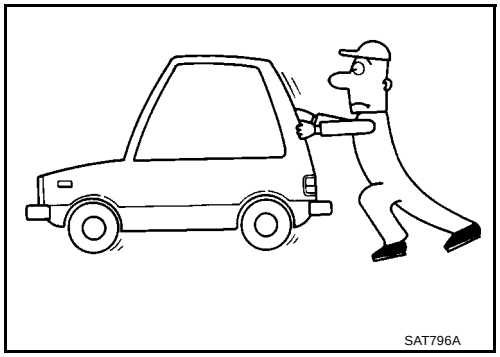


5. Does vehicle move when it is pushed forward or backward?

Yes or No

Yes >> Mark the box of “In “P” Position, Vehicle Moves Forward Or Backward When Pushed” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

No >> GO TO 4



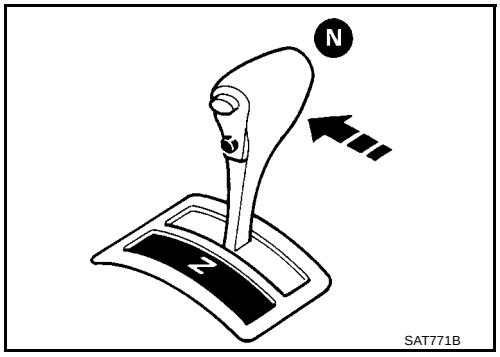
4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Move selector lever to “N” position.
3. Turn ignition switch to “START” position and start engine.
4. Release parking brake.
5. Does vehicle move forward or backward?

Yes or No

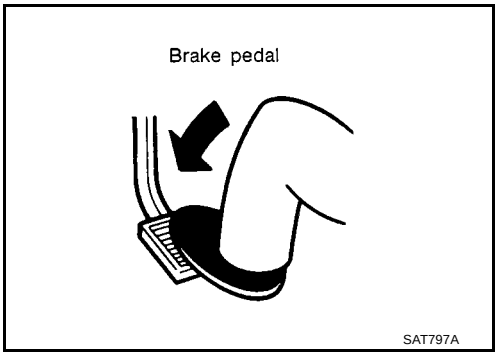
Yes >> Mark the box of “In “N” Position, Vehicle Moves” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

No >> GO TO 5



5. CHECK SHIFT SHOCK

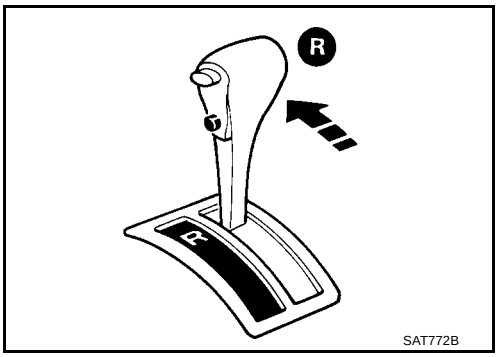
1. Apply foot brake.



2. Move selector lever to “R” position.
3. Is there large shock when changing from “N” to “R” position?

Yes or No

Yes >> Mark the box of “Large Shock “N” → “R” Position” on the DIAGNOSTIC WORKSHEET. Continue Road Test.
No >> GO TO 6

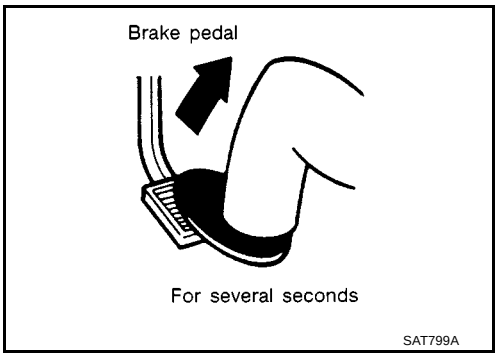


6. CHECK VEHICLE MOVE

1. Release foot brake for several seconds.
2. Does vehicle creep backward when foot brake is released?

Yes or No

Yes >> GO TO 7
No >> Mark the box of “Vehicle Does Not Creep Backward In “R” Position” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

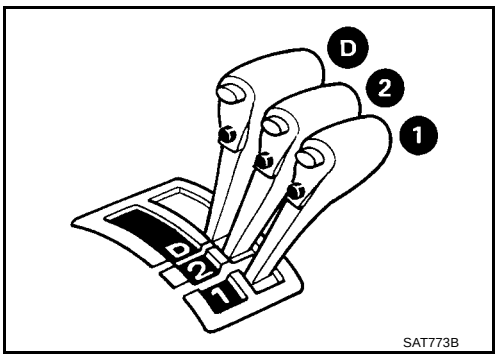


7. CHECK VEHICLE MOVE

1. Move selector lever to “D”, “2” and “1” positions and check if vehicle creeps forward.
2. Does vehicle creep forward in all three positions?

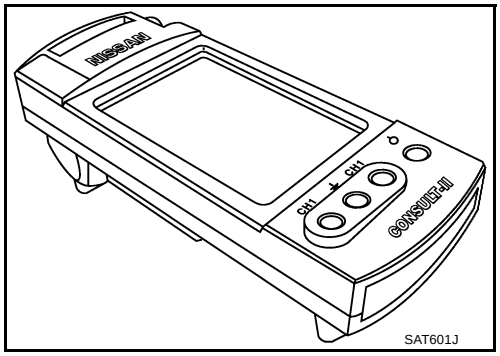
Yes or No

Yes >> Go To “3. CRUISE TEST”, AT-72 .
No >> Mark the box of “Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



3. CRUISE TEST

- Check all items listed in Parts 1 through 3.



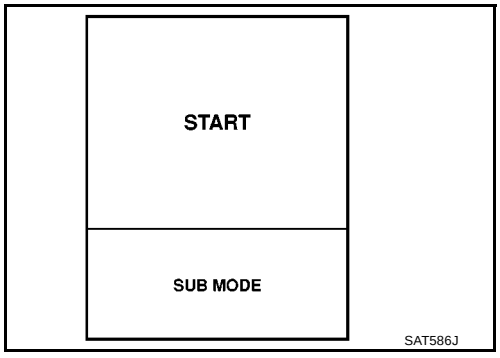
SAT601J

With CONSULT-II

- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

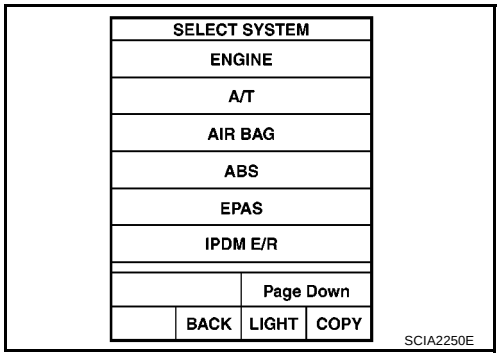
CONSULT-II Setting Procedure

1. Turn ignition switch to “OFF” position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument lower panel on driver side.
3. Turn ignition switch to “ON” position. (Do not start engine.)
4. Touch “START”.



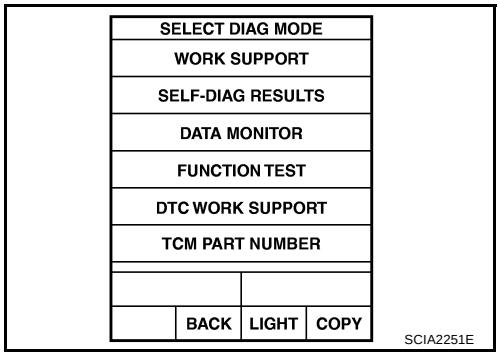
SAT586J

5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



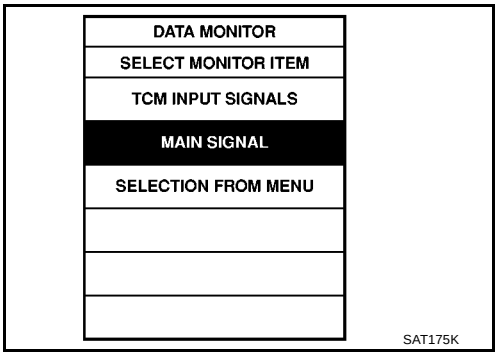
SCIA2250E

6. Touch “DATA MONITOR”.

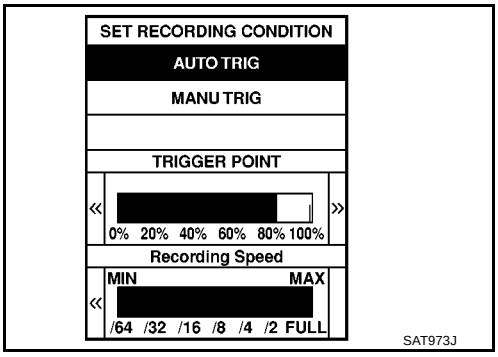


SCIA2251E

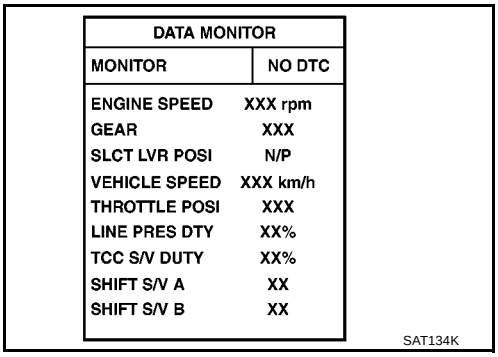
7. Touch “MAIN SIGNALS” or “TCM INPUT SIGNALS”.
8. Select “Numerical Display”, “Barchart Display” or “Line Graph Display”.



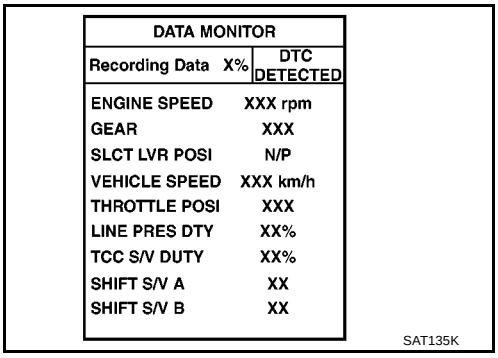
9. Touch “SETTING” to recording condition (“AUTO TRIG” or “MANU TRIG”) and touch “BACK”.
10. Touch “Start”.



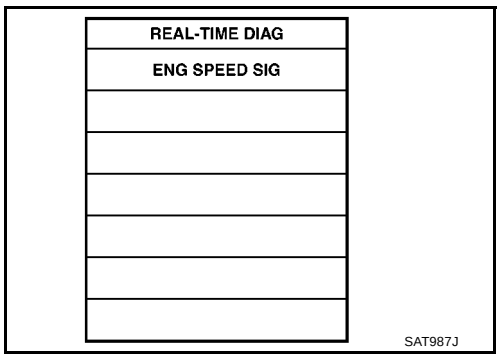
11. When performing cruise test, touch “RECORD”.

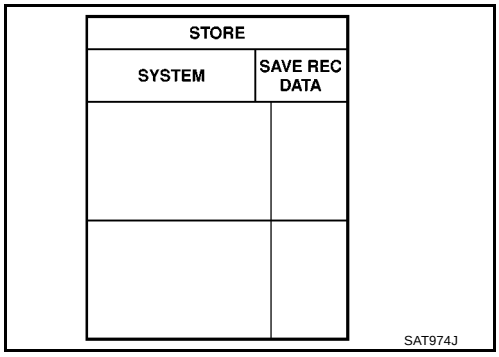


12. After finishing cruise test part 1, touch “STOP”.

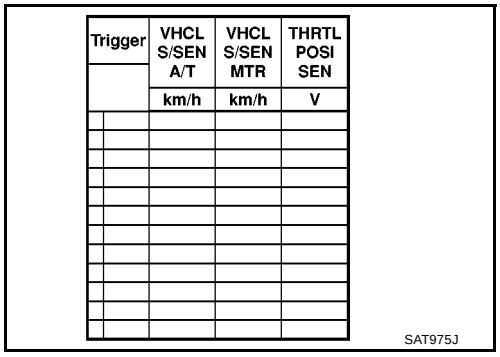


13. Touch “STORE” and touch “BACK”.



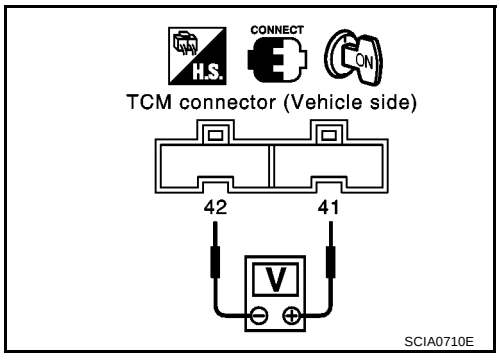


14. Touch “DISPLAY”.
15. Touch “PRINT”.
16. Check the monitor data printed out.
17. Continue cruise test part 2 and 3.



Without CONSULT-II

- Throttle position sensor can be checked by voltage across terminals 41 and 42 of TCM.



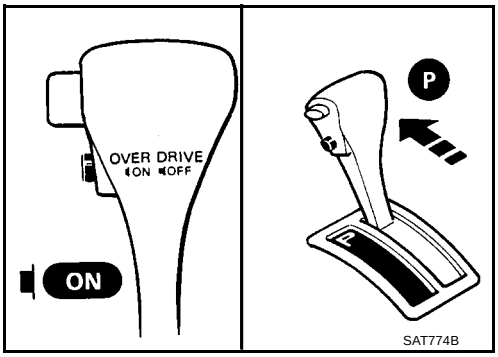
Cruise Test — Part 1

1. CHECK STARTING GEAR (D_1) POSITION

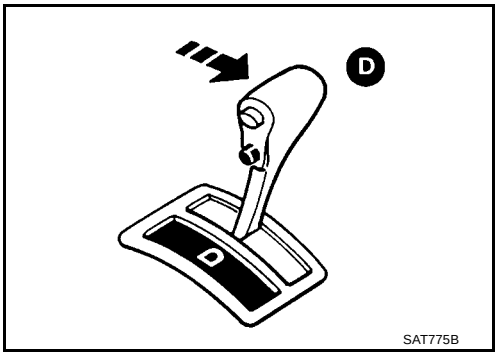
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

   ATF operating temperature: 50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.
3. Set overdrive control switch to “ON” position.
4. Move selector lever to “P” position.
5. Start engine.



6. Move selector lever to “D” position.



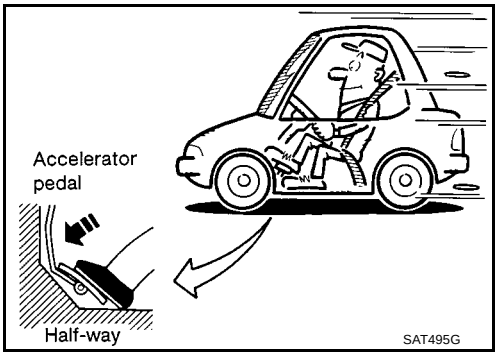
7. Accelerate vehicle by constantly depressing accelerator pedal halfway.
8. Does vehicle start from D_1 ?

   Read gear position.

Yes or No

Yes >> GO TO 2

No >> Mark the box of “Vehicle Cannot Be Started From D_1 ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



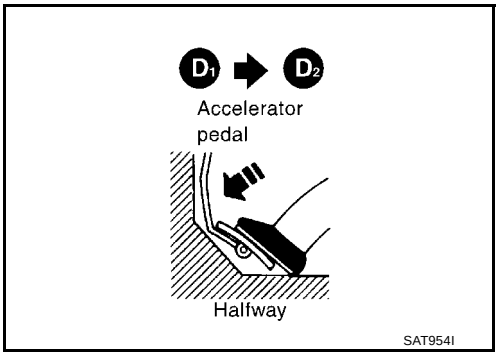
2. CHECK SHIFT UP (D_1 TO D_2)

Does A/T shift from D_1 to D_2 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_1 to D_2 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 3

No >> Mark the box of “A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

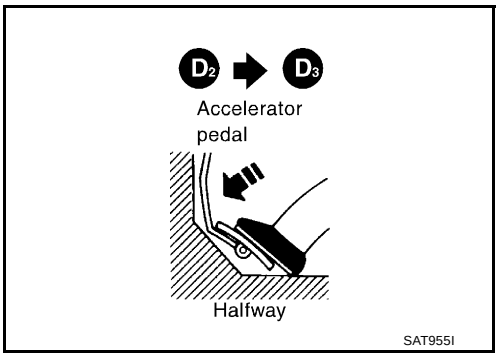
3. CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 4

No >> Mark the box of “A/T Does Not Shift: $D_2 \rightarrow D_3$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

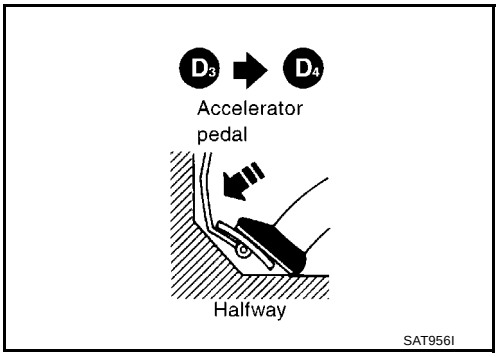
4. CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_3 to D_4 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 5

No >> Mark the box of “A/T Does Not Shift: $D_3 \rightarrow D_4$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

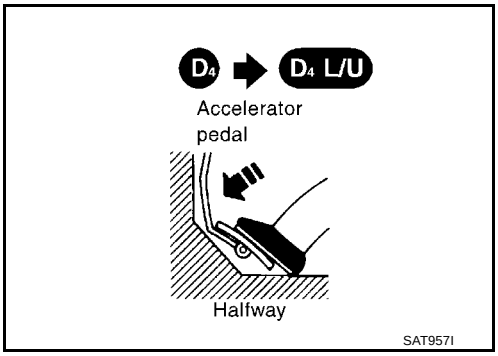
5. CHECK LOCK-UP (D4 TO D4 L/U)

Does A/T perform lock-up at the specified speed?

Read vehicle speed, throttle position when lock-up duty becomes 94%.

Specified speed when lock-up occurs:

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 6

No >> Mark the box of “A/T Does Not Perform Lock-up” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

6. CHECK HOLD LOCK-UP

Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes >> GO TO 7

No >> Mark the box of “A/T Does Not Hold Lock-up Condition” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

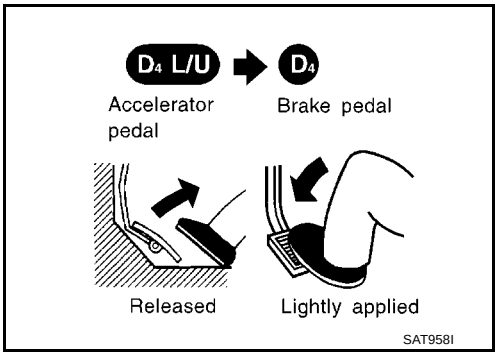
7. CHECK SHIFT DOWN (D4 L/U TO D4)

1. Release accelerator pedal.
2. Is lock-up released when accelerator pedal is released?

Yes or No

Yes >> GO TO 8

No >> Mark the box of “Lock-up Is Not Released” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



8. CHECK SHIFT DOWN (D4 TO D3)

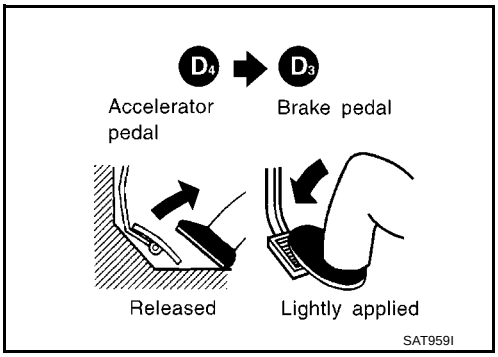
1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

Read gear position and engine speed.

Yes or No

Yes >> 1. Stop vehicle.
2. Go To “Cruise test — Part 2”, AT-78 .

No >> Mark the box of “Engine Speed Does Not Return To Idle (Light Braking D4 → D3)” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



Cruise Test — Part 2

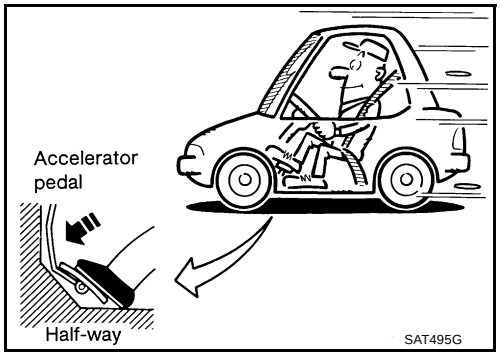
1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm overdrive control switch is in “ON” position.
2. Confirm selector lever is in “D” position.
3. Accelerate vehicle by half throttle again.
4. Does vehicle start from D_1 ?

Read gear position.

Yes or No

Yes >> GO TO 2
No >> Mark the box of “Vehicle Does Not Start From D_1 ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



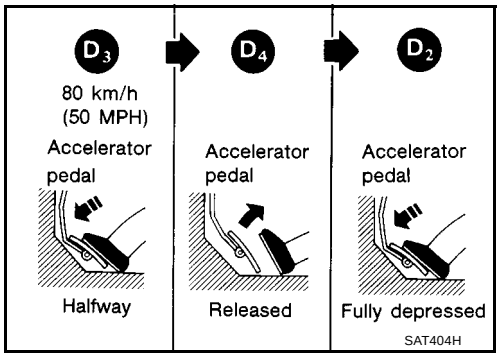
2. CHECK SHIFT UP AND SHIFT DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

Read gear position and throttle position.

Yes or No

Yes >> GO TO 3
No >> Mark the box of “A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



3. CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

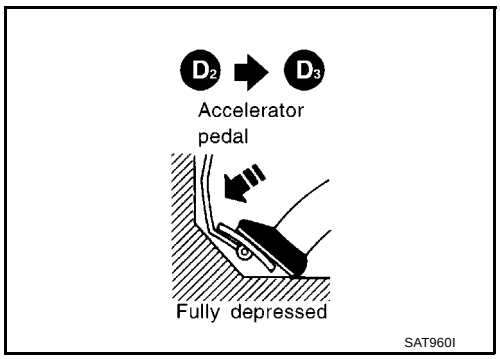
Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3 :

Refer to AT-534, "Shift Schedule" .

Yes or No

Yes >> GO TO 4
No >> Mark the box of “A/T Does Not Shift: $D_2 \rightarrow D_3$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



4. CHECK SHIFT UP (D_3 TO D_4) AND ENGINE BRAKE

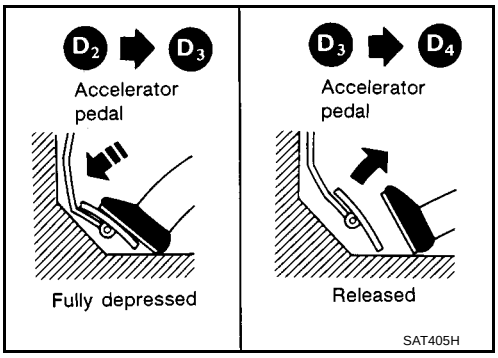
Release accelerator pedal after shifting from D_2 to D_3.
Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

Read gear position, throttle position and vehicle speed.

Yes or No

Yes >> 1. Stop vehicle.
2. Go To “Cruise test — Part 3”, AT-80.

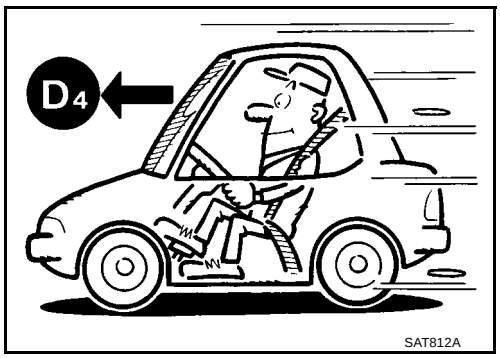
No >> Mark the box of “11. A/T Does Not Shift: $D_3 \rightarrow D_4$ ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



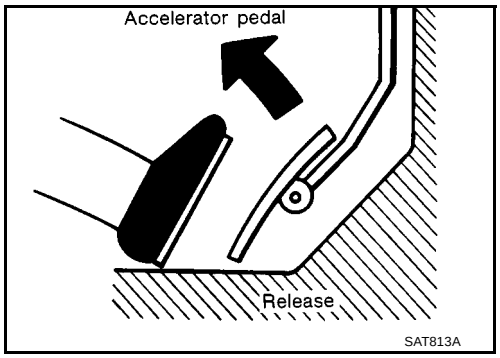
Cruise Test — Part 3

1. CHECK SHIFT DOWN (D_4 TO D_3)

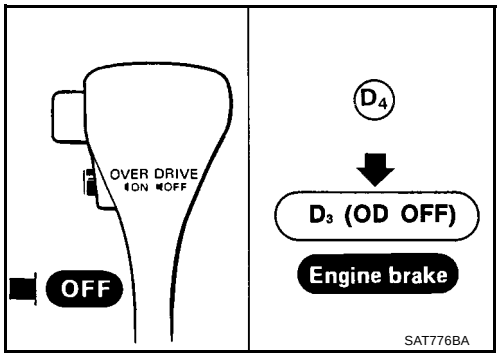
1. Confirm overdrive control switch is in “ON” position.
2. Confirm selector lever is in “D” position.
3. Accelerate vehicle using half-throttle to D_4 .



4. Release accelerator pedal.



5. Set overdrive control switch to “OFF” position while driving in D_4 .



6. Does A/T shift from D_4 to D_3 (O/D OFF)?

Read gear position and vehicle speed.

Yes or No

Yes >> GO TO 2

No >> Mark the box of “A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF” on the DIAGNOSTIC WORKSHEET. Continue Road Test.

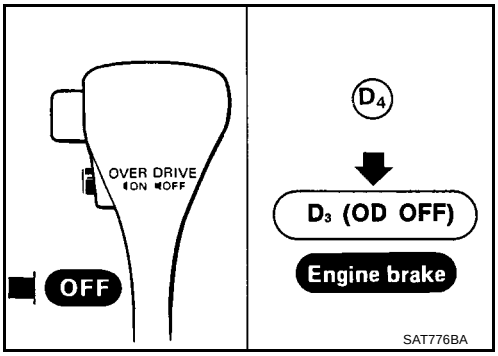
2. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 3

No >> Mark the box of “Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



3. CHECK SHIFT DOWN (D_3 TO 2_2)

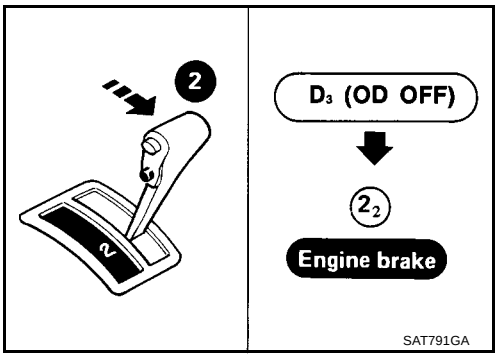
1. Move selector lever from “D” to “2” position while driving in D_3 (O/D OFF).
2. Does A/T shift from D_3 (O/D OFF) to 2_2 ?

Read gear position.

Yes or No

Yes >> GO TO 4

No >> Mark the box of “A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



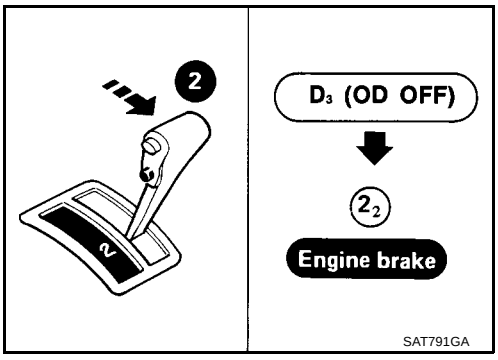
4. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 5

No >> Mark the box of “Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



5. CHECK SHIFT DOWN

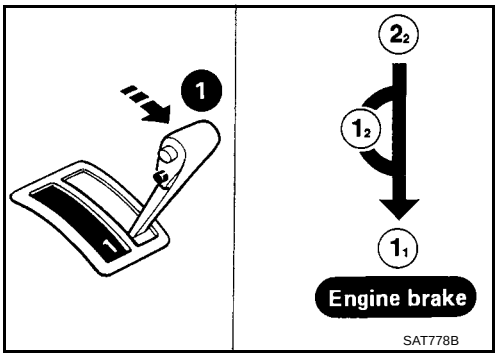
1. Move selector lever from “2” to “1” position while driving in 2_2 .
2. Does A/T shift from 2_2 to 1_1 position?

Read gear position.

Yes or No

Yes >> GO TO 6

No >> Mark the box of “A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector lever “2” → “1” Position” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



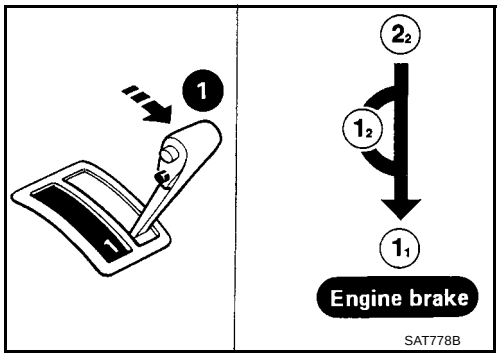
6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

No >> Mark the box of “Vehicle Does Not Decelerate By Engine Brake” on the DIAGNOSTIC WORKSHEET. Stop Road Test.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS008NW

Numbers are arranged in order of inspection.
Perform inspections starting with number one and work up.

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Engine cannot start in “P” and “N” positions. AT-214, "Engine Cannot Be Started In “P” and “N” Position"	ON vehicle	1. Ignition switch and starter	PG-4, "POWER SUPPLY ROUTING", SC-39, "STARTING SYSTEM"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
Engine starts in position other than “N” and “P” positions. AT-214, "Engine Cannot Be Started In “P” and “N” Position"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
Transaxle noise in “P” and “N” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
	OFF vehicle	5. Oil pump	AT-453, "Oil Pump"
		6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle moves when changing into “P” position, or parking gear does not disengage when shifted out of “P” position. AT-215, "In “P” Position, Vehicle Moves Forward Or Backward When Pushed"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	2. Parking components	AT-433, "Components", AT-450, "REPAIR FOR COMPONENT PARTS"
Vehicle runs in “N” position. AT-216, "In “N” Position, Vehicle Moves"	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	3. Forward clutch	AT-482, "Forward and Overrun Clutches"
		4. Reverse clutch	AT-472, "Reverse Clutch"
		5. Overrun clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-218, "Vehicle Does Not Creep Backward In “R” Position"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Stall test	AT-62, "Stall Test"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Reverse clutch	AT-472, "Reverse Clutch"
		7. High clutch	AT-477, "High Clutch"
		8. Forward clutch	AT-482, "Forward and Overrun Clutches"
		9. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		10. Low & reverse brake	AT-489, "Low & Reverse Brake"
Vehicle braked when shifting into “R” position.	ON vehicle	1. Fluid level	AT-61, "A/T Fluid Check"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Forward clutch	AT-482, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		5. Engine speed signal	AT-131, "DTC P0725 ENGINE SPEED SIGNAL"
		6. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		8. Accumulator N-D	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	9. Forward clutch	AT-482, "Forward and Overrun Clutches"
Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	2. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position"	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Stall test	AT-62, "Stall Test"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		6. Accumulator N-D	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Reverse clutch	AT-472, "Reverse Clutch"
		8. High clutch	AT-477, "High Clutch"
		9. Forward clutch	AT-482, "Forward and Overrun Clutches"
		10. Forward one-way clutch	AT-433, "OVERHAUL"
		11. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-65, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		7. Accumulator N-D	AT-426, "Control Valve Assembly and Accumulators"
		8. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		9. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		10. Overrun clutch solenoid valve	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		11. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
	OFF vehicle	12. Forward clutch	AT-482, "Forward and Overrun Clutches"
		13. Reverse clutch	AT-472, "Reverse Clutch"
		14. Low & reverse brake	AT-489, "Low & Reverse Brake"
		15. Oil pump	AT-433, "OVERHAUL"
		16. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
No creep at all. AT-218, "Vehicle Does Not Creep Backward In “R” Position" and AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position"	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-405, "LINE PRESSURE SOLENOID VALVE"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	4. Forward clutch	AT-482, "Forward and Overrun Clutches"
		5. Oil pump	AT-453, "Oil Pump"
		6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change gear from “D_1 ” to “D_2 ”.	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Failure to change gear from “D_2 ” to “D_3 ”.	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Piston Assembly"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Failure to change gear from “D_3 ” to “D_4 ”.	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Overdrive control switch	AT-247, "TCM Self-diagnosis Does Not Activate"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		6. Accelerator pedal position (APP) sensor	AT-426, "Control Valve Assembly and Accumulators"
		7. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	8. Brake band	AT-503, "Band Servo Piston Assembly"
Too high a gear change point from “D_1 ” to “D_2 ”, from “D_2 ” to “D_3 ”, from “D_3 ” to “D_4 ”. AT-225, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-227, "A/T Does Not Shift: $D_2 \rightarrow D_3$" and AT-229, "A/T Does Not Shift: $D_3 \rightarrow D_4$"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
Gear change directly from “D_1 ” to “D_3 ” occurs.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accumulator servo release	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	3. Brake band	AT-503, "Band Servo Piston Assembly"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Engine stops when shifting lever into “R”, “D”, “2” and “1”.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]
		2. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	4. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Too sharp a shock in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Accumulator servo release	AT-426, "Control Valve Assembly and Accumulators"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		5. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Too sharp a shock in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Too sharp a shock in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. Brake band	AT-503, "Band Servo Piston Assembly"
		6. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		7. Forward one-way clutch	AT-433, "OVERHAUL"
Almost no shock or clutches slipping in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Accumulator servo release	AT-426, "Control Valve Assembly and Accumulators"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Almost no shock or slipping in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Almost no shock or slipping in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Brake band	AT-503, "Band Servo Piston Assembly"
Vehicle braked by gear change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-472, "Reverse Clutch"
		3. Low & reverse brake	AT-489, "Low & Reverse Brake"
		4. High clutch	AT-477, "High Clutch"
		5. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle braked by gear change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Brake band	AT-503, "Band Servo Piston Assembly"
Vehicle braked by gear change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Overrun clutch	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		3. Forward one-way clutch	AT-433, "OVERHAUL"
		4. Reverse clutch	AT-472, "Reverse Clutch"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		3. Overdrive control switch	AT-247, "TCM Self-diagnosis Does Not Activate"
		4. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		5. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Reverse clutch	AT-472, "Reverse Clutch"
		9. High clutch	AT-477, "High Clutch"
		10. Brake band	AT-503, "Band Servo Piston Assembly"
		11. Low & reverse brake	AT-489, "Low & Reverse Brake"
		12. Oil pump	AT-453, "Oil Pump"
		13. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change gear from “D_4 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Overrun clutch solenoid valve	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		4. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		5. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Piston Assembly"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from “D_3 ” to “D_2 ” or from “D_4 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Piston Assembly"
Failure to change gear from “D_2 ” to “D_1 ” or from “D_3 ” to “D_1 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		7. High clutch	AT-477, "High Clutch"
		8. Brake band	AT-503, "Band Servo Piston Assembly"
Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-65, "Line Pressure Test"
		3. Overrun clutch solenoid valve	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Too high a change point from “D_4 ” to “D_3 ”, from “D_3 ” to “D_2 ”, from “D_2 ” to “D_1 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
Kickdown does not operate when depressing pedal in “D_4 ” within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
Kickdown operates or engine overruns when depressing pedal in “D_4 ” beyond kick down vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Races extremely fast or slips in changing from “D4 ” to “D3 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Piston Assembly"
		8. Forward clutch	AT-482, "Forward and Overrun Clutches"
Races extremely fast or slips in changing from “D4 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Brake band	AT-503, "Band Servo Piston Assembly"
		9. High clutch	AT-477, "High Clutch"
		10. Forward clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Races extremely fast or slips in changing from “D3 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		6. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Piston Assembly"
		8. High clutch	AT-477, "High Clutch"
Races extremely fast or slips in changing from “D4 ” or “D3 ” to “D1 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Forward clutch	AT-482, "Forward and Overrun Clutches"
		9. Forward one-way clutch	AT-433, "OVERHAUL"
		10. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
	OFF vehicle	5. Oil pump	AT-453, "Oil Pump"
		6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Piston Assembly"
		8. Low & reverse brake	AT-489, "Low & Reverse Brake"
		9. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		10. Parking components	AT-433, "Components"
Transmission noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change from “D_3 ” to “2_2 ” when changing lever into “2” position. AT-242, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		3. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		5. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Gear change from “2_2 ” to “2_3 ” in “2” position.	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Engine brake does not operate in “1” position. AT-238, "Vehicle Does Not Start From D1"	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		6. Overrun clutch solenoid valve	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
	OFF vehicle	7. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		8. Low & reverse brake	AT-489, "Low & Reverse Brake"
Gear change from “1$_1$” to “1$_2$” in “1” position.	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
Does not change from “1$_2$” to “1$_1$” in “1” position.	ON vehicle	1. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Low & reverse brake	AT-489, "Low & Reverse Brake"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Large shock changing from “1$_2$ ” to “1$_1$ ” in “1” position.	ON vehicle	1. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	2. Low & reverse brake	AT-489, "Low & Reverse Brake"
Transmission overheats.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]
		3. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-65, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Oil pump	AT-453, "Oil Pump"
		8. Reverse clutch	AT-472, "Reverse Clutch"
		9. High clutch	AT-477, "High Clutch"
		10. Brake band	AT-503, "Band Servo Piston Assembly"
		11. Forward clutch	AT-482, "Forward and Overrun Clutches"
		12. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		13. Low & reverse brake	AT-489, "Low & Reverse Brake"
		14. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-472, "Reverse Clutch"
		3. High clutch	AT-477, "High Clutch"
		4. Brake band	AT-503, "Band Servo Piston Assembly"
		5. Forward clutch	AT-482, "Forward and Overrun Clutches"
		6. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-489, "Low & Reverse Brake"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		3. Oil pump	AT-453, "Oil Pump"
		4. Reverse clutch	AT-472, "Reverse Clutch"
		5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Forward clutch	AT-482, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		9. Low & reverse brake	AT-489, "Low & Reverse Brake"
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		3. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		4. Engine speed signal	AT-131, "DTC P0725 ENGINE SPEED SIGNAL"
		5. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		6. Line pressure test	AT-65, "Line Pressure Test"
		7. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		8. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	9. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-65, "Line Pressure Test"
		4. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		5. Line pressure solenoid valve	AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Lock-up point is extremely high or low. AT-232, "A/T Does Not Perform Lock-up"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		3. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"

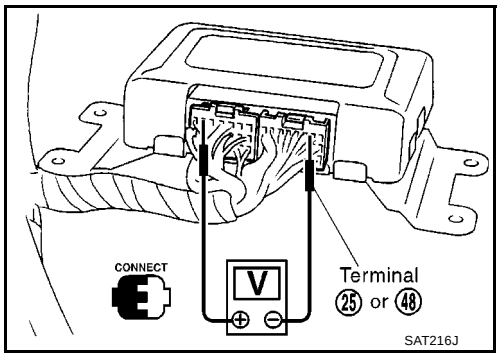
Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
A/T does not shift to “D4 ” when driving with overdrive control switch “ON”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		3. Overdrive control switch	AT-247, "TCM Self-diagnosis Does Not Activate"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-202, "DTC VEHICLE SPEED SENSOR MTR"
		5. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Overrun clutch solenoid valve	AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		8. A/T fluid temperature sensor	AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		9. Line pressure test	AT-65, "Line Pressure Test"
	OFF vehicle	10. Brake band	AT-503, "Band Servo Piston Assembly"
		11. Overrun clutch	AT-482, "Forward and Overrun Clutches"
Engine is stopped at “R”, “D”, “2” and “1” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Torque converter clutch solenoid valve	AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Shift solenoid valve A	AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TCM Terminals and Reference Value

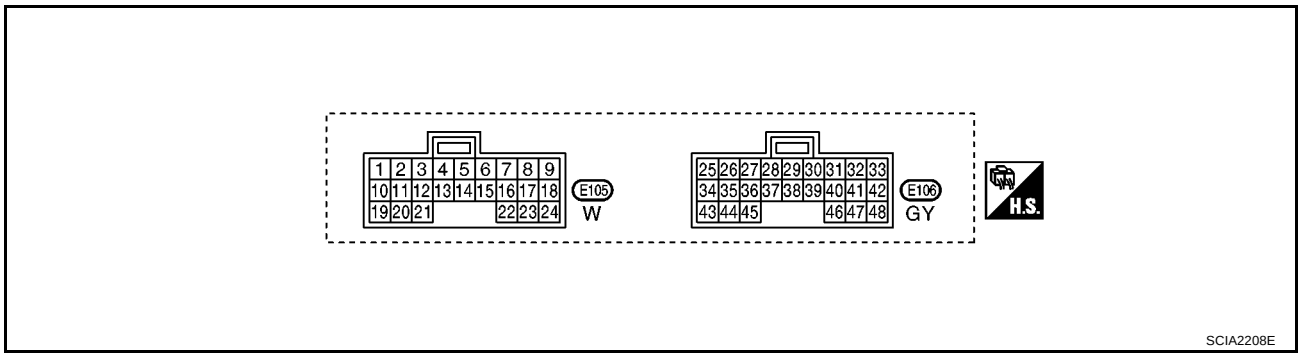
ECS008NX

PREPARATION

- Measure voltage between each terminal and terminal 25 or 48 by following “TCM INSPECTION TABLE”.

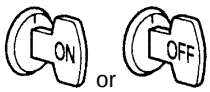


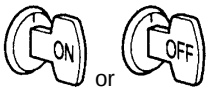
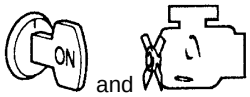
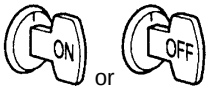
TCM HARNESS CONNECTOR TERMINAL LAYOUT

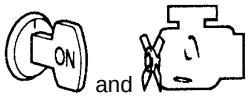
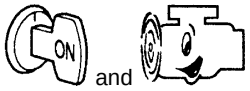


TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
1	PU	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BR	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	GY	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5	R	CAN-H (high)	—	—	—
6	W	CAN-L (low)	—	—	—
10	G	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	0V
19	G	Power source		Same as No. 10	
20	Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
25	B	Ground	Always		0V
26	BR	PNP switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	LG	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
28	GY	Power source (Memory back-up)	Always		Battery voltage
29	OR	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz
30 *3	L	CONSULT- II (RX)		—	—
31 *3	BR	CONSULT- II (TX)		—	—
32 *2	OR	Throttle position sensor (Power source)		When turning ignition switch to “ON”.	4.5 - 5.5V
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
34	P	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	R	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
36	Y	PNP switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *2	L	Engine speed signal		—	EC-94, "ECM INSPECTION TABLE"
40	G	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V
41	Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	Always		0V
47	PU	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	Always		0V

*2: These terminals are connected to the ECM.
*3: These terminals are connected to the data link connector.

CAN COMMUNICATION

PFP:23710

CAN Communication

ECS00CVJ

SYSTEM DESCRIPTION

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

CAN Communication Unit

ECS00FF5

Go to CAN system, when selecting your car model from the following table.

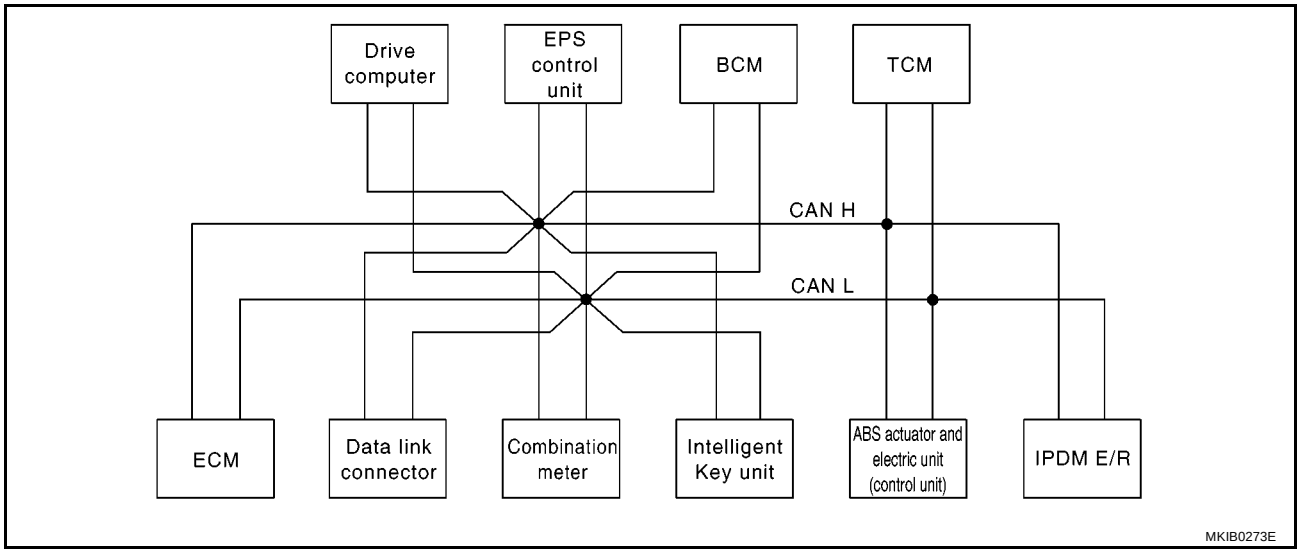
Body type	3door/5door							
Axle	2WD							
Engine	CR10DE/CR12DE/CR14DE				CR12DE/CR14DE			
Handle	LHD/RHD							
Brake control	ABS system				ESP system			
Transmission	A/T				A/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×		
Drive computer	×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×
TCM	×	×	×	×	×	×	×	×
IPDM E/R	×	×	×	×	×	×	×	×
CAN communication type	AT-108, "TYPE 1/TYPE 2"				AT-111, "TYPE 5/TYPE 6"			

×: Applicable

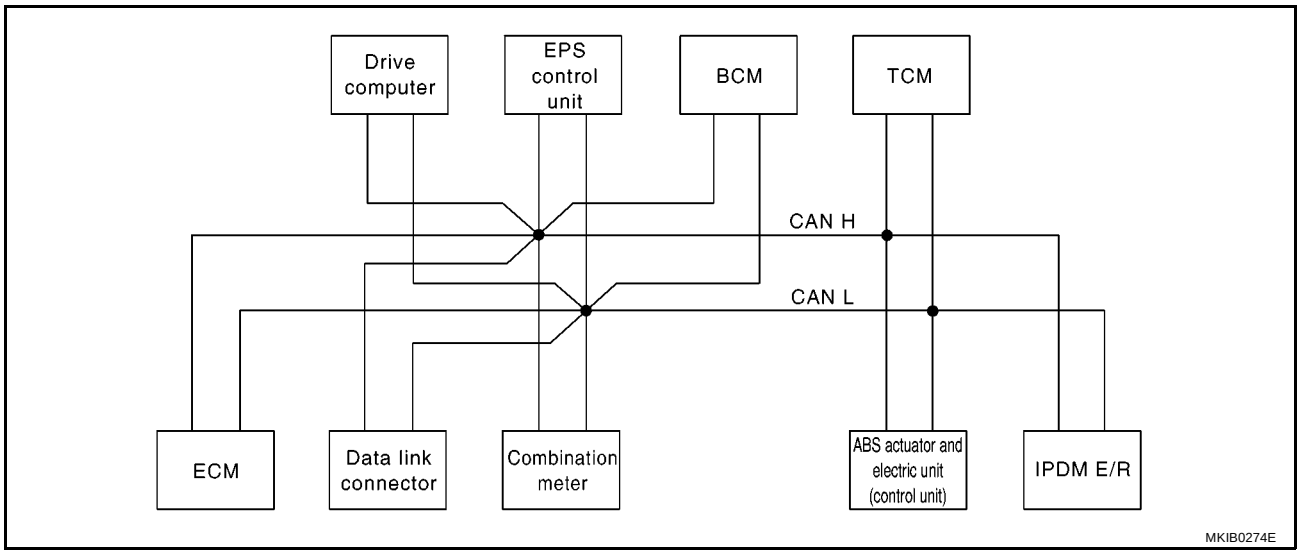
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

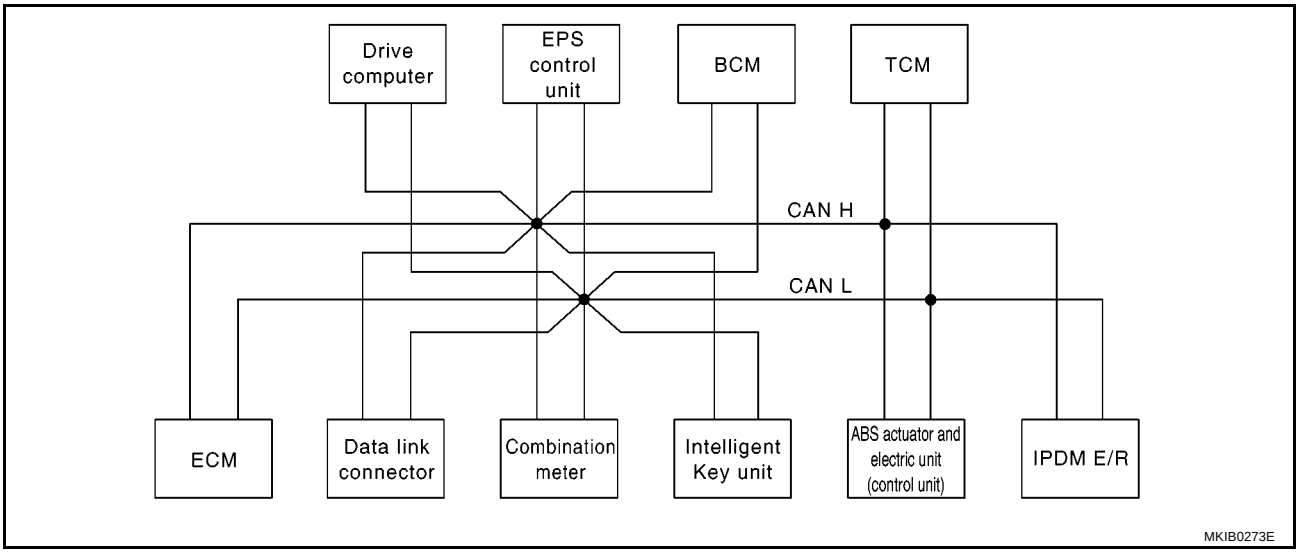
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

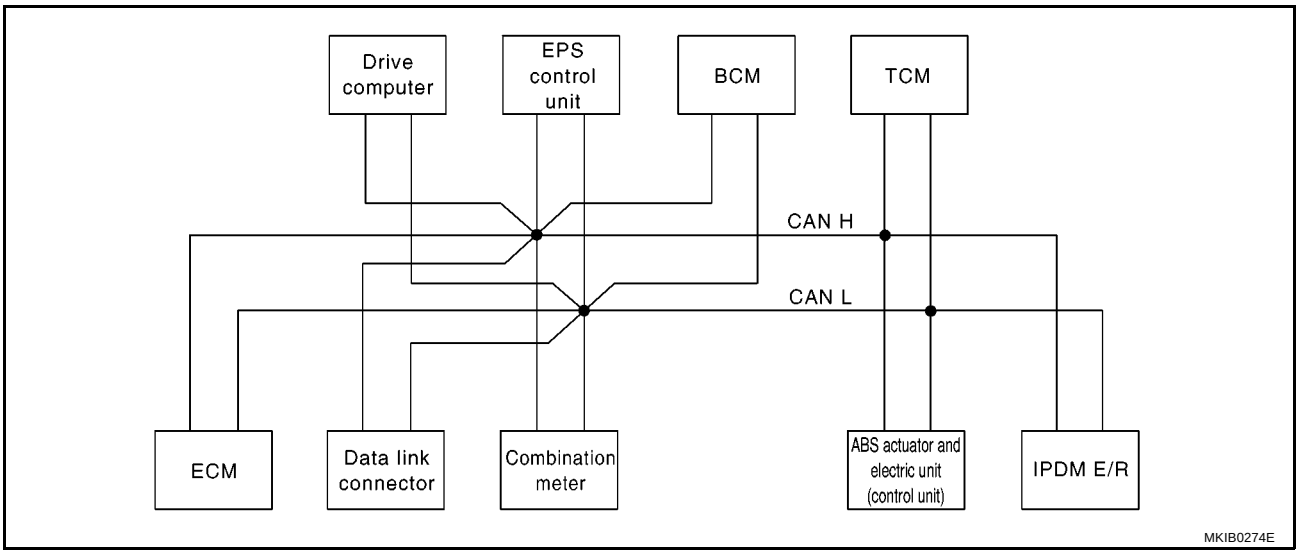
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

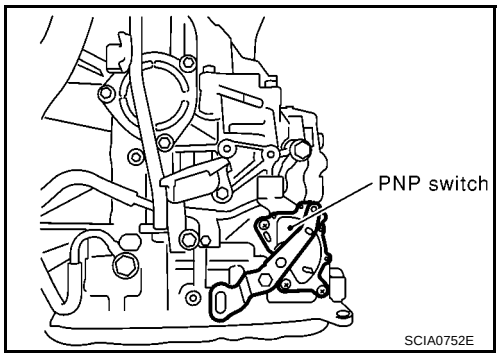
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PFP:32006

Description

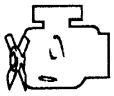
ECS008NZ

- The PNP switch assembly includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
26	BR	PNP switch “1” position	and 	When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	LG	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
34	P	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	R	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
36	Y	PNP switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: PNP SW/CIRC	TCM does not receive the correct voltage signal from the switch based on the gear position.	● Harness or connectors (The PNP switch circuit is open or shorted.) ● PNP switch
: P0705		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

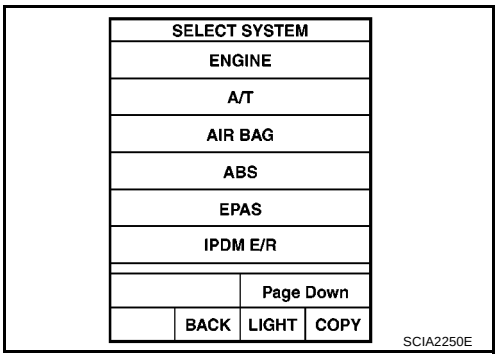
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

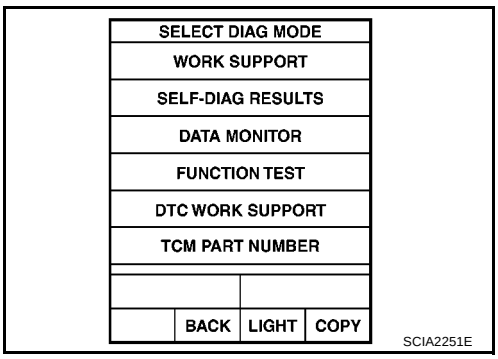
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.3V
   Selector lever: D position (OD "ON" or "OFF")

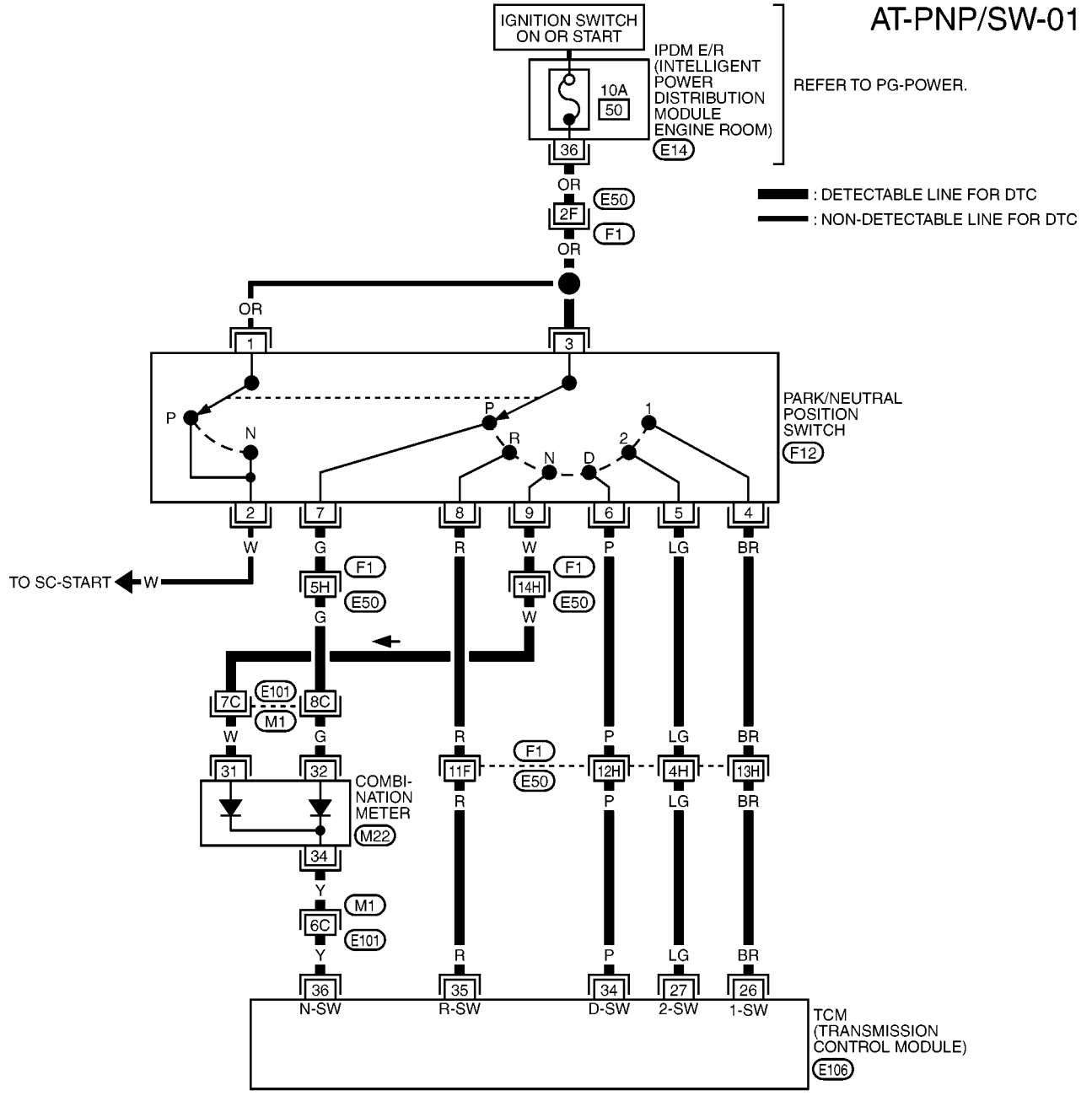


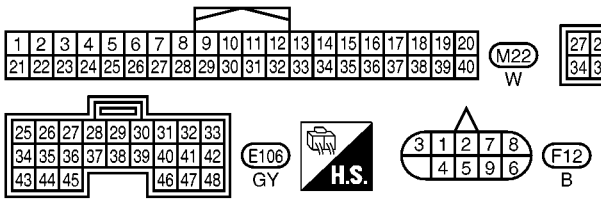
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — PNP/SW

ECS008O0





REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0071E

Diagnostic Procedure

ECS008O1

1. INSPECTION START

Do you have CONSULT-II?

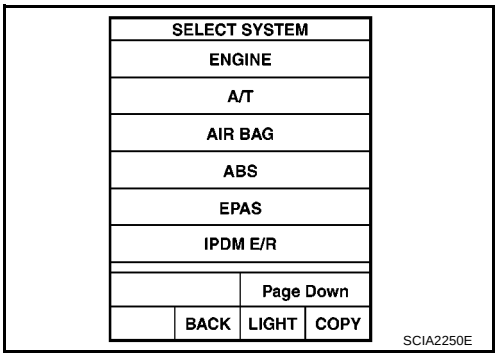
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

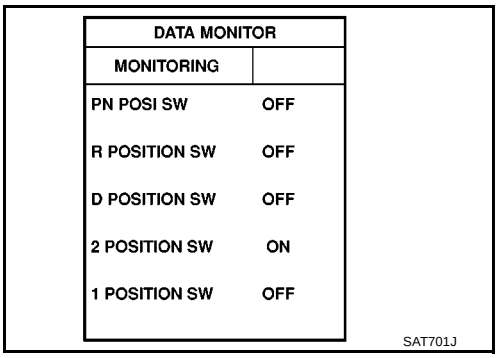
2. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out “P/N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.
   Check the signal of the selector lever position is indicated properly.



OK or NG

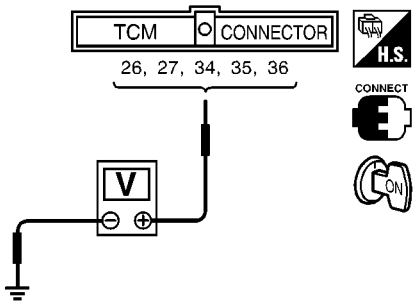
OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- PNP switch
  Refer to AT-119, "Component Inspection" .
- Harness for short or open between fuse and PNP switch
- Harness for short or open between PNP switch and TCM
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING" .

3. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch to “ON” position.(Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.



Voltage:
B: Battery voltage
0: 0V

Lever position	Terminal No.				
	36	35	34	27	26
P, N	**B**	0	0	0	0
R	0	**B**	0	0	0
D	0	0	**B**	0	0
2	0	0	0	**B**	0
1	0	0	0	0	**B**

SAT840J

OK or NG

OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- PNP switch
  Refer to AT-119, "Component Inspection" .
- Harness for short or open between fuse and PNP switch
- Harness for short or open between PNP switch and TCM
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING" .

4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-115, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

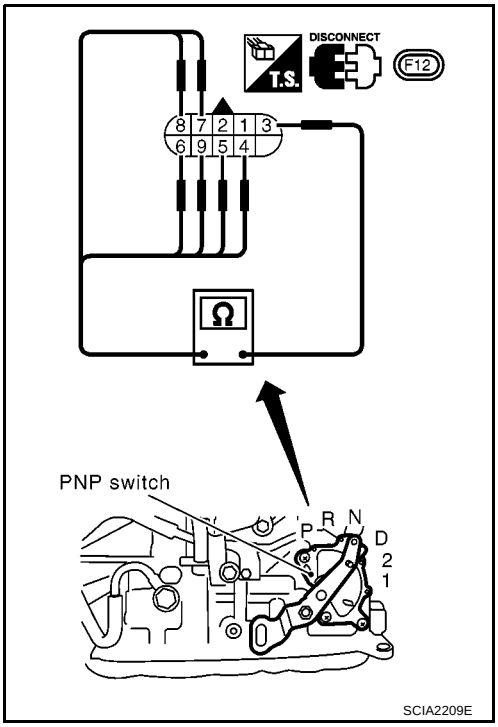
Component Inspection

ECS008O2

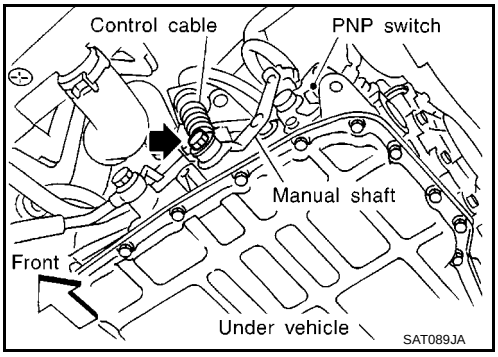
PARK/NEUTRAL POSITION SWITCH

1. Check continuity between terminals 1 and 3 and between terminals 2 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 - 7	1 - 2
R	3 - 8	
N	3 - 9	1 - 2
D	3 - 6	
2	3 - 5	
1	3 - 4	



2. If NG, check again with control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust control cable. Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to AT-426, "Control Valve Assembly and Accumulators" .
6. If NG on step 4, replace PNP switch.



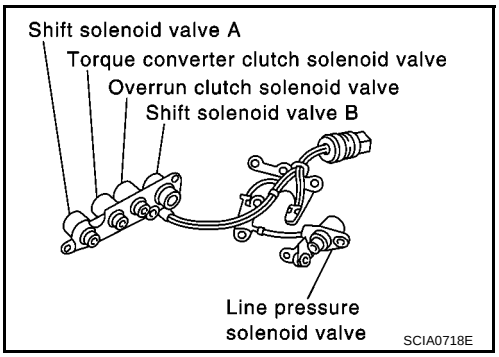
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

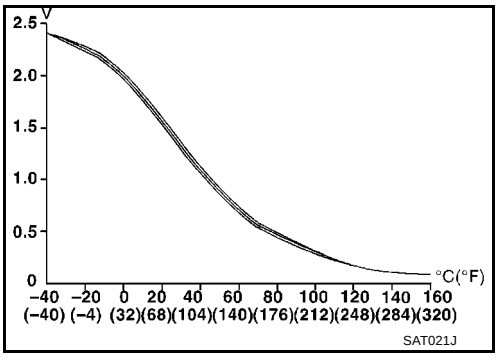
PFP:31940

Description

ECS008O3

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.





CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
42	B	Throttle position sensor (Ground)	Always		0V
47	pu	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: ATF TEMP SEN/CIRC	TCM receives an excessively low or high voltage from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor
: P0710		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

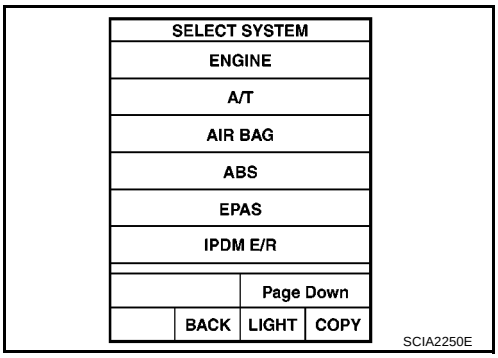
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

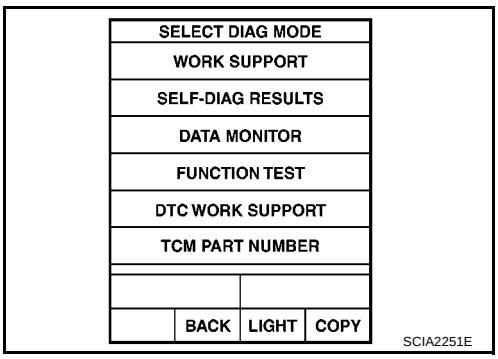
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
   CMPS·RPM (REF): 450 rpm or more
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (OD "ON")

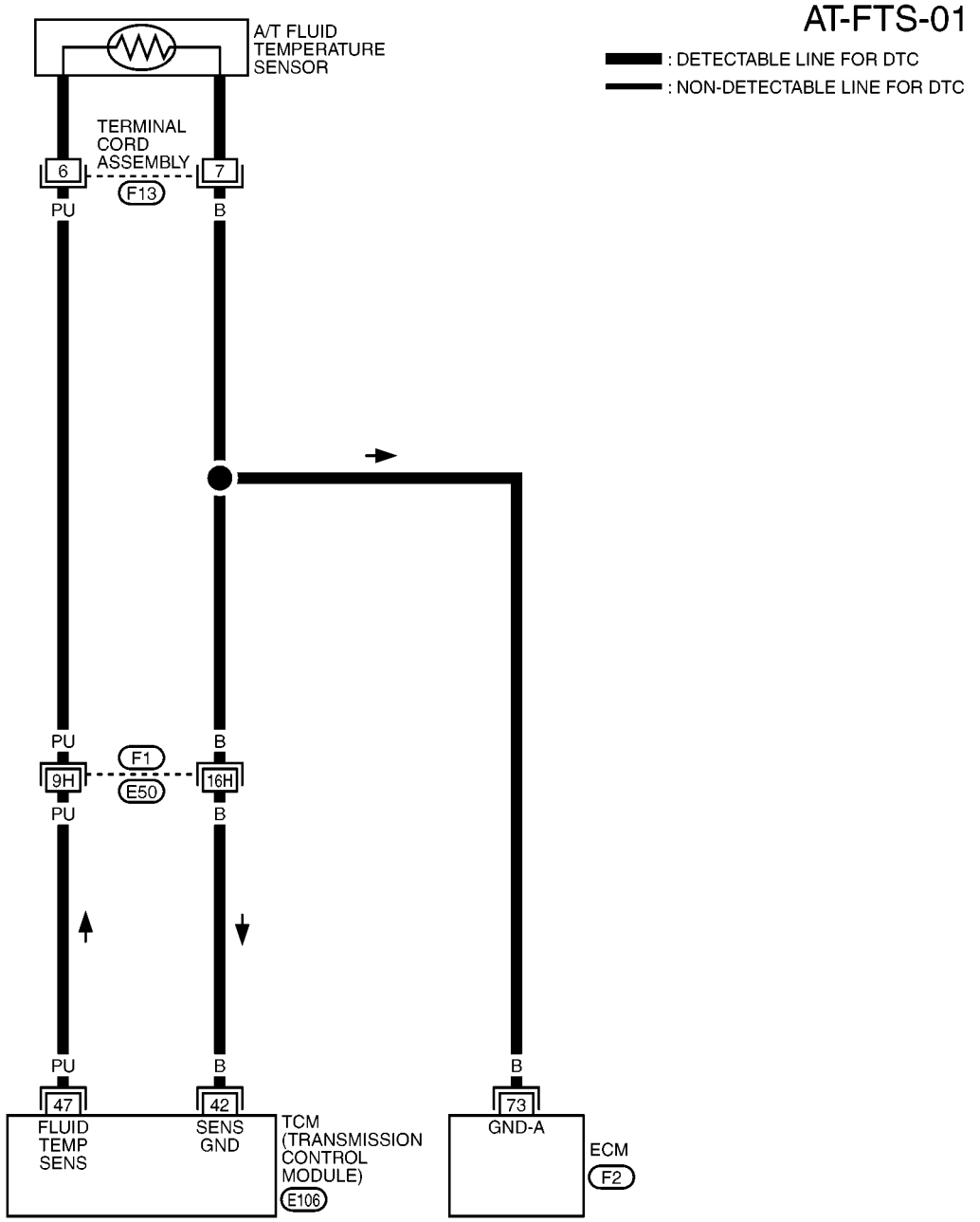


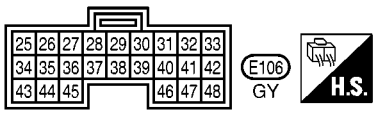
With GST

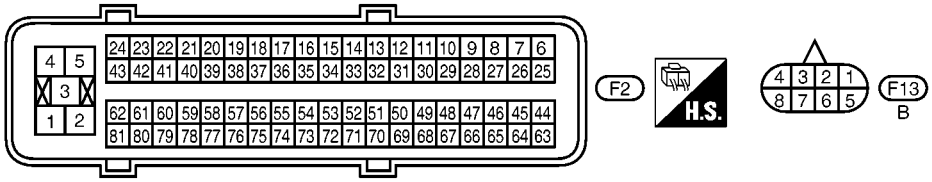
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — FTS

ECS008O4







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0072E

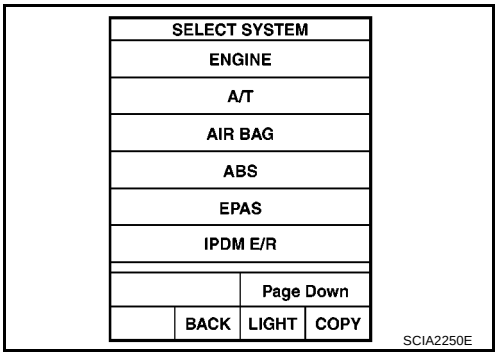
Diagnostic Procedure

ECS008O5

1. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.

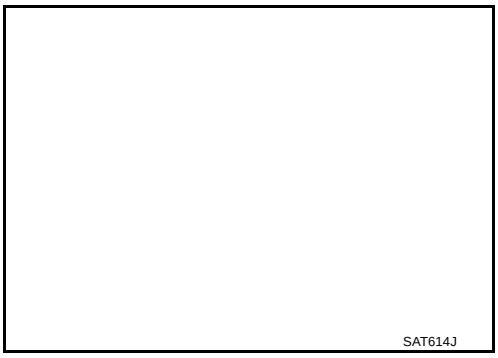


3. Read out the value of “FLUID TEMP SE”.

Voltage:

Cold [20°C (68°F)] → Hot [80°C (176°F)]

Approximately 1.5V → 0.5V



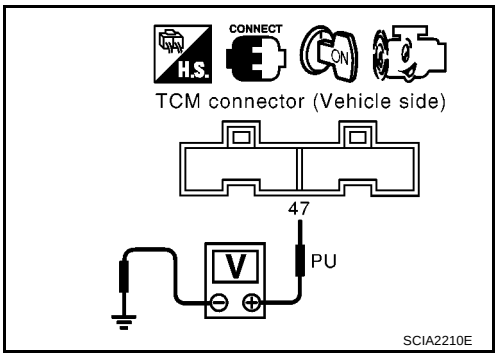
Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

Voltage:

Cold [20°C (68°F)] → Hot [80°C (176°F)]

Approximately 1.5V → 0.5V



3. Turn ignition switch to “OFF” position.
4. Disconnect TCM harness connector.

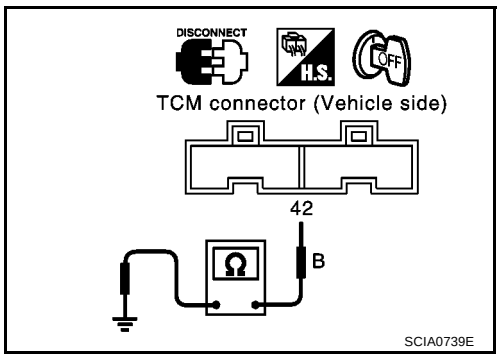
5. Check continuity between terminal 42 and ground.

Continuity should exist.

If OK, check harness for short to ground and short to power.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.



2. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-121, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

3. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

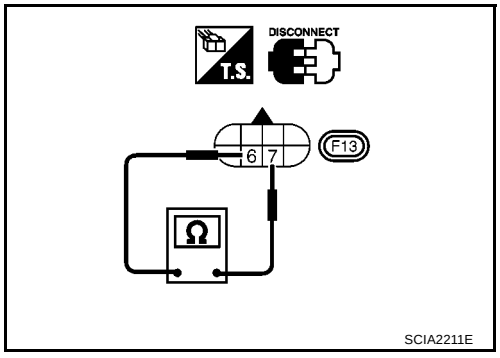
1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold.

Resistance:

Cold [20°C (68°F)]

Approximately 2.5 kΩ

4. Reinstall any part removed.



OK or NG

OK >> GO TO 4.
NG >> 1. Remove oil pan.
2. Check the following items. If any items are damaged, repair or replace damaged parts.
– A/T fluid temperature sensor
Refer to AT-125, "Component Inspection" .
– Harness of terminal cord assembly for short or open

4. DETECT MALFUNCTIONING ITEM

Check the following items:

- harness for short ground or short power or open between TCM, ECM and terminal cord assembly
- Ground circit for ECM
Refer to EC-125, "POWER SUPPLY CIRCUIT FOR ECM" .

OK or NG

OK >> GO TO 2.
NG >> Repair or replace damaged parts.

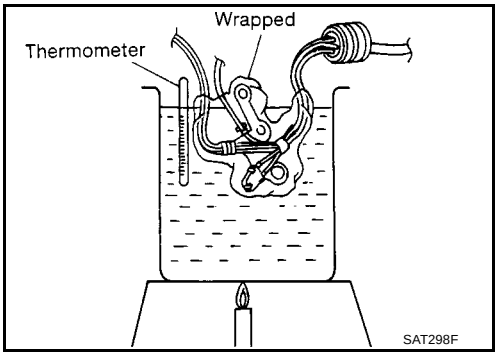
Component Inspection

ECS008O6

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-426, "REMOVAL" .
- Check resistance between two terminals while changing temperature as shown in the figure.

Temperature °C (°F)	Resistance
20 (68)	Approximately 2.5 kΩ
80 (176)	Approximately 0.3 kΩ



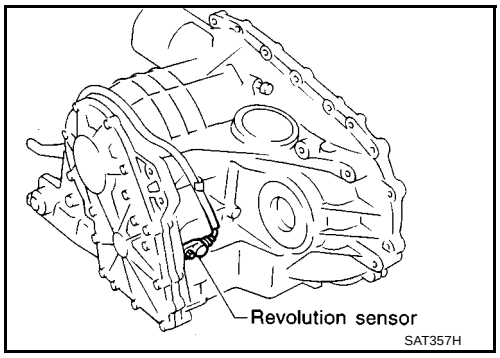
DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

PFP:32702

Description

ECS008O7

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	OR	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz
42	B	Throttle position sensor (Ground)	Always		0V

ON BOARD DIAGNOSIS LOGIC

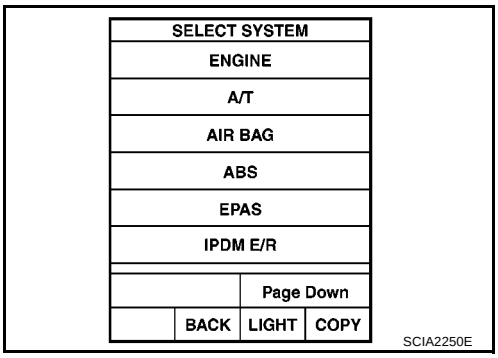
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: VEH SPD SEN/CIR AT	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Revolution sensor
: P0720		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

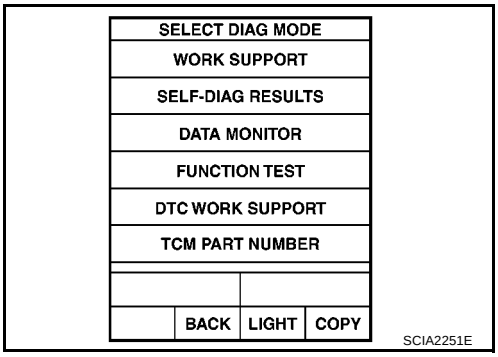
NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

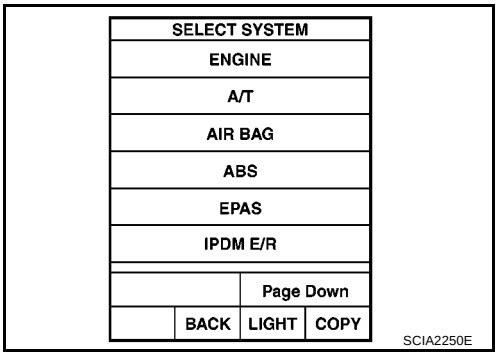


After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Drive vehicle and check for an increase of "VHCL/S SE·MTR" value increase.
   If the check result is NG, go to AT-129, "Diagnostic Procedure" .
   If the check result is OK, go to following step.
3. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 30 km/h (19 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (OD "ON")
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to AT-129, "Diagnostic Procedure" .
   If the check result is OK, go to following step.

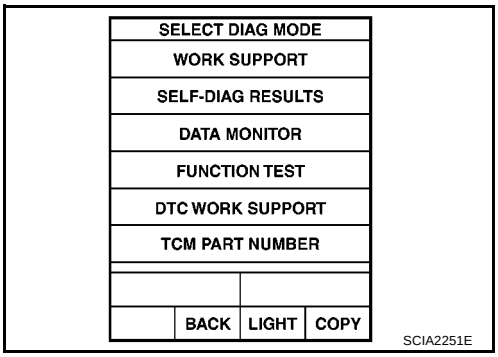




5. Maintain the following conditions for at least 5 consecutive seconds.
   CMPS·RPM (REF): 3,500 rpm or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (OD "ON")
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

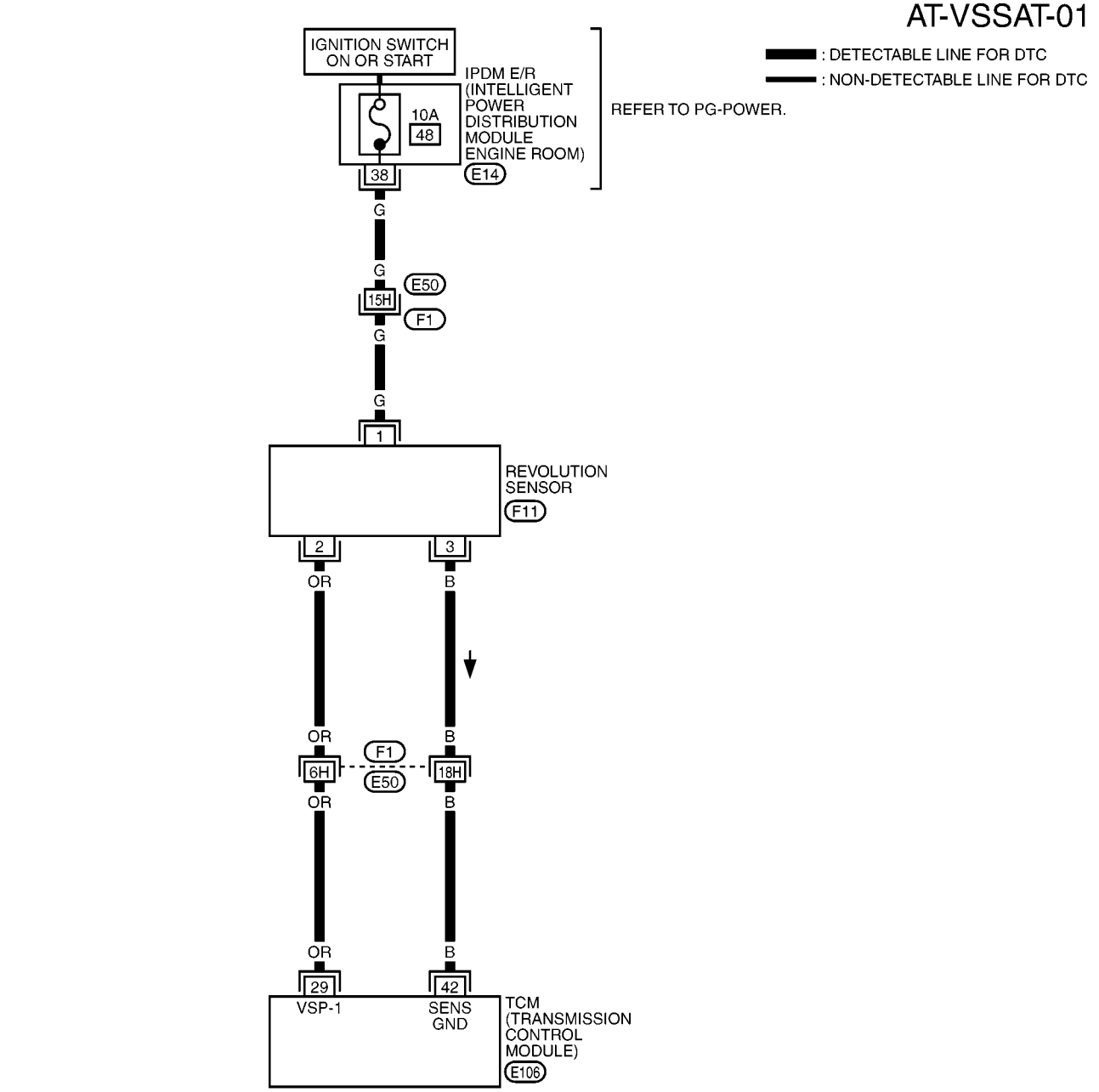
With GST

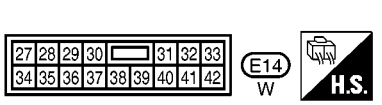
Follow the procedure "With CONSULT-II".

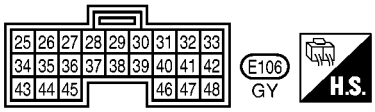


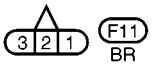
Wiring Diagram — AT — VSSA/T

ECS008O8









REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0073E

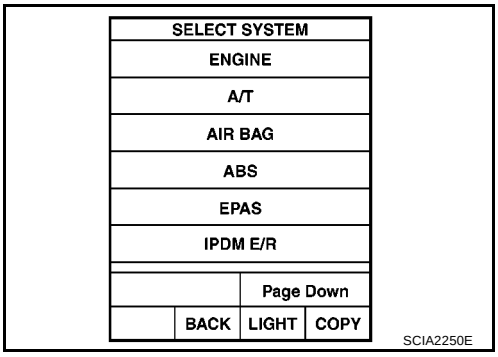
Diagnostic Procedure

ECS008O9

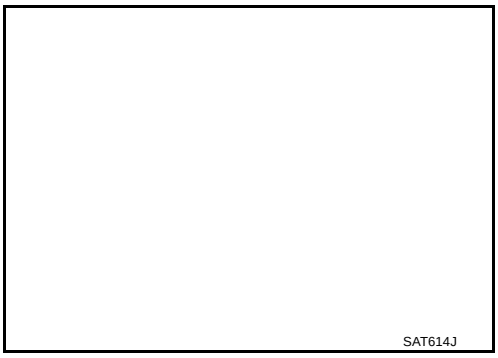
1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “VHCL/S SE·A/T” while driving. Check the value changes according to driving speed.



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

With CONSULT-II

1. Start engine.
2. Check the pulse when vehicle cruises.

Item	Condition		Judgement standard (Approx.)
Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz

OK or NG

OK >> GO TO 3.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM, ECM and revolution sensor
- Harness for short or open between fuse and revolution sensor

3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-127, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

DTC P0725 ENGINE SPEED SIGNAL

PFP:24825

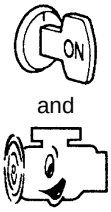
Description

ECS008OA

The engine speed signal is sent from the ECM to the TCM.

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	L	Engine speed signal	 and	—	Refer to EC-94, "ECM INSPECTION TABLE" .

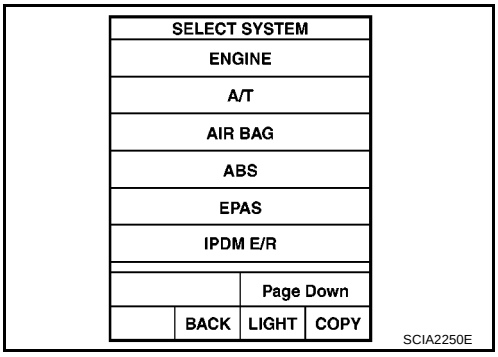
ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
: ENGINE SPEED SIG : P0725	TCM does not receive the proper voltage signal from ECM.	● Harness or connectors (The sensor circuit is open or shorted.)

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:
Always drive vehicle at a safe speed.

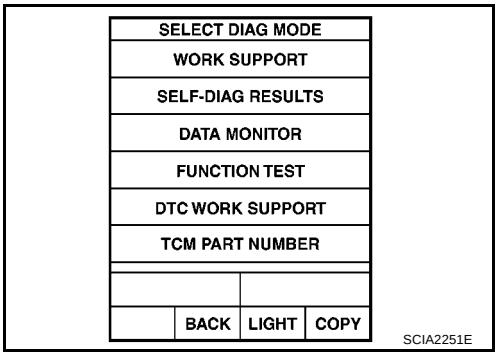
NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.



After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (OD "ON")

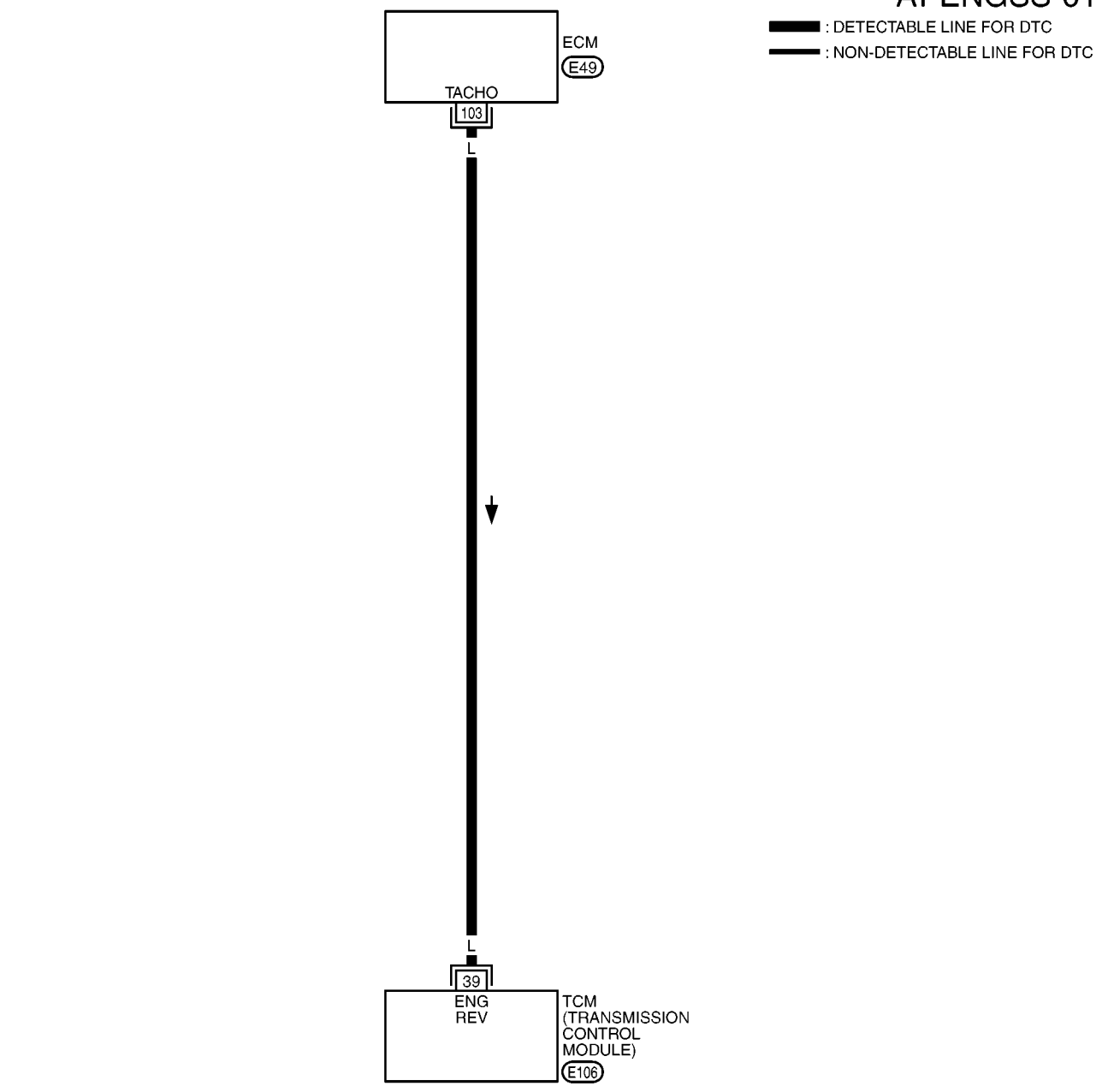


With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — ENGSS

ECS008OB



MCWA0074E

Diagnostic Procedure

ECS008OC

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self- diagnostic results) for engine control. Check ignition signal circuit condition.

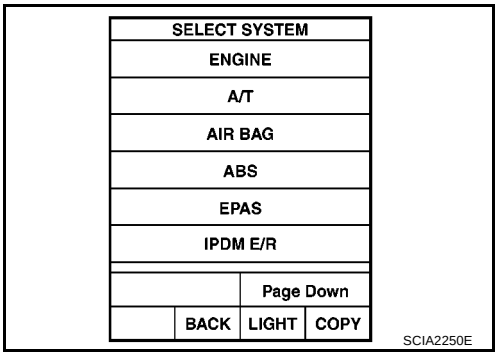
OK or NG

OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to EC-435, "IGNITION SIGNAL" .

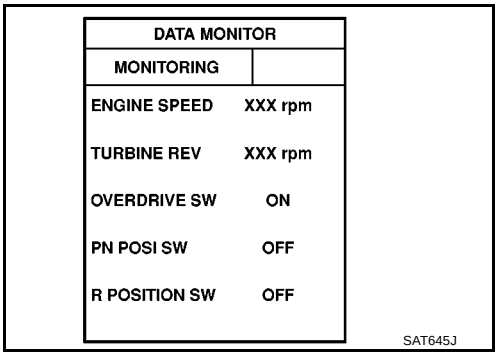
2. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.



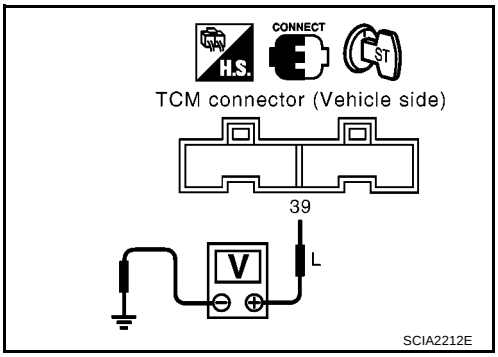
Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 39 and ground.

Voltage (Idle speed): Refer to EC-94, "ECM INSPECTION TABLE" .

OK or NG

OK >> GO TO 3.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.
- Harness for short or open between TCM and ECM
- Resistor and ignition coil. Refer to EC-435, "IGNITION SIGNAL" .



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-131, "DTC P0725 ENGINE SPEED SIGNAL" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

DTC P0731 A/T 1ST GEAR FUNCTION

PFP:31940

Description

ECS008OD

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

ON BOARD DIAGNOSTIC LOGIC

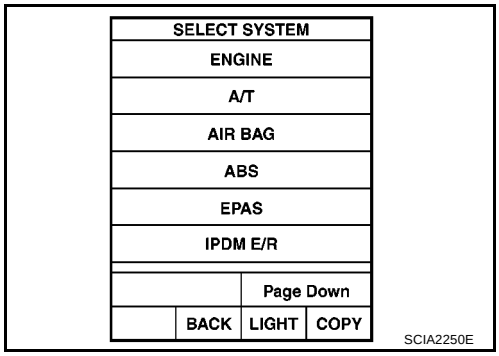
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve A stuck open	2*	2	3	3
In case of gear position with shift solenoid valve B stuck open	4*	3	3	4

*: P0731 is detected.

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: A/T 1ST GR FNCTN	A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
: P0731		

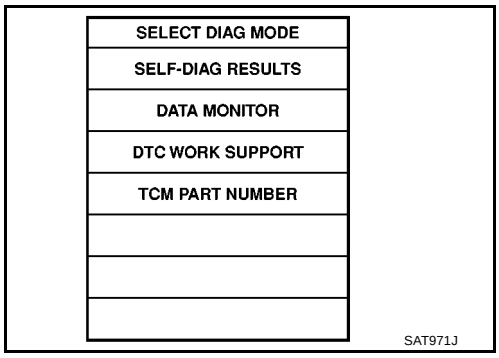
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE



CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

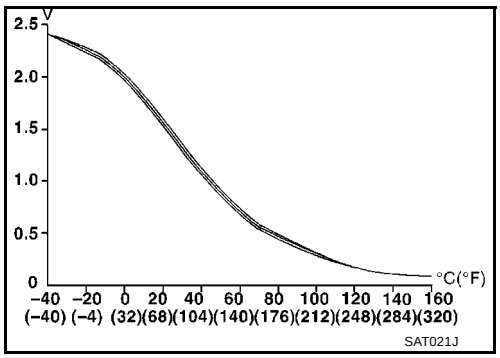
NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.



TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "1ST GR FNCTN P0731" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (OD "ON")



- **Check that "GEAR" shows "2" after releasing pedal.**

5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-139, "Diagnostic Procedure" .
   If "STOP VEHICLE" appears on CONSULT-II screen, go to the following step.

- **Check that "GEAR" shows "1" when depressing accelerator pedal to WOT.**
- **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0731 exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

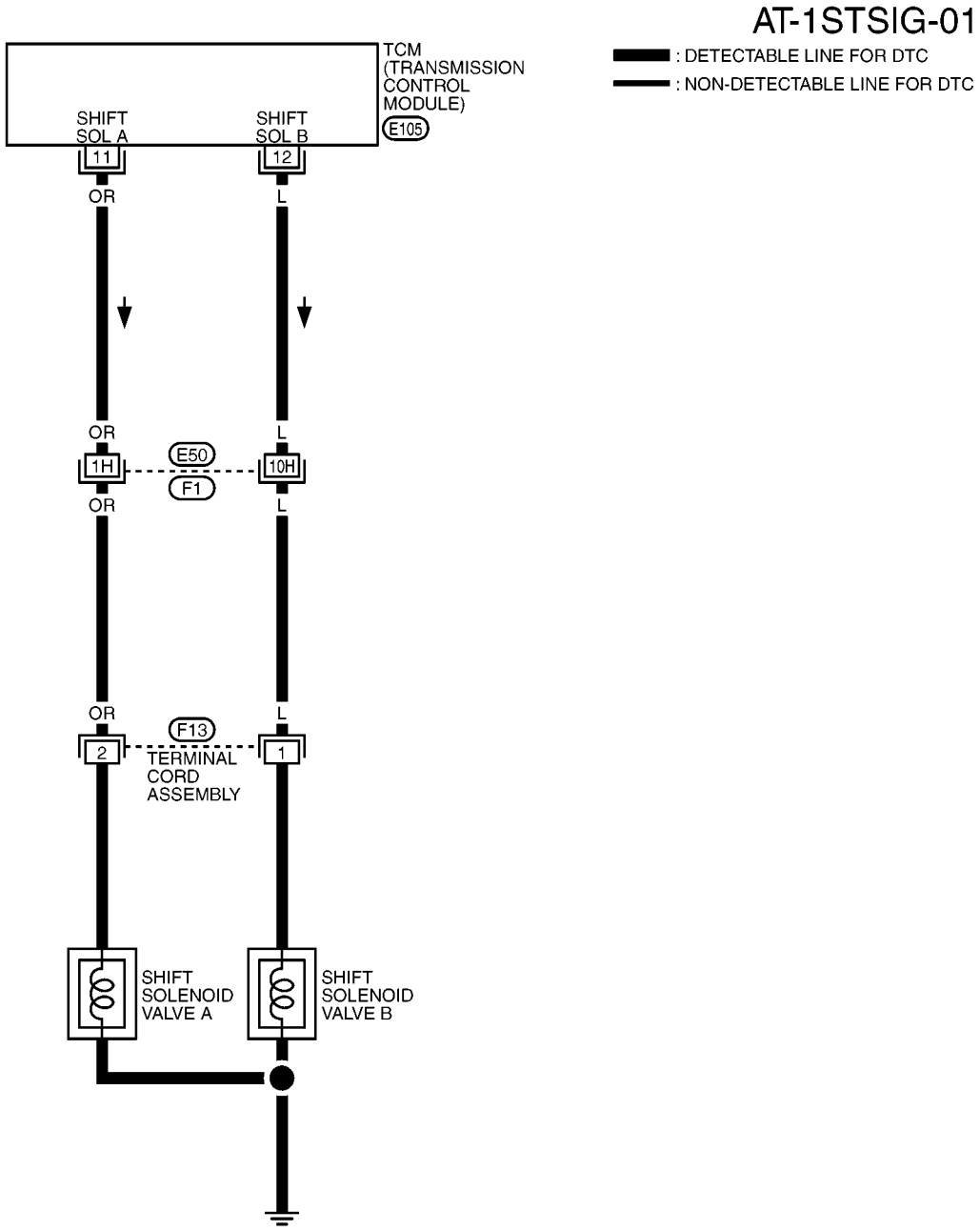
8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-139, "Diagnostic Procedure" .
   Refer to AT-534, "Shift Schedule" .

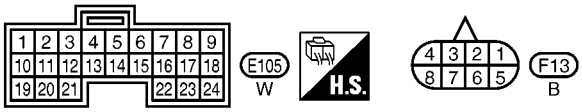
With GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 1ST

ECS008OE





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0075E

Diagnostic Procedure

ECS008OF

1. CHECK SHIFT SOLENOID VALVE

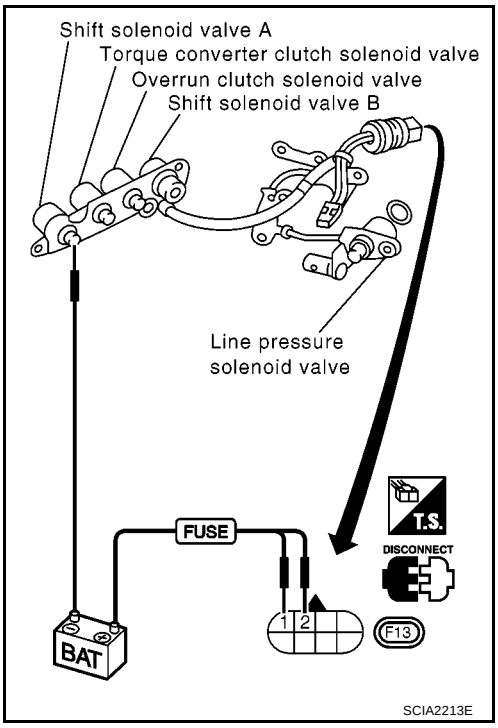
1. Remove control valve assembly. Refer to AT-426, "REMOVAL"
2. Check shift solenoid valve operation.

- Shift solenoid valve A
- Shift solenoid valve B

Refer to AT-140, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.



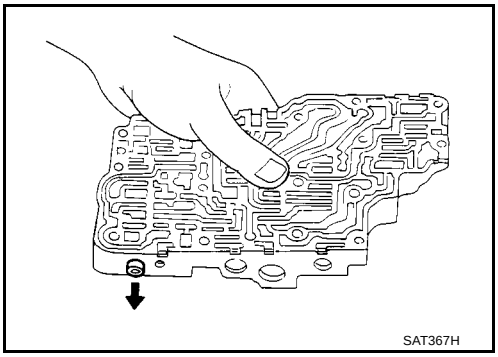
2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-457, "Control Valve Assembly" .
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace control valve assembly.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-136, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> Check transaxle inner parts (clutch, brake, etc.).

Component Inspection

ECS008OG

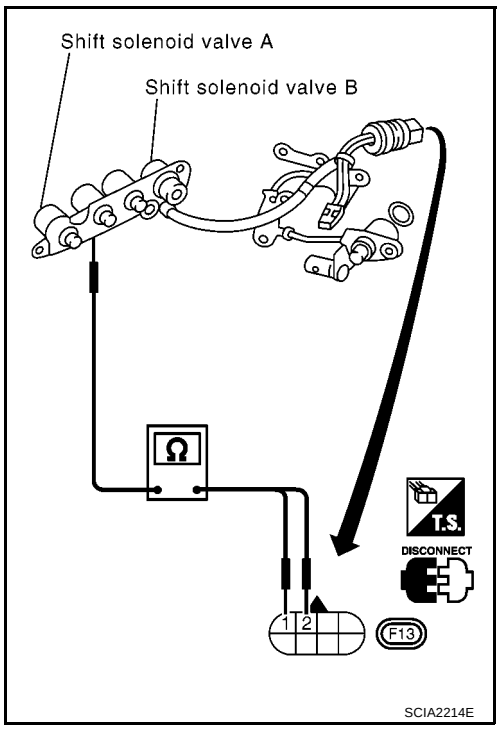
SHIFT SOLENOID VALVE A AND B

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

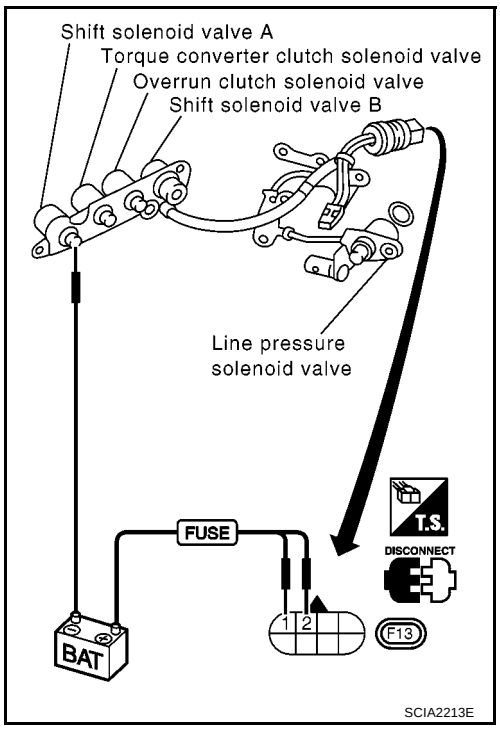
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0732 A/T 2ND GEAR FUNCTION

PFP:31940

Description

ECS008OH

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck open.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck open	4	3*	3	4

*: P0732 is detected.

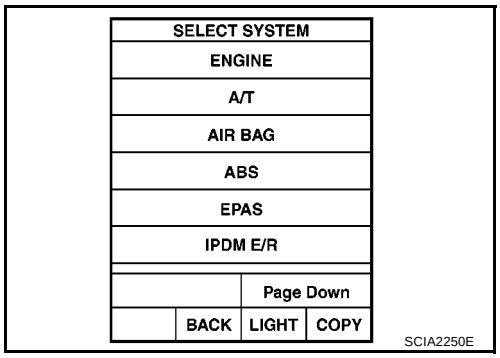
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: A/T 2ND GR FNCTN	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
GST : P0732		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

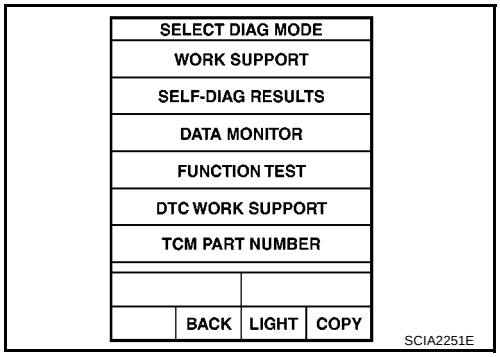
CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

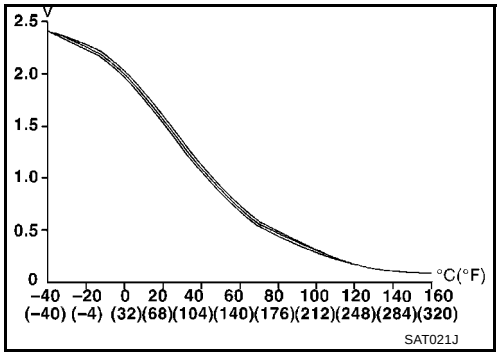


TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4. Accelerate vehicle to 50 to 55 km/h (31 to 34 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (OD "ON")
   - **Check that "GEAR" shows "3" or "4" after releasing pedal.**
5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 50 to 55 km/h (31 to 34 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-145, "Diagnostic Procedure" .
   If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.



- **Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.**
- **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4

No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0732 exists.	4 → 3 → 3 → 4

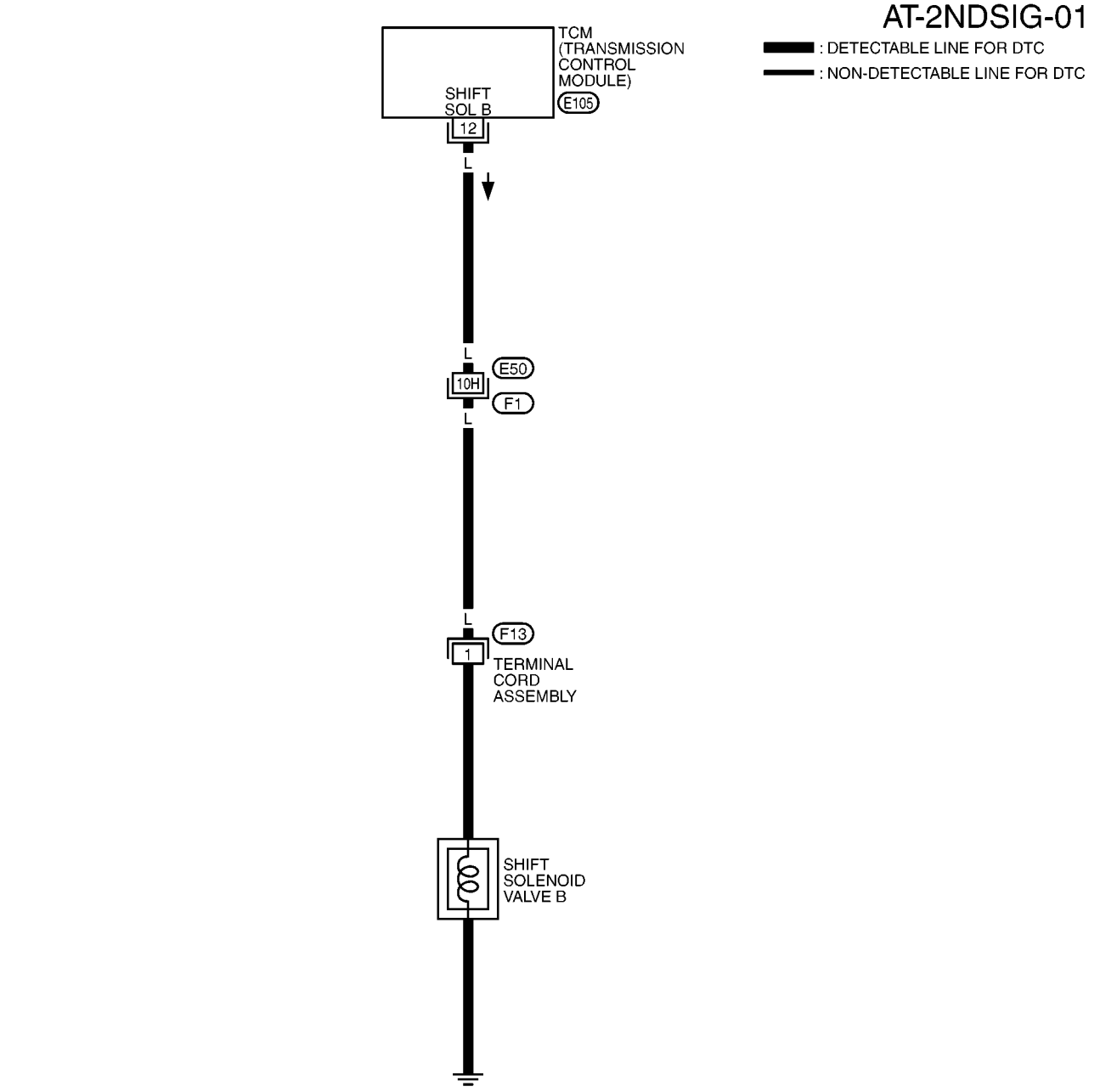
8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-145, "Diagnostic Procedure" .
   Refer to AT-534, "Shift Schedule" .

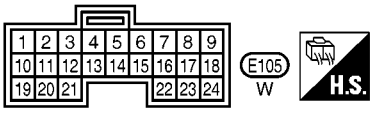
With GST

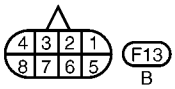
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 2ND

ECS008OI







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0076E

Diagnostic Procedure

ECS008OJ

1. CHECK SHIFT SOLENOID VALVE

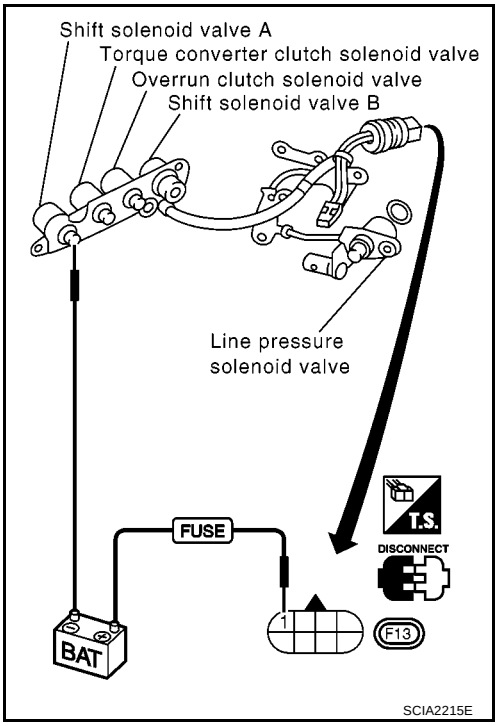
1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check shift solenoid valve operation.

- Shift solenoid valve B

Refer to AT-146, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.



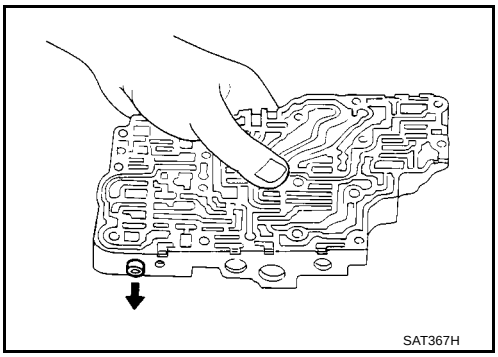
2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-457, "Control Valve Assembly" .
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace control valve assembly.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-142, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> Check transaxle inner parts (clutch, brake, etc.).

Component Inspection

ECS008OK

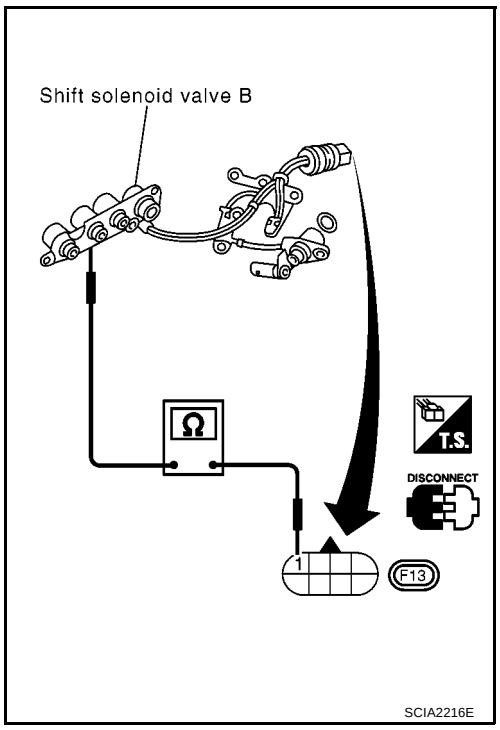
SHIFT SOLENOID VALVE B

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

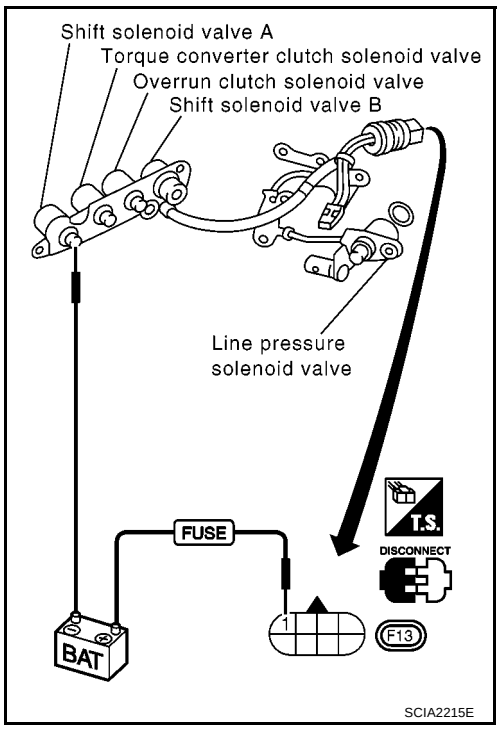
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ECS008OL

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve A is stuck closed.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve A stuck closed	1	1	4*	4

*: P0733 is detected.

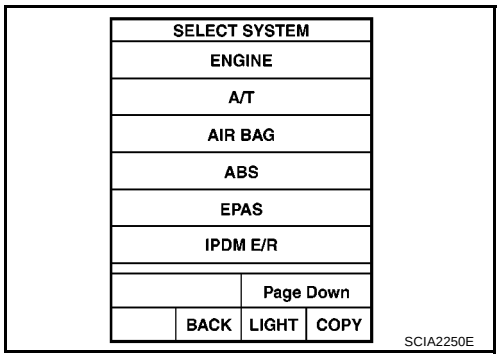
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: A/T 3RD GR FNCTN	A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
: P0733		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

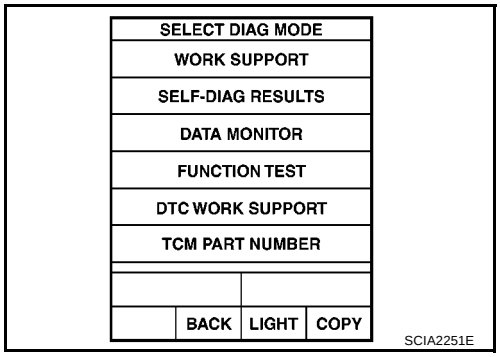
CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

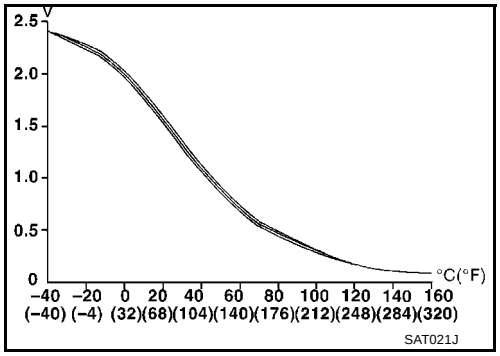


TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "3RD GR FNCTN P0733" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4. Accelerate vehicle to 70 to 85 km/h (43 to 53 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (OD "ON")
   - **Check that "GEAR" shows "4" after releasing pedal.**
5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of "THROTTLE POSI" from a speed of 70 to 85 km/h (43 to 53 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-151, "Diagnostic Procedure" .
   If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.



- **Check that "GEAR" shows "3" when depressing accelerator pedal with 3.5/8 - 4.5/8 of "THROTTLE POSI".**
- **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0733 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for P0733 exists.	1 → 1 → 4 → 4

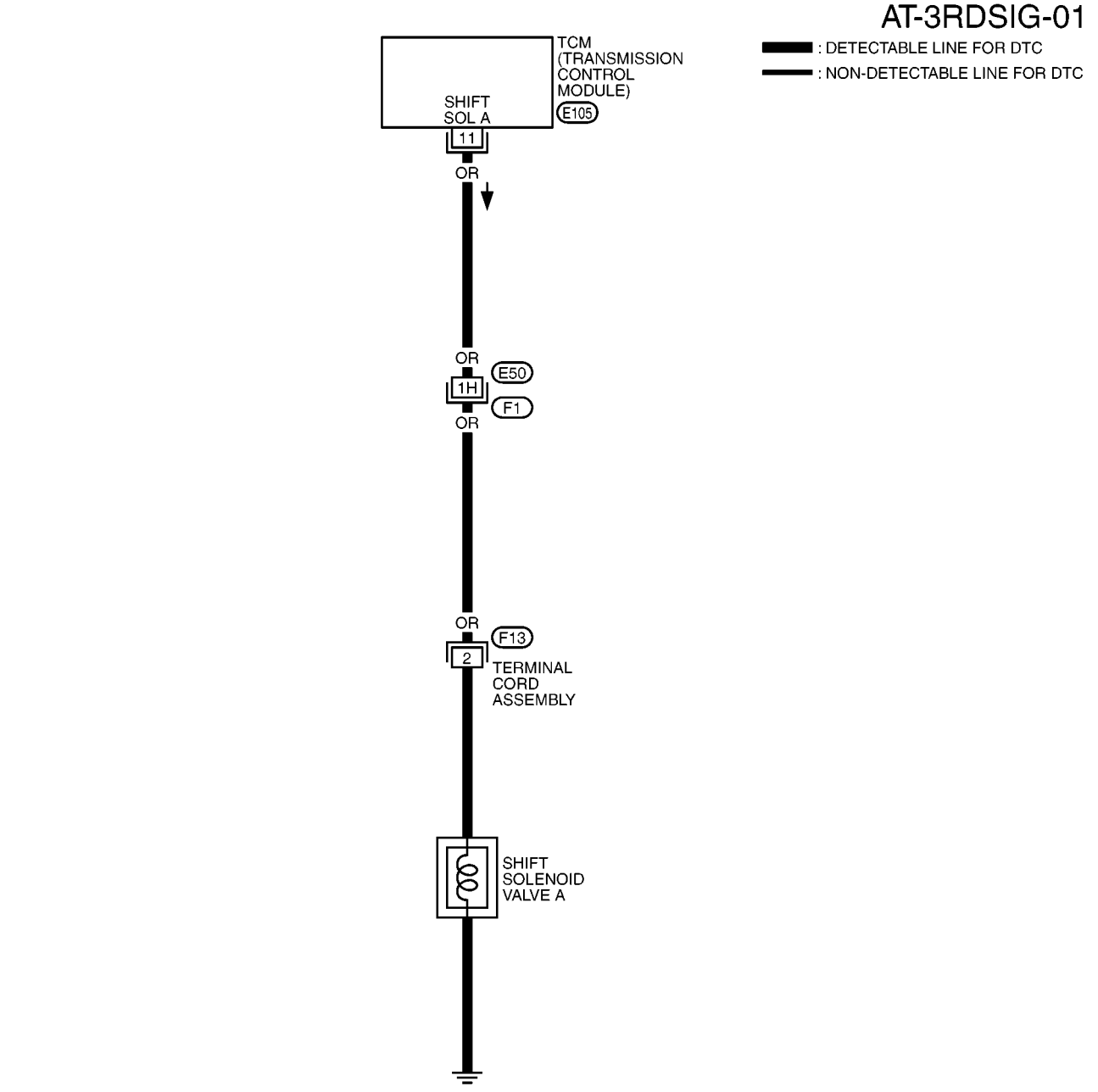
8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to AT-151, "Diagnostic Procedure" .)
   Refer to AT-151, "Diagnostic Procedure" .
   Refer to AT-534, "Shift Schedule" .

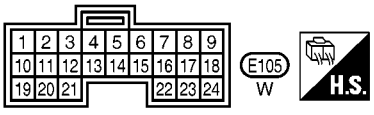
With GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 3RD

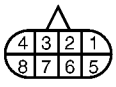
ECS008OM





E105
W

H.S.



F13
B

REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0077E

Diagnostic Procedure

ECS008ON

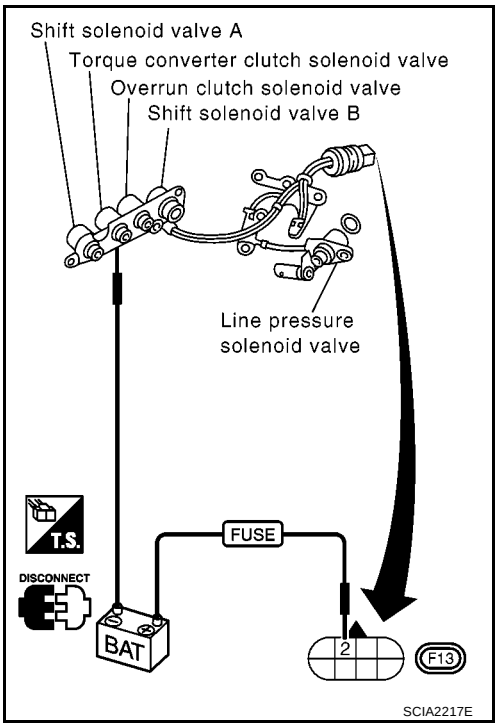
1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check shift solenoid valve operation.

- Shift solenoid valve A
  Refer to “Component Inspection” below.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.



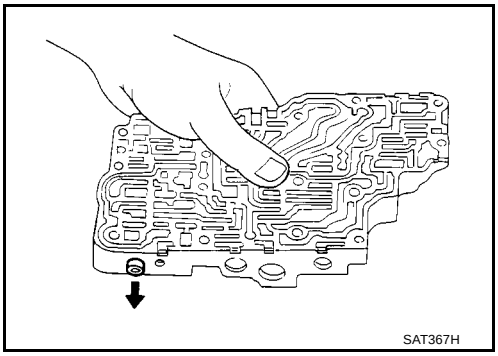
2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-457, "Control Valve Assembly" .
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace control valve assembly.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-147, "DTC P0733 A/T 3RD GEAR FUNCTION" .

OK or NG

OK >> **INSPECTION END**
NG >> Check transaxle inner parts (clutch, brake, etc.).

Component Inspection

ECS008OO

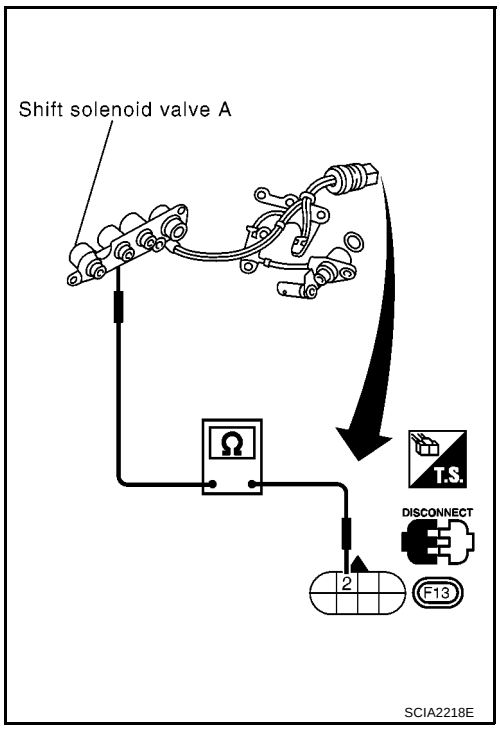
SHIFT SOLENOID VALVE A

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

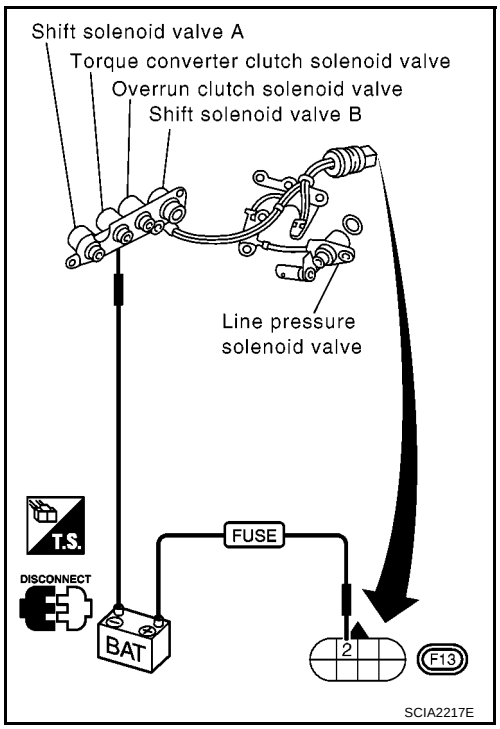
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0734 A/T 4TH GEAR FUNCTION

PFP:31940

Description

ECS008OP

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or line pressure is low as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	PU	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BR	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	0V

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve A is stuck open or shift solenoid valve B is stuck closed.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	**4**
In case of gear position with shift solenoid valve A stuck open	2	2	3	**3***
In case of gear position with shift solenoid valve B stuck closed	1	2	2	**1***

*: P0734 is detected.

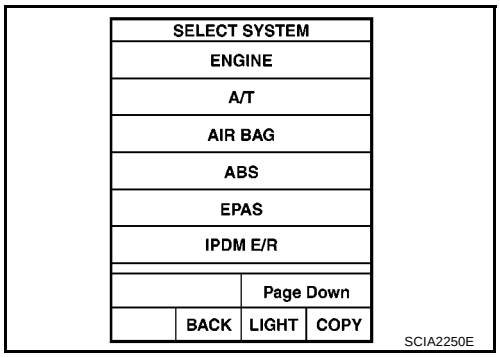
And also, this malfunction will be caused when line pressure is lower than normal same as line pressure solenoid valve stuck open.

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: A/T 4TH GR FNCTN : P0734	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	● Shift solenoid valve A ● Shift solenoid valve B ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit

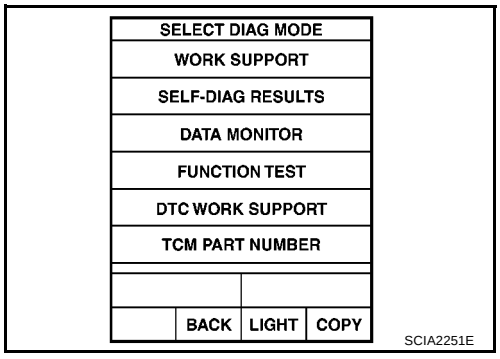
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If conducting this “DTC CONFIRMATION PROCEDURE” again, always turn ignition switch “OFF” and wait at least 5 seconds before continuing.**
- **Be careful not to rev engine into the red zone on the tachometer.**

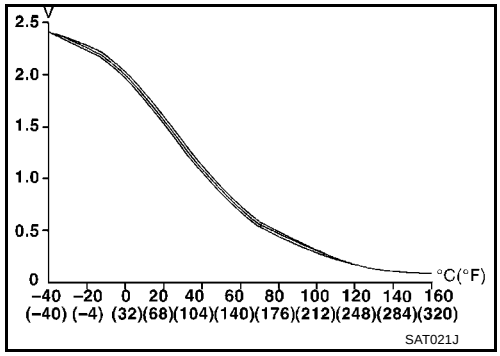


NOTE:
If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “4TH GR FNCTN P0734” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
4. Accelerate vehicle to 45 to 55 km/h (28 to 34 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   Selector lever: D position (OD “ON”)
   - **Check that “GEAR” shows “3” after releasing pedal.**
5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 45 to 55 km/h (28 to 34 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-157, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Check that “GEAR” shows “4” when depressing accelerator pedal with 1.0/8 - 2.0/8 of “THROTTLE POSI”.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0734 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0734 exists.	2 → 2 → 3 → 3
	1 → 2 → 2 → 1

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to AT-157, "Diagnostic Procedure" .)
   Refer to AT-157, "Diagnostic Procedure" .
   Refer to AT-534, "Shift Schedule" .

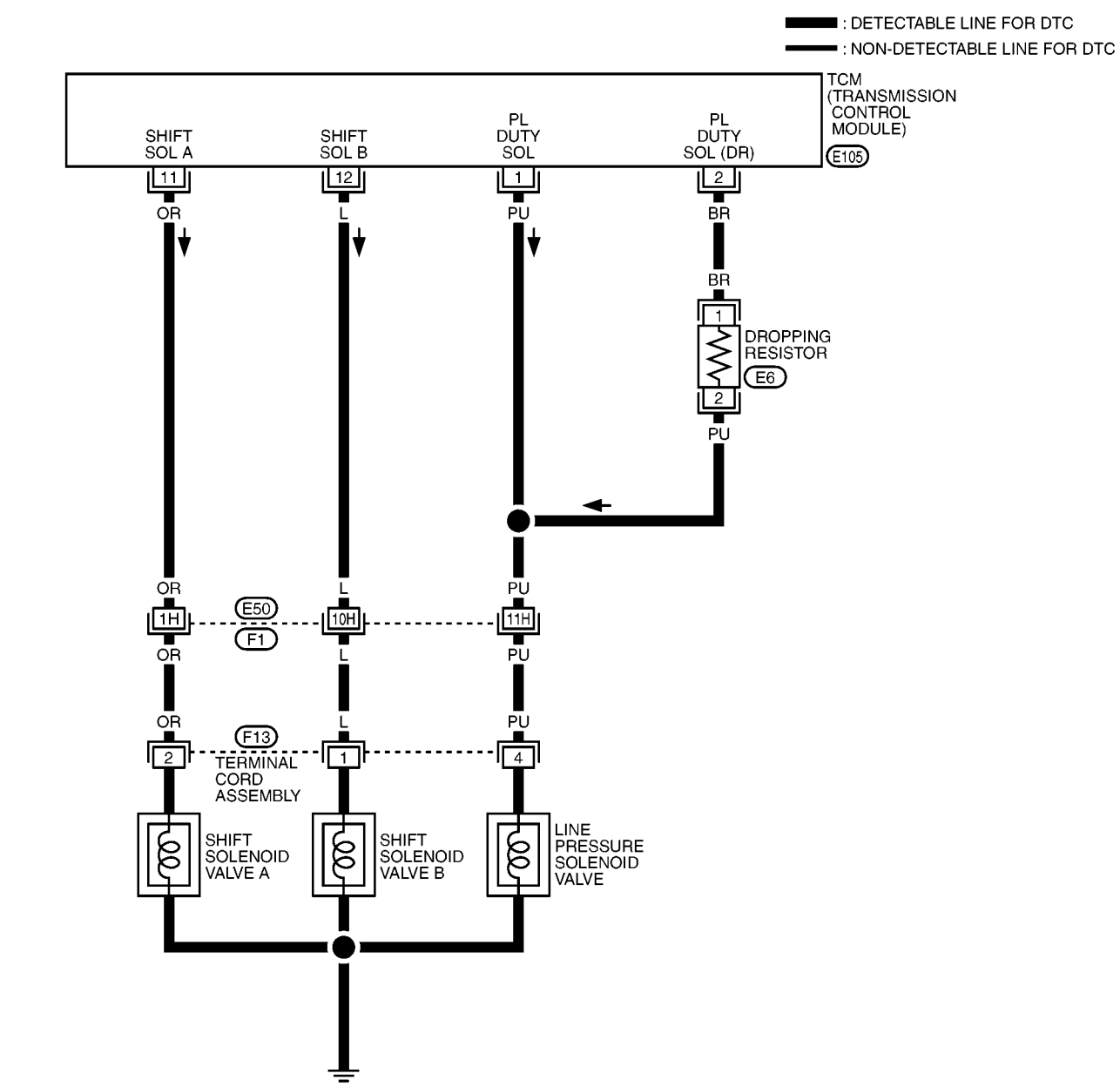
With GST

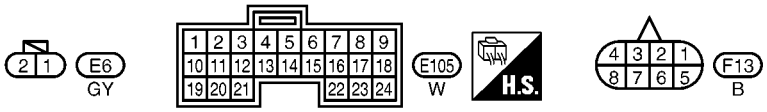
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 4TH

ECS008OQ

AT-4THSIG-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0078E

Diagnostic Procedure

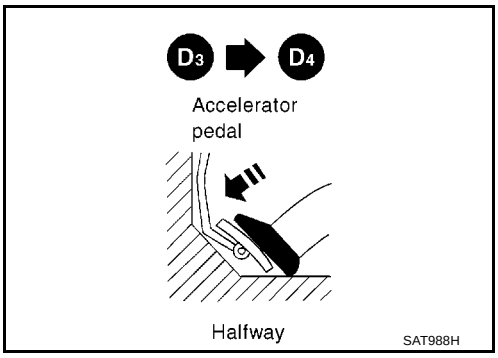
ECS008OR

1. CHECK SHIFT UP (D_3 TO D_4)

During “Cruise test — Part 1” (AT-75, "Cruise Test — Part 1"), does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

Yes >> GO TO 9.
No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-65, "Line Pressure Test" .

OK or NG

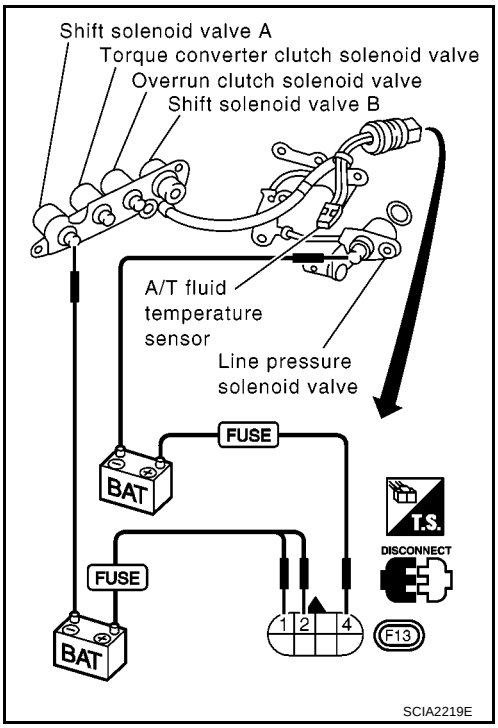
OK >> GO TO 3.
NG >> GO TO 6.

3. CHECK SOLENOID VALVES

1. Remove control valve assembly.
   Refer to AT-426, "REMOVAL" .
2. Refer to AT-160, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace solenoid valve assembly.



4. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to AT-457, "Control Valve Assembly" .
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace control valve.

5. CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

OK or NG

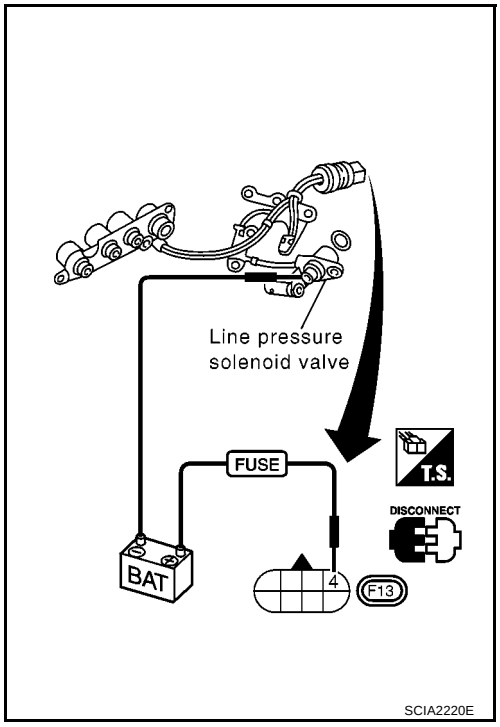
OK >> GO TO 9.
NG >> Check transaxle inner parts (clutch, brake, etc.). If NG, repair or replace the transaxle inner parts.

6. CHECK LINE PRESSURE SOLENOID VALVE

1. Remove control valve assembly.
   Refer to AT-426, "REMOVAL" .
2. Refer to AT-160, "Component Inspection" .

OK or NG

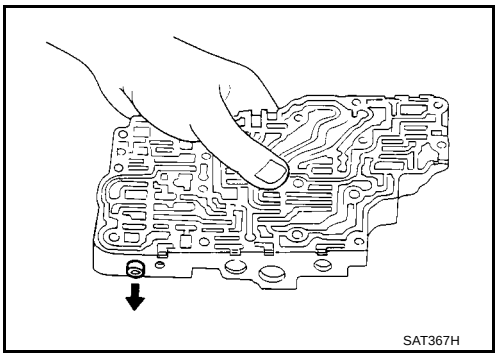
OK >> GO TO 7.
NG >> Replace solenoid valve assembly.



7. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to AT-457, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



OK or NG

OK >> GO TO 8.
NG >> Repair or replace control valve.

8. CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

Yes >> GO TO 9.
No >> Check transaxle inner parts (clutch, brake, etc.). If NG, repair or replace the transaxle inner parts.

9. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-154, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> Perform “Cruise test — Part 1” again and return to the start point of this test group.

Component Inspection

ECS008OS

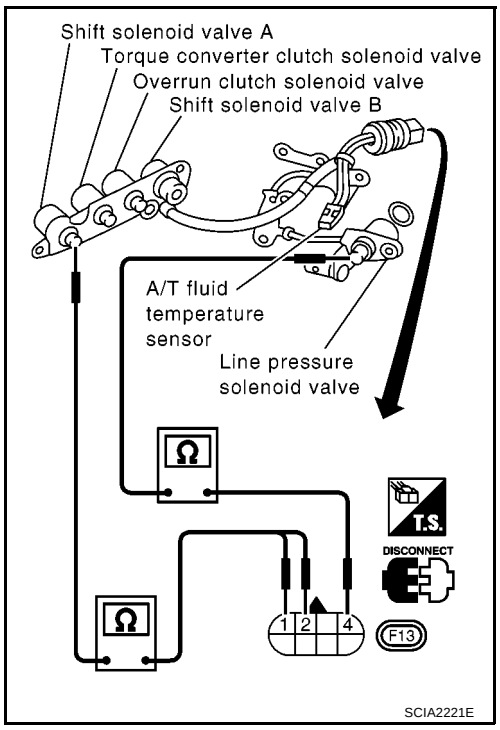
SOLENOID VALVES

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

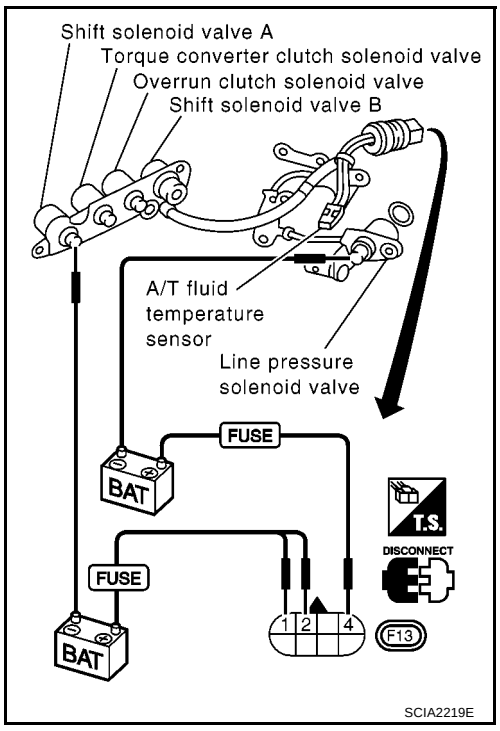
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω
Line pressure solenoid valve	4		2.5 - 5Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



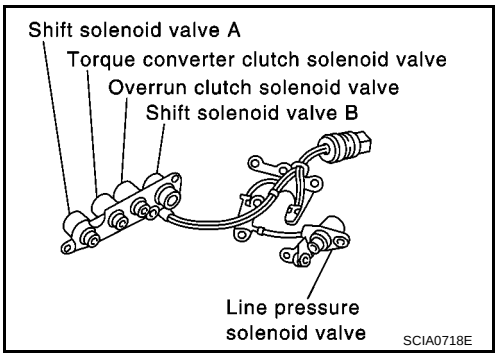
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS008OT

The torque converter clutch solenoid valve is activated, with the gear in "D4 ", by the TCM in response to signals sent from the vehicle speed and throttle position sensors. Lock-up piston operation will then be controlled.
Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓ Lock-up "ON"	Approximately 4% ↓ Approximately 94%

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
3	GY	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

ON BOARD DIAGNOSIS LOGIC

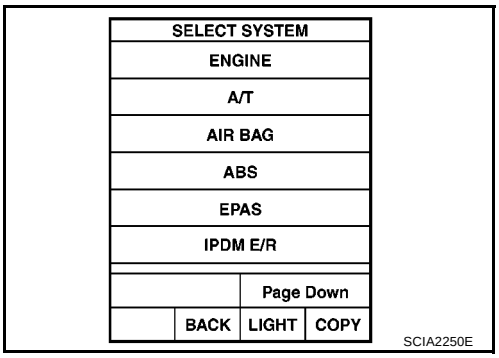
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: TCC SOLENOID/CIRC	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
: P0740		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

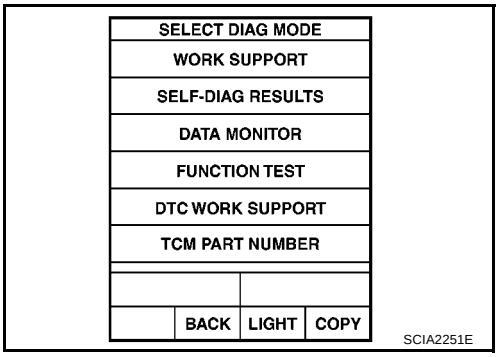
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON". (Do not start engine.)
2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 80 km/h (50 MPH) or more
   THROTTLE POSI : 0.5/8 - 1.0/8
   Selector lever: D position (OD "ON")
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

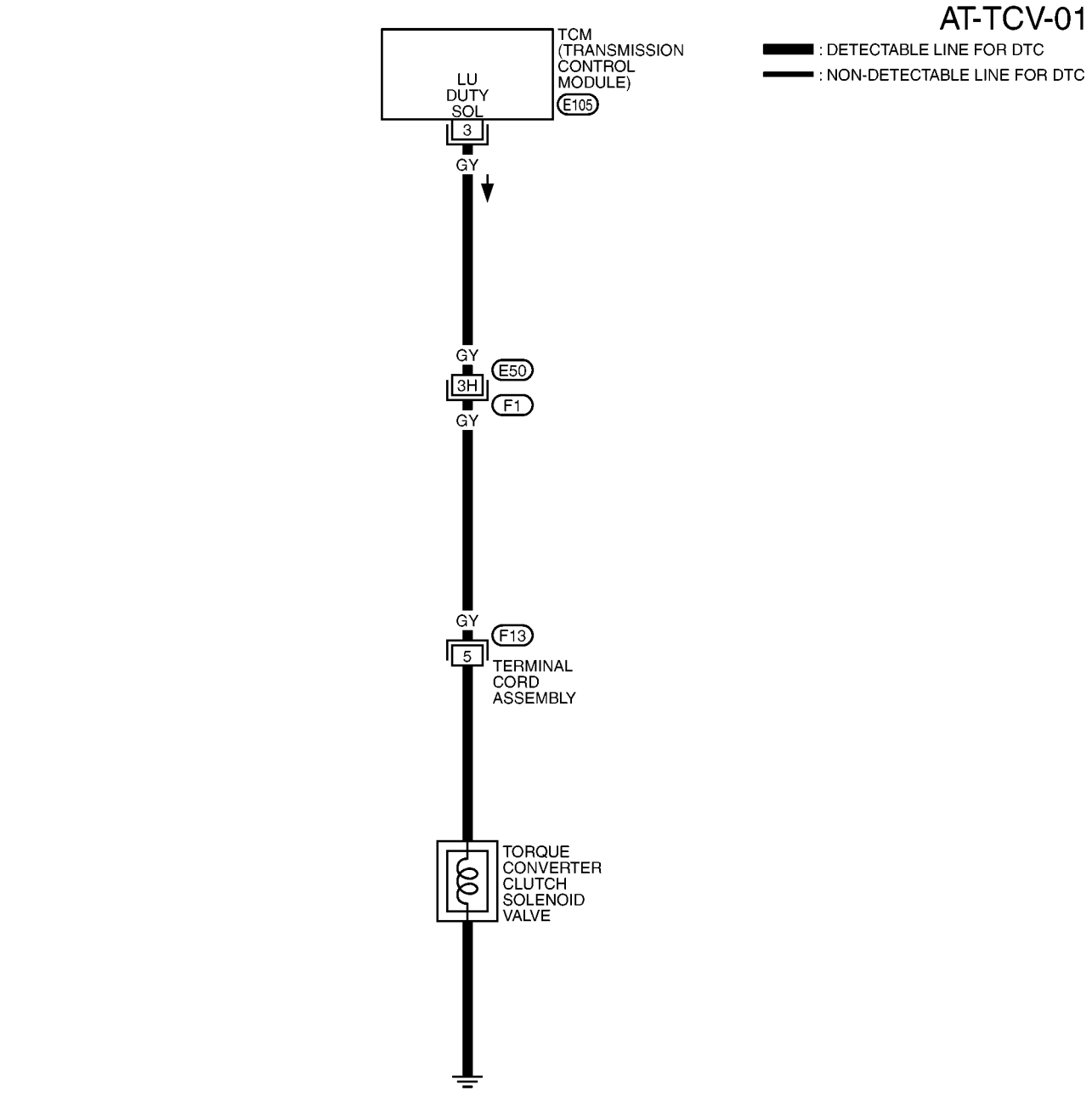


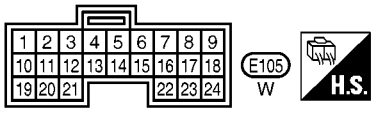
With GST

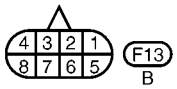
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCV

ECS008OU







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0079E

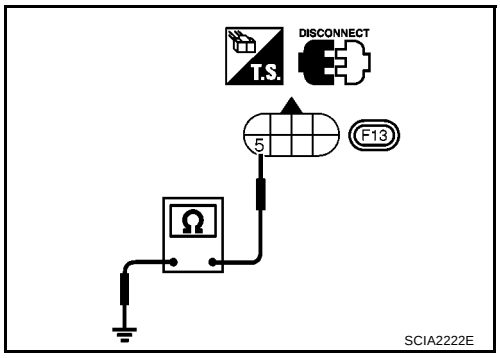
Diagnostic Procedure

ECS008OV

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 5 and ground.

Resistance: 5 - 20Ω



OK or NG

OK >> GO TO 2.
NG >> 1. Remove oil pan. Refer to AT-426, "REMOVAL" .
2. Check the following items. If any items are damaged, repair or replace damaged parts.
- Torque converter clutch solenoid valve
Refer to AT-165, "Component Inspection" .
- Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 5 and TCM harness connector terminal 3.

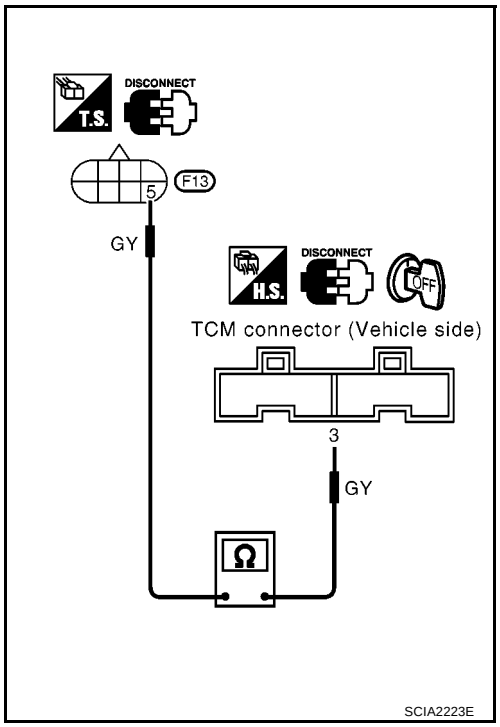
Continuity should exist.

If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-162, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008OW

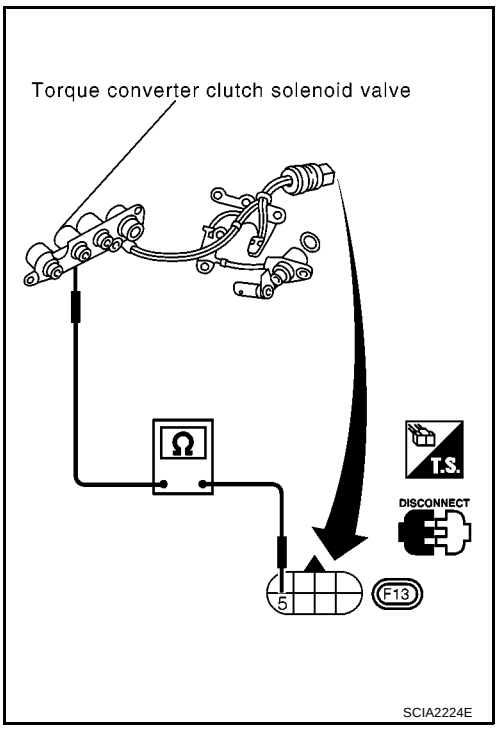
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

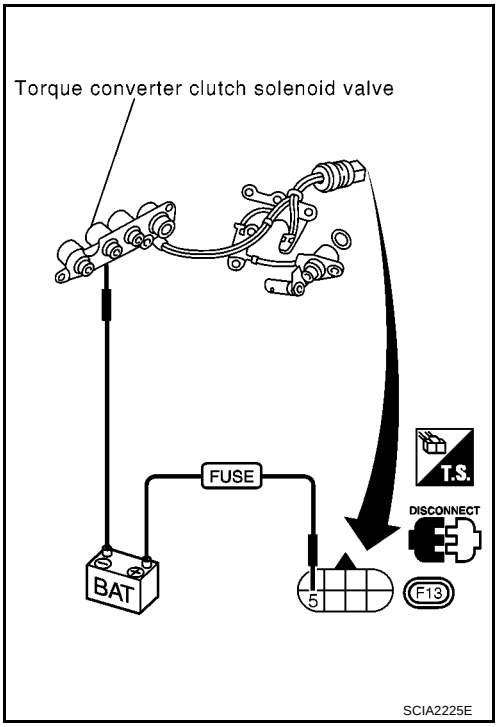
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0745 LINE PRESSURE SOLENOID VALVE

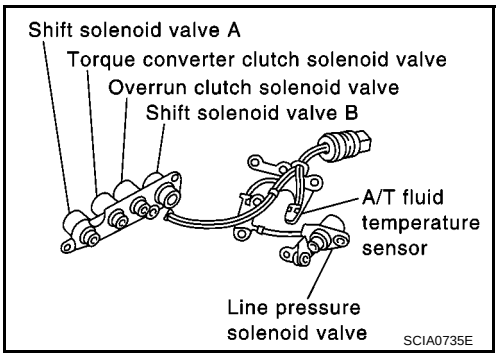
PFP:31940

Description

ECS008OX

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

The line pressure duty cycle value is not consistent when the closed throttle position switch is “ON”. To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is “OFF”.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

NOTE:

The line pressure duty cycle value is not consistent when the closed throttle position switch is “ON”. To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is “OFF”.

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	PU	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BP	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

ON BOARD DIAGNOSIS LOGIC

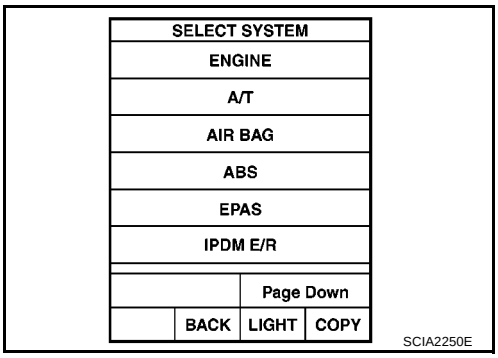
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: L/PRESS SOL/CIRC	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Line pressure solenoid valve
: P0745		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

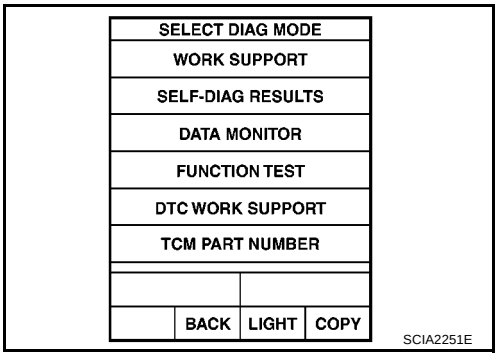
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Depress accelerator pedal completely and wait at least 5 seconds.

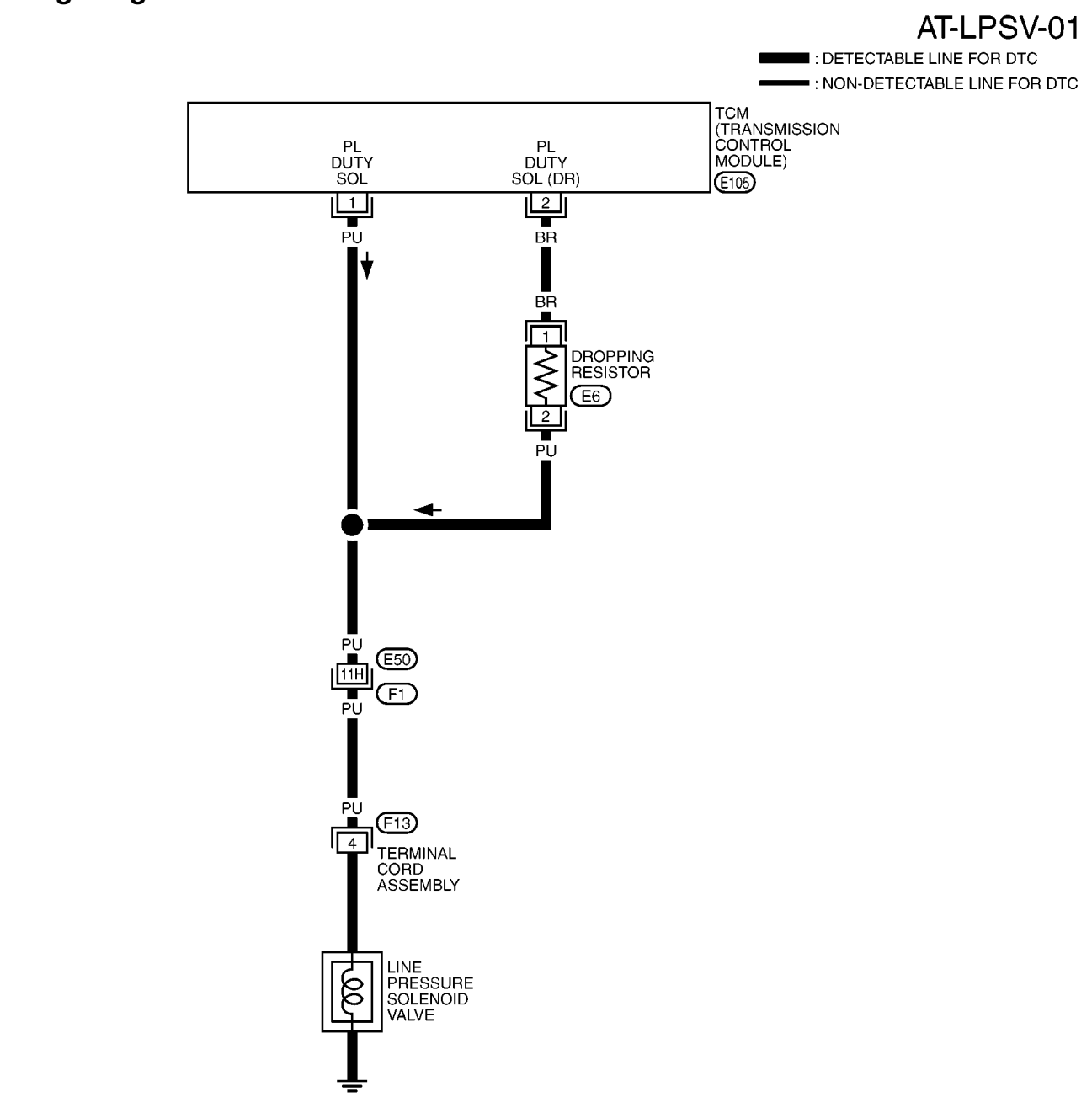


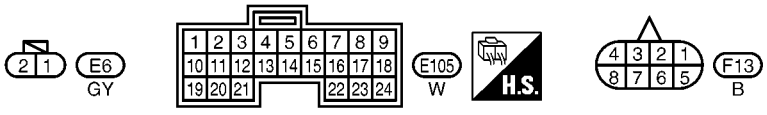
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — LPSV

ECS008OY





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0080E

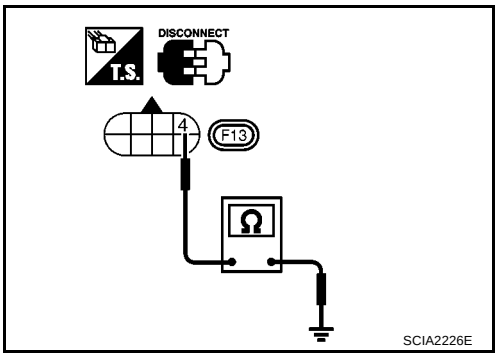
Diagnostic Procedure

ECS008OZ

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 4 and ground.

Resistance: 2.5 - 5Ω



OK or NG

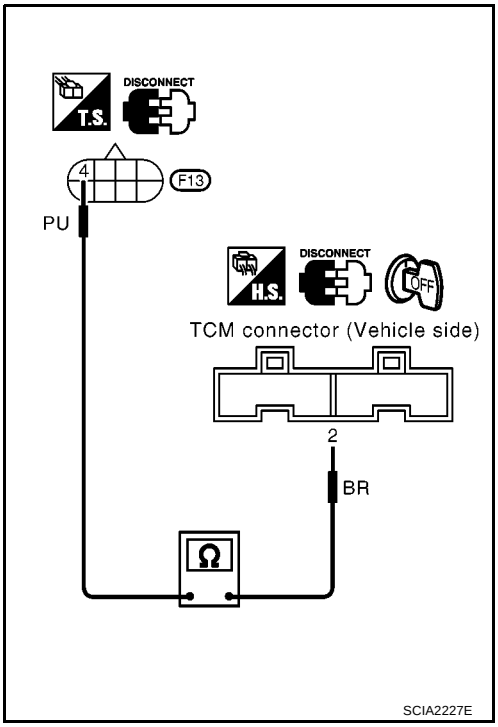
OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items. If any items are damaged, repair or replace damaged parts.
- Line pressure solenoid valve
  Refer to AT-171, "Component Inspection" .
- Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal 4 and TCM harness connector terminal 2.

Resistance: 10 - 15Ω



OK or NG

OK >> GO TO 3.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.
- Dropping resistor
  Refer to AT-171, "Component Inspection" .
- Harness for short or open between TCM terminal 2 and terminal cord assembly

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Check resistance between terminal 4 and TCM harness connector terminal 1.

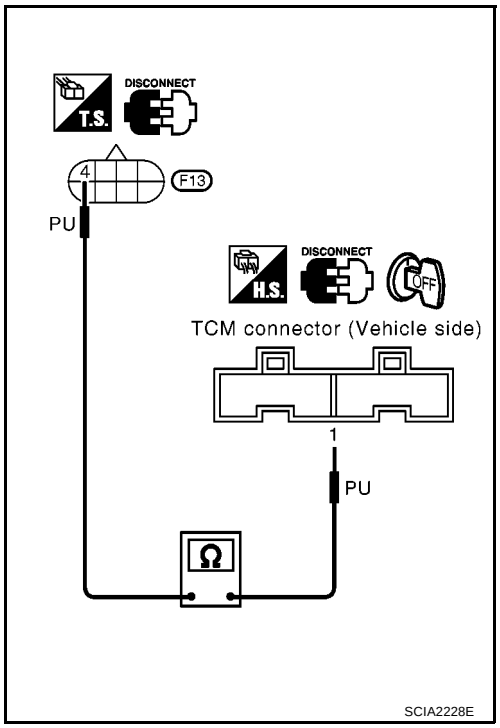
Resistance: Approx. 0Ω

If OK, check harness for short to ground and short to power.

3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-167, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008P0

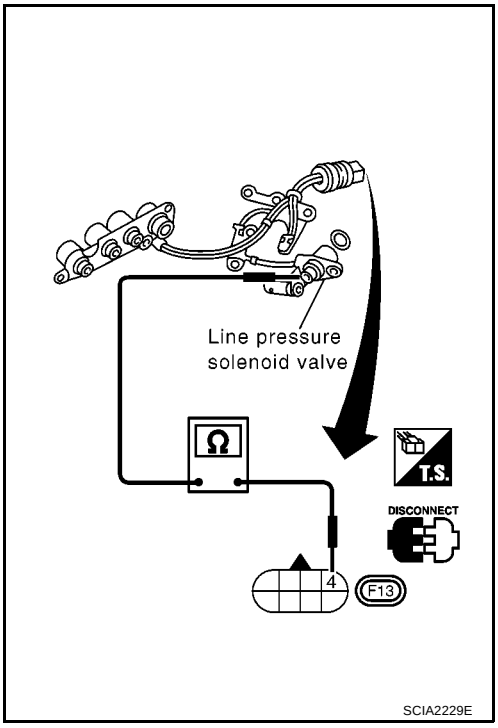
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

- Check resistance between two terminals.

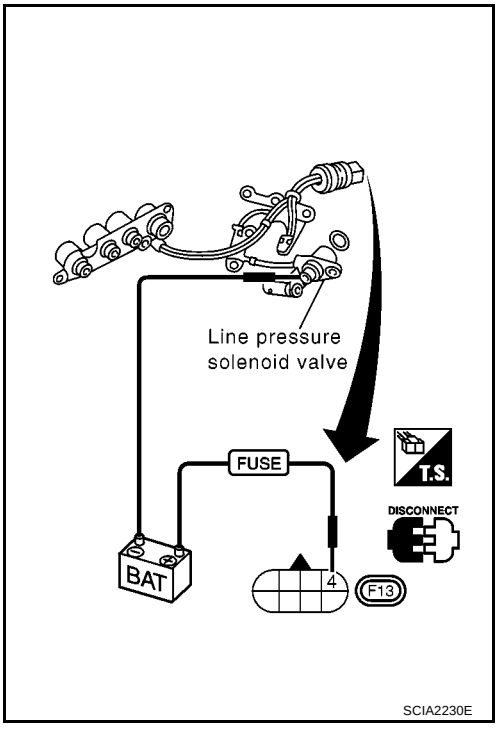
Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω



SCIA2229E

Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

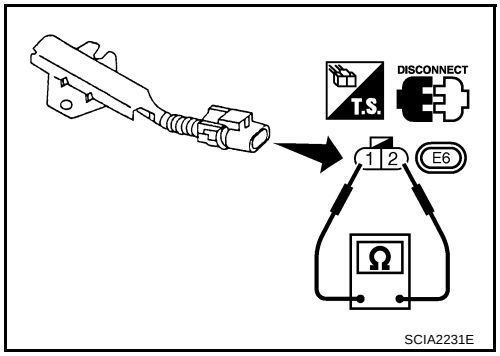


SCIA2230E

DROPPING RESISTOR

- Check resistance between two terminals.

Resistance: 10 - 15Ω



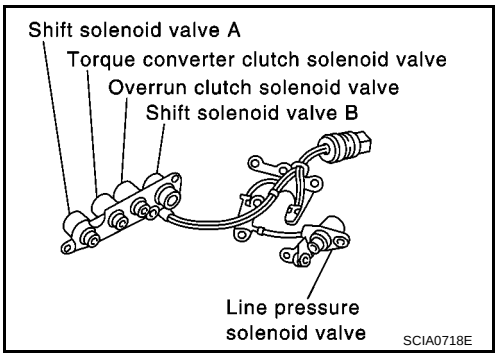
DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS008P1

Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.



Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: SFT SOL A/CIRC	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve A
: P0750		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

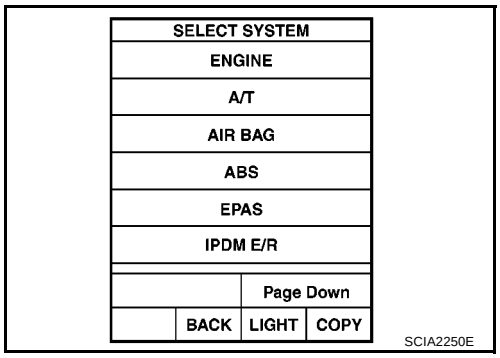
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

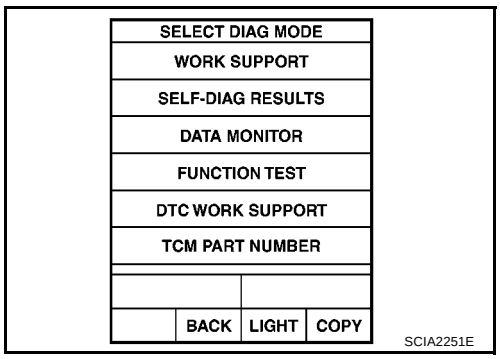
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift "1" → "2" ("GEAR").

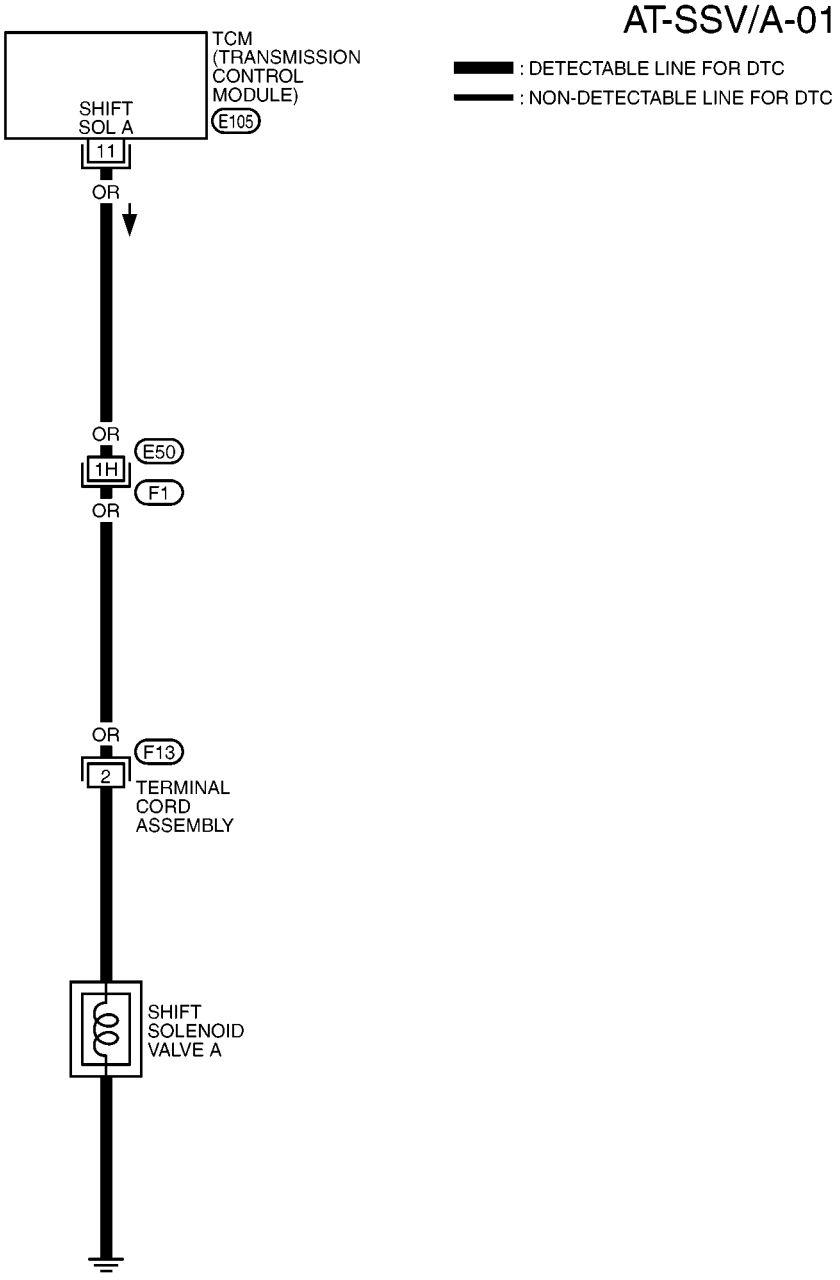


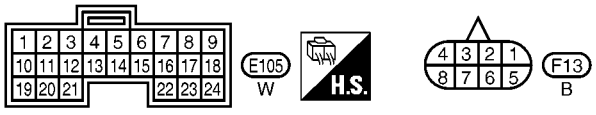
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — SSV/A

ECS008P2





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0081E

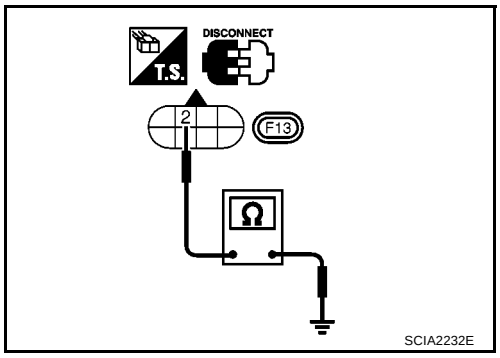
Diagnostic Procedure

ECS008P3

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 2 and ground.

Resistance: 20 - 30Ω



OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL"

2. Check the following items. If any items are damaged, repair or replace damaged parts.

- Shift solenoid valve A
  Refer to AT-177, "Component Inspection" .
- Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 2 and TCM harness connector terminal 11.

Continuity should exist.

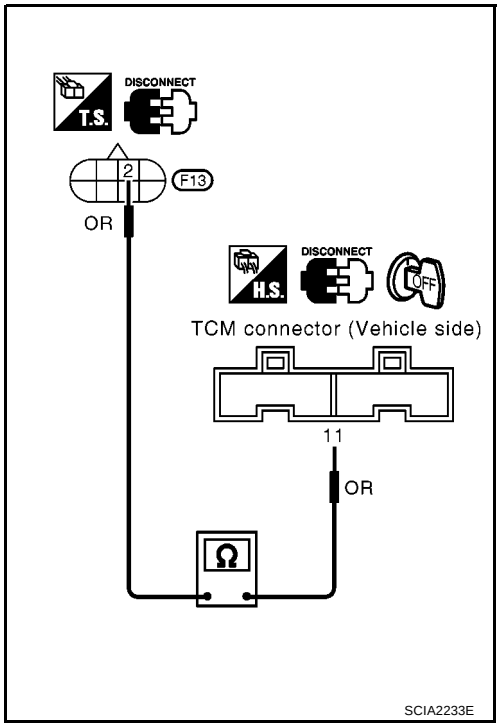
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-174, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008P4

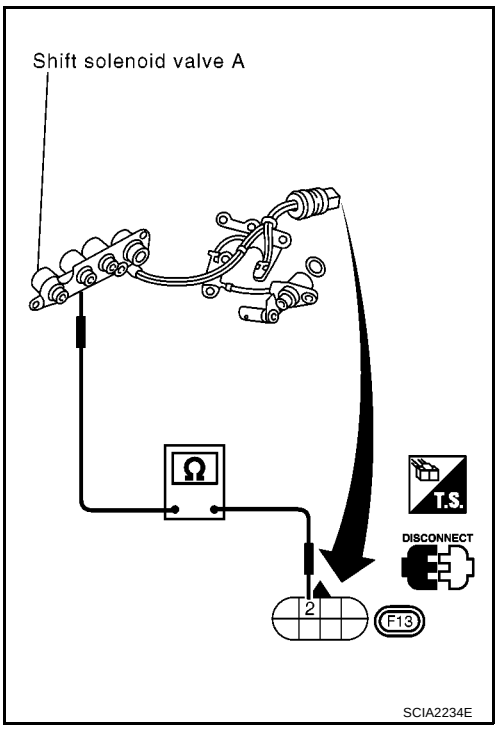
SHIFT SOLENOID VALVE A

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

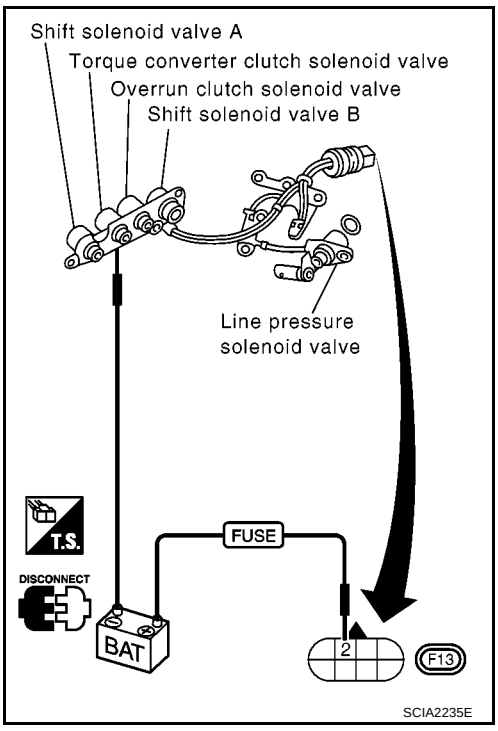
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



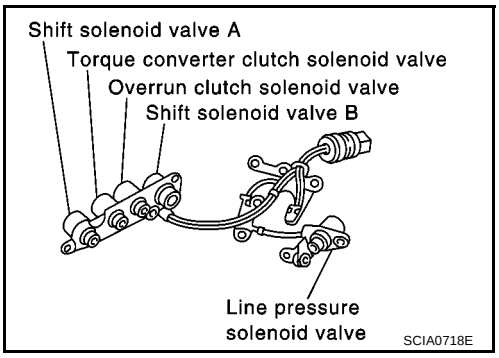
DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS008P5

Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.



Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: SFT SOL B/CIRC	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve B
: P0755		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

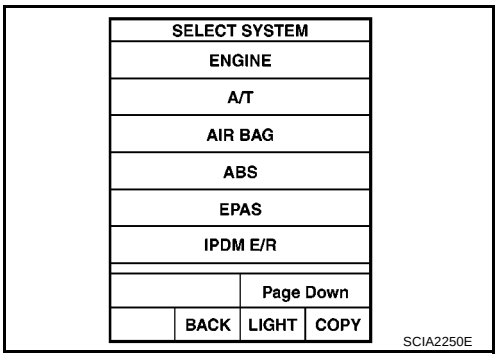
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

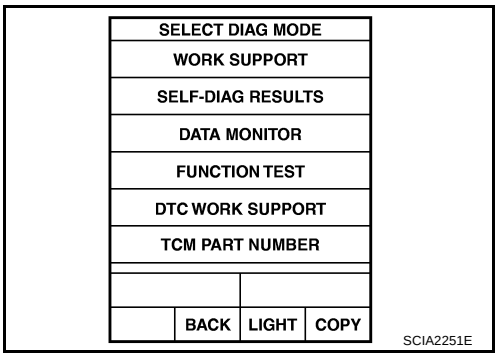
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 ("GEAR").

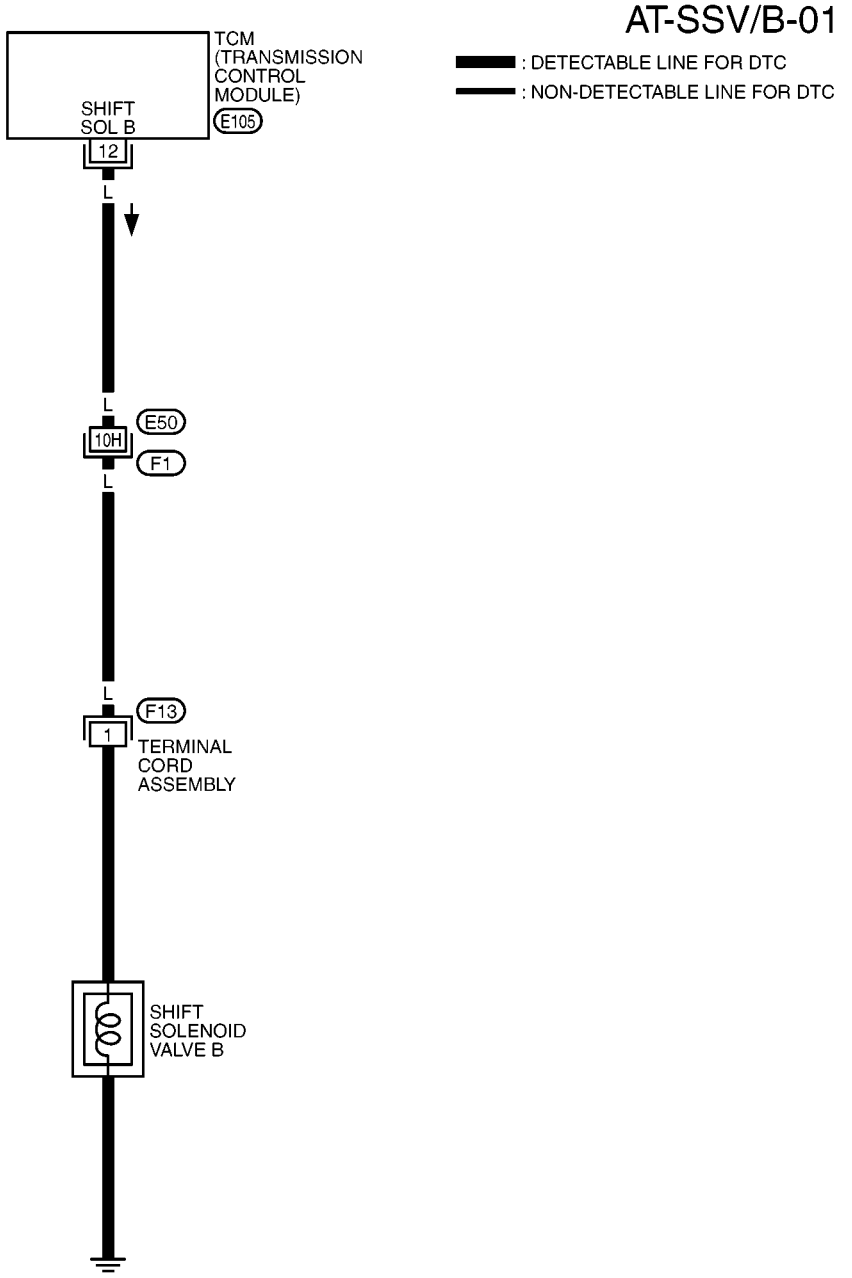


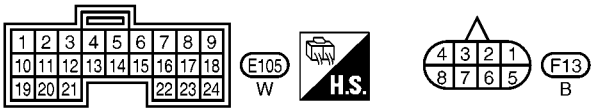
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — SSV/B

ECS008P6





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0082E

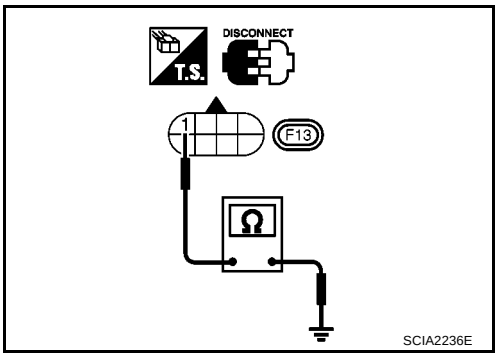
Diagnostic Procedure

ECS008P7

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 1 and ground.

Resistance: 5 - 20Ω



OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items. If any items are damaged, repair or replace damaged parts.
- Shift solenoid valve B
  Refer to AT-182, "Component Inspection" .
- Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 12 and TCM harness connector terminal 1.

Continuity should exist.

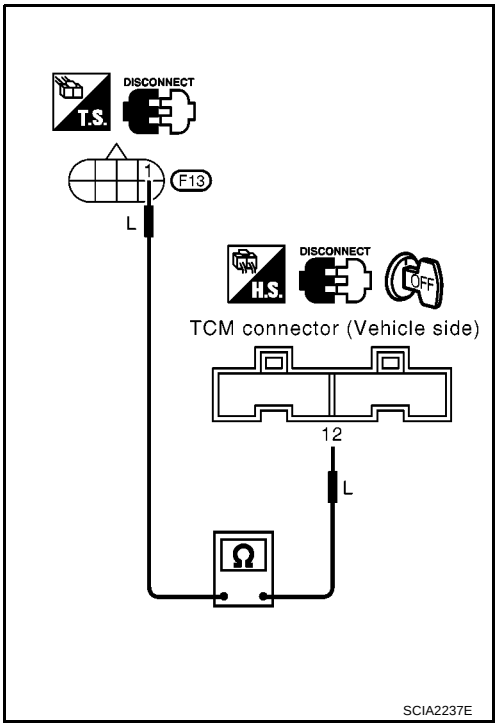
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-179, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008P8

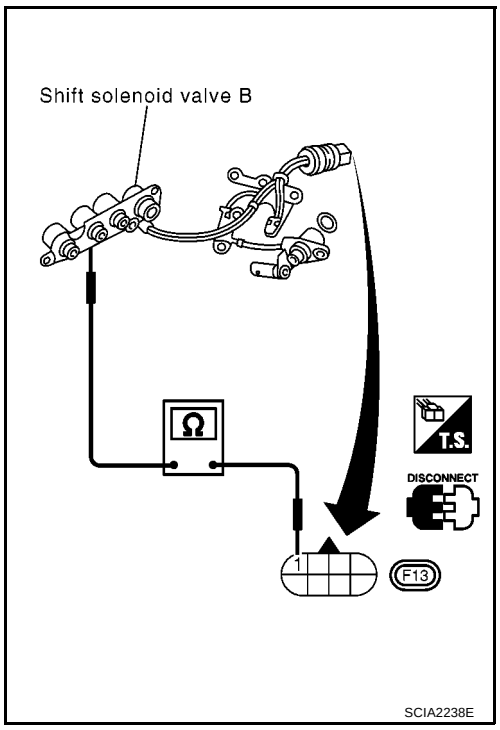
SHIFT SOLENOID VALVE B

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

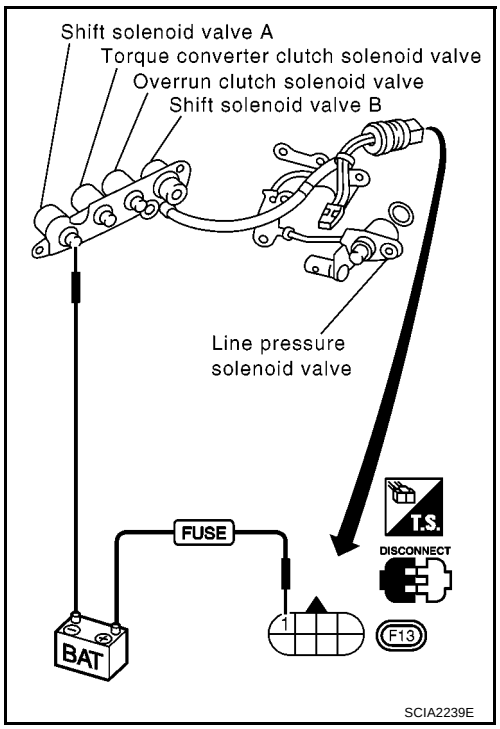
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



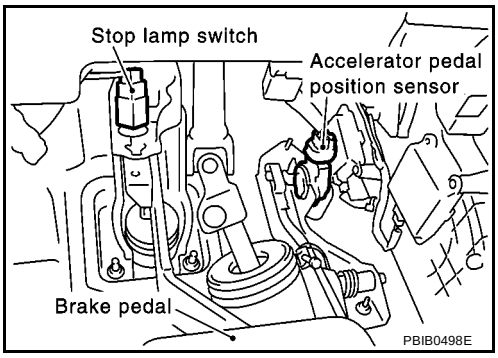
DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

PFP:22620

Description

ECS008P9

- Accelerator pedal position (APP) sensor
  Electric throttle control actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The actuator sends a signal to the TCM.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position (APP) sensor (THRTL POS SEN)	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
32	OR	Throttle position sensor (Power source)	or	When turning ignition switch “ON”	4.5 - 5.5V
				When turning ignition switch “OFF”	0V
41	Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Ground (Throttle position sensor)	Always		0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: TP SEN/CIRC A/T*	TCM receives an excessively low or high voltage from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Accelerator pedal position (APP) sensor
: P1705		

*:This code means Accelerator pedal position (APP) sensor in reality.

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

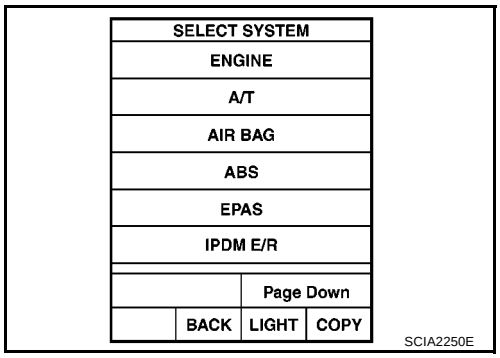
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

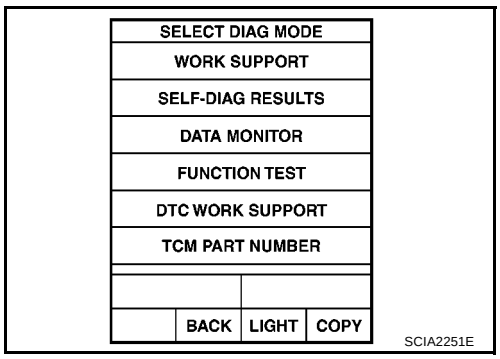
After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

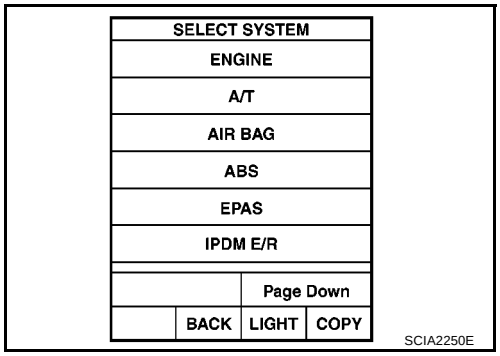
1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Check the following.

Accelerator pedal condition	THRTL POS SEN
Fully released	Less than 4.7V
Partially depressed	0.1 - 4.6V
Fully depressed	1.9 - 4.6V

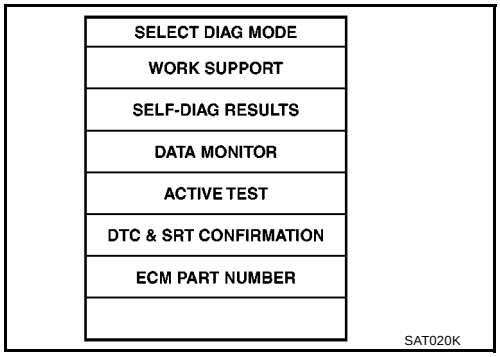


If the check result is NG, go toAT-186, "Diagnostic Procedure" .
If the check result is OK, go to following step.

3. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
4. Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: Approximately 3V or less
   Selector lever: D position (OD "ON")
   If the check result is NG, go to AT-186, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



5. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   Accelerator pedal: Wide open throttle
   Selector lever: D position (OD "ON")

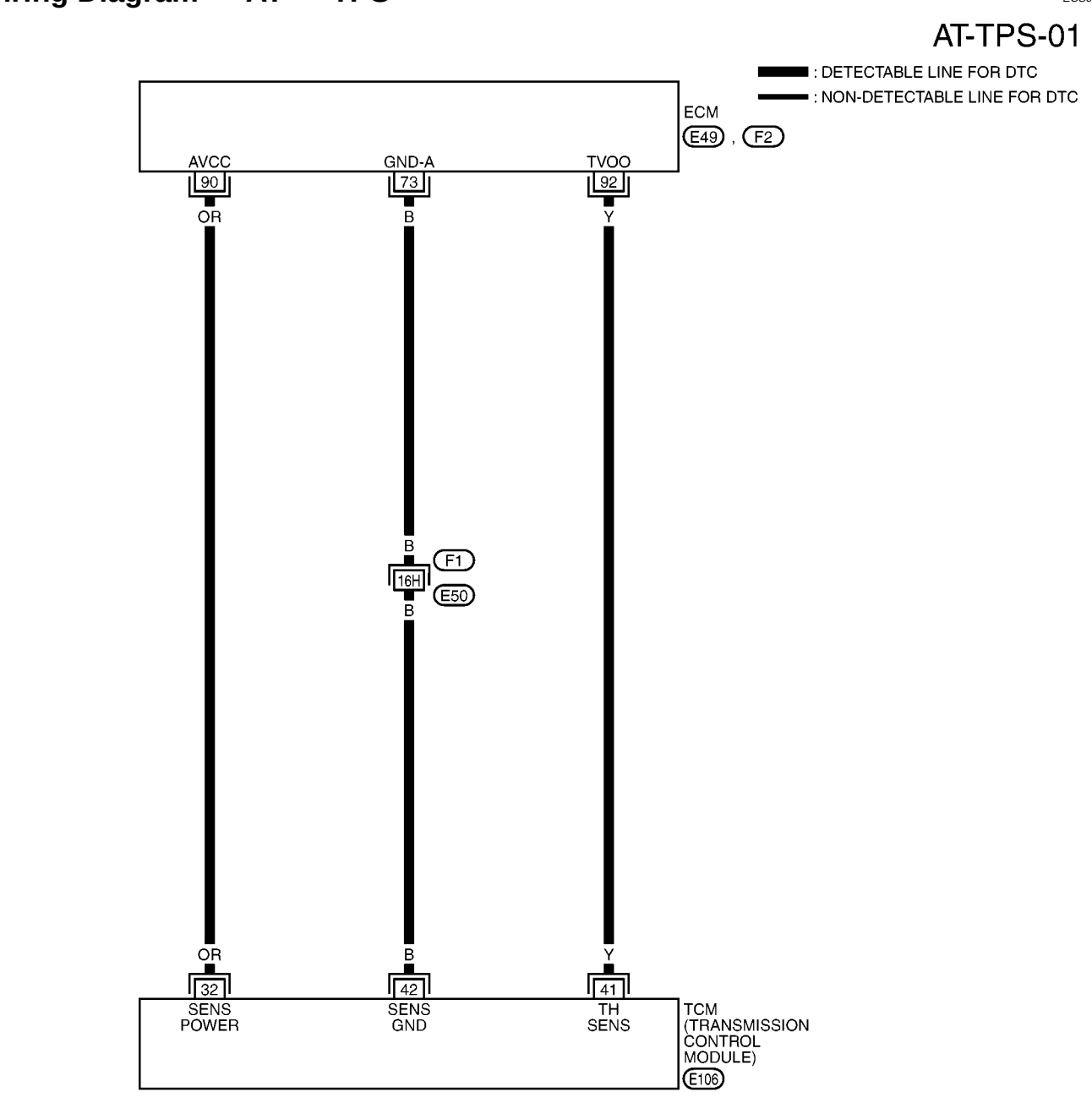


With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TPS

ECS008PA



MCWA0083E

Diagnostic Procedure

ECS008PB

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control.
Refer to EC-60, "Malfunction Indicator (MI)" (With EURO-OBD) or EC-511, "Malfunction Indicator (MI)" (Without EURO-OBD).

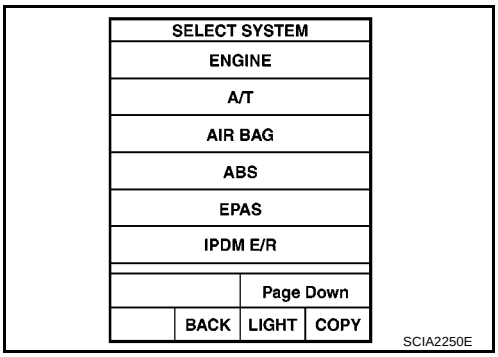
OK or NG

OK >> GO TO 2.
NG >> Check throttle position sensor circuit for engine control.

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

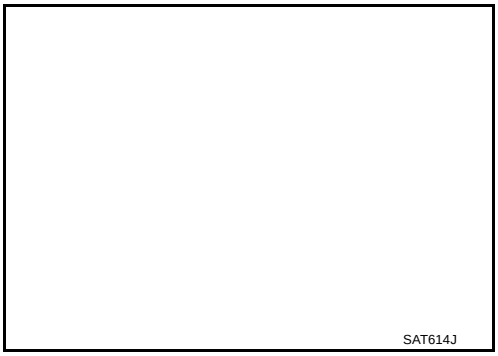
With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “THRTL POS SEN”.

Voltage:
Fully-closed throttle: Approximately 0.5V
Fully-open throttle: Approximately 4V



Without CONSULT-II

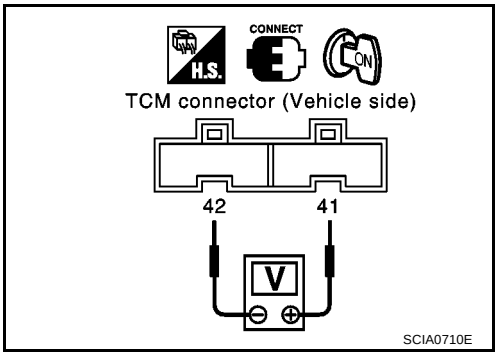
1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 41 and 42 while accelerator pedal is depressed slowly.

Voltage:
Fully-closed throttle valve: Approximately 0.5V
Fully-open throttle valve: Approximately 4V

(Voltage rises gradually in response to throttle position)

OK or NG

OK >> GO TO 3.
NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-184, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

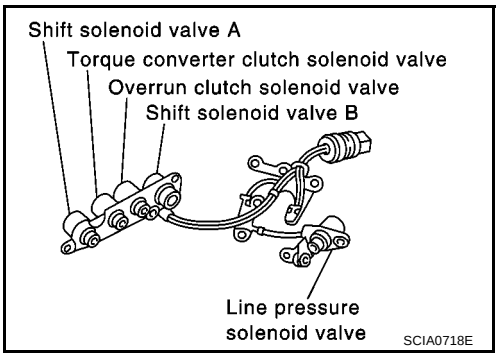
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS008PC

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the inhibitor switch, overdrive control switch, vehicle speed and throttle position sensors. The overrun clutch operation will then be controlled.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
20	Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: O/R CLTCH SOL/CIRC	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve
: P1760		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

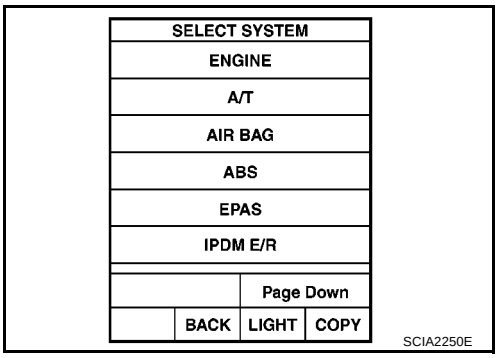
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

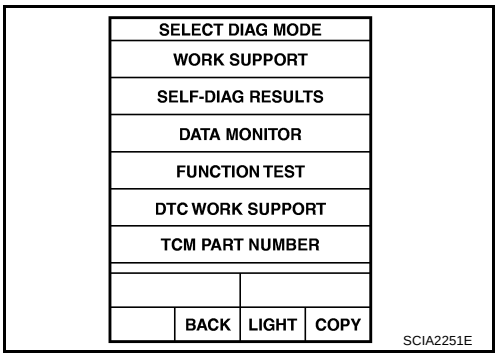
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:



Always drive vehicle on a level road to improve accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.



With CONSULT-II

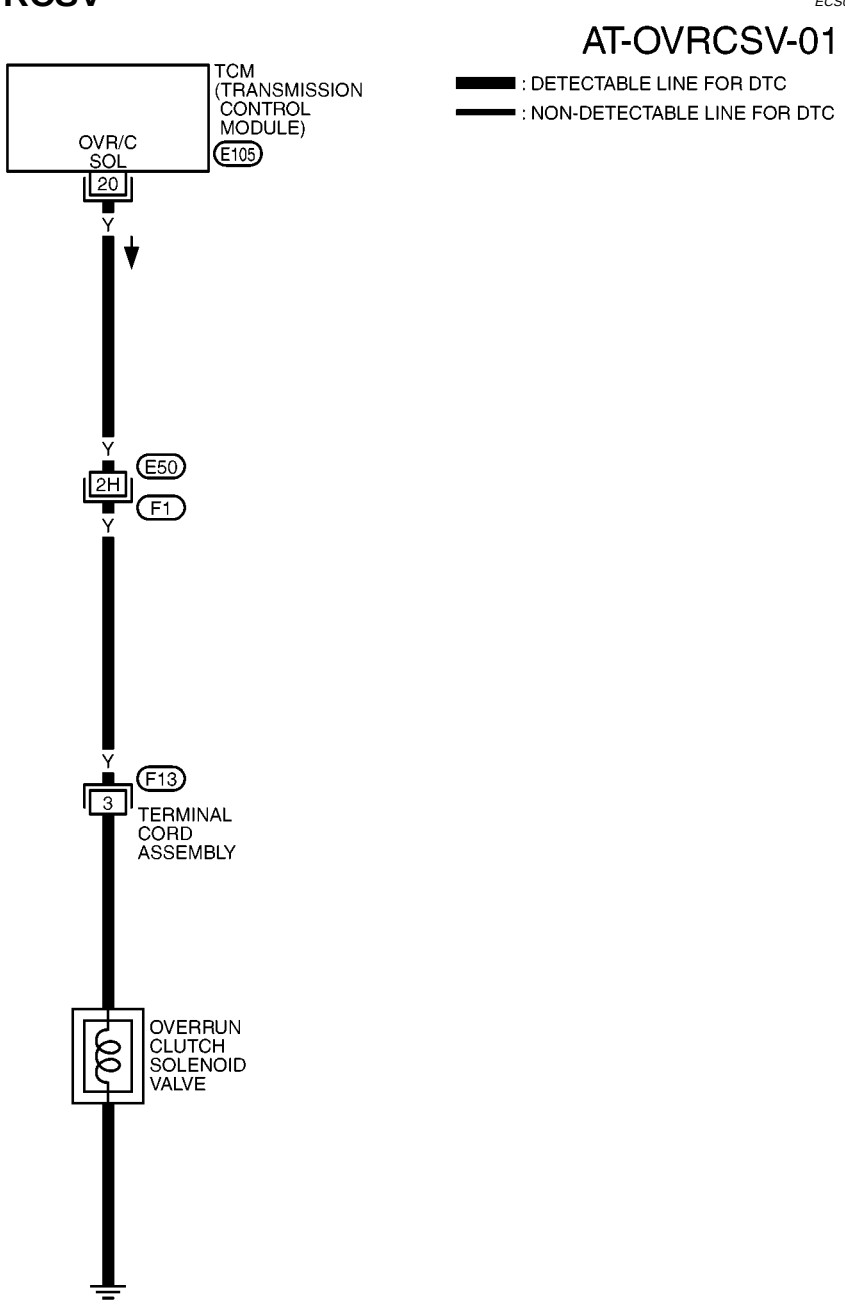
1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine.
3. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with "D" position (OD "ON").
4. Release accelerator pedal completely with "D" position (OD "OFF").

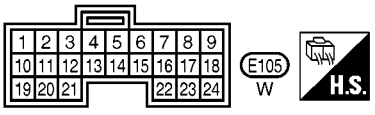
With GST

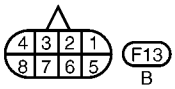
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — OVRCSV

ECS008PD







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0084E

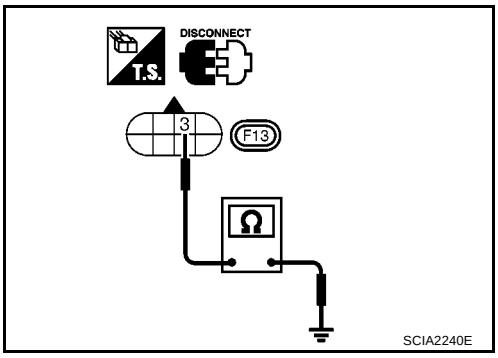
Diagnostic Procedure

ECS008PE

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 3 and ground.

Resistance: 20 - 30Ω



OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items. If any items are damaged, repair or replace damaged parts.
- Overrun clutch solenoid valve
  Refer to AT-192, "Component Inspection" .
- Harness of terminal cord assembly for short or open

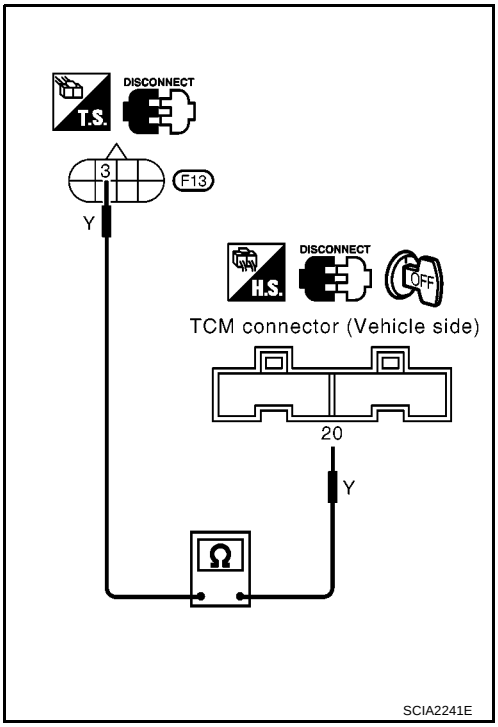
2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 3 and TCM harness connector terminal 20.

Continuity should exist.

If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.



OK or NG

OK >> GO TO 3.

NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.

3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-189, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008PF

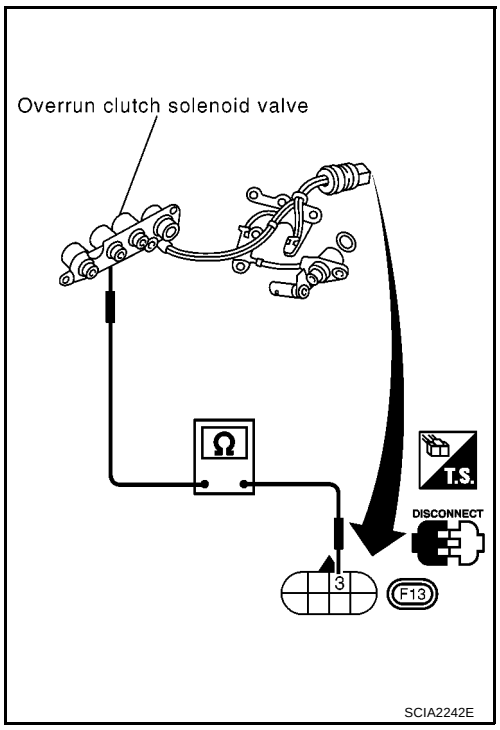
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

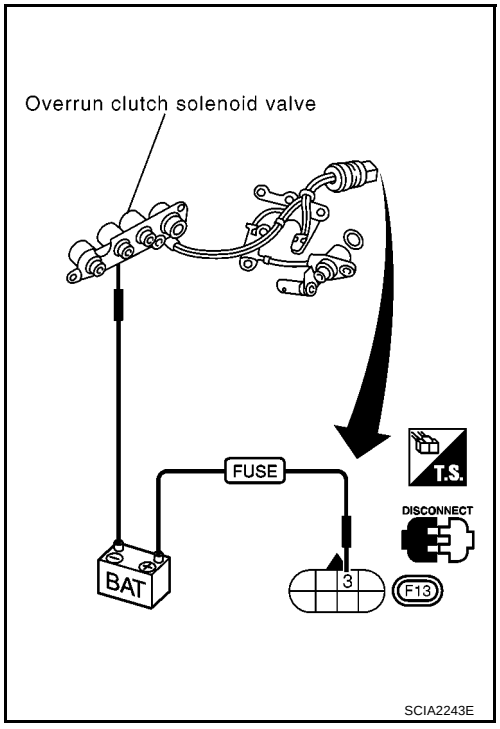
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC U1000 CAN COMMUNICATION LINE

PFP:31940

Description

ECS008PG

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	R	CAN-H (high)	—	—
6	W	CAN-L (low)	—	—

On Board Diagnosis Logic

ECS008PH

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
:CAN COMM CIRCUIT	When a malfunction is detected in CAN communication line.	● Harness or connectors (CAN communication line is open or shorted.)
:11th judgement flicker		

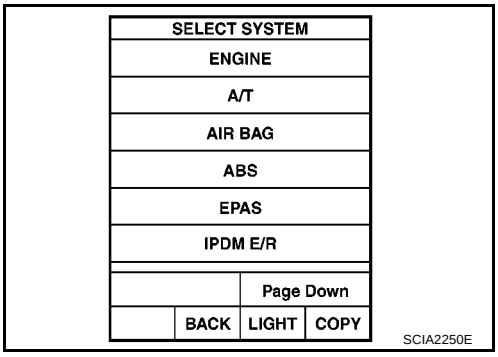
DTC Confirmation Procedure

ECS008PI

After the repair, perform the following procedure to confirm the malfunction is eliminated.

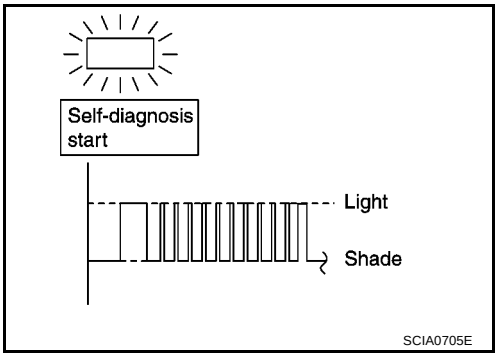
WITH CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
3. Wait at least 6 seconds or start engine and wait for at least 6 seconds.



WITHOUT CONSULT-II

1. Turn ignition switch “ON”.
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis.
   Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

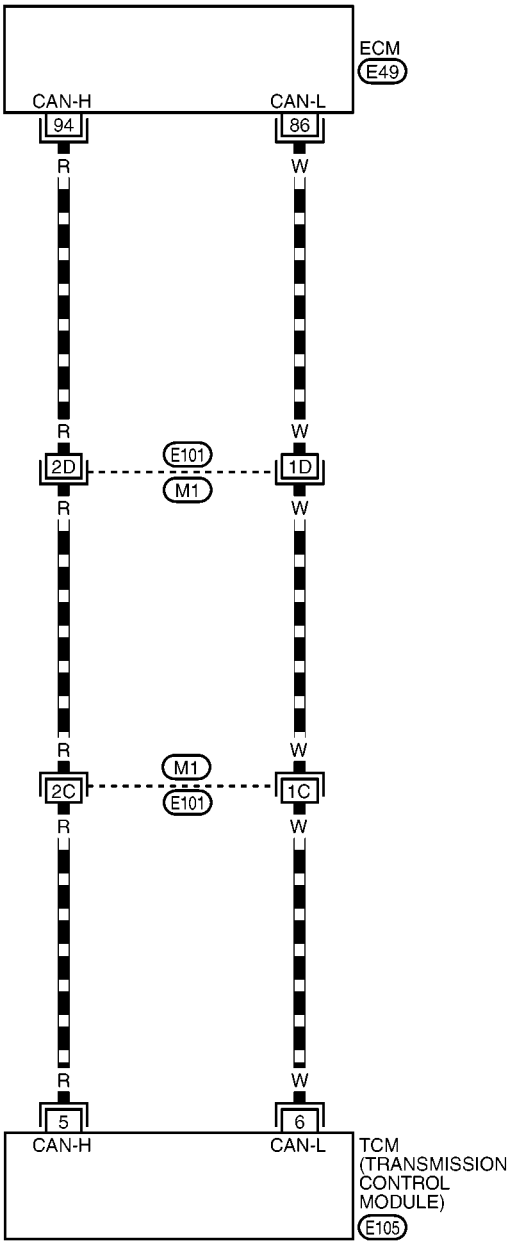


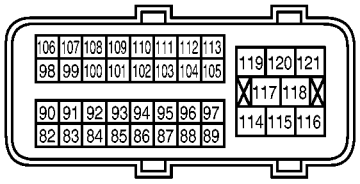
Wiring Diagram — AT — CAN

ECS008PJ

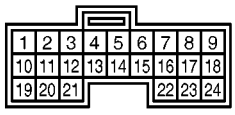
AT-CAN-01

: DATA LINE





E49 H.S.



E105
W
H.S.

REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0085E

Diagnostic Procedure

ECS008PK

Go to LAN-4, "Precautions When Using CONSULT-II" .

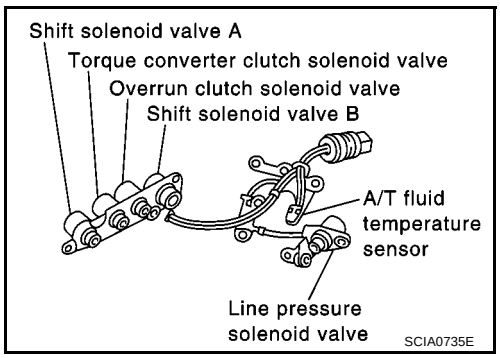
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

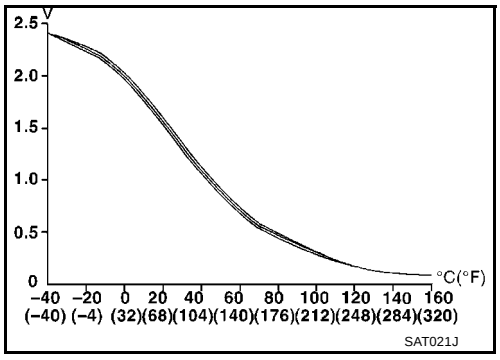
PFP:31940

Description

ECS008PL

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.





CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	G	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V
19	G	Power source	or	Same as No. 10	
28	GY	Power source (Memory back-up)	Always		Battery voltage
42	B	Ground (A/T fluid temperature sensor)	Always		0V
47	PU	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

ON BOARD DIAGNOSIS LOGIC

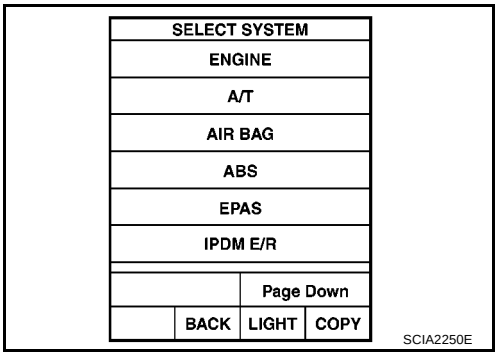
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: BATT/FLUID TEMP SEN	TCM receives an excessively low or high voltage from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor
: 8th judgement flicker		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

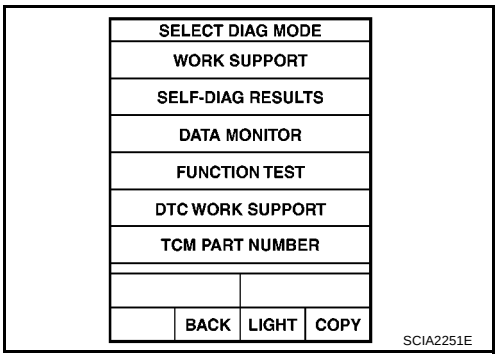
1. Start engine.
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.



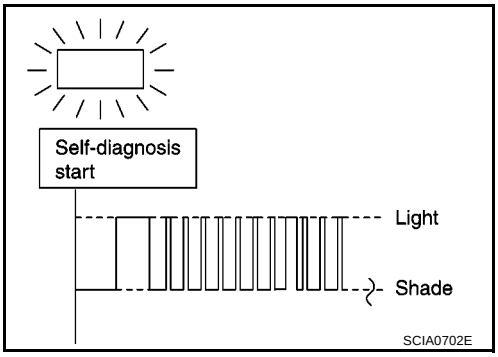
3. Drive vehicle under the following conditions:
   Selector lever in “D”, vehicle speed higher than 20 km/h (12 MPH).

Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D”, vehicle speed higher than 20 km/h (12 MPH).

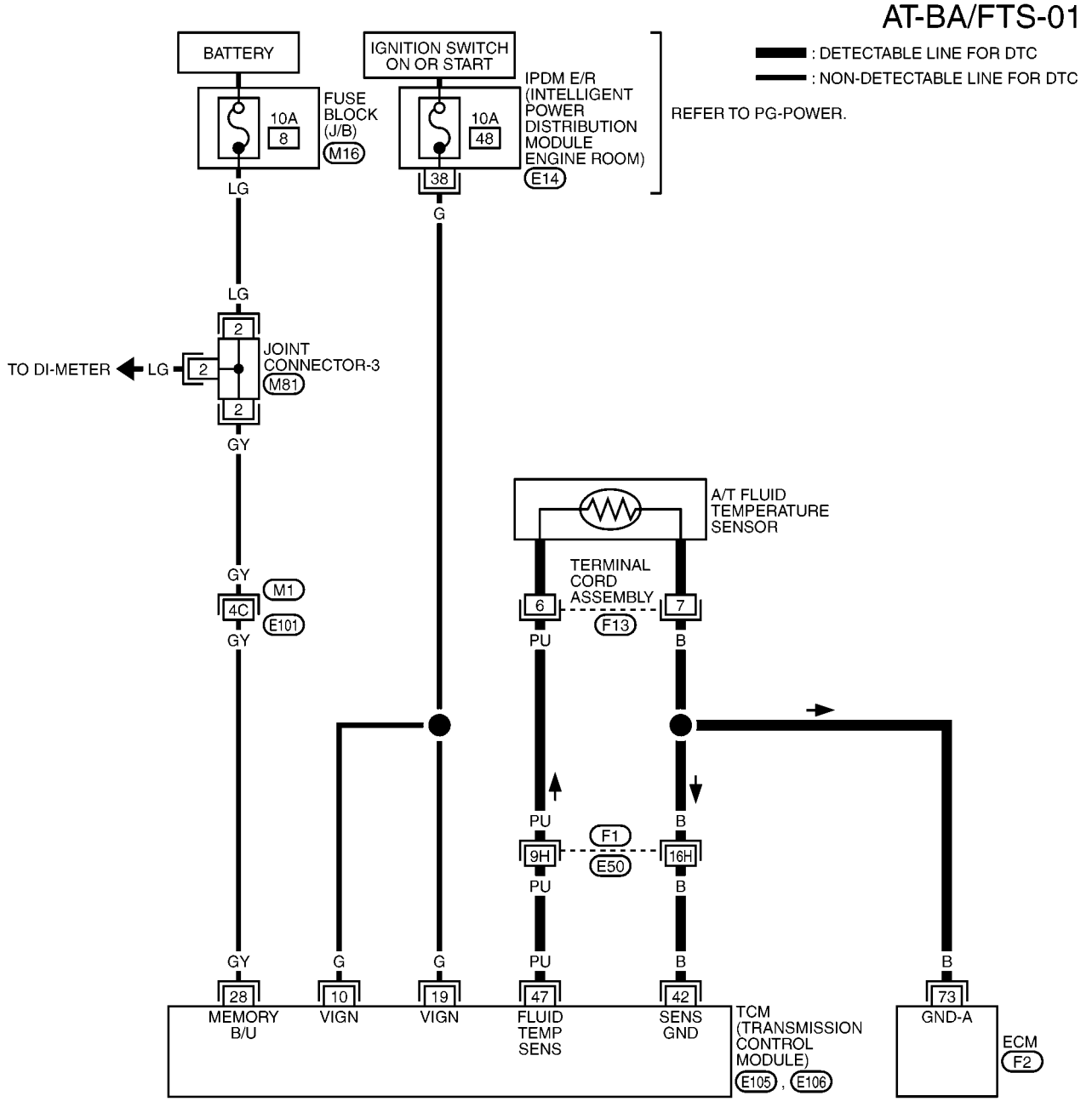


3. Perform self-diagnosis.
   Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .



Wiring Diagram — AT — BA/FTS

ECS008PM



MCWA0121E

Diagnostic Procedure

ECS008PN

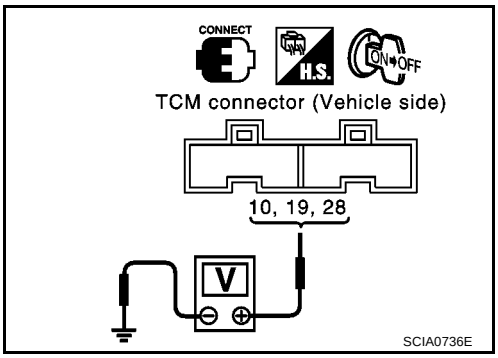
1. CHECK TCM POWER SOURCE

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage: Battery voltage

3. Turn ignition switch to “OFF” position.
4. Check voltage between TCM terminal 28 and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.

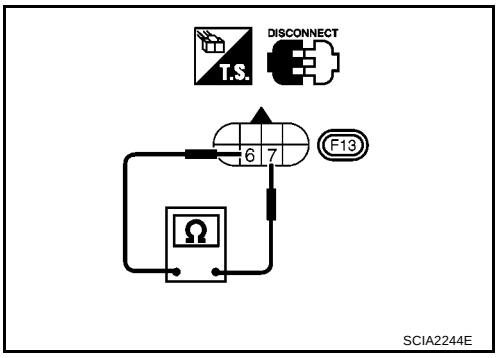
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between battery, ignition switch and TCM
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold.

Resistance: Cold [20°C (68°F)]
Approximately 2.5 kΩ



4. Reinstall any part removed.

OK or NG

OK (With CONSULT-II)>>GO TO 3.
OK (Without CONSULT-II)>>GO TO 4.

NG >> 1. Remove oil pan.
2. Check the following items. If any items are damaged, repair or replace damaged parts.

- A/T fluid temperature sensor
  Refer to AT-201, "Component Inspection" .
- Harness of terminal cord assembly for short or open

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITH CONSULT-II)

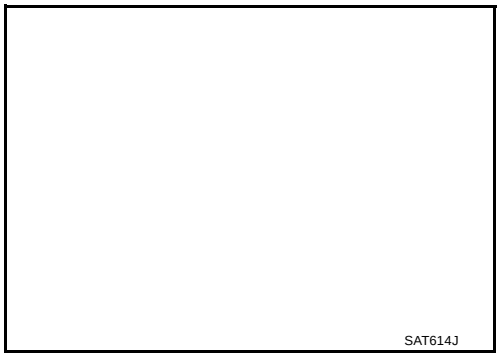
With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

Voltage:

Cold [20°C (68°F)] → Hot [80°C (176°F)]

Approximately 1.5V → 0.5V



OK or NG

OK >> GO TO 5.

NG >> Check the following item. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to EC-289, "DTC P1065 ECM POWER SUPPLY" .

4. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)

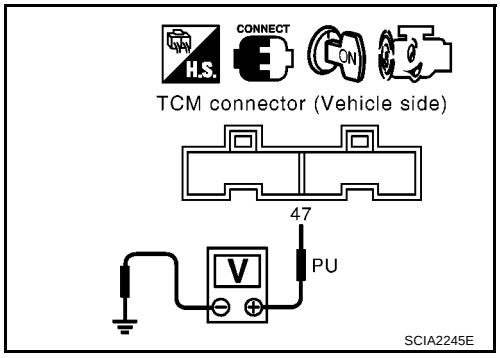
Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

Voltage:

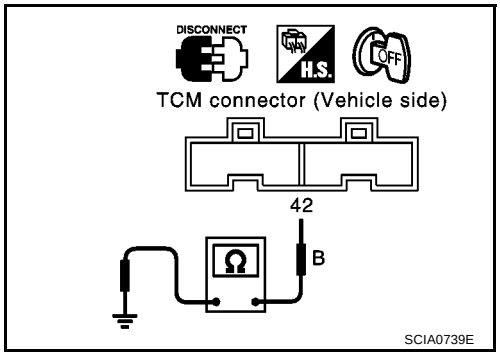
Cold [20°C (68°F)] → Hot [80°C (176°F)]

Approximately 1.5V → 0.5V



3. Turn ignition switch to “OFF” position.
4. Disconnect TCM harness connector.
5. Check resistance between terminal 42 and ground.

Continuity should exist.



OK or NG

OK >> GO TO 5.

NG >> Check the following item. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to EC-289, "DTC P1065 ECM POWER SUPPLY" .

5. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-197, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

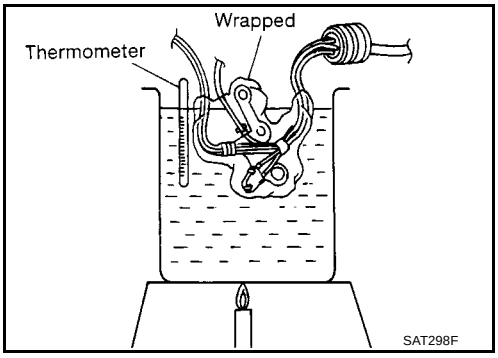
Component Inspection

ECS008PO

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-426, "REMOVAL" .
- Check resistance between two terminals while changing temperature as shown in the figure.

Temperature °C (°F)	Resistance
20 (68)	Approximately 2.5 kΩ
80 (176)	Approximately 0.3 kΩ



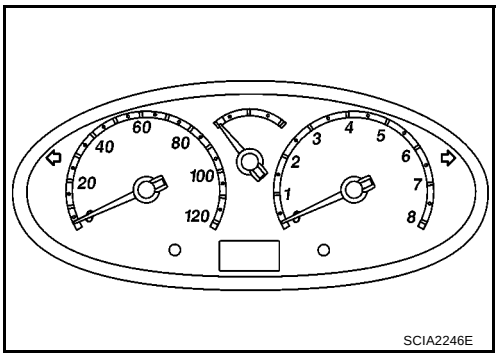
DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS008PP

The vehicle speed sensor·MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor·MTR.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	G	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V

ON BOARD DIAGNOSIS LOGIC

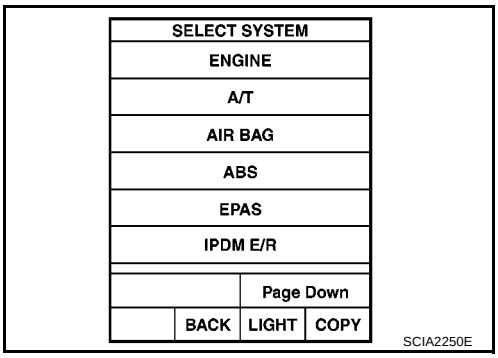
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: VHCL SPEED SEN·MTR : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

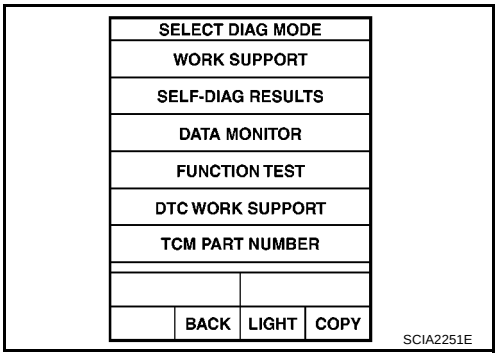
- **Always drive vehicle at a safe speed.**
- **If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch "OFF" and wait at least 5 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.



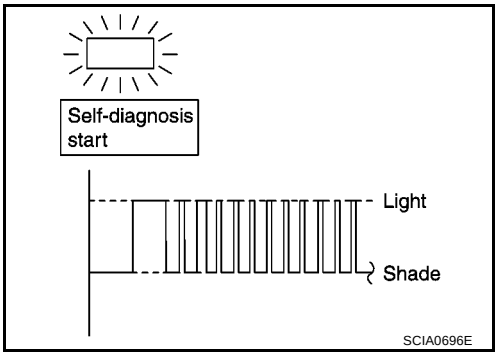
With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).



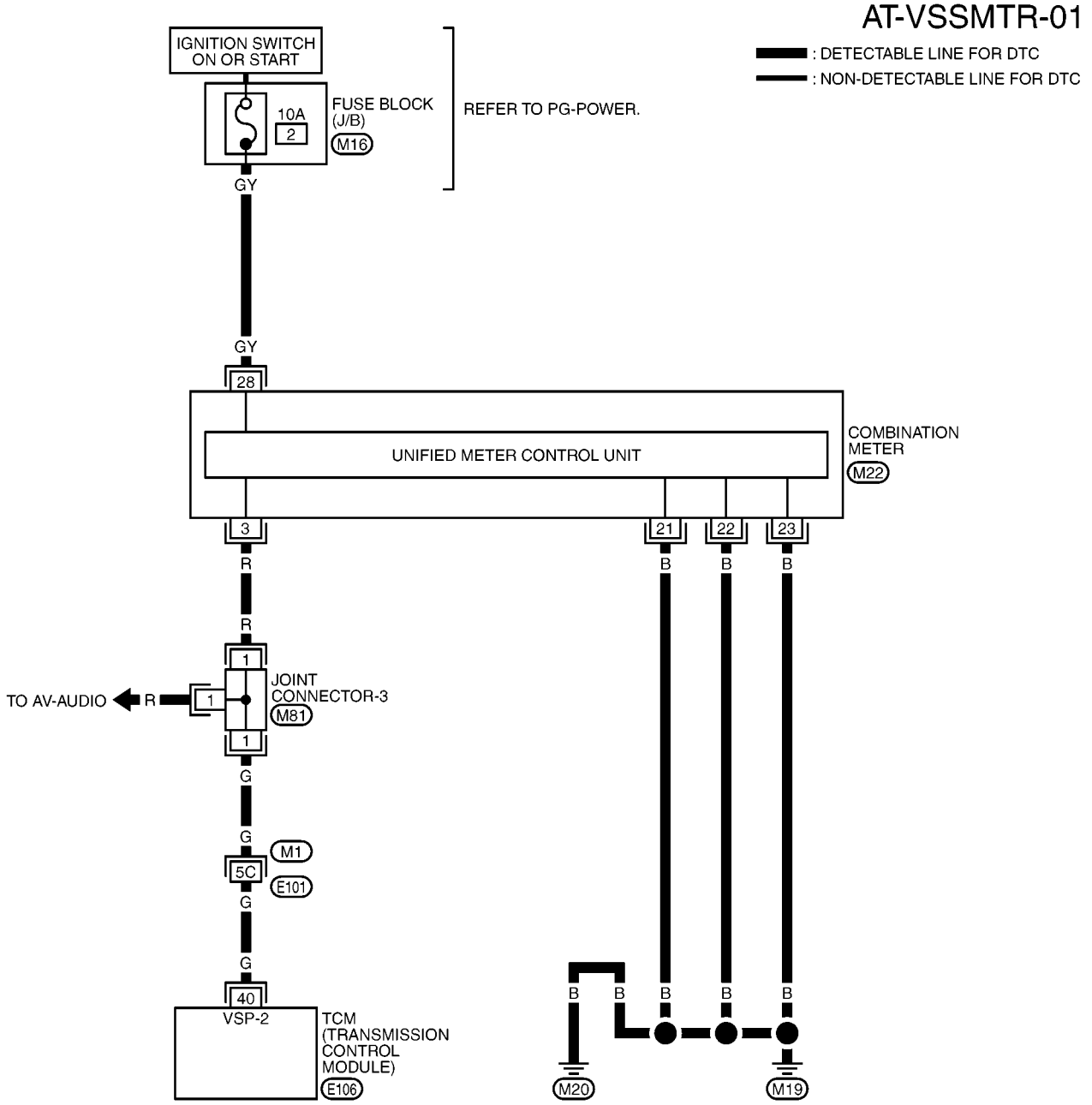
Without CONSULT-II

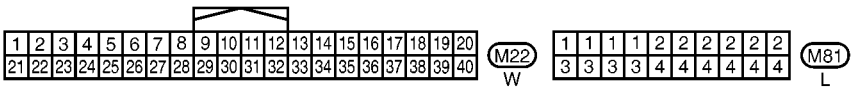
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in "D" and vehicle speed higher than 25 km/h (16 MPH).
3. Perform self-diagnosis.
   Refer to TCM SELF-DIAGNOSTIC PROCEDURE (No Tools), AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)"
   .

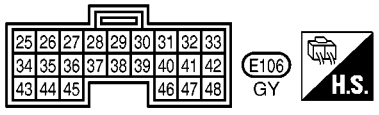


Wiring Diagram — AT — VSSMTR

ECS008PQ







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0122E

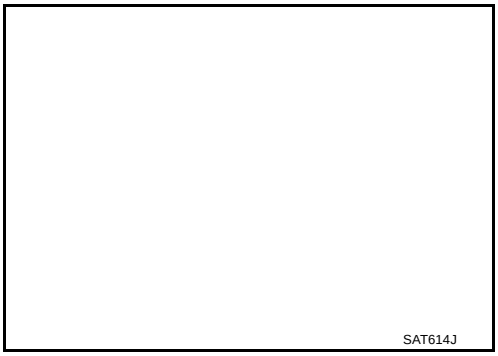
Diagnostic Procedure

ECS008PR

1. CHECK INPUT SIGNAL

With CONSULT-II

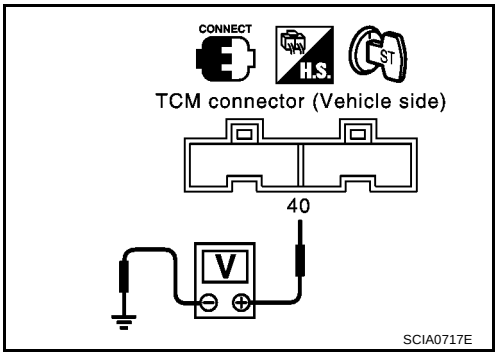
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving. Check the value changes according to driving speed.



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.

Voltage: Voltage varies between less than 1V and more than 4.5V.



OK or NG

OK >> GO TO 2.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Combination meter
  Refer to DI-5, "COMBINATION METERS" .
- Harness for short or open between TCM and combination meter
- Harness for short or open between combination meter and vehicle speed sensor

2. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to AT-203, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

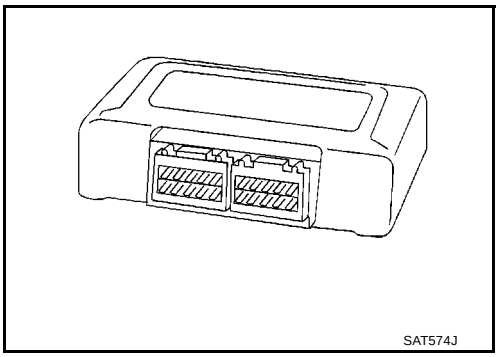
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

ECS008PS

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.


SAT574J

ON BOARD DIAGNOSIS LOGIC

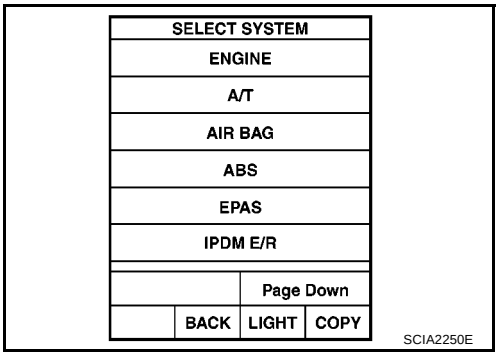
Diagnostic Trouble Code No.	Malfunction is detected when....	Check Item (Possible Cause)
(P) : CONTROL UNIT (RAM), CONTROL UNIT (ROM)	TCM memory (RAM) or (ROM) is malfunctioning.	● TCM

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

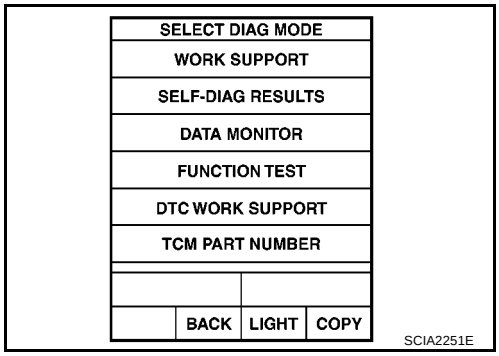
NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

(P) With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for A/T with CONSULT-II.
2. Start engine.
3. Run engine for at least 2 seconds at idle speed.



SCIA2250E



SCIA2251E

Diagnostic Procedure

ECS008PT

1. INSPECTION START (WITH CONSULT-II)

(P) With CONSULT-II

1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.
2. Touch "ERASE".

>> GO TO 2.

2. CHECK DTC

PERFORM DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE.
See above.

>> GO TO 3.

3. CHECK DTC AGAIN

Is the “CONTROL UNIT (RAM) or CONTROL UNIT (ROM)” displayed again?

Yes or No

Yes >> Replace TCM.
No >> **INSPECTION END**

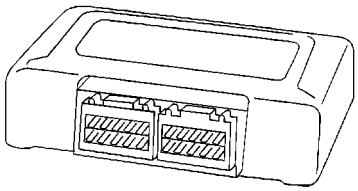
DTC CONTROL UNIT(EEPROM)

PFP:31036

Description

ECS008PU

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



SAT574J

ON BOARD DIAGNOSIS LOGIC

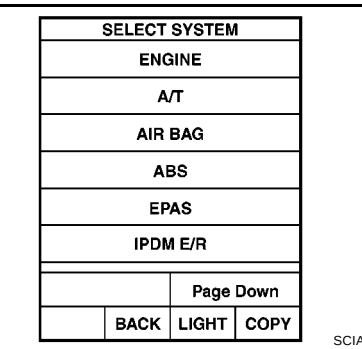
Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
: CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunctioning.	● TCM

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

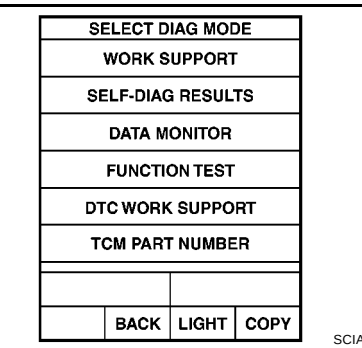
NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for A/T with CONSULT-II.
2. Start engine.
3. Run engine for at least 2 seconds at idle speed.



SCIA2250E



SCIA2251E

Diagnostic Procedure

ECS008PV

1. CHECK DTC

With CONSULT-II

1. Turn ignition switch “ON” and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II.
2. Move selector lever to “R” position.
3. Depress accelerator pedal (Full throttle position).
4. Touch “ERASE”.
5. Turn ignition switch “OFF” position for 10 seconds.

PERFORM DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE.
See previous page.

Is the “CONT UNIT (EEP ROM)” displayed again?

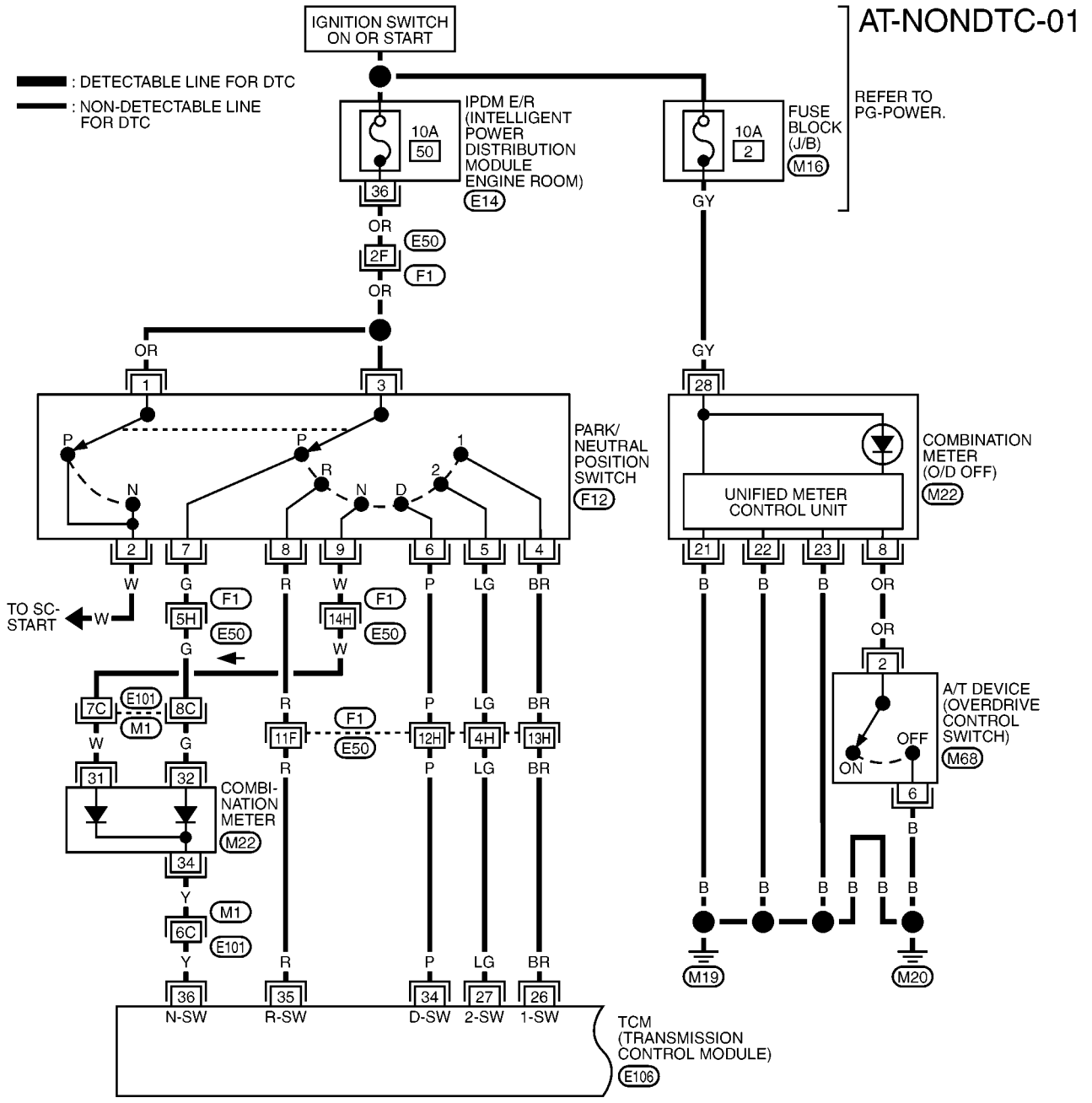
Yes >> Replace TCM.
No >> **INSPECTION END**

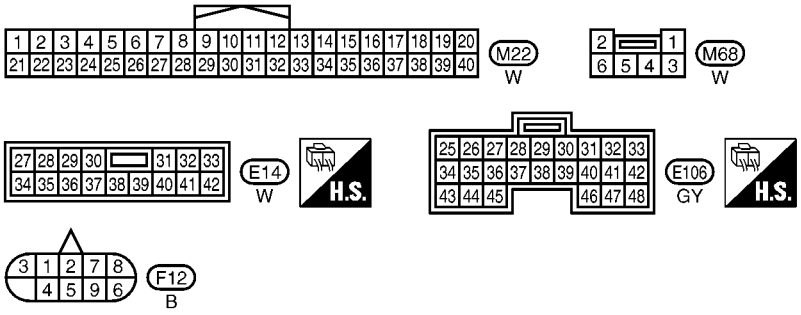
TROUBLE DIAGNOSES FOR SYMPTOMS

PFP:00100

Wiring Diagram — AT — NONDTC

ECS008PW

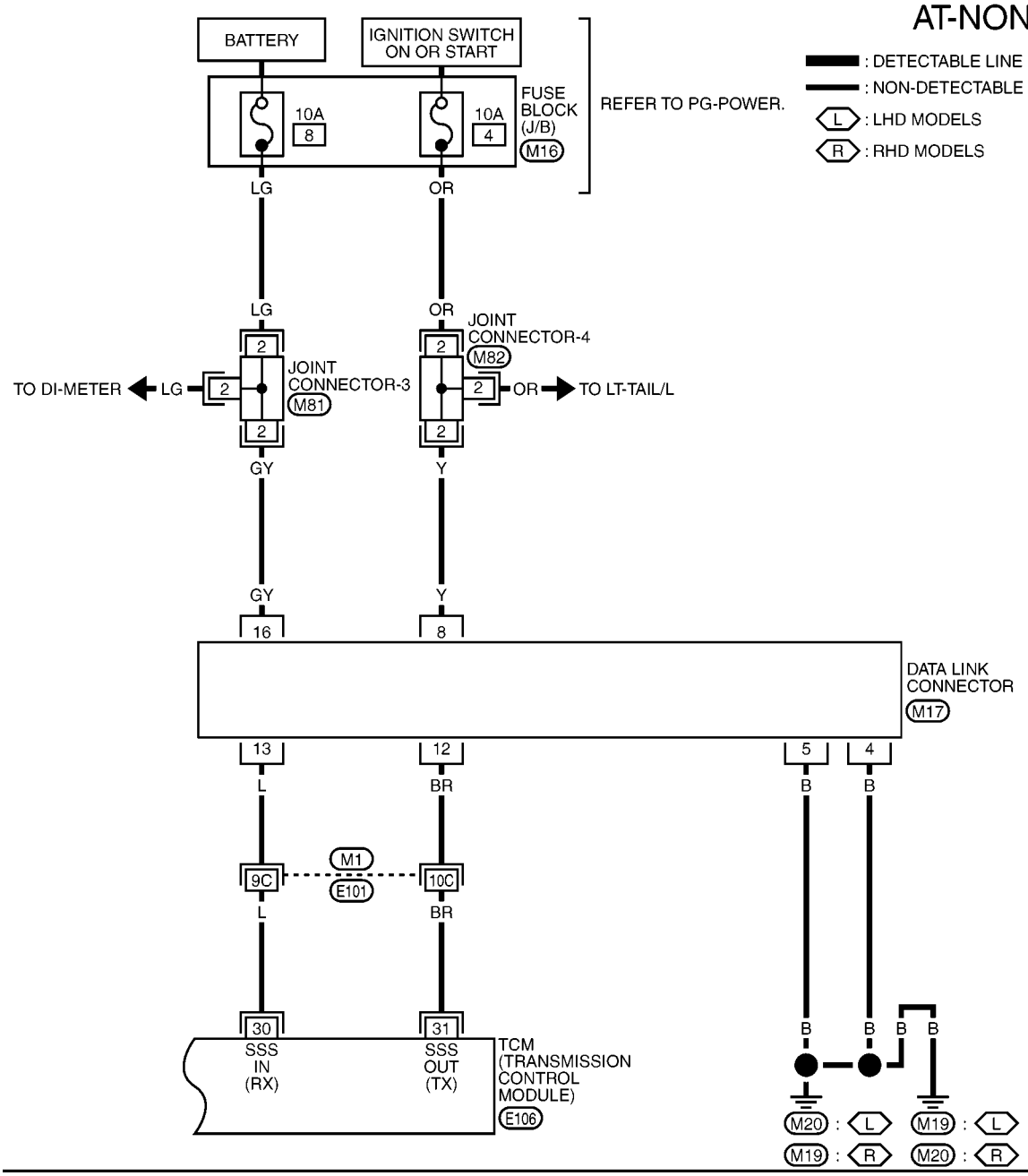


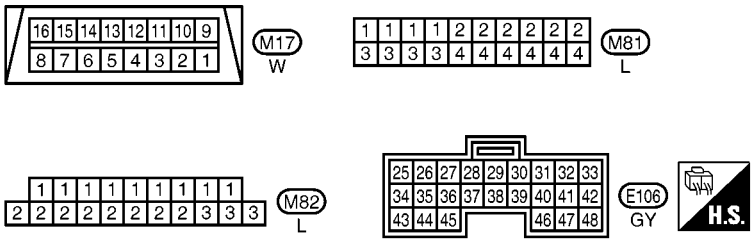


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0088E

AT-NONDTC-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0123E

O/D OFF Indicator Lamp Does Not Come On

ECS008PX

SYMPTOM:
O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to “ON”.

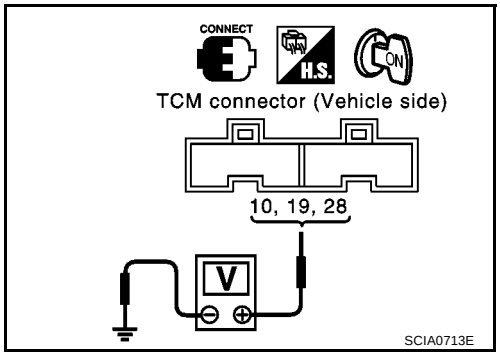
1. CHECK TCM POWER SOURCE

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage: Battery voltage

3. Turn ignition switch to “OFF” position.
4. Check voltage between TCM terminal 28 and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

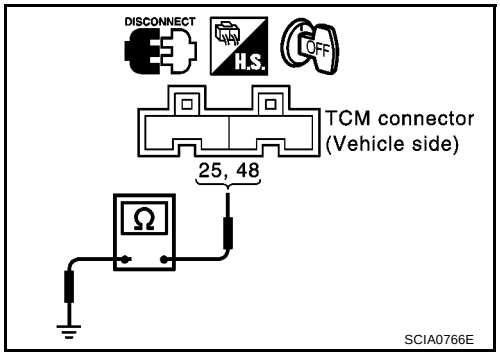
- Harness for short or open between battery, fuse and TCM terminals 10, 19 and 28
- Refer to AT-415, "Wiring Diagram — AT — MAIN" .
- Ignition switch and fuse Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground.

Continuity should exist.

If OK, check harness for short to ground and short to power.



OK or NG

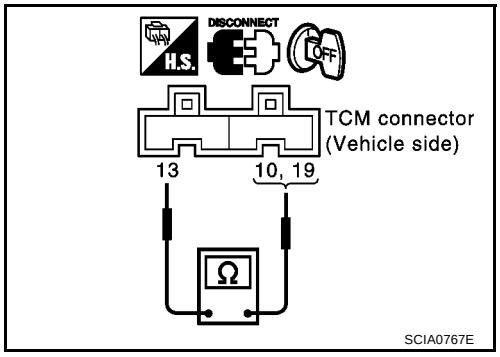
OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors. Refer to AT-415, "Wiring Diagram — AT — MAIN" .

3. CHECK LAMP CIRCUIT

1. Check continuity between TCM terminals 13 and 10, 19.

Continuity should exist.

2. Reinstall any part removed.



OK or NG

OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- O/D OFF indicator lamp.
  Refer to DI-25, "Combination Meter Self-Diagnosis" .
- Harness and fuse for short or open between fuse and O/D OFF indicator lamp
  Refer to PG-4, "POWER SUPPLY ROUTING" .
- Harness for short or open between O/D OFF indicator lamp and TCM.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Engine Cannot Be Started In “P” and “N” Position

ECS008PY

SYMPTOM:

- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”, “2”, “1” or “R” position.**

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

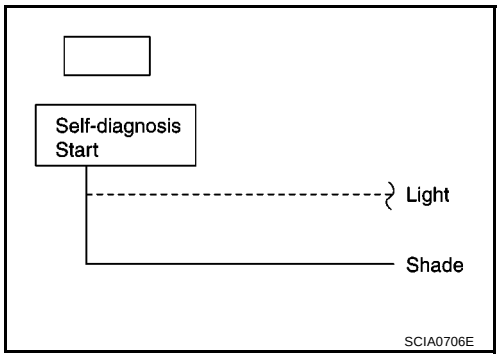
Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .

No >> GO TO 2.



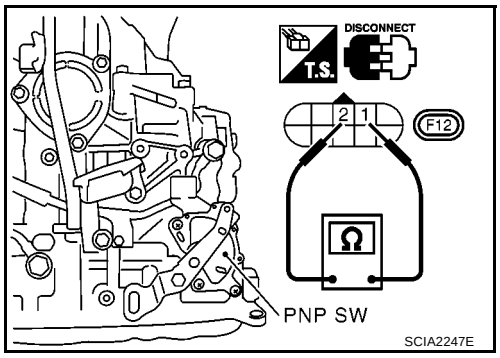
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.
Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace PNP switch.



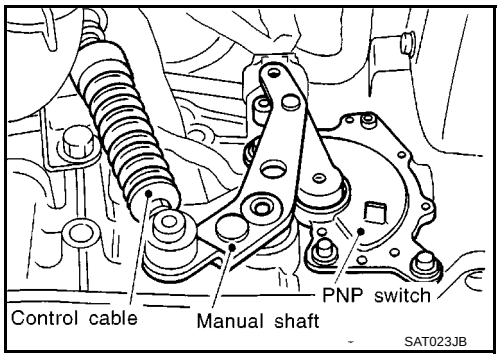
3. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 4.

NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



4. CHECK STARTING SYSTEM

Check starting system. Refer to SC-39, "STARTING SYSTEM" .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

In “P” Position, Vehicle Moves Forward Or Backward When Pushed

ECS008PZ

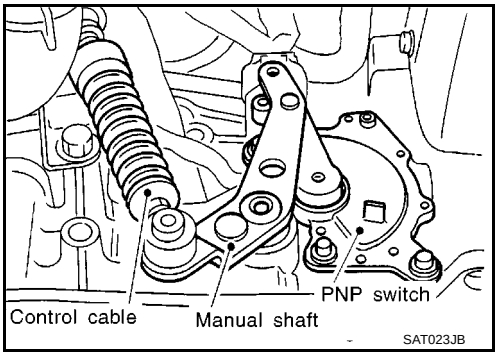
SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

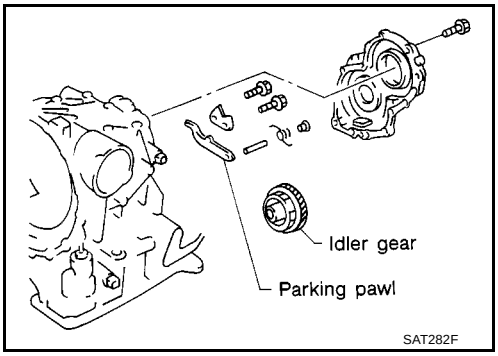


2. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-433, "OVERHAUL" .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.



In “N” Position, Vehicle Moves

ECS008Q0

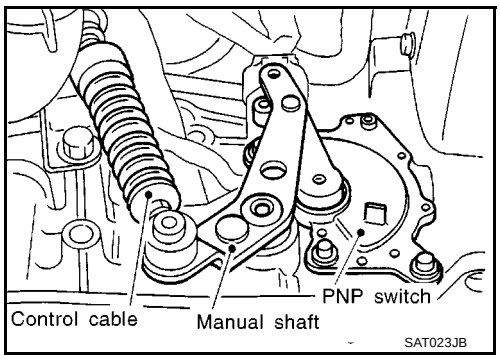
SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

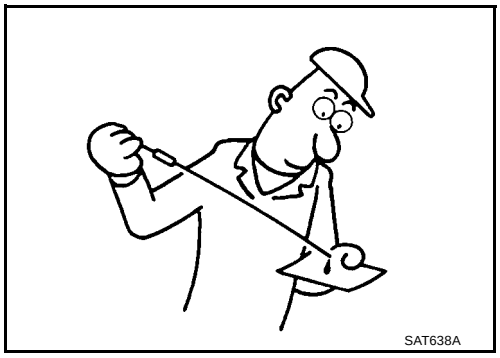


2. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

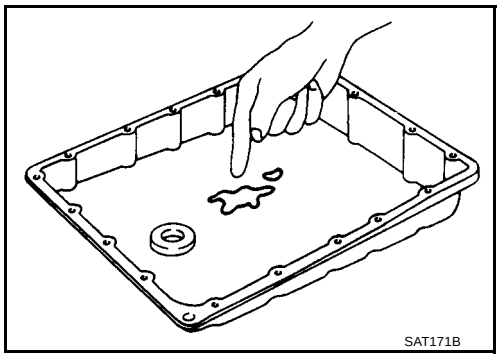


3. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 4.
NG >> 1. Disassemble A/T.
2. Check the following items:
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly



4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Large Shock. “N” → “R” Position

ECS008Q1

SYMPTOM:
There is large shock when changing from “N” to “R” position.

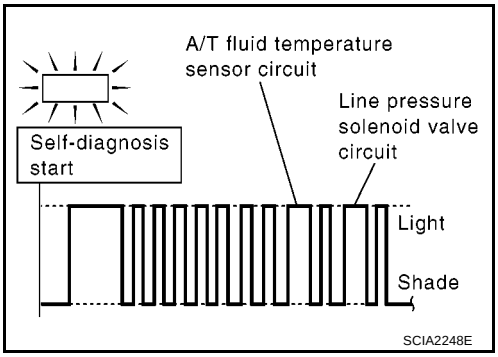
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve circuit?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
- AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"

No >> GO TO 2



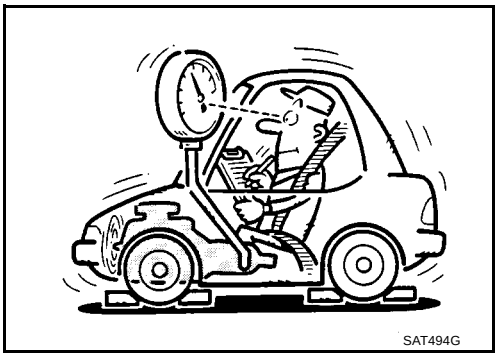
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-65, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- Oil pump assembly



3. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Vehicle Does Not Creep Backward In “R” Position

ECS008Q2

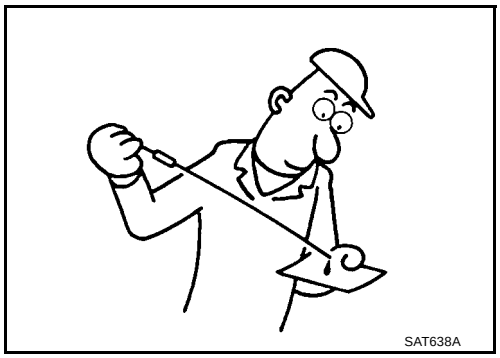
SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.


SAT638A

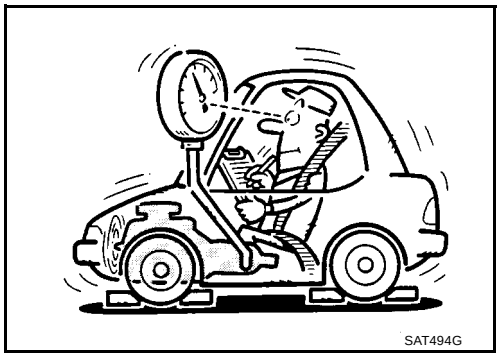
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “R” position. Refer to AT-65, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve (AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE")

3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly


SAT494G

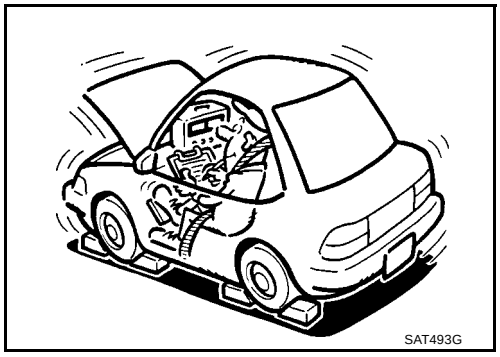
3. CHECK STALL TEST

Check stall revolution with selector lever in “1” and “R” positions.
Refer to AT-62, "Stall Test" .

OK or NG

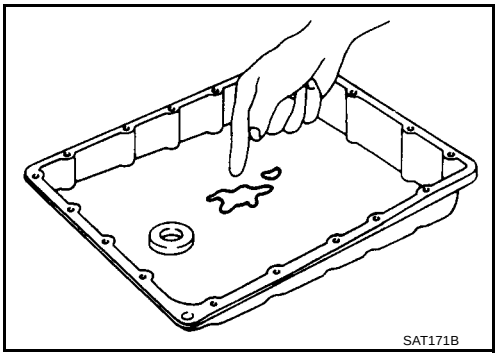
OK >> GO TO 4.
OK in “1” position, NG in “R” position>>1.Disassemble A/T.
2. Check the following items:
- Reverse clutch assembly
- Low & reverse brake assembly

NG in both “1” and “R” positions>>GO TO 6.


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Forward clutch assembly
- Overrun clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position

ECS008Q3

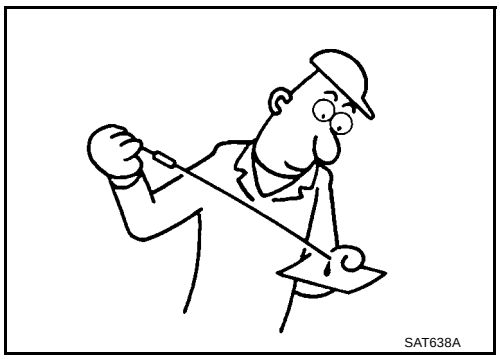
SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.


SAT638A

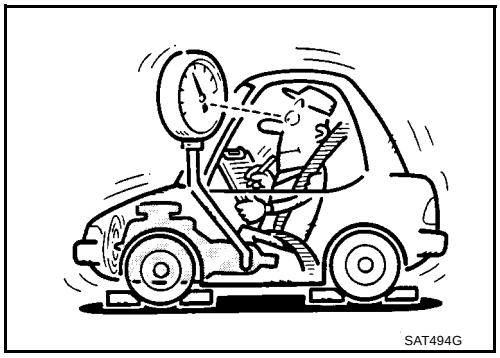
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-65, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve (AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE")

3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

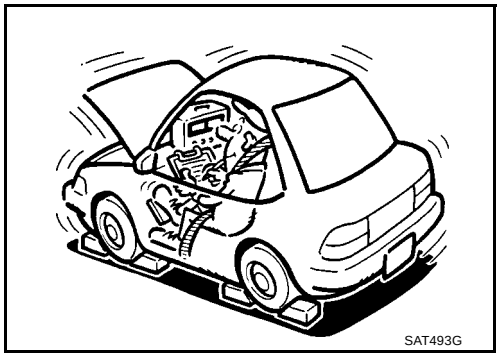

SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in “D” position. Refer to AT-62, "Stall Test" .

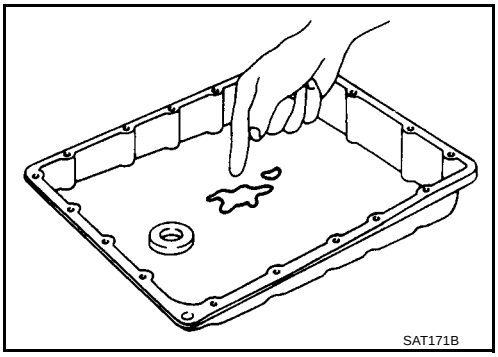
OK or NG

OK >> GO TO 4.
NG >> GO TO 6.


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Reverse clutch assembly
- High clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

Vehicle Cannot Be Started From D1

ECS008Q4

SYMPTOM:
Vehicle cannot be started from D1 on Cruise test — Part 1.

1. CHECK SYMPTOM

Is Vehicle Does Not Creep Backward In “R” Position OK?

Yes or No

Yes >> GO TO 2.
No >> Go to AT-218, "Vehicle Does Not Creep Backward In “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B, overrun clutch solenoid valve, vehicle speed sensor·MTR after cruise test?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
- AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
- AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
- AT-367, "DTC VEHICLE SPEED SENSOR MTR"

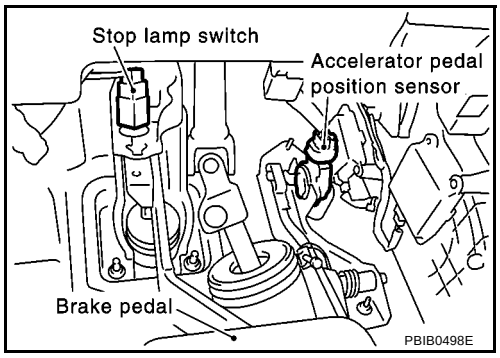
No >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

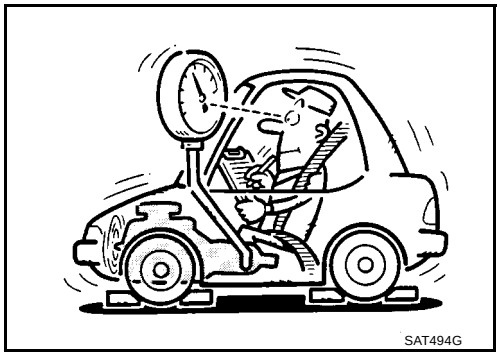


4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-65, "Line Pressure Test" .

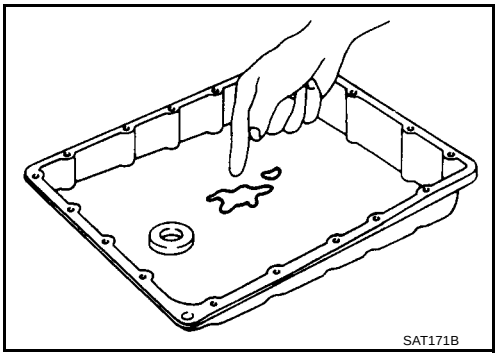
OK or NG

OK >> GO TO 5.
NG >> GO TO 8.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 8.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Forward clutch assembly
- Torque converter
- Oil pump assembly
- Reverse clutch assembly
- Low & reverse clutch assembly

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$

ECS008Q5

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D_1 OK?

Yes or No

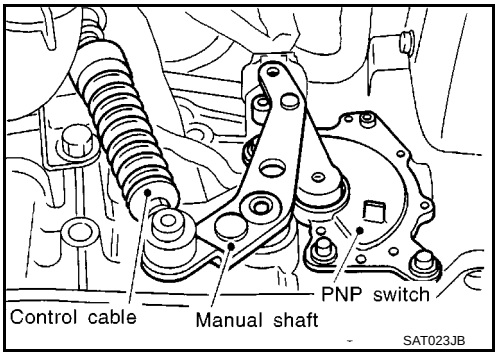
Yes >> GO TO 2.
No >> Go to AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-222, "Vehicle Cannot Be Started From D_1" .

2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-202, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

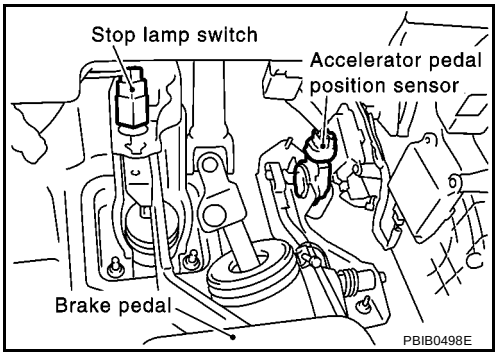
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

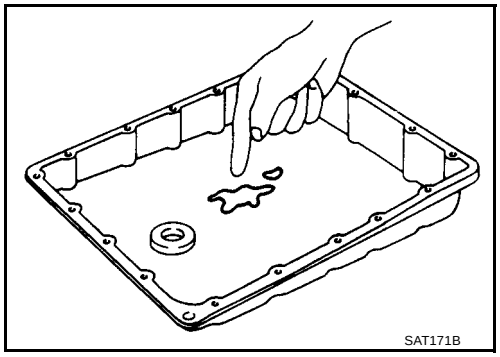
OK or NG

OK >> GO TO 5
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 8.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_2 \rightarrow D_3$

ECS008Q6

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed.

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D_1 OK?

Yes or No

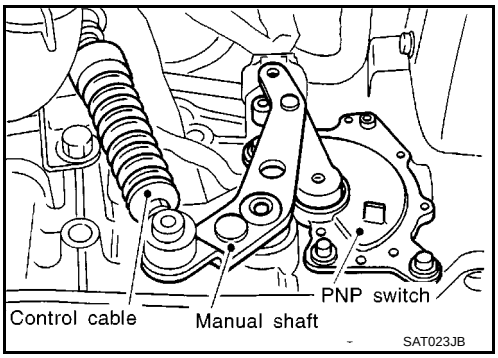
Yes >> GO TO 2.
No >> Go to AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-222, "Vehicle Cannot Be Started From D_1" .

2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-202, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

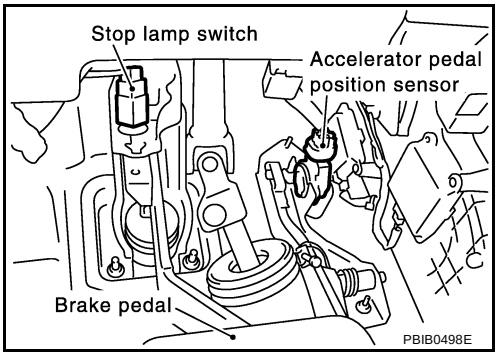
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

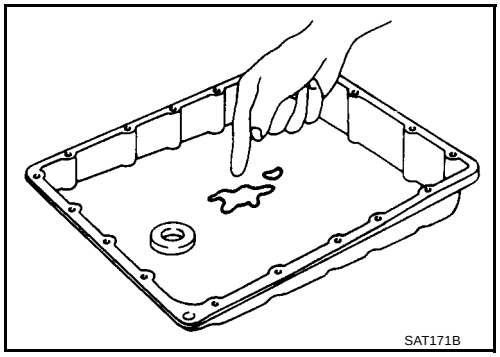
OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 8.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- High clutch assembly
- Brake band

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_3 \rightarrow D_4$

ECS008Q7

SYMPTOM:

- **A/T does not shift from D_3 to D_4 at the specified speed.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D_1 OK?

Yes or No

Yes >> GO TO 2.

No >> Go to AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-222, "Vehicle Cannot Be Started From D_1" .

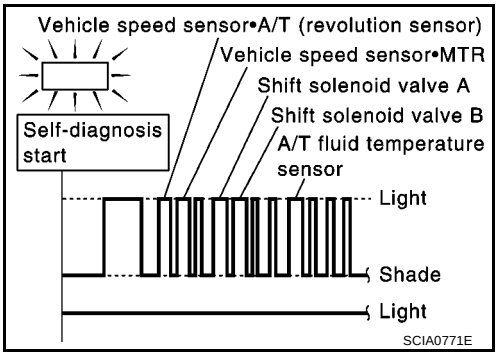
2. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis, after cruise test, show damage to any of the following circuits?

- PNP switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor·A/T (revolution sensor)
- Shift solenoid valve A or B
- Vehicle speed sensor·MTR

Yes or No

Yes >>
- Check damaged circuit. Refer to the following items.
  - AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
  - AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
  - AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
  - AT-196, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
  - AT-202, "DTC VEHICLE SPEED SENSOR MTR"
  - AT-247, "TCM Self-diagnosis Does Not Activate"



No >> GO TO 3.

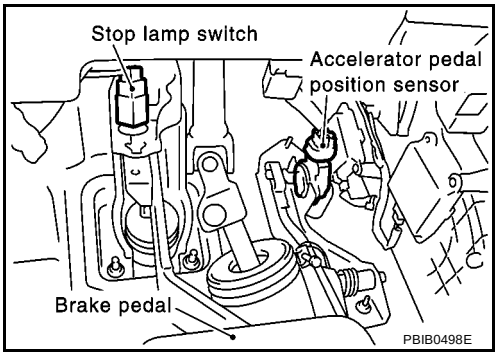
3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

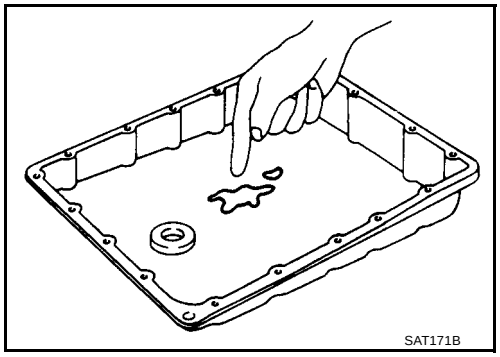
OK >> GO TO 4.

NG >> Repair or replace accelerator pedal position (APP) sensor.



4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 7.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 6
NG >> Repair or replace damaged parts.

A/T Does Not Perform Lock-up

ECS008Q8

SYMPTOM:
A/T does not perform lock-up at the specified speed.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to PNP switch, A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), vehicle speed sensor·MTR, engine speed signal or torque converter clutch solenoid valve circuit after cruise test?

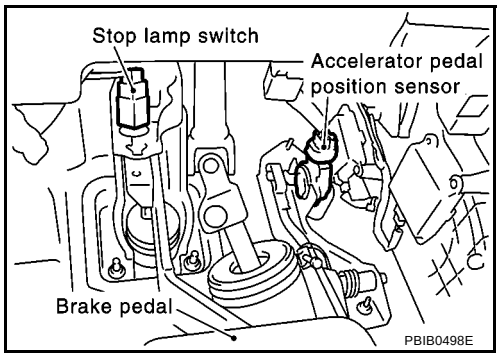
Yes or No

Yes >> Check damaged circuit. Refer to AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" , AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-202, "DTC VEHICLE SPEED SENSOR MTR" , AT-131, "DTC P0725 ENGINE SPEED SIGNAL" .

No >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .



OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position (APP) sensor.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter relief valve
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check torque converter.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Hold Lock-up Condition

ECS008Q9

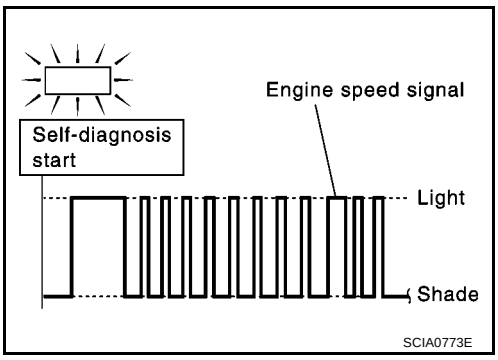
SYMPTOM:
A/T does not hold lock-up condition for more than 30 seconds.

1. CHECK DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes or No

Yes >> Check engine speed signal circuit. Refer to AT-131, "DTC P0725 ENGINE SPEED SIGNAL" .
No >> GO TO 2.

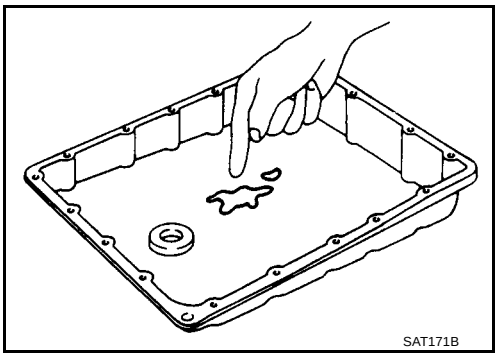


2. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 3.
NG >> GO TO 5.



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following item:

- Torque converter

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

Lock-up Is Not Released

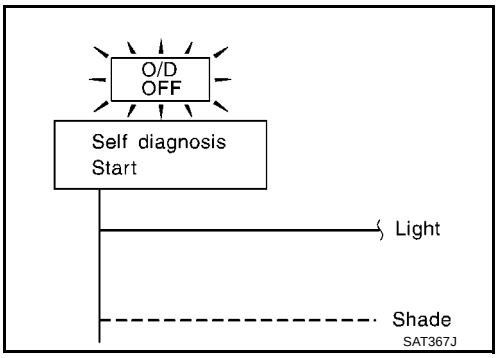
ECS008QA

SYMPTOM:
Lock-up is not released when accelerator pedal is released.

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage accelerator pedal position (APP) sensor circuit?

Without CONSULT-II
Does self-diagnosis show damage to accelerator pedal position (APP) sensor circuit?



Yes or No

Yes >> Check accelerator pedal position (APP) sensor circuit. Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .

No >> GO TO 2.

2. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Engine Speed Does Not Return To Idle (Light Braking D4 → D3)

ECS008QB

SYMPTOM:

- **Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .**
- **Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.**
- **Vehicle does not decelerate by engine brake when shifting A/T from “D” to “2” position.**

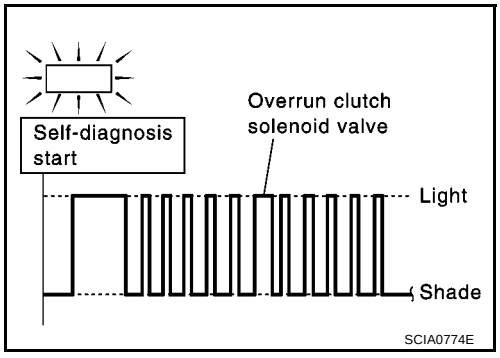
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes or NO

Yes >> Check overrun clutch solenoid valve circuit. Refer to AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .

No >> GO TO 2.



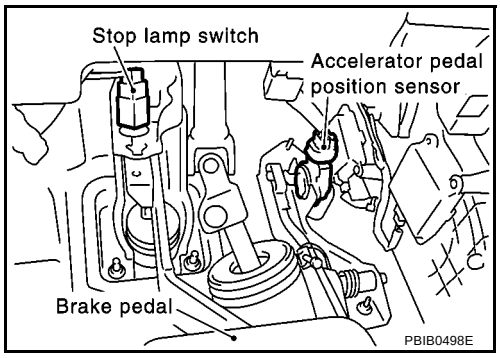
2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .



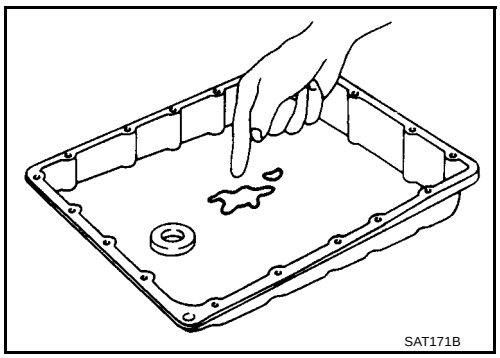
3. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 4.

NG >> GO TO 6.



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T.
4. Check the following item:

- Overrun clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

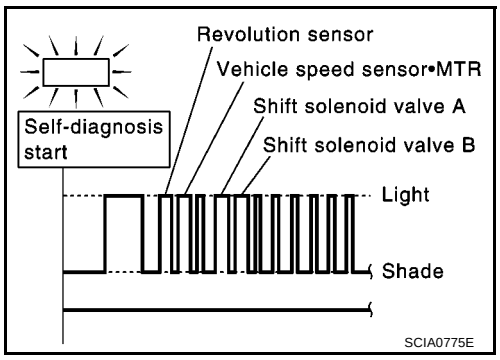
Vehicle Does Not Start From D1

ECS008QC

SYMPTOM:
Vehicle does not start from D1 on Cruise test — Part 2.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test?



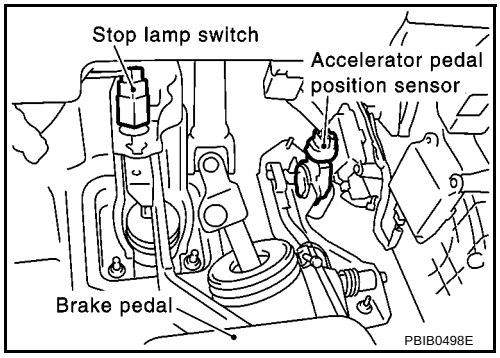
Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-173, "DTC P0750 SHIFT SOLENOID VALVE A"
- AT-178, "DTC P0755 SHIFT SOLENOID VALVE B"
- AT-202, "DTC VEHICLE SPEED SENSOR MTR"

No >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

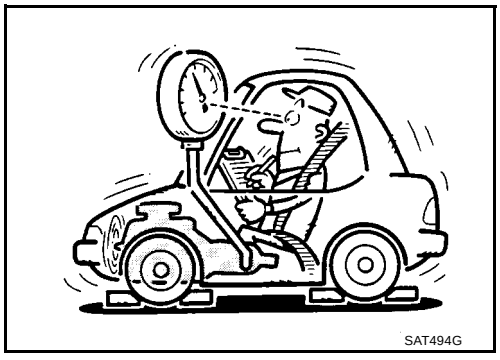


OK or NG

OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

3. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-65, "Line Pressure Test" .

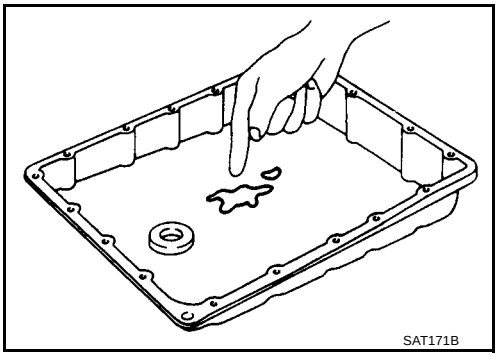


OK or NG

OK >> GO TO 4.
NG >> GO TO 7.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 7.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> Go to AT-222, "Vehicle Cannot Be Started From D1" .
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Forward clutch assembly
- Reverse clutch assembly
- Low & reverse brake assembly
- Torque converter
- Oil pump assembly

OK or NG

OK >> GO TO 6
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”

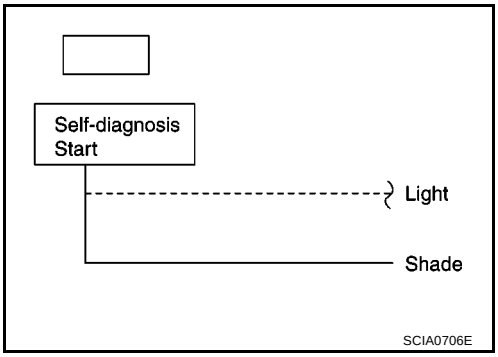
ECS008QD

SYMPTOM:
A/T does not shift from D_4 to D_3 when changing overdrive control switch to “OFF” position.

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to overdrive control switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to overdrive control switch circuit?



Yes or No

Yes >> Check overdrive control switch circuit. Refer to AT-248, "DIAGNOSTIC PROCEDURE" .

No >> Go to AT-227, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .

A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position

ECS008QE

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from “D” to “2” position.

1. CHECK PNP SWITCH CIRCUIT

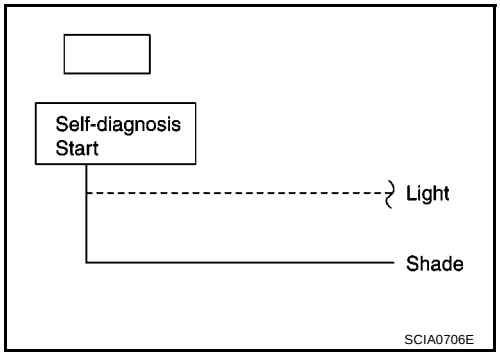
With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .

No >> Go to AT-225, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .



A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” Position

ECS008QF

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from “2” to “1” position.

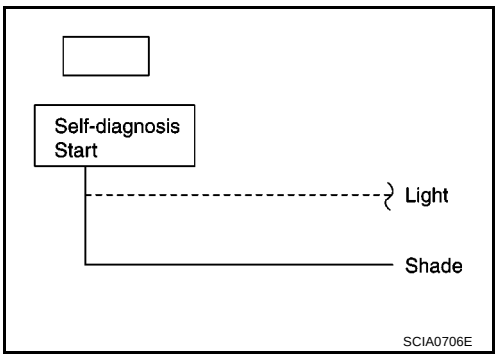
1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .
No >> GO TO 2.

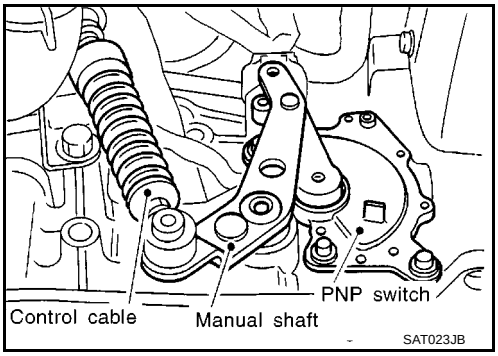


2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

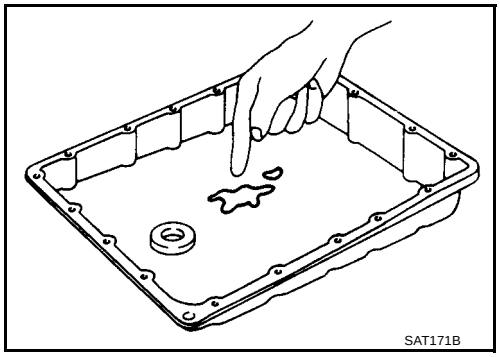
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-202, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Overrun clutch control valve
- Shift valve A
- Shift solenoid valve A

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

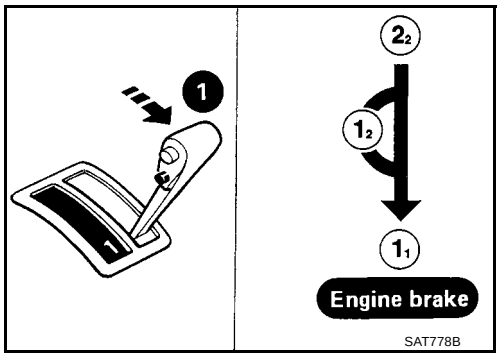
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



Vehicle Does Not Decelerate By Engine Brake

ECS008QG

SYMPTOM:
Vehicle does not decelerate by engine brake when shifting from 2$_2$ (1$_2$) to 1$_1$.

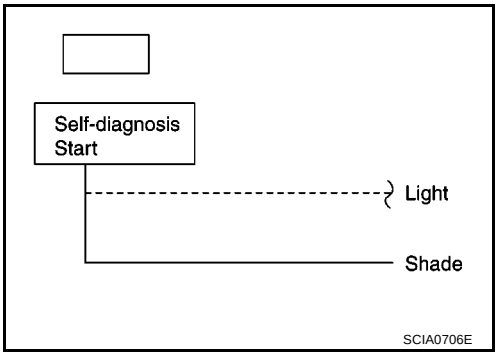
1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-247, "TCM Self-diagnosis Does Not Activate" .
No >> GO TO 2.

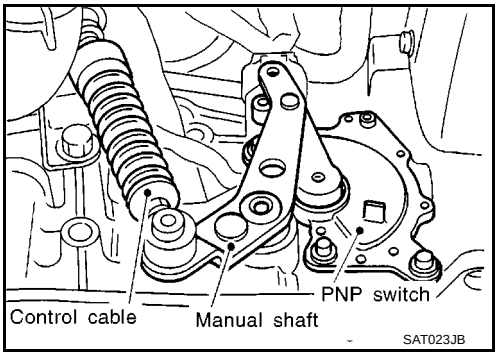


2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

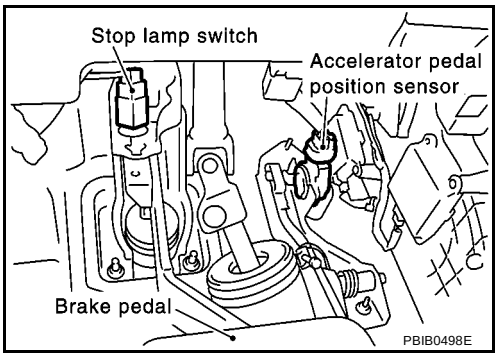


3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor. Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .



4. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

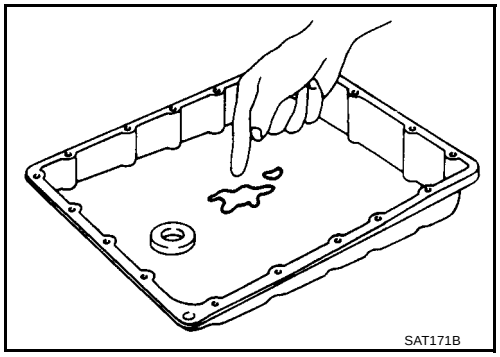
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-202, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Overrun clutch control valve
- Shift valve A
- Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
- Overrun clutch assembly
- Low & reverse bake assembly

OK or NG

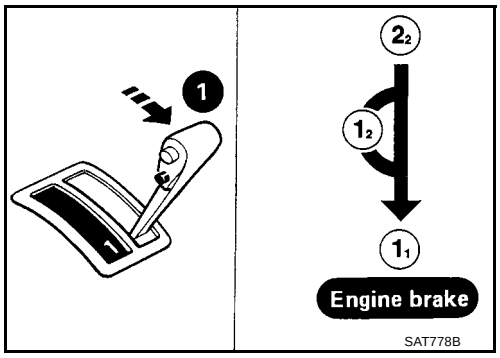
OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



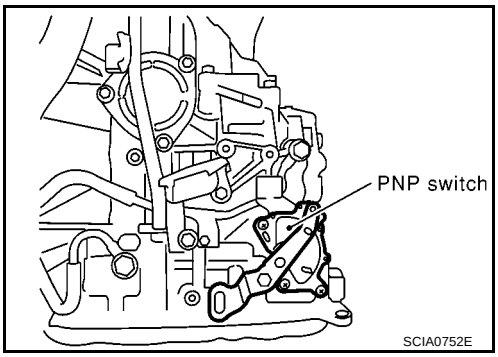
TCM Self-diagnosis Does Not Activate

ECS008QH

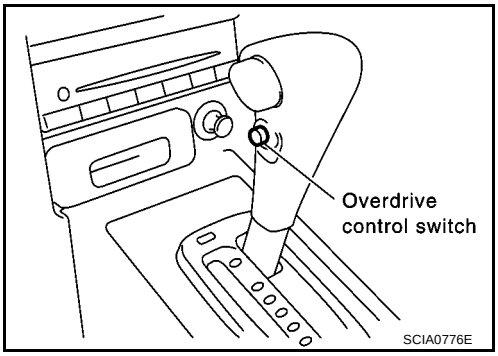
SYMPTOM:
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

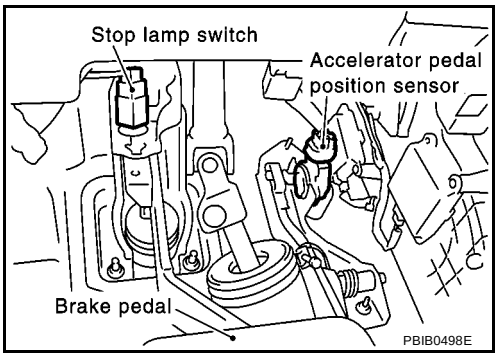
- PNP switch
  The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.



- Overdrive control switch
  Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.



- Closed throttle position signal and wide-open throttle position signal
  ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.



DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P/N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.
   Check that the signal of the selector lever position is indicated properly.

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

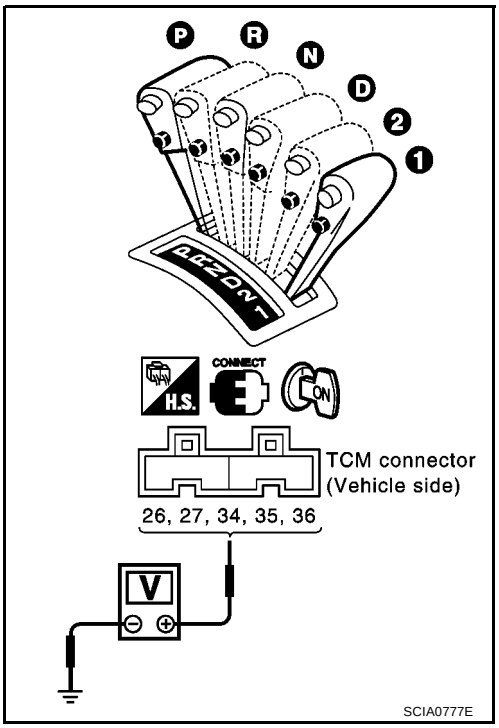
SAT701J

Without CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Voltage:
B: Battery voltage
0: 0V

Lever position	Terminal No.				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B



SCIA0777E

OK or NG

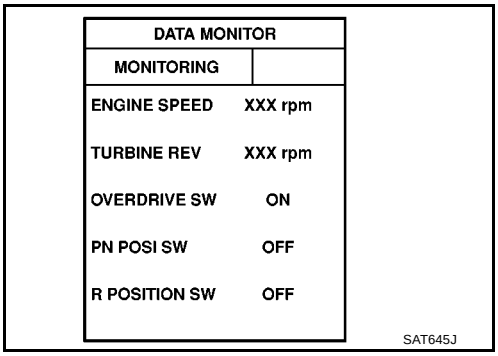
OK >> GO TO 2.
NG >> Check the following items:

- PNP switch (Refer to AT-250, "COMPONENT INSPECTION" .)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Harness for short or open between combination meter and TCM
- Harness for short or open between combination meter and PNP switch

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SWITCH”.
   Check the signal of the overdrive control switch is indicated properly.
   (Overdrive control switch “ON” displayed on CONSULT-II means overdrive “OFF”.)



OK or NG

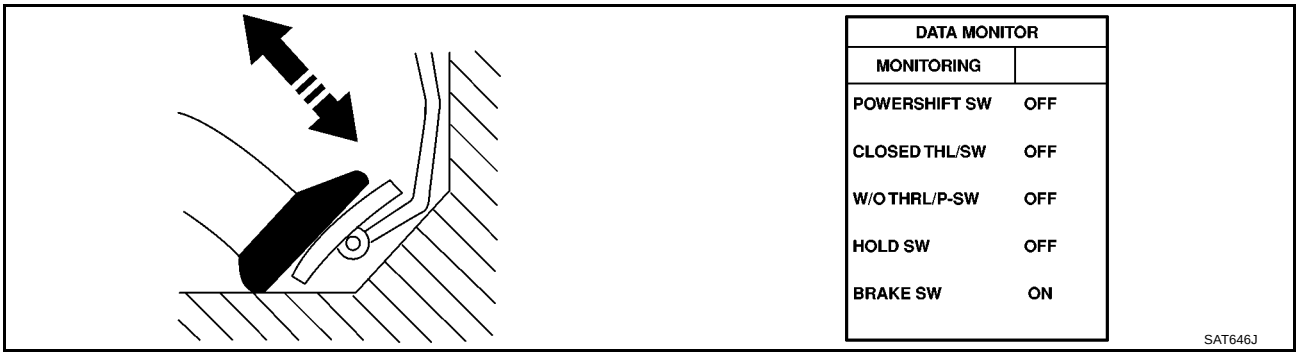
OK >> GO TO 3.
NG >> Check the following items:

- Overdrive control switch (Refer to AT-250, "COMPONENT INSPECTION" .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

3. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for A/T with CONSULT-II.
3. Read out “CLOSED THL/SW” and “W/O THRL-SW” depressing and releasing accelerator pedal.
   Check the signal of throttle position signal is indicated properly.



Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position sensor — Refer to AT-183, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .
- Harness for short or open between accelerator pedal position sensor and ECM

4. CHECK DTC

Perform “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-49, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

OK or NG

OK >> **INSPECTION END**

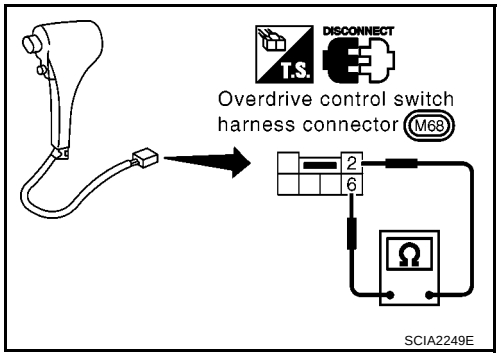
NG >> ● Perform TCM input/output signal inspection.
● If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

● Check continuity between two terminals 2 and 6.

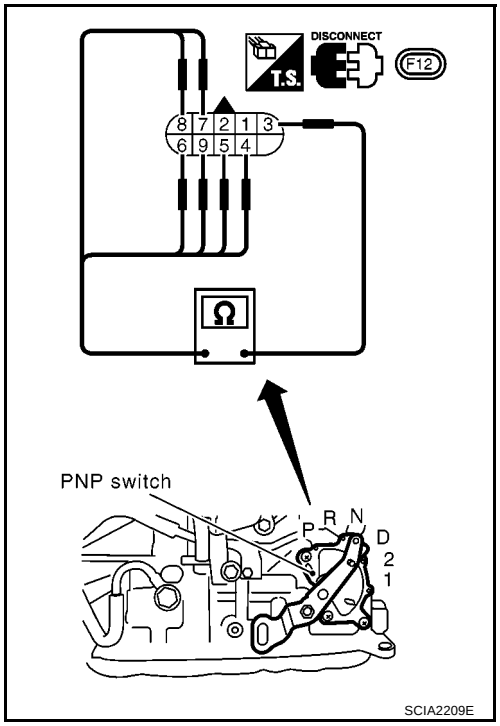
Switch position	Continuity
ON	No
OFF	Yes



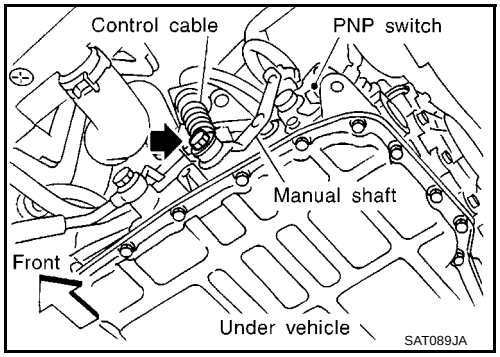
PNP Switch

1. Check continuity between terminals 1 and 2, and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 — 7	1 — 2
R	3 — 8	
N	3 — 9	1 — 2
D	3 — 6	
2	3 — 5	
1	3 — 4	



2. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control cable. Refer to AT-427, "Control Cable Adjustment" .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to AT-427, "Control Cable Adjustment" .
6. If NG on step 4, replace PNP switch.



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

CONSULT-II Function (A/T)

ECS008QI

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

Diagnostic test mode	Function
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the TCM can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.
ECU part number	ECU part number can be read.

After performing AT-251, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" , place check marks for results on the AT-263, "DIAGNOSTIC WORKSHEET" . Reference pages are provided following the items.

NOTICE:

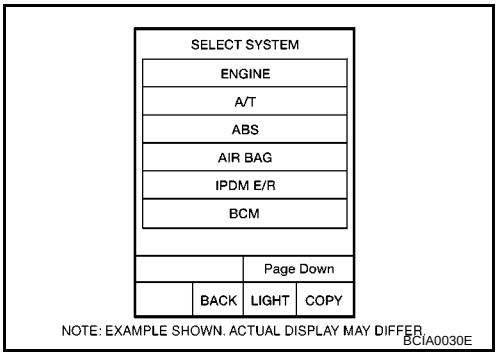
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.

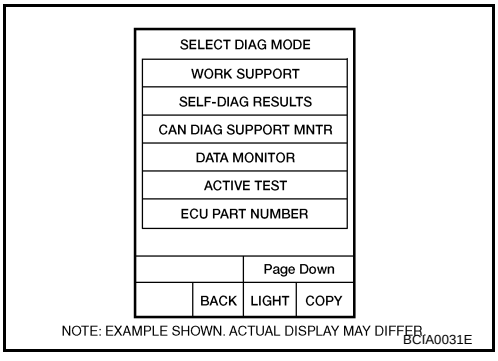
3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

1. Turn on CONSULT-II and touch “A/T” for TCM self-diagnosis.
   If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-311, "TCM Terminals and Reference Value" . If result is NG, refer to PG-4, "POWER SUPPLY ROUTING" .



2. Touch “SELF-DIAG RESULTS”.
   Display shows malfunction experienced since the last erasing operation.
   CONSULT-II performs “REAL TIME DIAG”.
   Also, any malfunction detected while in this mode will be displayed at real time.



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	Remarks
Item	Display		
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)		● No failure has been detected.	
Initial start	INITIAL START	● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	
Revolution sensor	VHCL SPEED SEN·A/T	● TCM does not receive the proper voltage signal from the sensor.	
Vehicle speed sensor (Meter)	VHCL SPEED SEN·MTR	● TCM does not receive the proper voltage signal from the sensor.	
Accelerator pedal position (APP) sensor	THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from the sensor.	
Shift solenoid valve A	SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Shift solenoid valve B	SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Overrun clutch solenoid valve	OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
T/C clutch solenoid valve	T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
A/T fluid temperature sensor	BATT/FLUID TEMP SEN	● TCM receives an excessively low or high voltage from the sensor.	To be displayed in case of abnormality and when no recording is made.
Engine speed signal	ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	
Line pressure solenoid valve	LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
CAN communication	CAN COMM CIRCUIT	● When malfunction is detected in CAN communication line.	
TCM (RAM)	CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning	Refer to AT-311, "TCM Terminals and Reference Value"
TCM (ROM)	CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning	Refer to AT-311, "TCM Terminals and Reference Value"
TCM (EEP ROM)	CONT UNIT (EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	Refer to AT-311, "TCM Terminals and Reference Value"

CAUTION:

If malfunction is detected in multiple systems including CAN communication line, CAN communication line trouble diagnosis shall be performed first.

DATA MONITOR MODE (A/T)

Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of revolution sensor is displayed.	● When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	● Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Throttle position sensor	THRTL POS SEN [V]	X	—	▼	● Throttle position sensor signal voltage is displayed.	● Accelerator pedal position sensor signal
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	▼	● A/T fluid temperature sensor signal voltage is displayed. ● Signal voltage lowers as fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	X	—	▼	● Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	▼	● Engine speed, computed from engine speed signal, is displayed.	● Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Power train revolution sensor	TURBINE REV [rpm]	X	—	▼		● Not mounted but displayed.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of overdrive control SW is displayed.	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of PN position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of R position SW is displayed.	
D position switch	D POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of D position SW is displayed.	
2 position switch	2 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 2 position SW, is displayed.	
1 position switch	1 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 1 position SW, is displayed.	

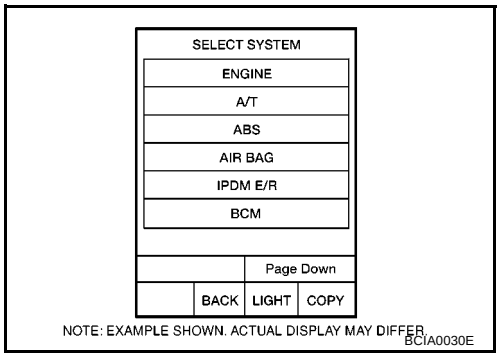
Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	X	—	▼	● Status of ASCD cruise signal is displayed. ON... Cruising state OFF... Normal running state	● This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD·OD CUT [ON/OFF]	X	—	▼	● Status of ASCD OD release signal is displayed. ON... OD released OFF... OD not released	● This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of kick down SW, is displayed.	● This is displayed even when no kick down switch is equipped.
Closed throttle position signal	CLOSED THL/SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of closed throttle position signal, is displayed.	● This means closed throttle position signal input via CAN communication line.
Wide open throttle position signal	W/O THRL/P-SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of wide open throttle position signal, is displayed.	● This means wide open throttle position signal input via CAN communication line.
A/T mode switch	HOLD SW [ON/OFF]	X	—	▼		● Not mounted but displayed.
Gear position	GEAR	—	X	▼	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	X	▼	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	▼	● Vehicle speed data, used for computation by TCM, is displayed.	
A/T mode switch	POWER SHIFT SW [ON/OFF]	—	—	▼		● Not mounted but displayed.
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	▼	● Difference in revolution between input shaft revolution and input shaft revolution of torque converter	● Display doesn't indicate o rpm even if engine is stopped. But this isn't malfunction.
CAN communication	CAN COMM [OK/NG]	—	—	—		
CAN circuit 1	CAN CIRC 1 [OK/UNKWN]	—	—	—		
CAN circuit 2	CAN CIRC 2 [OK/UNKWN]	—	—	—		
CAN circuit 3	CAN CIRC 3 [OK/UNKWN]	—	—	—		
CAN circuit 4	CAN CIRC 4 [OK/UNKWN]	—	—	—		

Item	Display	Mover to center Monitor items			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
CAN circuit 5	CAN CIRC 5 [OK/UNKWN]	—	—	—		
Throttle position	THROTTLE POSI [/8]	—	X	▼	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	▼	● ON/OFF status is displayed. ON... Brake pedal is depressed. OFF... Brake pedal is released.	
Line pressure duty	LINE PRES DTY [%]	—	X	▼	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	▼	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	▼	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	● Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	▼	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	▼	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	▼	● Control status of O/D OFF indicator lamp is displayed.	
Voltage [V]		—	—	▼	● Value measured by voltage probe is displayed.	
Frequency [Hz]		—	—	▼	● Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	
DUTY-HI		—	—	▼	● Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	▼		
PLS WIDTH-HI		—	—	▼	● Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	▼		

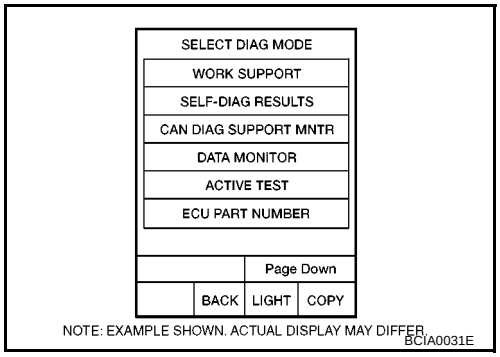
X: Applicable —: Not applicable ▼: Option

HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITH CONSULT-II)

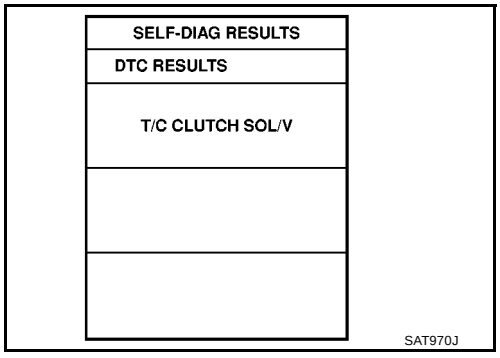
1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait for at least 3 seconds and then turn it “ON” again.
2. Turn CONSULT-II “ON”, and touch “A/T”.



3. Touch “SELF-DIAG RESULTS”.



4. Touch “ERASE”. (The self-diagnostic results will be erased.)



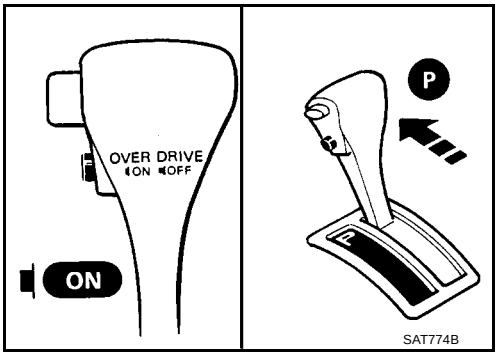
Diagnostic Procedure Without CONSULT-II

ECS008QJ

SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)

1. CHECK O/D OFF INDICATOR LAMP

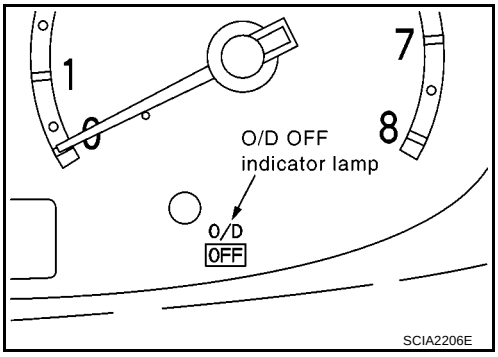
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch to “OFF” position.
   Wait 5 seconds.
3. Turn ignition switch to “ACC” position.
4. Set overdrive control switch to “ON” position.
5. Move selector lever to “P” position.
6. Turn ignition switch to “ON” position. (Do not start engine.)



7. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

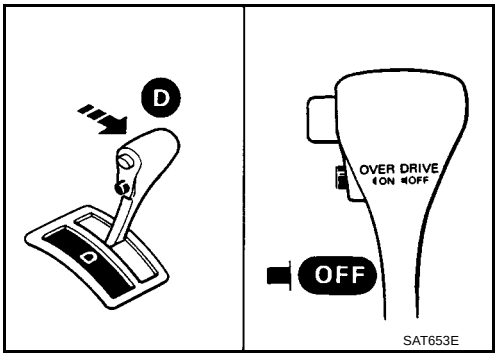
Yes >> GO TO 2.
No >> GO TO AT-323, "O/D OFF Indicator Lamp Does Not Come On" .



2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to “OFF” position.
2. Turn ignition switch to “ACC” position.
3. Move selector lever to “D” position.
4. Set overdrive control switch to “OFF” position.
5. Turn ignition switch to “ON” position. (Do not start engine.)
   Wait more than 2 seconds after turning ignition switch “ON”.

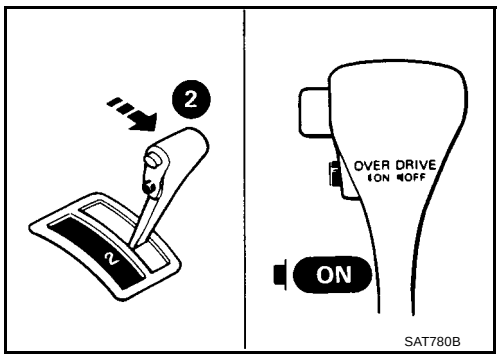
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to “2” position.
2. Set overdrive control switch to “ON” position.

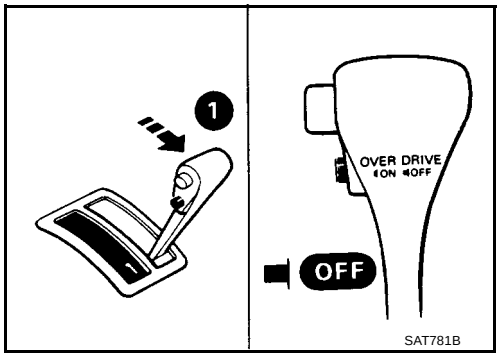
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

1. Move selector lever to “1” position.
2. Set overdrive control switch to “OFF” position.

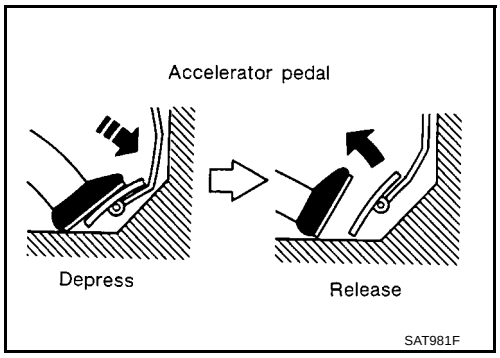
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

1. Depress accelerator pedal fully and release it.

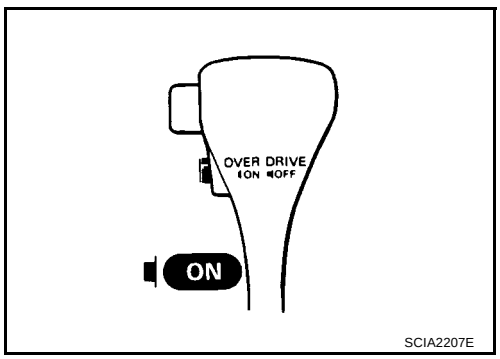
>> GO TO 6.



6. JUDGEMENT PROCEDURE STEP 5

1. Set overdrive control switch to “ON” position.

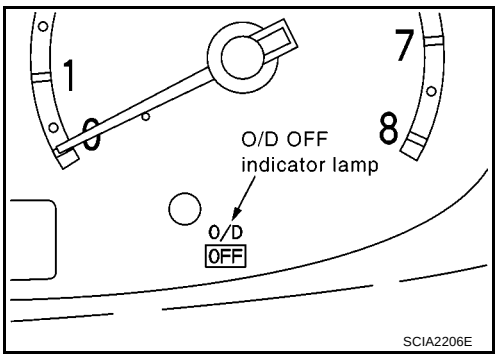
>> GO TO 7.



7. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to AT-259, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

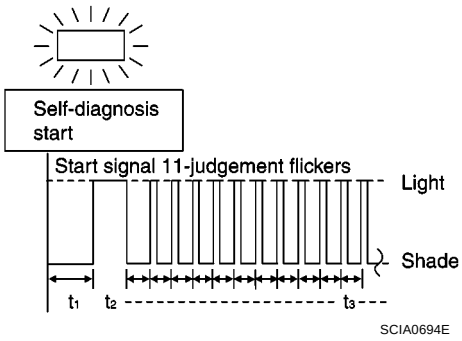
>> **DIAGNOSIS END**



JUDGEMENT OF SELF-DIAGNOSIS CODE

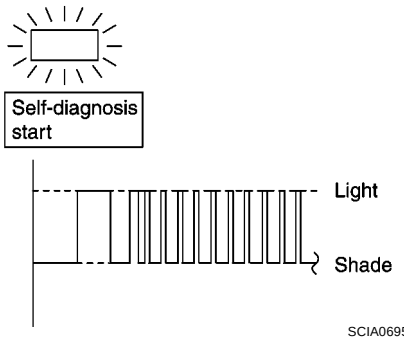
O/D OFF indicator lamp:

All judgement flickers are the same.



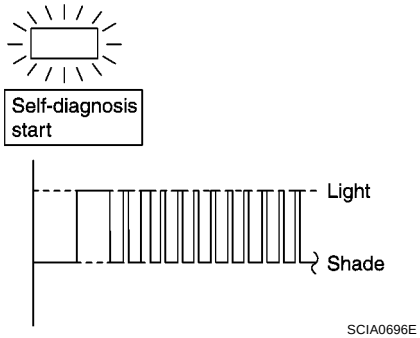
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



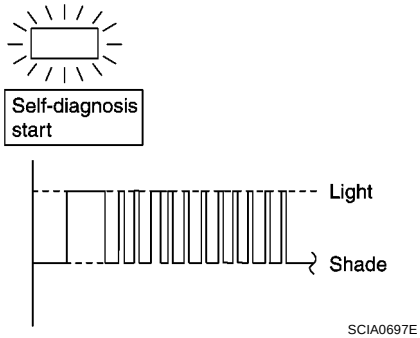
Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR).**
Refer to AT-362

2nd judgement flicker is longer than others.



Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR.**
Refer to AT-367

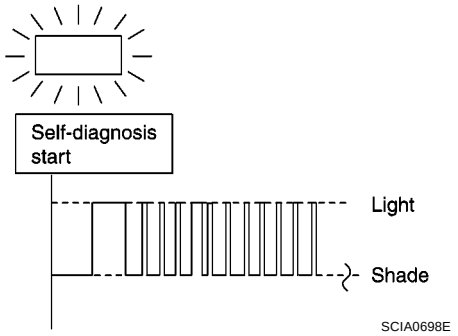
3rd judgement flicker is longer than others.



Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
⇒ **Go to ACCELERATOR PEDAL POSITION (APP) SENSOR.**
Refer to AT-371

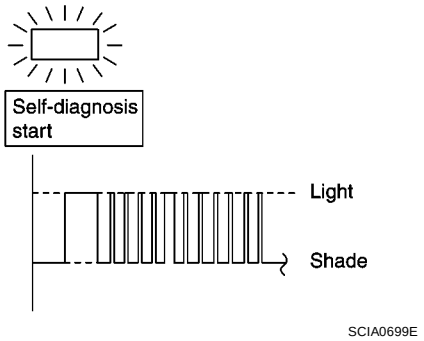
O/D OFF indicator lamp:

4th judgement flicker is longer than others.



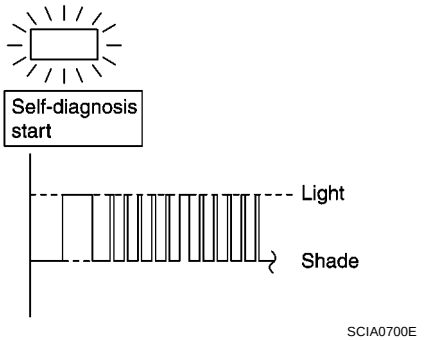
Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A.**
Refer to AT-376

5th judgement flicker is longer than others.



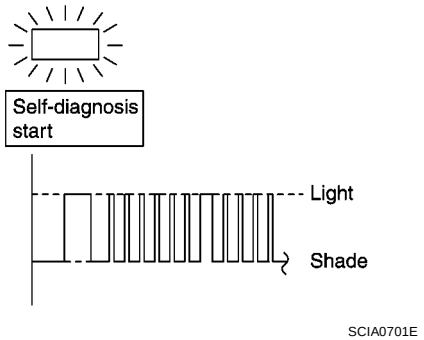
Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B.**
Refer to AT-381

6th judgement flicker is longer than others.



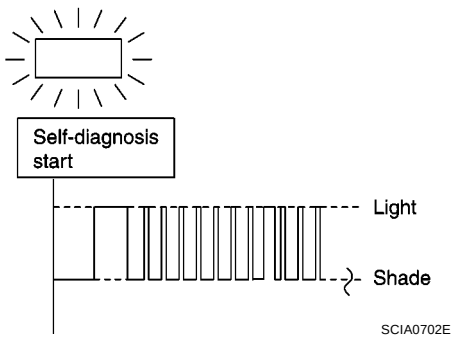
Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE.**
Refer to AT-386

7th judgement flicker is longer than others.



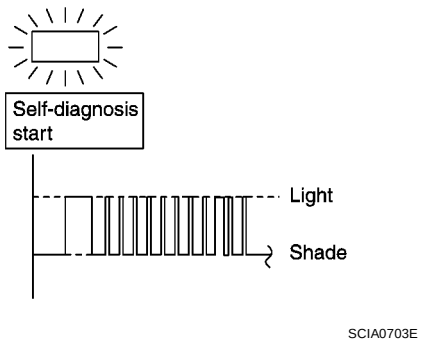
Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE.**
Refer to AT-390

8th judgement flicker is longer than others.

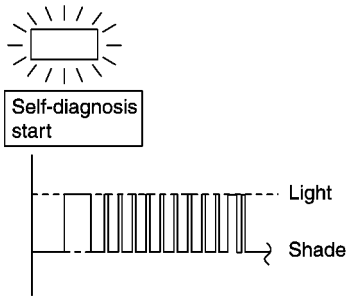
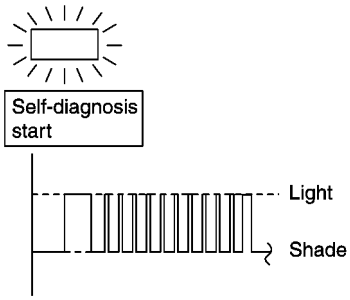
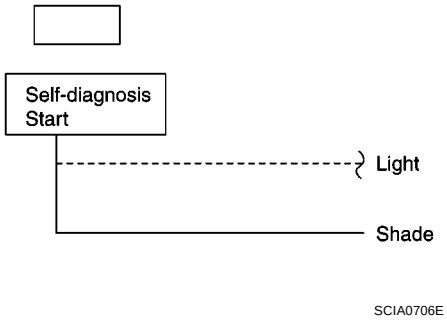
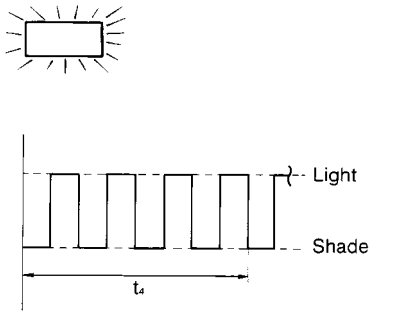


A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
⇒ **Go to BATT/FLUID TEMP SEN(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE).**
Refer to AT-395

9th judgement flicker is longer than others.



Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to ENGINE SPEED SIGNAL.**
Refer to AT-401

O/D OFF indicator lamp:	
10th judgement flicker is longer than others.  SCIA0704E	11th judgement flicker is longer than others.  SCIA0705E
Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to LINE PRESSURE SOLENOID VALVE.** Refer to AT-405	CAN communication line is damaged. ⇒**Go to CAN COMMUNICATION LINE.** Refer to AT-412
Lamp comes OFF.  SCIA0706E	Flickers as shown below.  SAT804H
PNP switch, overdrive control switch, closed throttle position signal or wide-open throttle position signal circuit is disconnected or TCM is damaged. (Because closed throttle position signal and wide-open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.) ⇒ **Go to TCM Self-diagnosis Does Not Activate.** Refer to AT-358	Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors.—This is a problem.)

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 1.0 second

HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITHOUT CONSULT-II)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait for at least 3 seconds and then turn it “ON” again.
2. Perform “SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)”. Refer to AT-257, "Diagnostic Procedure Without CONSULT-II" .
3. Turn ignition switch “OFF”. (The self-diagnostic results will be erased.)

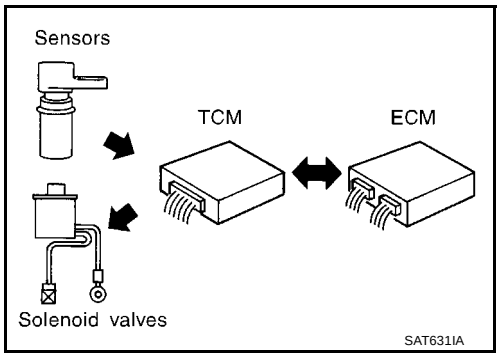
TROUBLE DIAGNOSIS — INTRODUCTION

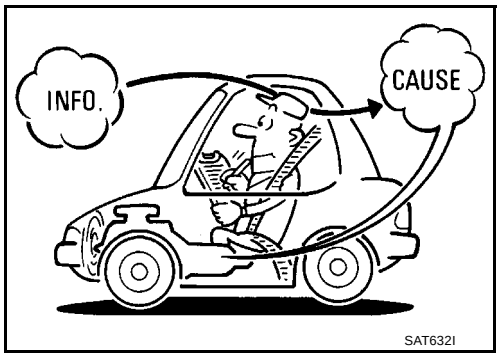
PFP:00000

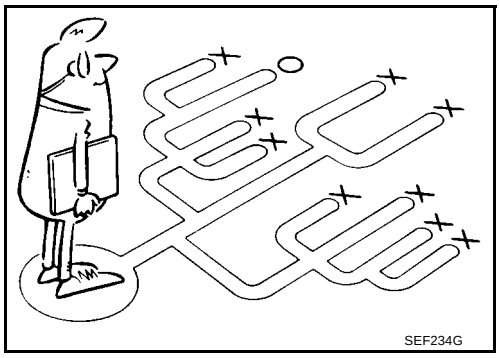
Introduction

ECS008QK

The TCM receives a signal from the vehicle speed sensor, throttle position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.
Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only, may not find the cause of the problems. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the “Work Flow”. Refer to AT-58 .
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drive ability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Worksheet” like the example (AT-55) should be used.
Start your diagnosis by looking for “conventional” problems first. This will help troubleshoot drive ability problems on an electronically controlled engine vehicle.
Also check related Service bulletins for information.







DIAGNOSTIC WORKSHEET

Information from Customer

KEY POINTS

- **WHAT**..... Vehicle & A/T model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. model	Engine	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	❑ Continuous ❑ Intermittent (times a day)	
Symptoms	❑ Vehicle does not move. (❑ Any position ❑ Particular position)	
	❑ No up-shift (❑ 1st → 2nd ❑ 2nd → 3rd ❑ 3rd → O/D)	
	❑ No down-shift (❑ O/D → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lockup malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ Lockup ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
O/D OFF indicator lamp	Blinks for about 8 seconds.	
	❑ Continuously lit	❑ Not lit

Diagnostic Worksheet

1.	❑ Read the Fail-safe and listen to customer complaints.		AT-8, "Wiring Diagrams and Trouble Diagnosis", AT-263, "DIAGNOSTIC WORKSHEET"
2.	❑ CHECK A/T FLUID		AT-268, "A/T Fluid Check"
	❑ Leakage (Follow specified procedure) ❑ Fluid condition ❑ Fluid level		
3.	❑ Perform STALL TEST and LINE PRESSURE TEST.		AT-269, "Stall Test", AT-272, "Line Pressure Test"
	❑ Stall test — Mark possible damaged components/others.		
	❑ Torque converter one-way clutch ❑ Reverse clutch ❑ Forward clutch ❑ Overrun clutch ❑ Forward one-way clutch	❑ Low & reverse brake ❑ Low one-way clutch ❑ Engine ❑ Line pressure is low ❑ Clutches and brakes except high clutch and brake band are OK
	❑ Line Pressure test — Suspected parts:		
4.	❑ Perform all ROAD TEST and mark required procedures.		AT-273, "Road Test"
4-1.	Check before engine is started.		AT-275, "1. CHECK BEFORE ENGINE IS STARTED"
	❑ O/D OFF Indicator Lamp Does Not Come On, AT-323 . ❑ SELF-DIAGNOSTIC CONFIRMATION PROCEDURE — Mark detected items.		
	❑ Vehicle speed sensor·A/T (Revolution sensor), AT-362 . ❑ Vehicle speed sensor·MTR, AT-367 . ❑ Accelerator pedal position (APP) sensor, AT-371 . ❑ Shift solenoid valve A, AT-376 . ❑ Shift solenoid valve B, AT-381 . ❑ Overrun clutch solenoid valve, AT-386 . ❑ Torque converter clutch solenoid valve, AT-390 . ❑ A/T fluid temperature sensor and TCM power source, AT-395 . ❑ Engine speed signal, AT-401 . ❑ Line pressure solenoid valve, AT-405 . ❑ CAN communication line, AT-412 . ❑ Control unit (RAM), control unit (ROM), AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❑ Control unit (EEP ROM), AT-208, "DTC CONTROL UNIT(EEPROM)" . ❑ PNP & overdrive control switches, and throttle position sensor, AT-358 . ❑ Battery ❑ Others		
4-2.	Check at idle		AT-276, "2. CHECK AT IDLE"
	❑ Engine Cannot Be Started In “P” And “N” Position, AT-325 . ❑ In “P” Position, Vehicle Moves Forward Or Backward When Pushed, AT-326 . ❑ In “N” Position, Vehicle Moves, AT-327 . ❑ Large Shock. “N” → “R” Position, AT-328 . ❑ Vehicle Does Not Creep Backward In “R” Position, AT-328 . ❑ Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position, AT-331 .		

4.	4-3.	Cruise test	AT-279, "3. CRUISE TEST", AT-283, "Cruise Test — Part 1"
		Part-1	
		❏ Vehicle Cannot Be Started From D1 , AT-333 . ❏ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-336 . ❏ A/T Does Not Shift: D2 → D3 , AT-338 . ❏ A/T Does Not Shift: D3 → D4 , AT-340 . ❏ A/T Does Not Perform Lock-up,AT-343 . ❏ A/T Does Not Hold Lock-up Condition, AT-344 . ❏ Lock-up Is Not Released, AT-346 . ❏ Engine Speed Does Not Return To Idle (Light Braking D4 → D3), AT-347 .	
		Part-2	AT-286, "Cruise Test — Part 2"
		❏ Vehicle Does Not Start From D1 , AT-349 . ❏ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-336 . ❏ A/T Does Not Shift: D2 → D3 , AT-338 . ❏ A/T Does Not Shift: D3 → D4 , AT-340 .	
		Part-3	AT-288, "Cruise Test — Part 3"
		❏ A/T Does Not Shift: D4 → D3 When Overdrive Control Switch “ON” → “OFF”, AT-352 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In D3), AT-347 . ❏ A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position, AT-353 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In 22),AT-347 . ❏ A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position, AT-354 . ❏ Vehicle Does Not Decelerate By Engine Brake, AT-356 . ❏ TCM Self-diagnosis Does Not Activate (PNP & Overdrive Control Switches, and throttle position sensor Circuit Checks), AT-358 . ❏ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		❏ Vehicle speed sensor·A/T (Revolution sensor), AT-362 . ❏ Vehicle speed sensor·MTR, AT-367 . ❏ Accelerator pedal position (APP) sensor, AT-371 . ❏ Shift solenoid valve A, AT-376 . ❏ Shift solenoid valve B, AT-381 . ❏ Overrun clutch solenoid valve, AT-386 . ❏ Torque converter clutch solenoid valve, AT-390 . ❏ Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-395 . ❏ Engine speed signal, AT-401 . ❏ Line pressure solenoid valve, AT-405 . ❏ CAN communication line, AT-412 . ❏ Control unit (RAM), control unit (ROM), AT-206, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❏ Control unit (EEP ROM), AT-208, "DTC CONTROL UNIT(EEPROM)" . ❏ PNP & overdrive control switches, and throttle position sensor, AT-358 . ❏ Battery ❏ Others	
5.	❏ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)"
6.	❏ Perform all ROAD TEST and re-mark required procedures.		AT-273, "Road Test"

7.	❑ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-291, "TROUBLE DIAGNOSIS — GENERAL DESCRIPTION"
8.	❑ Erase self-diagnosis code from TCM memories.	AT-256, "HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITH CONSULT-II)", AT-261, "HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITHOUT CONSULT-II)"

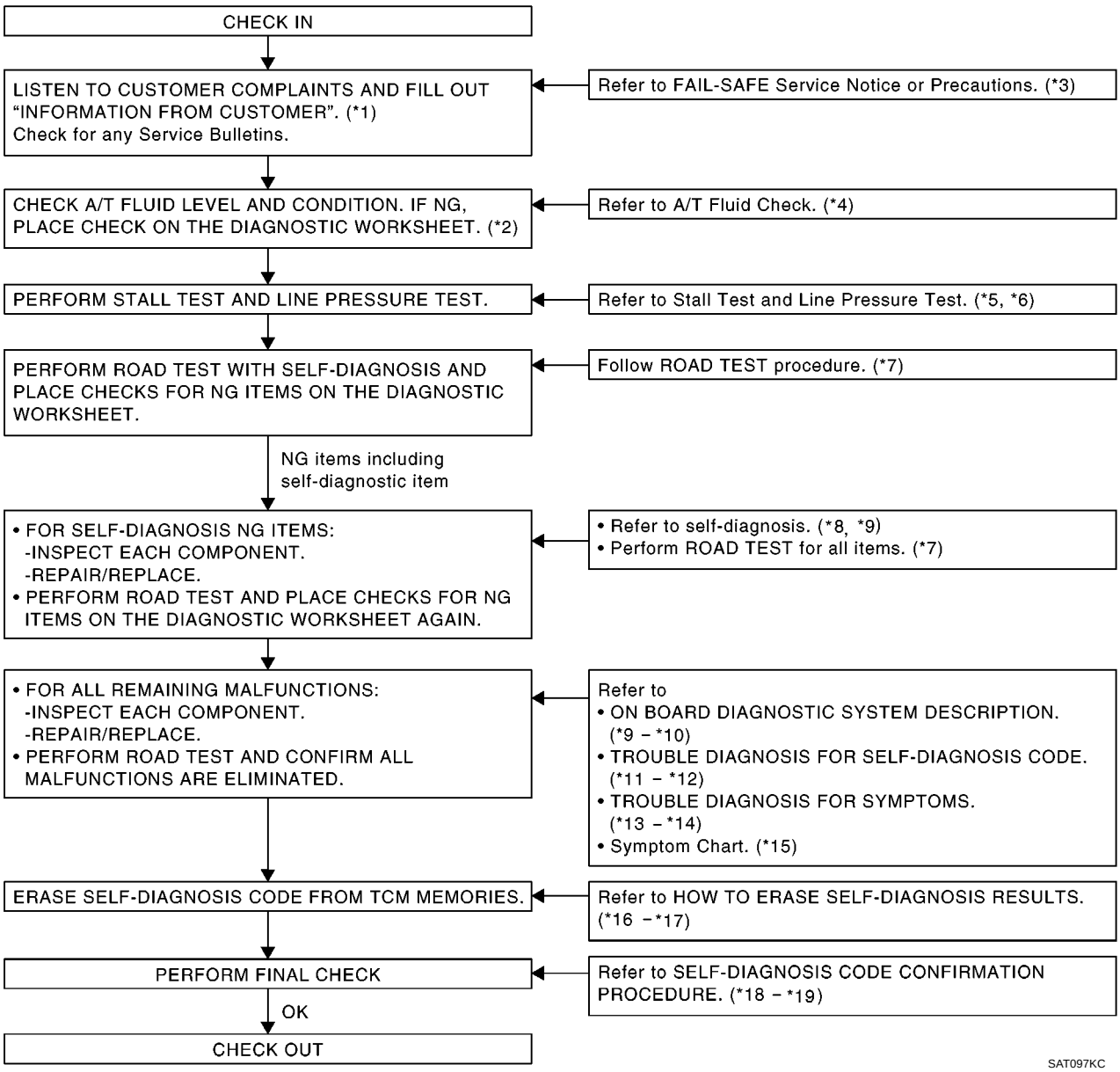
Work Flow

ECS008QL

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.
Make good use of the two sheets provided, “INFORMATION FROM CUSTOMER” (AT-263) and “DIAGNOSTIC WORKSHEET” (AT-264), to perform the best troubleshooting possible.

WORK FLOW CHART



*1 AT-263	*2 AT-264	*3 AT-7
*4 AT-268	*5 AT-269	*6 AT-272
*7 AT-273	*8 AT-257	*9 AT-251
*10 AT-251	*11 AT-362	*12 AT-412
*13 AT-323	*14 AT-356	:15 AT-291
*16 AT-256	*17 AT-261	*18 AT-362
*19 AT-412		

TROUBLE DIAGNOSIS — BASIC INSPECTION

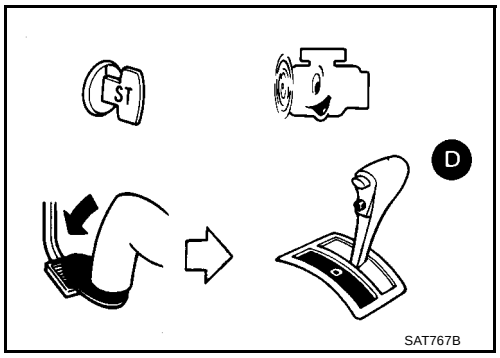
PFP:00000

A/T Fluid Check

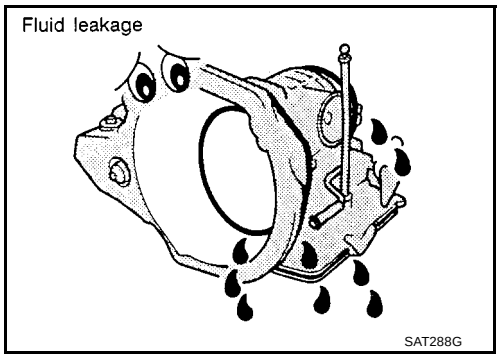
ECS008QM

FLUID LEAKAGE CHECK

1. Clean area suspected of leaking. — for example, mating surface of converter housing and transmission case.
2. Start engine, apply foot brake, place selector lever in “D” position and wait a few minutes.
3. Stop engine.



4. Check for fresh leakage.

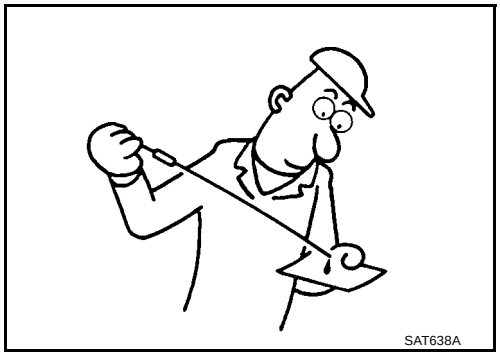


FLUID CONDITION CHECK

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating

FLUID LEVEL CHECK

Refer to AT-12, "Checking A/T Fluid" .



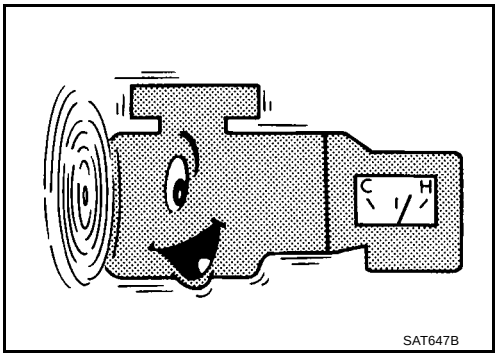
Stall Test

ECS008QN

STALL TEST PROCEDURE

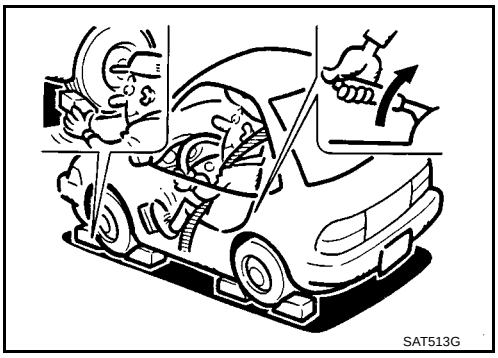
1. Check A/T fluid and engine oil levels. If necessary, add.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

   ATF operating temperature:
   50 - 80°C (122 - 176°F)

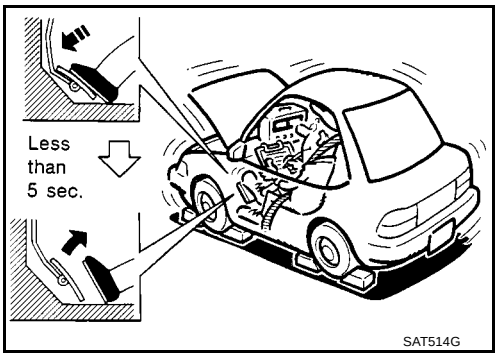


SAT647B

3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
   - **It is good practice to mark the point of specified engine rpm on indicator.**


SAT513G

5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   - **During test, never hold throttle wide open for more than 5 seconds.**

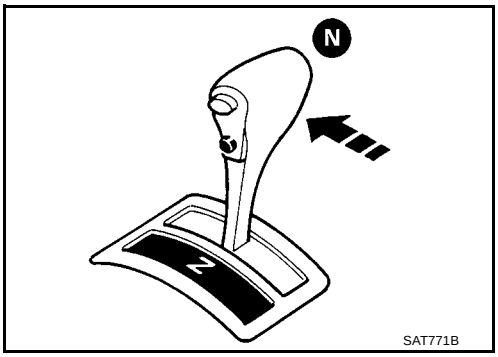


SAT514G

Stall revolution:

CR12DE	2,100 - 2,550 rpm
CR14DE	2,300 - 2,800 rpm

8. Move selector lever to “N” position.
9. Cool off ATF.
   - **Run engine at idle for at least one minute.**
10. Repeat steps 5 through 9 with selector lever in “2”, “1” and “R” positions.



SAT771B

JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations on next page.
In order to pinpoint the possible damaged components, follow the WORK FLOW shown in AT-266, "Work Flow" .

NOTE:
Stall revolution is too high in “D”, “2” or “1” position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears..... Low one-way clutch slippage
- Slippage occurs in the following gears:
  1st through 3rd gears in “D” position and engine brake functions with overdrive control switch set to “OFF”.
  1st and 2nd gears in “2” position and engine brake functions with accelerator pedal released (fully closed throttle)..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

- Engine brake does not function in “1” position..... Low & reverse brake slippage
- Engine brake functions in “1” position..... Reverse clutch slippage

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50 MPH)..... One-way clutch seizure in torque converter housing

CAUTION:
Be careful since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in “D” position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in “D” position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in “D” position, 2nd gear in “2” position, and 1st gear in “1” position with overdrive control switch set to “OFF”..... Overrun clutch slippage

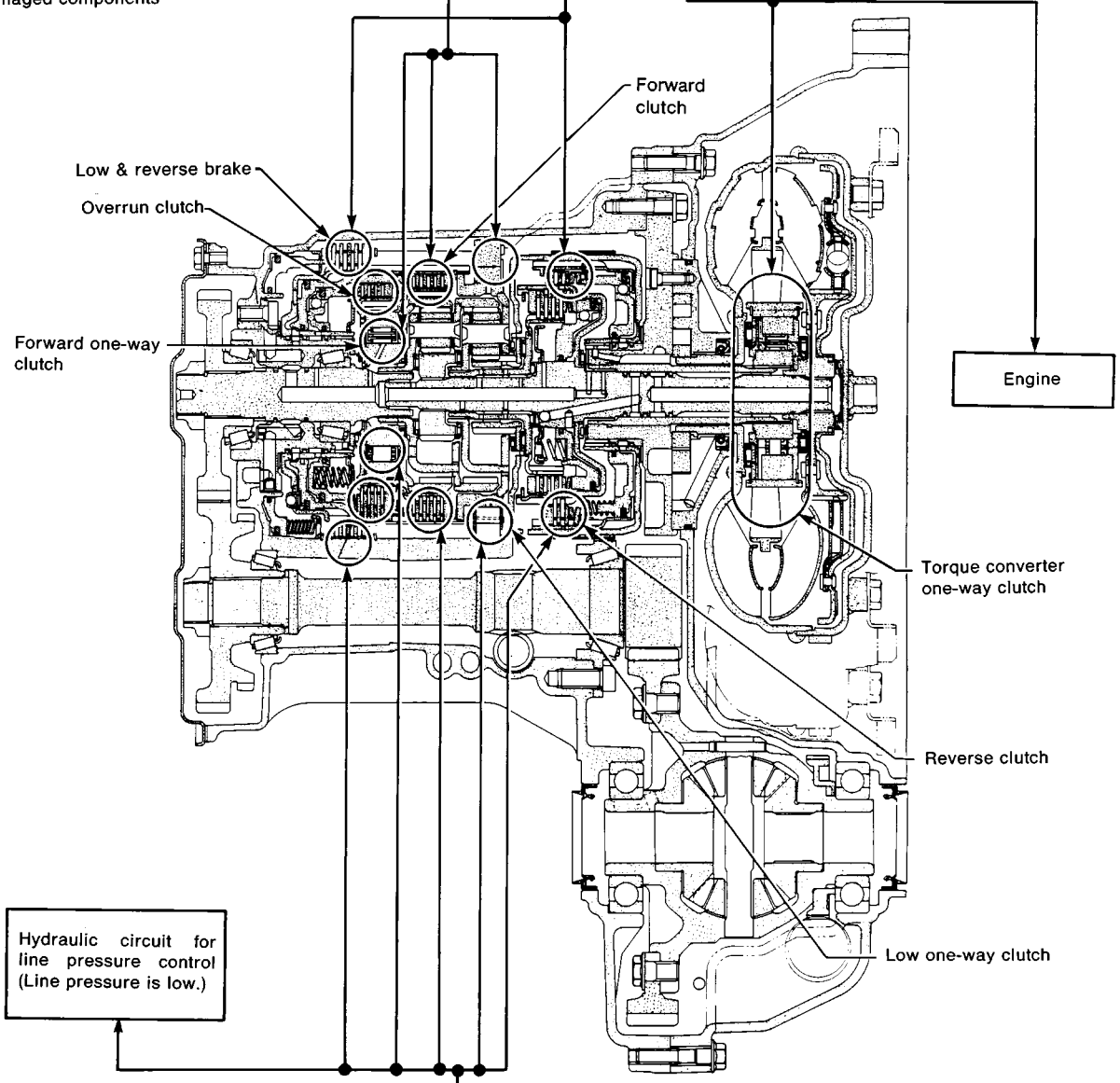
Stall revolution less than specifications:

- Poor acceleration during starts..... One-way clutch slippage in torque converter

Selector lever position	Judgement		
D	H	O	L
2	H	O	L
1	H	O	L
R	O	H	L

O : Stall revolution is normal.
H : Stall revolution is higher than specified.
L : Stall revolution is lower than specified.

Damaged components



D	H	O
2	H	O
1	H	O
R	H	O
Selector lever position	Judgement	

Clutches and brakes except high clutch and brake band are OK. (Condition of high clutch and brake band cannot be confirmed by stall test.)

SAT871HA

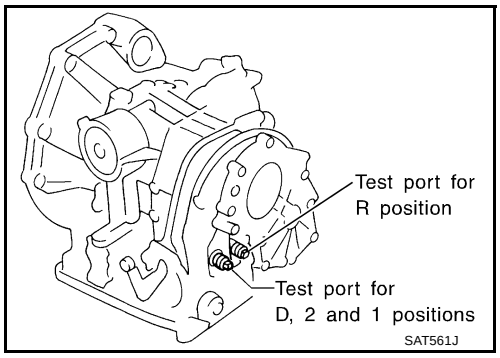
Line Pressure Test

ECS008QO

LINE PRESSURE TEST PORTS

Location of line pressure test ports are shown in the illustration.

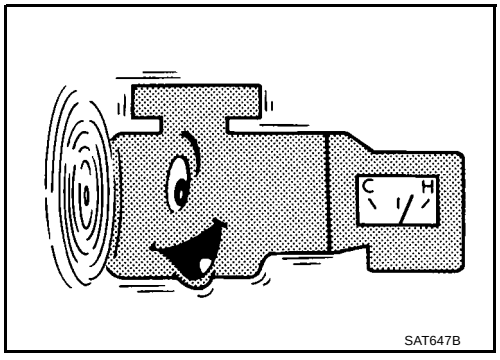
- **Always replace pressure plugs as they are self-sealing bolts.**



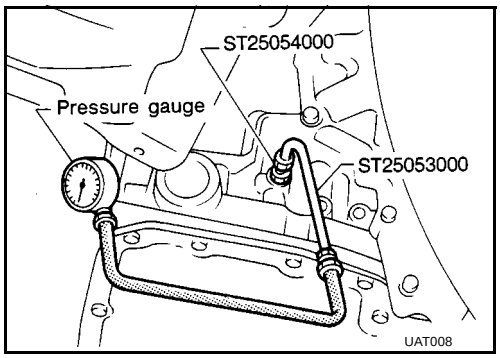
LINE PRESSURE TEST PROCEDURE

1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

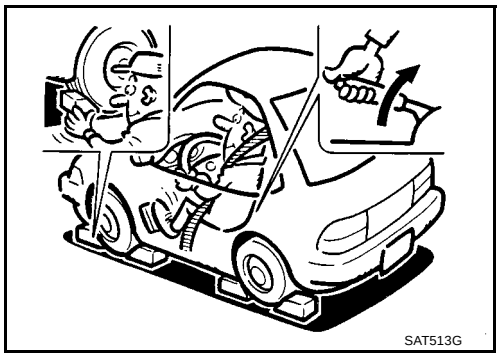
   ATF operating temperature: 50 - 80°C (122 -176°F)



3. Install pressure gauge to corresponding line pressure port.

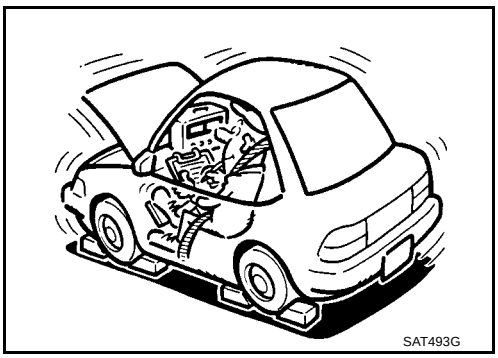


4. Set parking brake and block wheels.
   - **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**



5. Start engine and measure line pressure at idle and stall speed.
   - **When measuring line pressure at stall speed, follow the stall test procedure.**

Line pressure: Refer to AT-535, "Line Pressure" .


SAT493G

JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: – Low in “R” and “1” positions, but – Normal in “D” and “2” positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-18, "CLUTCH AND BAND CHART" .
	Line pressure is high.	● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

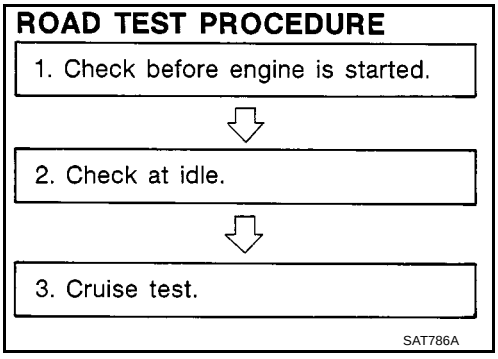
Road Test

ECS008QP

DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:

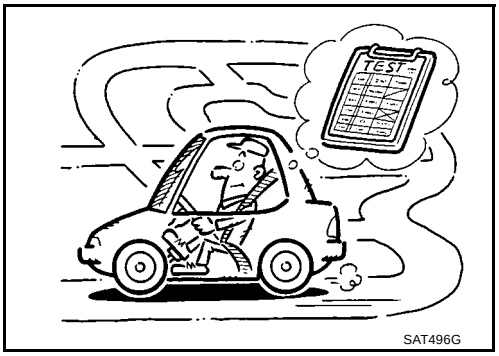
1. Check before engine is started
2. Check at idle



SAT786A

3. Cruise test

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to the following items.

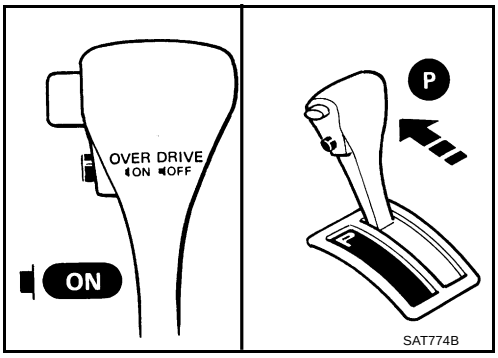


	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
Except for Euro-OBD	AT-251, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" to AT-257, "Diagnostic Procedure Without CONSULT-II"	AT-323, "O/D OFF Indicator Lamp Does Not Come On" to AT-358, "TCM Self-diagnosis Does Not Activate"

1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Turn ignition switch to “OFF” position.
3. Move selector lever to “P” position.
4. Set overdrive control switch to “ON” position.
5. Turn ignition switch to “ON” position. (Do not start engine.)

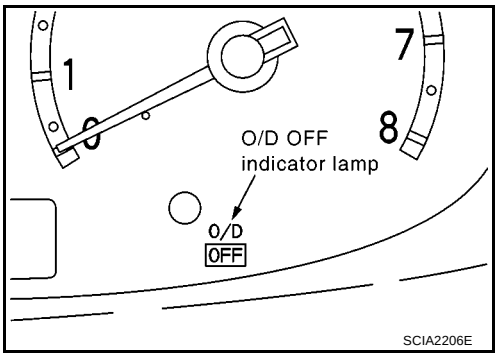


6. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.

No >> Stop ROAD TEST. GO TO AT-323, "O/D OFF Indicator Lamp Does Not Come On" .



2. CHECK O/D OFF INDICATOR LAMP

Does O/D OFF indicator lamp flicker for about 8 seconds?

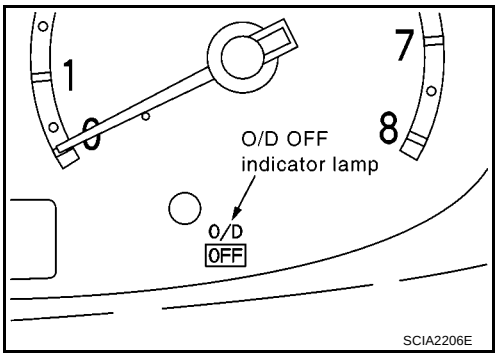
Yes or No

Yes >> TCM is under fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORK-SHEET. Refer to AT-263, "DIAGNOSTIC WORK-SHEET" and AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

No >> 1. Turn ignition switch to “OFF” position.

2. Perform self-diagnosis and note NG items. Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

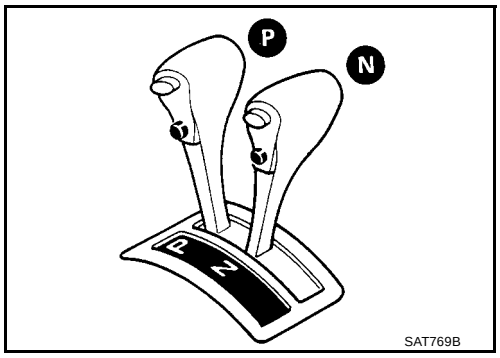
3. GO TO AT-276, "2. CHECK AT IDLE" .



2. CHECK AT IDLE

1. CHECK ENGINE START

1. Park vehicle on flat surface.
2. Turn ignition switch to “OFF” position.
3. Move selector lever to “P” or “N” position.
4. Turn ignition switch to “START” position.
5. Is engine started?



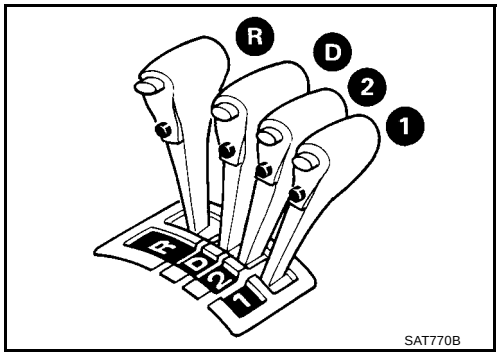
Yes or No

Yes >> GO TO 2.

No >>
- Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-325, "Engine Cannot Be Started In “P” and “N” Position" .

2. CHECK ENGINE START

1. Turn ignition switch to “OFF” position.
2. Move selector lever to “D”, “1”, “2” or “R” position.
3. Turn ignition switch to “START” position.
4. Is engine started?



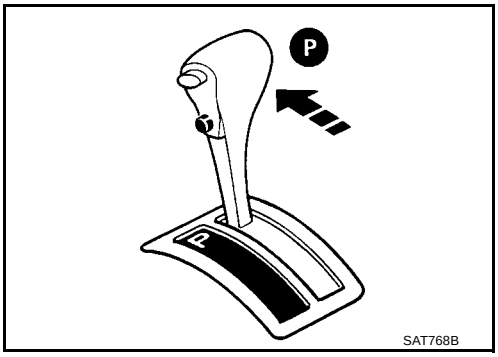
Yes or No

Yes >>
- Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-325, "Engine Cannot Be Started In “P” and “N” Position" .
- Continue ROAD TEST. Refer to AT-273, "Road Test" .

No >> GO TO 3.

3. CHECK VEHICLE MOVE

1. Turn ignition switch to “OFF” position.
2. Move selector lever to “P” position.
3. Release parking brake.
4. Push vehicle forward or backward.

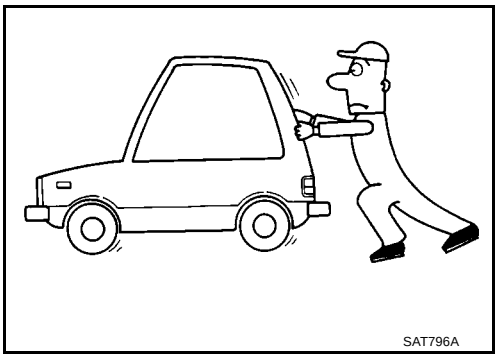


5. Does vehicle move when it is pushed forward or backward?

Yes or No

Yes >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-326, "In “P” Position, Vehicle Moves Forward Or Backward When Pushed" .
- Continue ROAD TEST.

No >> GO TO 4.



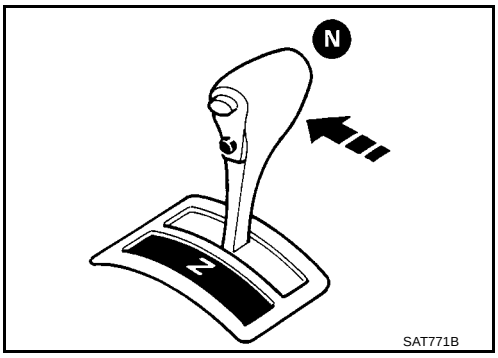
4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Move selector lever to “N” position.
3. Turn ignition switch to “START” position and start engine.
4. Release parking brake.
5. Does vehicle move forward or backward?

Yes or No

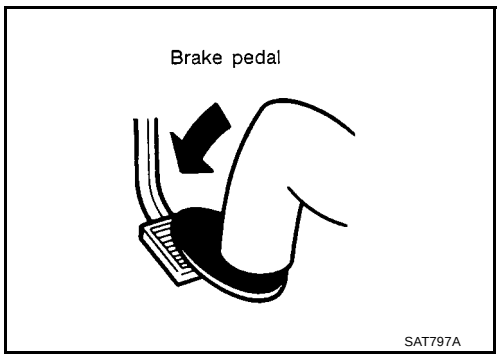
Yes >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-327, "In “N” Position, Vehicle Moves" .
- Continue ROAD TEST.

No >> GO TO 5.



5. CHECK SHIFT SHOCK

1. Apply foot brake.

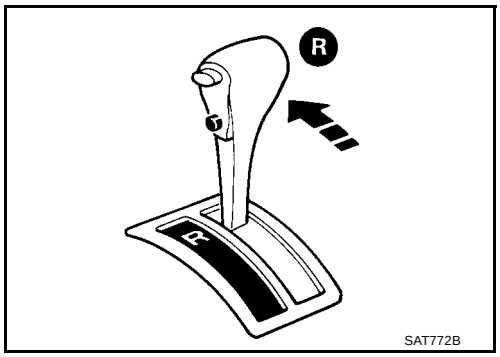


2. Move selector lever to “R” position.
3. Is there large shock when changing from “N” to “R” position?

Yes or No

Yes >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-328, "Large Shock. “N” → “R” Position" .
- Continue ROAD TEST.

No >> GO TO 6.



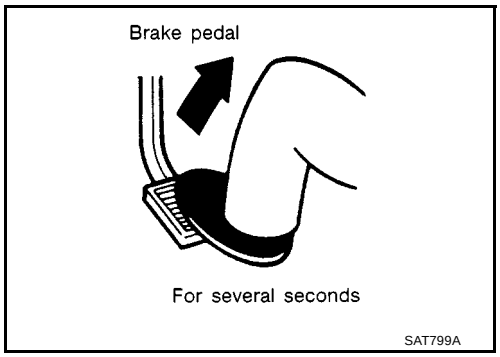
6. CHECK VEHICLE MOVE

1. Release foot brake for several seconds.
2. Does vehicle creep backward when foot brake is released?

Yes or No

Yes >> GO TO 7.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-329, "Vehicle Does Not Creep Backward In “R” Position" .
- Continue ROAD TEST.



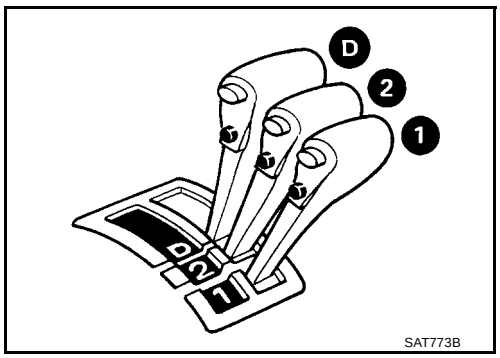
7. CHECK VEHICLE MOVE

1. Move selector lever to “D”, “2” and “1” positions and check if vehicle creeps forward.
2. Does vehicle creep forward in all three positions?

Yes or No

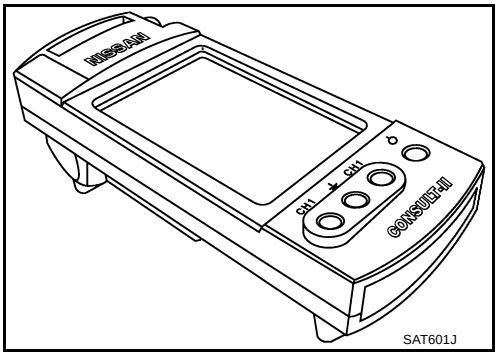
Yes >> GO TO AT-279, "3. CRUISE TEST" .

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-263, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-331, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" .
- Continue ROAD TEST.



3. CRUISE TEST

- Check all items listed in Parts 1 through 3.



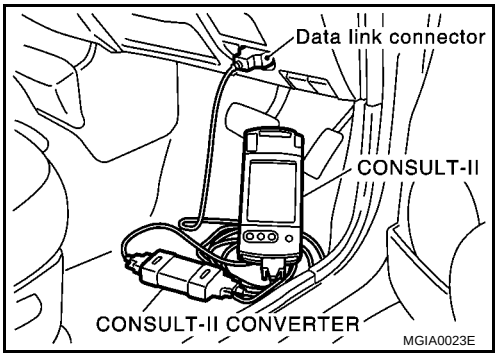
With CONSULT-II

- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

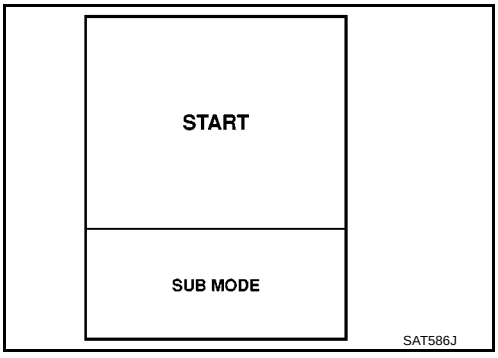
CONSULT-II Setting Procedure

CAUTION:
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

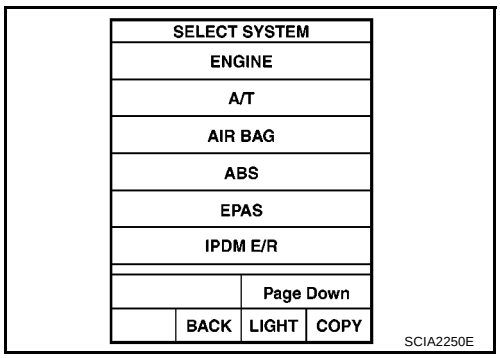
1. Turn ignition switch to “OFF” position.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument lower panel on driver side.



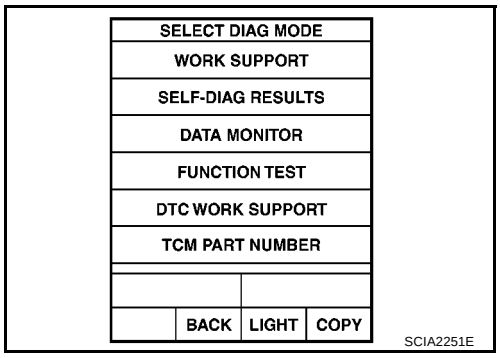
3. Turn ignition switch to “ON” position. (Do not start engine.)
4. Touch “START”.



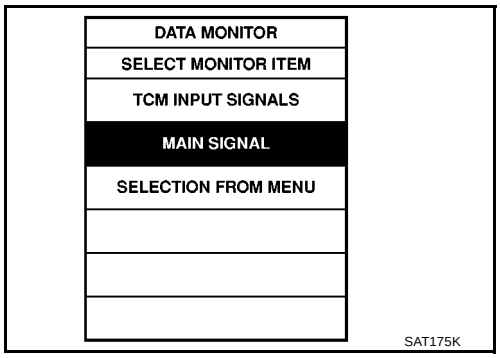
5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



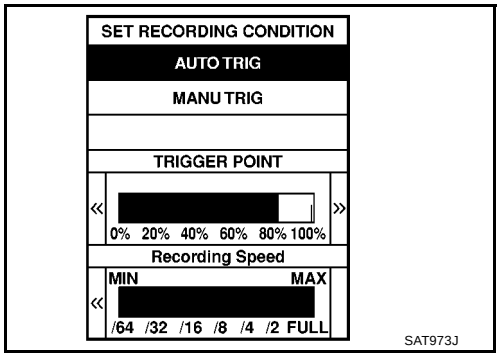
6. Touch “DATA MONITOR”.



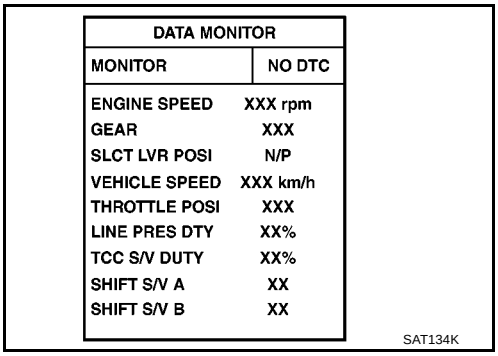
7. Touch “MAIN SIGNALS” or “TCM INPUT SIGNALS”.
8. Select “Numerical Display”, “Barchart Display” or “Line Graph Display”.



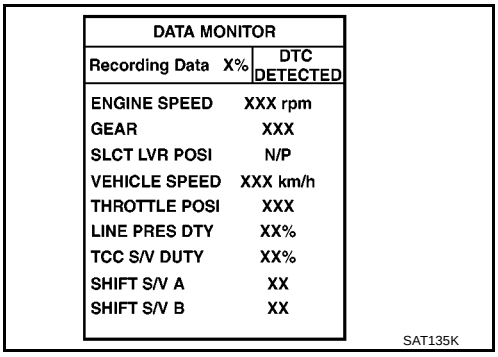
9. Touch “SETTING” to recording condition (“AUTO TRIG” or “MANU TRIG”) and touch “BACK”.
10. Touch “Start”.



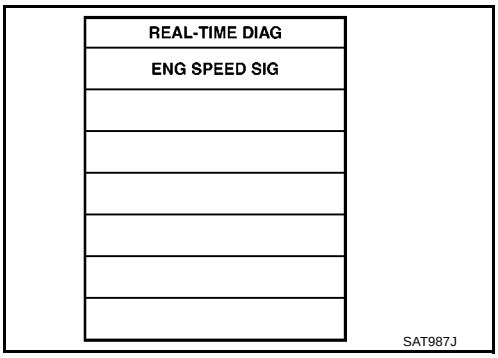
11. When performing cruise test, touch “RECORD”.

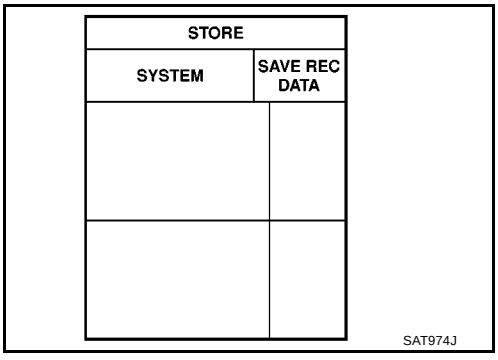


12. After finishing cruise test part 1, touch “STOP”.



13. Touch “STORE” and touch “BACK”.





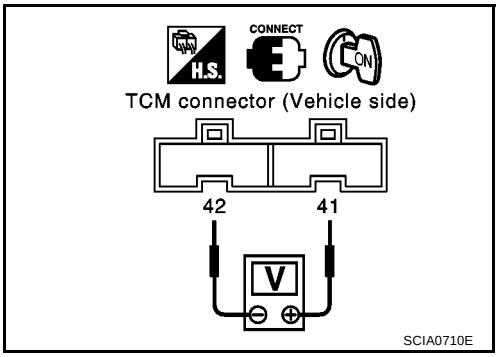
14. Touch “DISPLAY”.
15. Touch “PRINT”.
16. Check the monitor data printed out.
17. Continue cruise test part 2 and 3.

Trigger	VHCL S/SEN A/T	VHCL S/SEN MTR	THRTL POSI SEN
	km/h	km/h	V

SAT975J

Without CONSULT-II

- Throttle position sensor can be checked by voltage across terminals 41 and 42 of TCM.



SCIA0710E

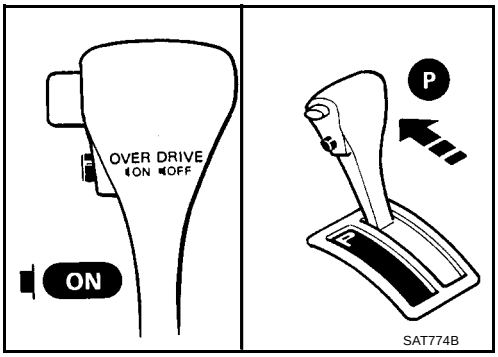
Cruise Test — Part 1

1. CHECK STARTING GEAR (D_1) POSITION

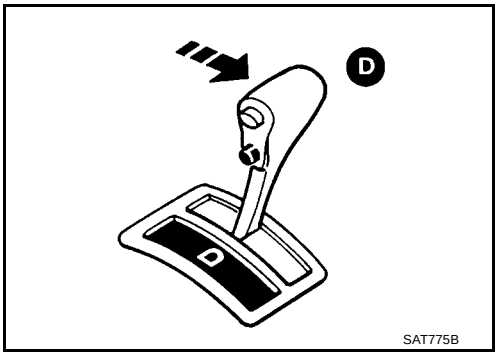
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

   ATF operating temperature: 50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.
3. Set overdrive control switch to “ON” position.
4. Move selector lever to “P” position.
5. Start engine.



6. Move selector lever to “D” position.



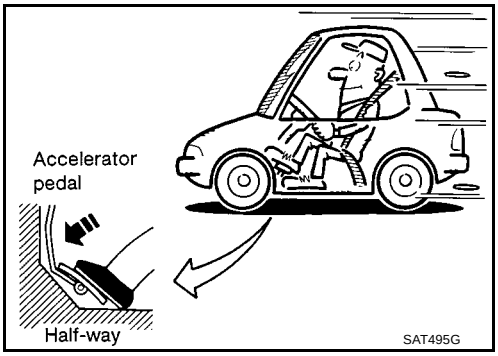
7. Accelerate vehicle by constantly depressing accelerator pedal halfway.
8. Does vehicle start from D_1 ?

   Read gear position.

Yes or No

Yes >> GO TO 2.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-333, "Vehicle Cannot Be Started From D_1" .
- Continue ROAD TEST.



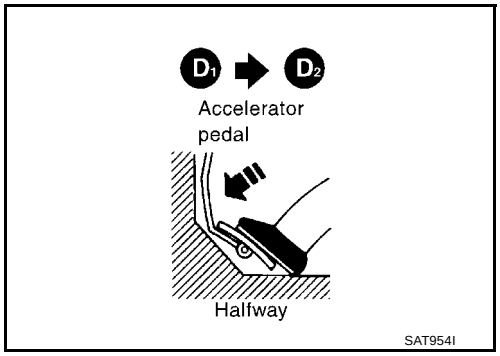
2. CHECK SHIFT UP (D_1 TO D_2)

Does A/T shift from D_1 to D_2 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_1 to D_2 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 3.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-336, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kick down: $D_4 \rightarrow D_2$" .
- Continue ROAD TEST.

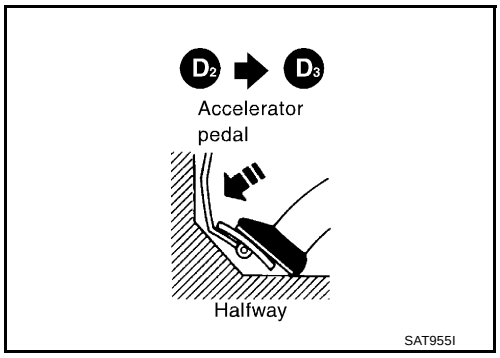
3. CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 4.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-338, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue ROAD TEST.

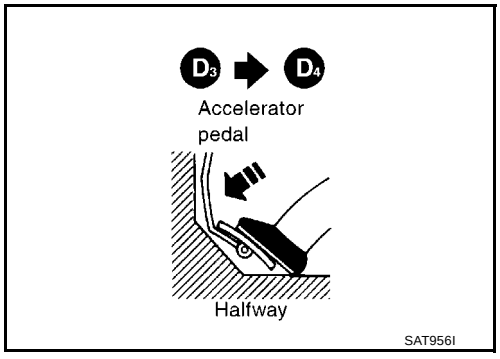
4. CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_3 to D_4 :

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 5.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-340, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue ROAD TEST.

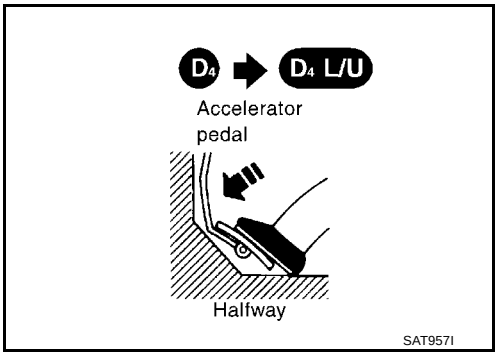
5. CHECK LOCK-UP (D4 TO D4 L/U)

Does A/T perform lock-up at the specified speed?

Read vehicle speed, throttle position when lock-up duty becomes 94%.

Specified speed when lock-up occurs:

Refer to AT-534, "Shift Schedule" .



Yes or No

Yes >> GO TO 6.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-343, "A/T Does Not Perform Lock-up" .
- Continue ROAD TEST.

6. CHECK HOLD LOCK-UP

Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes >> GO TO 7.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-344, "A/T Does Not Hold Lock-up Condition" .
- Continue ROAD TEST.

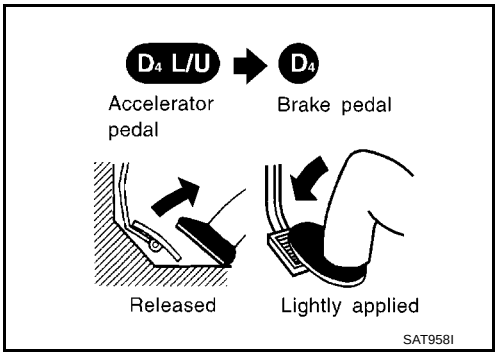
7. CHECK SHIFT DOWN (D4 L/U TO D4)

1. Release accelerator pedal.
2. Is lock-up released when accelerator pedal is released?

Yes or No

Yes >> GO TO 8.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-346, "Lock-up Is Not Released" .
- Continue ROAD TEST.



8. CHECK SHIFT DOWN (D4 TO D3)

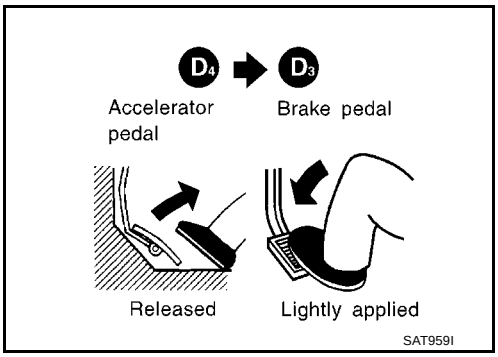
1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

Read gear position and engine speed.

Yes or No

Yes >>
1. Stop vehicle.
2. GO TO AT-286, "Cruise Test — Part 2" .

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-347, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" .
- Continue ROAD TEST.



Cruise Test — Part 2

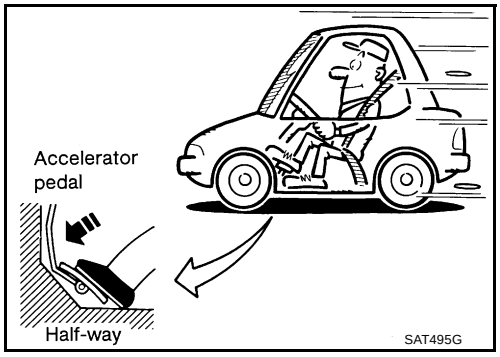
1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm overdrive control switch is in “ON” position.
2. Confirm selector lever is in “D” position.
3. Accelerate vehicle by half throttle again.
4. Does vehicle start from D_1 ?

Read gear position.

Yes or No

Yes >> GO TO 2.
No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-349, "Vehicle Does Not Start From D_1" .
- Continue ROAD TEST.



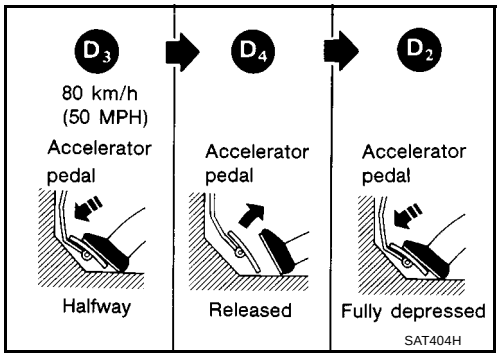
2. CHECK SHIFT UP AND SHIFT DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

Read gear position and throttle position.

Yes or No

Yes >> GO TO 3.
No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-336, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kick down: $D_4 \rightarrow D_2$" .
- Continue ROAD TEST.



3. CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

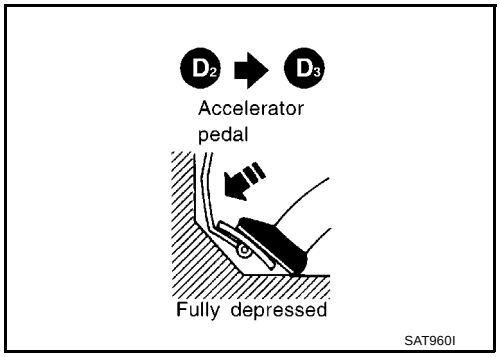
Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3 :

Refer to AT-534, "Shift Schedule" .

Yes or No

Yes >> GO TO 4.
No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-338, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue ROAD TEST.



4. CHECK SHIFT UP (D_3 TO D_4) AND ENGINE BRAKE

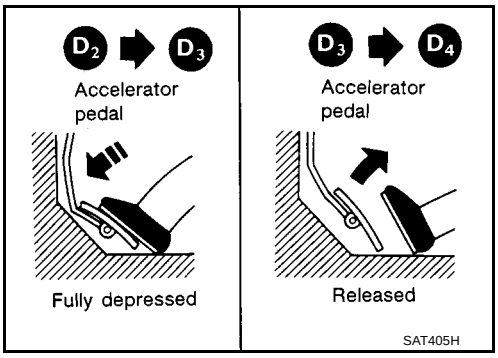
Release accelerator pedal after shifting from D_2 to D_3.
Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

Read gear position, throttle position and vehicle speed.

Yes or No

Yes >> 1. Stop vehicle.
2. GO TO AT-288, "Cruise Test — Part 3".

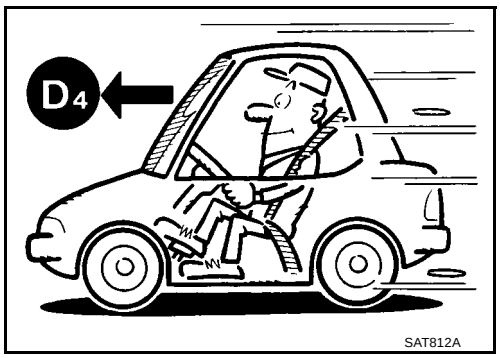
No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-340, "A/T Does Not Shift: $D_3 \rightarrow D_4$".
- Continue ROAD TEST.



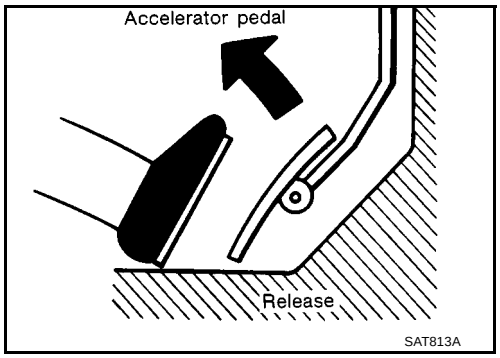
Cruise Test — Part 3

1. CHECK SHIFT DOWN (D_4 TO D_3)

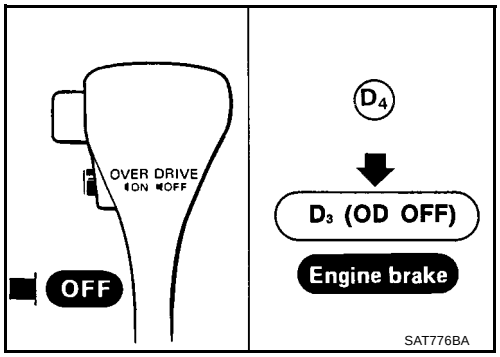
1. Confirm overdrive control switch is in “ON” position.
2. Confirm selector lever is in “D” position.
3. Accelerate vehicle using half-throttle to D_4 .



4. Release accelerator pedal.



5. Set overdrive control switch to “OFF” position while driving in D_4 .



6. Does A/T shift from D_4 to D_3 (O/D OFF)?

Read gear position and vehicle speed.

Yes or No

Yes >> GO TO 2.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-352, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”" .
- Continue ROAD TEST.

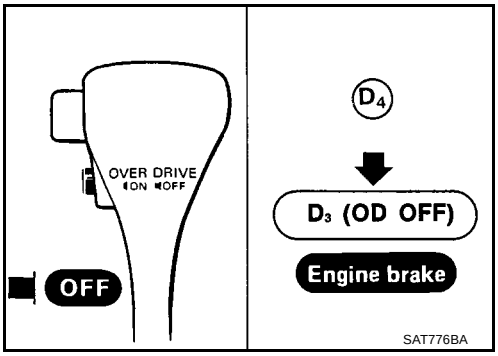
2. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 3.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-347, "Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)".
- Continue ROAD TEST.



3. CHECK SHIFT DOWN (D_3 TO 2_2)

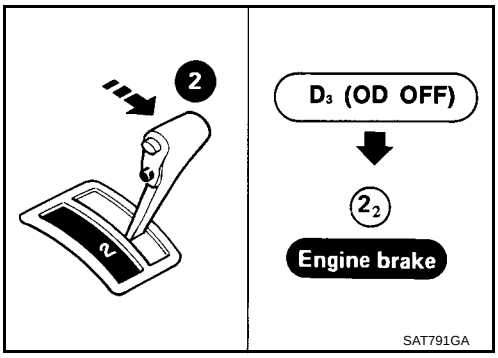
1. Move selector lever from "D" to "2" position while driving in D_3 (O/D OFF).
2. Does A/T shift from D_3 (O/D OFF) to 2_2 ?

Read gear position.

Yes or No

Yes >> GO TO 4.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-353, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position".
- Continue ROAD TEST.



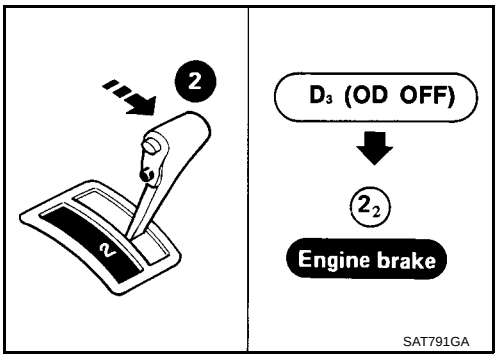
4. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 5.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-347, "Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)".
- Continue ROAD TEST.



5. CHECK SHIFT DOWN

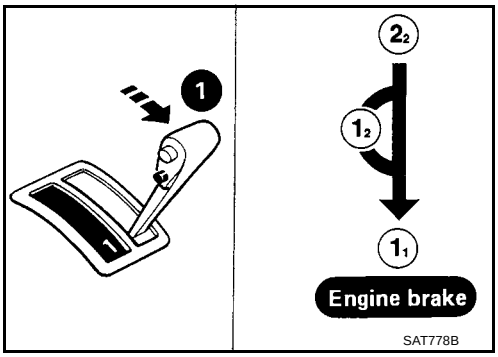
1. Move selector lever from "2" to "1" position while driving in 2_2.
2. Does A/T shift from 2_2 to 1_1 position?

Read gear position.

Yes or No

Yes >> GO TO 6.

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-354, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position".
- Continue ROAD TEST.



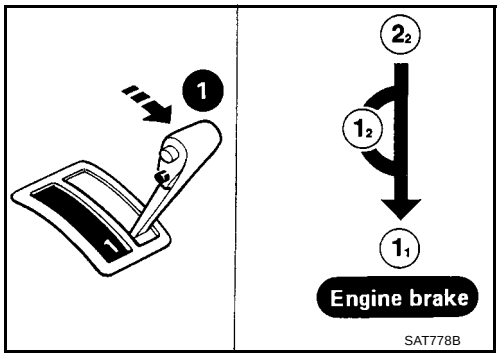
6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" ,

No >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-356, "Vehicle Does Not Decelerate By Engine Brake" .
- Stop ROAD TEST.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS008QQ

Numbers are arranged in order of inspection.
Perform inspections starting with number one and work up.

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Engine cannot start in “P” and “N” positions. AT-214, "Engine Cannot Be Started In “P” and “N” Position"	ON vehicle	1. Ignition switch and starter	PG-4, "POWER SUPPLY ROUTING", SC-39, "STARTING SYSTEM"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
Engine starts in position other than “N” and “P” positions. AT-214, "Engine Cannot Be Started In “P” and “N” Position"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
Transaxle noise in “P” and “N” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
	OFF vehicle	5. Oil pump	AT-453, "Oil Pump"
		6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle moves when changing into “P” position, or parking gear does not disengage when shifted out of “P” position. AT-215, "In “P” Position, Vehicle Moves Forward Or Backward When Pushed"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	2. Parking components	AT-433, "Components", AT-450, "REPAIR FOR COMPONENT PARTS"
Vehicle runs in “N” position. AT-216, "In “N” Position, Vehicle Moves"	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	3. Forward clutch	AT-482, "Forward and Overrun Clutches"
		4. Reverse clutch	AT-472, "Reverse Clutch"
		5. Overrun clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-218, "Vehicle Does Not Creep Backward In “R” Position"	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Stall test	AT-269, "Stall Test"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Reverse clutch	AT-472, "Reverse Clutch"
		7. High clutch	AT-477, "High Clutch"
		8. Forward clutch	AT-482, "Forward and Overrun Clutches"
		9. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		10. Low & reverse brake	AT-489, "Low & Reverse Brake"
Vehicle braked when shifting into “R” position.	ON vehicle	1. Fluid level	AT-61, "A/T Fluid Check"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Forward clutch	AT-482, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		5. Engine speed signal	AT-401, "ENGINE SPEED SIGNAL"
		6. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		8. Accumulator N-D	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	9. Forward clutch	AT-482, "Forward and Overrun Clutches"
Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	2. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjust-ing Shims, Needle Bear-ings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-220, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position"	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Stall test	AT-269, "Stall Test"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		6. Accumulator N-D	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Reverse clutch	AT-472, "Reverse Clutch"
		8. High clutch	AT-477, "High Clutch"
		9. Forward clutch	AT-482, "Forward and Overrun Clutches"
		10. Forward one-way clutch	AT-433, "OVERHAUL"
		11. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-272, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		7. Accumulator N-D	AT-426, "Control Valve Assembly and Accumula-tors"
		8. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		9. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
		10. Overrun clutch solenoid valve	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		11. Torque converter clutch solenoid valve	AT-390, "TORQUE CON-VERTER CLUTCH SOLE-NOID VALVE"
	OFF vehicle	12. Forward clutch	AT-482, "Forward and Overrun Clutches"
		13. Reverse clutch	AT-472, "Reverse Clutch"
		14. Low & reverse brake	AT-489, "Low & Reverse Brake"
		15. Oil pump	AT-433, "OVERHAUL"
		16. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]
No creep at all. AT-218, "Vehicle Does Not Creep Backward In “R” Position" and AT-220, "Vehicle Does Not Creep For-ward In “D”, “2” Or “1” Position"	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	4. Forward clutch	AT-482, "Forward and Overrun Clutches"
		5. Oil pump	AT-453, "Oil Pump"
		6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from “D_1 ” to “D_2 ”.	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Failure to change gear from “D_2 ” to “D_3 ”.	ON vehicle	1. Control cable adjustment	AT-427, "Control Cable Adjustment"
		2. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Piston Assembly"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Failure to change gear from “D_3 ” to “D_4 ”.	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Overdrive control switch	AT-247, "TCM Self-diagnosis Does Not Activate"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
		5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		6. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		7. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	8. Brake band	AT-503, "Band Servo Piston Assembly"
Too high a gear change point from “D_1 ” to “D_2 ”, from “D_2 ” to “D_3 ”, from “D_3 ” to “D_4 ”. AT-225, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-227, "A/T Does Not Shift: $D_2 \rightarrow D_3$" and AT-229, "A/T Does Not Shift: $D_3 \rightarrow D_4$"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
Gear change directly from “D_1 ” to “D_3 ” occurs.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accumulator servo release	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	3. Brake band	AT-503, "Band Servo Piston Assembly"
Engine stops when shifting lever into “R”, “D”, “2” and “1”.	ON vehicle	1. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]
		2. Torque converter clutch solenoid valve	AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	4. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Too sharp a shock in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Accumulator servo release	AT-426, "Control Valve Assembly and Accumula-tors"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		5. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Pis-ton Assembly"
Too sharp a shock in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		4. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Pis-ton Assembly"
Too sharp a shock in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		4. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		6. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		7. Forward one-way clutch	AT-433, "OVERHAUL"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Almost no shock or clutches slipping in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Accumulator servo release	AT-426, "Control Valve Assembly and Accumulators"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Almost no shock or slipping in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
Almost no shock or slipping in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Brake band	AT-503, "Band Servo Piston Assembly"
Vehicle braked by gear change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-472, "Reverse Clutch"
		3. Low & reverse brake	AT-489, "Low & Reverse Brake"
		4. High clutch	AT-477, "High Clutch"
		5. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle braked by gear change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Brake band	AT-503, "Band Servo Piston Assembly"
Vehicle braked by gear change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Overrun clutch	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		3. Forward one-way clutch	AT-433, "OVERHAUL"
		4. Reverse clutch	AT-472, "Reverse Clutch"
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		3. Overdrive control switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		4. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		5. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Reverse clutch	AT-472, "Reverse Clutch"
		9. High clutch	AT-477, "High Clutch"
		10. Brake band	AT-503, "Band Servo Piston Assembly"
		11. Low & reverse brake	AT-489, "Low & Reverse Brake"
		12. Oil pump	AT-453, "Oil Pump"
		13. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Failure to change gear from “D4 ” to “D3 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Overrun clutch solenoid valve	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		4. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		5. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"
Failure to change gear from “D3 ” to “D2 ” or from “D4 ” to “D2 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Pis-ton Assembly"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from “D2 ” to “D1 ” or from “D3 ” to “D1 ”.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	6. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjust-ing Shims, Needle Bear-ings, Thrust Washers and Snap Rings"
		7. High clutch	AT-477, "High Clutch"
		8. Brake band	AT-503, "Band Servo Pis-ton Assembly"
Gear change shock felt during deceleration by releasing accelera-tor pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-272, "Line Pressure Test"
		3. Overrun clutch solenoid valve	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
Too high a change point from “D4 ” to “D3 ”, from “D3 ” to “D2 ”, from “D2 ” to “D1 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLU-TION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
Kickdown does not operate when depressing pedal in “D4 ” within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLU-TION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Kickdown operates or engine over-runs when depressing pedal in “D4 ” beyond kick down vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLU-TION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
Races extremely fast or slips in changing from “D4 ” to “D3 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		8. Forward clutch	AT-482, "Forward and Overrun Clutches"
Races extremely fast or slips in changing from “D4 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		6. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	8. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		9. High clutch	AT-477, "High Clutch"
		10. Forward clutch	AT-482, "Forward and Overrun Clutches"

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Races extremely fast or slips in changing from “D_3 ” to “D_2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
		6. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
	OFF vehicle	7. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		8. High clutch	AT-477, "High Clutch"
Races extremely fast or slips in changing from “D_4 ” or “D_3 ” to “D_1 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-376, "SHIFT SOLE-NOID VALVE A"
		6. Shift solenoid valve B	AT-381, "SHIFT SOLE-NOID VALVE B"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	8. Forward clutch	AT-482, "Forward and Overrun Clutches"
		9. Forward one-way clutch	AT-433, "OVERHAUL"
		10. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjust-ing Shims, Needle Bear-ings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
	OFF vehicle	5. Oil pump	AT-453, "Oil Pump"
		6. High clutch	AT-477, "High Clutch"
		7. Brake band	AT-503, "Band Servo Piston Assembly"
		8. Low & reverse brake	AT-489, "Low & Reverse Brake"
		9. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		10. Parking components	AT-433, "Components"
Transmission noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change from “D_3” to “2_2” when changing lever into “2” position. AT-242, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		3. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		5. Control cable adjustment	AT-427, "Control Cable Adjustment"
	OFF vehicle	6. Brake band	AT-503, "Band Servo Piston Assembly"
Gear change from “2_2” to “2_3” in “2” position.	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Engine brake does not operate in “1” position. AT-238, "Vehicle Does Not Start From D_1"	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		6. Overrun clutch solenoid valve	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
	OFF vehicle	7. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		8. Low & reverse brake	AT-489, "Low & Reverse Brake"
Gear change from “1_1 ” to “1_2 ” in “1” position.	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-427, "Control Cable Adjustment"
Does not change from “1_2 ” to “1_1 ” in “1” position.	ON vehicle	1. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Low one-way clutch	AT-433, "OVERHAUL", AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Low & reverse brake	AT-489, "Low & Reverse Brake"
Large shock changing from “1_2 ” to “1_1 ” in “1” position.	ON vehicle	1. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	2. Low & reverse brake	AT-489, "Low & Reverse Brake"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Transmission overheats.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Engine idling rpm	EC-41, "Idle Speed and Ignition Timing Check"]
		3. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-272, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumula-tors"
	OFF vehicle	7. Oil pump	AT-453, "Oil Pump"
		8. Reverse clutch	AT-472, "Reverse Clutch"
		9. High clutch	AT-477, "High Clutch"
		10. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		11. Forward clutch	AT-482, "Forward and Overrun Clutches"
		12. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		13. Low & reverse brake	AT-489, "Low & Reverse Brake"
		14. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-472, "Reverse Clutch"
		3. High clutch	AT-477, "High Clutch"
		4. Brake band	AT-503, "Band Servo Pis-ton Assembly"
		5. Forward clutch	AT-482, "Forward and Overrun Clutches"
		6. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-489, "Low & Reverse Brake"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		3. Oil pump	AT-453, "Oil Pump"
		4. Reverse clutch	AT-472, "Reverse Clutch"
		5. High clutch	AT-477, "High Clutch"
		6. Brake band	AT-503, "Band Servo Piston Assembly"
		7. Forward clutch	AT-482, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-482, "Forward and Overrun Clutches"
		9. Low & reverse brake	AT-489, "Low & Reverse Brake"
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		3. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		4. Engine speed signal	AT-401, "ENGINE SPEED SIGNAL"
		5. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		6. Line pressure test	AT-272, "Line Pressure Test"
		7. Torque converter clutch solenoid valve	AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		8. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	9. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-272, "Line Pressure Test"
		4. Torque converter clutch solenoid valve	AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		5. Line pressure solenoid valve	AT-405, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Lock-up point is extremely high or low. AT-232, "A/T Does Not Perform Lock-up"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		3. Torque converter clutch solenoid valve	AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"

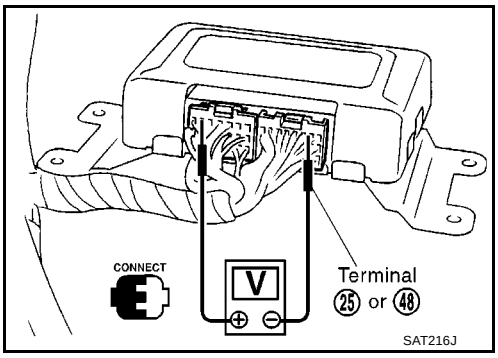
Symptom	Condition	Diagnostic Item	Reference Page EURO-OBD
A/T does not shift to “D_4 ” when driving with overdrive control switch “ON”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-358, "TCM Self-diagnosis Does Not Activate"
		3. Overdrive control switch	AT-247, "TCM Self-diagnosis Does Not Activate"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", AT-367, "DTC VEHICLE SPEED SENSOR MTR"
		5. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		6. Overrun clutch solenoid valve	AT-386, "OVERRUN CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
		8. A/T fluid temperature sensor	AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		9. Line pressure test	AT-272, "Line Pressure Test"
	OFF vehicle	10. Brake band	AT-503, "Band Servo Piston Assembly"
		11. Overrun clutch	AT-482, "Forward and Overrun Clutches"
Engine is stopped at “R”, “D”, “2” and “1” positions.	ON vehicle	1. Fluid level	AT-61, "FLUID LEVEL CHECK"
		2. Torque converter clutch solenoid valve	AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Shift solenoid valve A	AT-376, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-381, "SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-426, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Torque converter	AT-437, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TCM Terminals and Reference Value

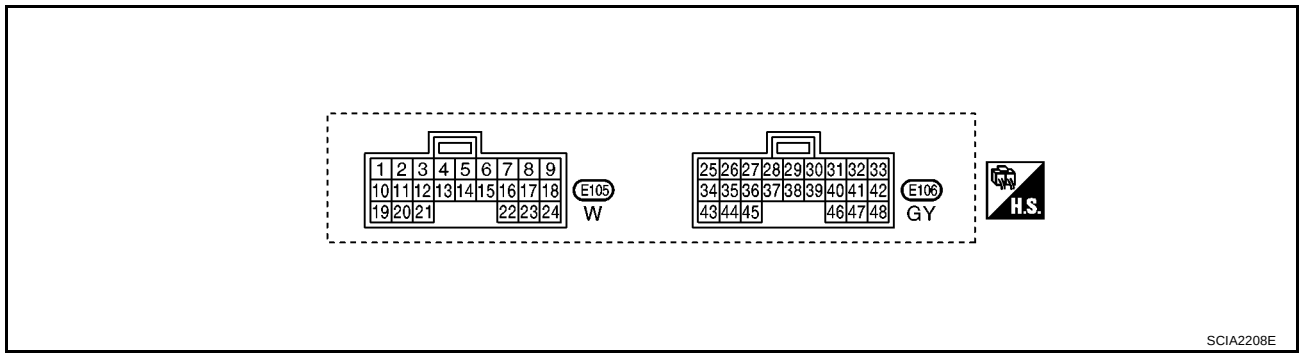
ECS0094W

PREPARATION

- Measure voltage between each terminal and terminal 25 or 48 by following “TCM INSPECTION TABLE”.

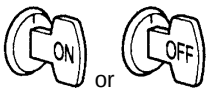


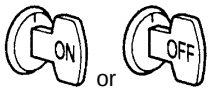
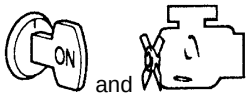
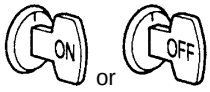
TCM HARNESS CONNECTOR TERMINAL LAYOUT

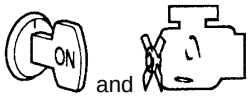
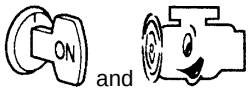


TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
1	PU	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BR	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	GY	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5	R	CAN-H (high)	—	—	—
6	W	CAN-L (low)	—	—	—
10	G	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	0V
19	G	Power source		Same as No. 10	
20	Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
25	B	Ground	Always		0V
26	BR	PNP switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	LG	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
28	GY	Power source (Memory back-up)	Always		Battery voltage
29	OR	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz
30 *3	L	CONSULT- II (RX)		—	—
31 *3	BR	CONSULT- II (TX)		—	—
32 *2	OR	Throttle position sensor (Power source)		When turning ignition switch to “ON”.	4.5 - 5.5V
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
34	P	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	R	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
36	Y	PNP switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *2	L	Engine speed signal		—	EC-94, "ECM INSPECTION TABLE"
40	G	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V
41	Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	Always		0V
47	PU	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	Always		0V

*2: These terminals are connected to the ECM.
*3: These terminals are connected to the data link connector.

CAN COMMUNICATION

PFP:23710

CAN Communication

ECS00CVL

SYSTEM DESCRIPTION

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

CAN Communication Unit

ECS00CVM

Go to CAN system, when selecting your car model from the following table.

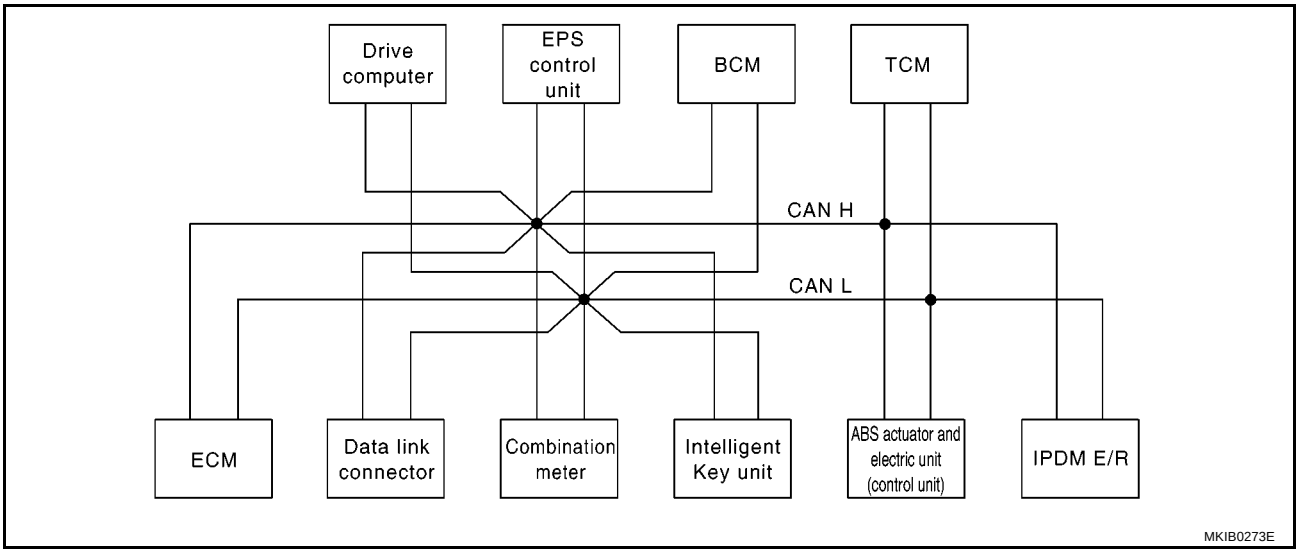
Body type	3door/5door							
Axle	2WD							
Engine	CR10DE/CR12DE/CR14DE				CR12DE/CR14DE			
Handle	LHD/RHD							
Brake control	ABS system				ESP system			
Transmission	A/T				A/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×		
Drive computer	×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×
TCM	×	×	×	×	×	×	×	×
IPDM E/R	×	×	×	×	×	×	×	×
CAN communication type	AT-315, "TYPE 1/TYPE 2"				AT-318, "TYPE 5/TYPE 6"			

×: Applicable

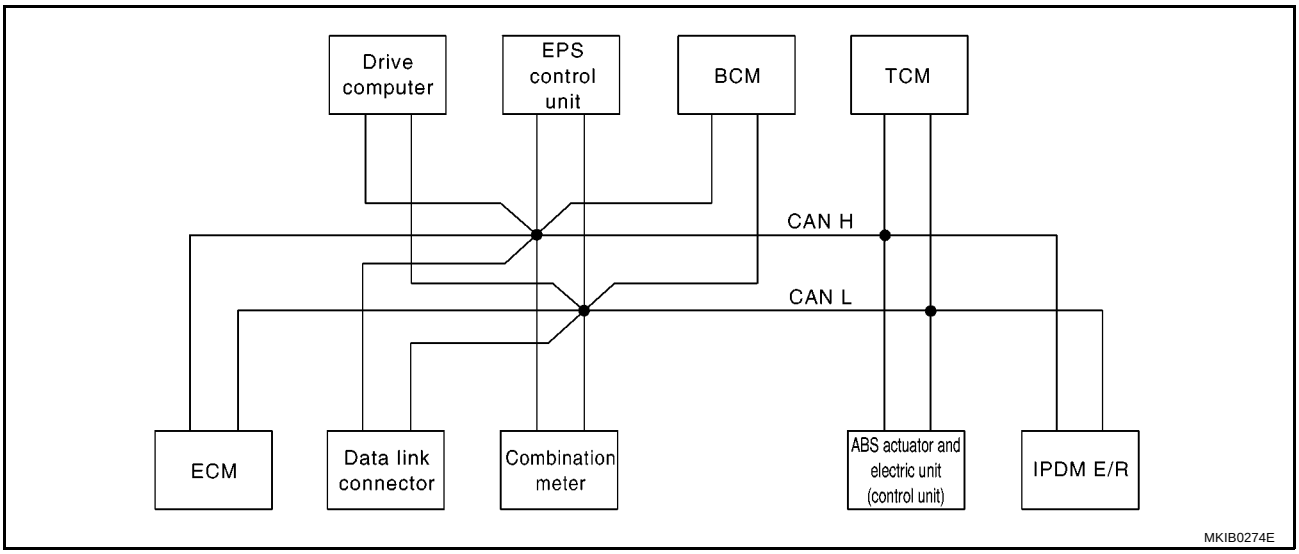
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

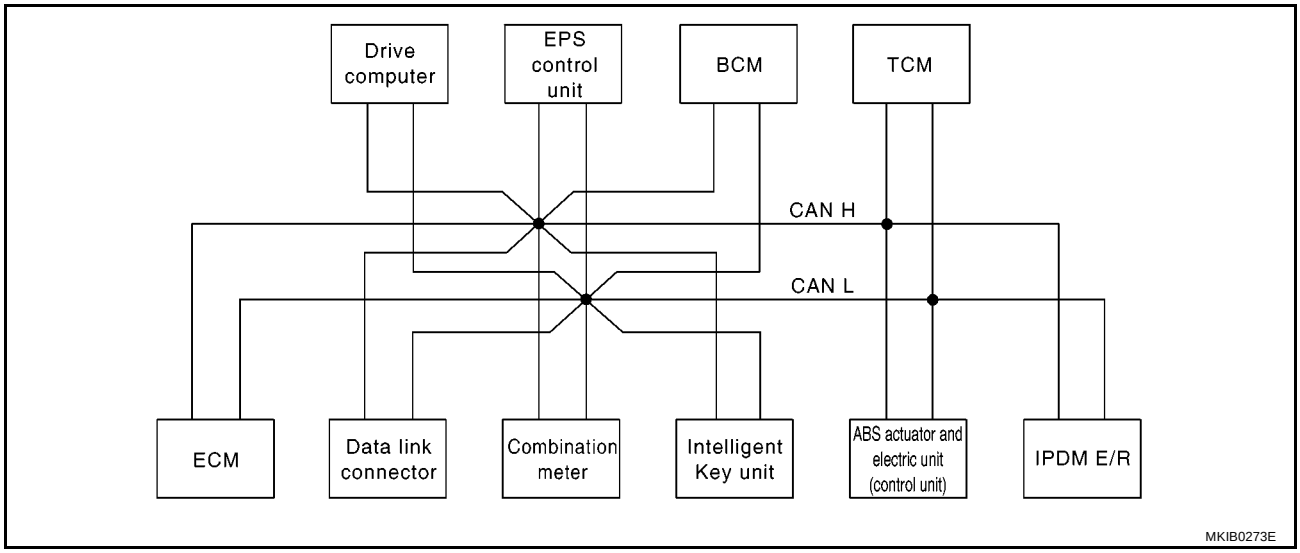
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

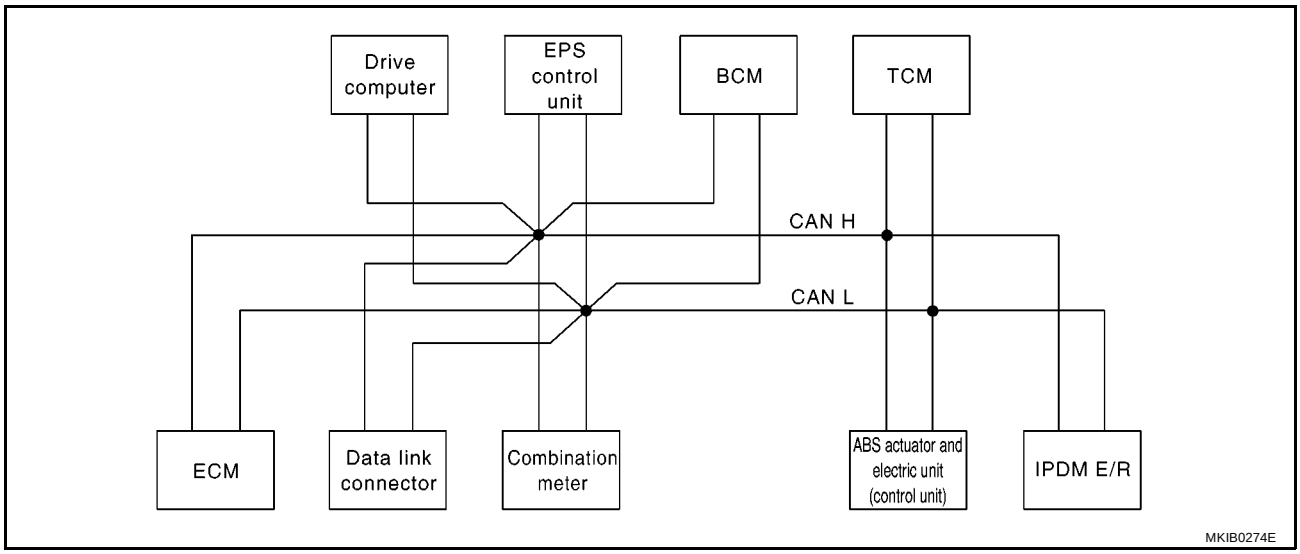
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

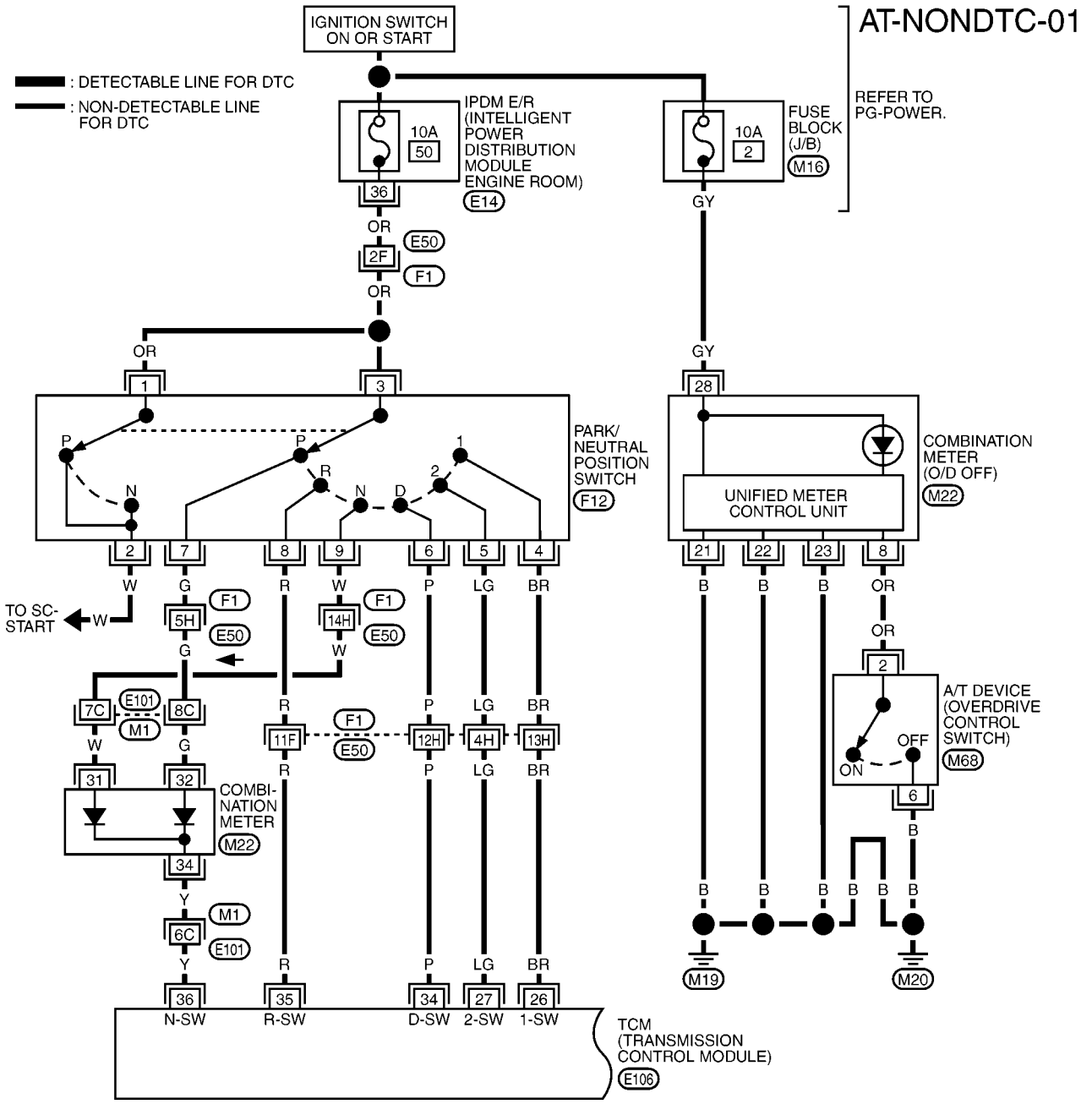
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

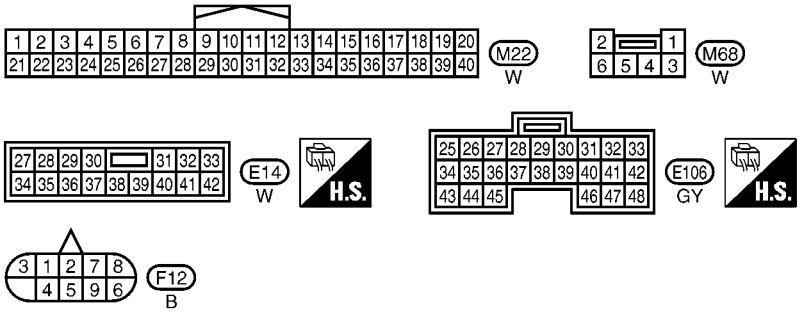
TROUBLE DIAGNOSES FOR SYMPTOMS

PFP:00100

Wiring Diagram — AT — NONDTC

ECS008QT

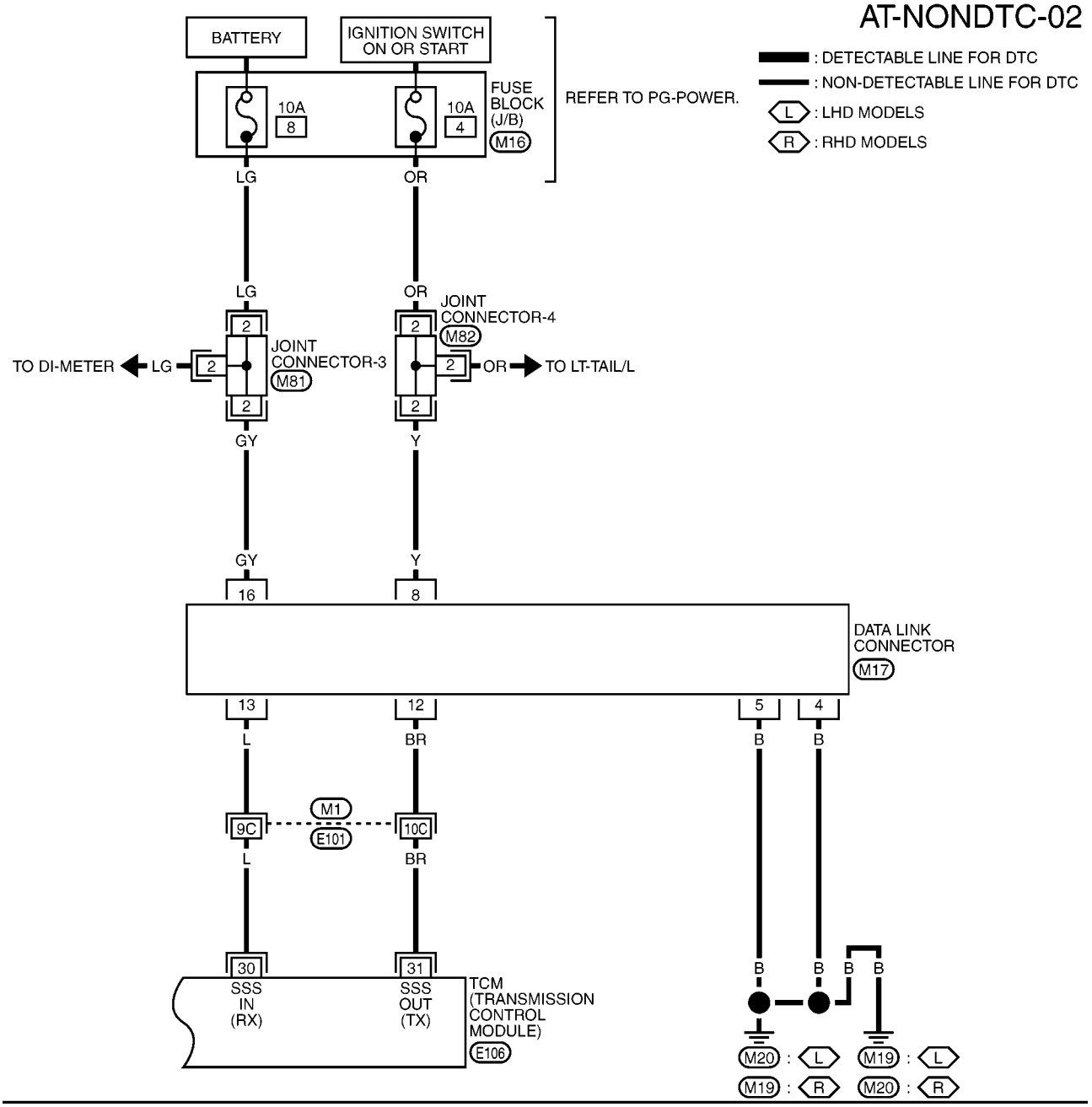


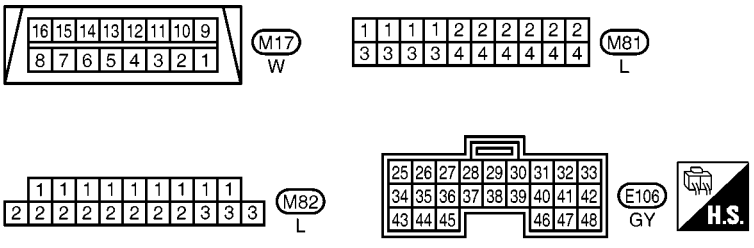


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

MCWA0088E

AT-NONDTC-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0123E

O/D OFF Indicator Lamp Does Not Come On

ECS008QU

SYMPTOM:
O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to “ON”.

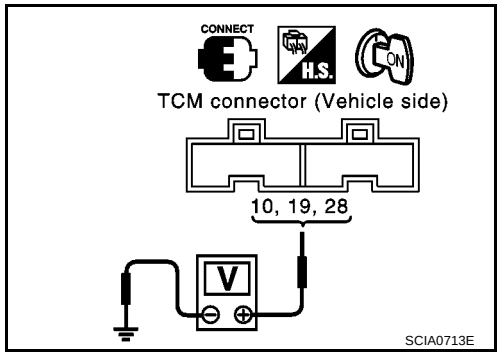
1. CHECK TCM POWER SOURCE

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage: Battery voltage

3. Turn ignition switch to “OFF” position.
4. Check voltage between TCM terminal 28 and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

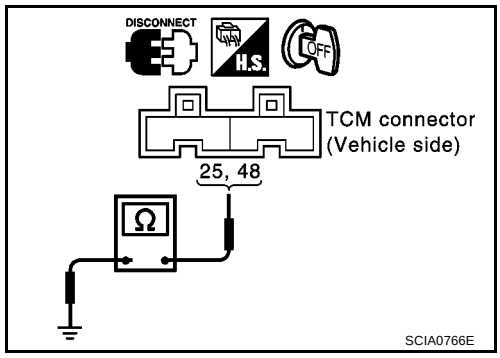
- Harness for short or open between battery, fuse and TCM terminals 10, 19 and 28
- Refer to AT-415, "Wiring Diagram — AT — MAIN" .
- Ignition switch and fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground.

Continuity should exist.

If OK, check harness for short to ground and short to power.



OK or NG

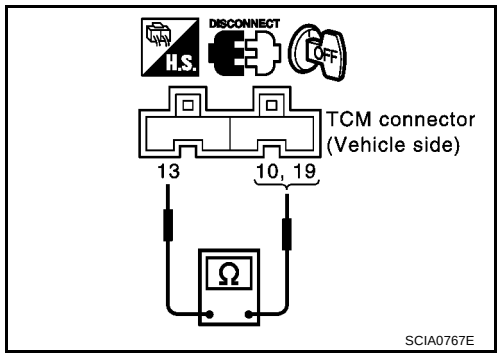
OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors. Refer to AT-415, "Wiring Diagram — AT — MAIN" .

3. CHECK LAMP CIRCUIT

1. Check continuity between TCM terminals 13 and 10, 19.

Continuity should exist.

2. Reinstall any part removed.



OK or NG

OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- O/D OFF indicator lamp.
  Refer to DI-21, "Combination Meter" .
- Harness and fuse for short or open between fuse and O/D OFF indicator lamp
  Refer to PG-4, "POWER SUPPLY ROUTING" .
- Harness for short or open between O/D OFF indicator lamp and TCM.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Engine Cannot Be Started In “P” and “N” Position

ECS008QV

SYMPTOM:

- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”, “2”, “1” or “R” position.**

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

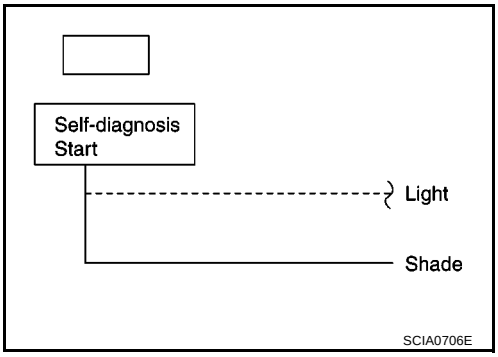
Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .

No >> GO TO 2.



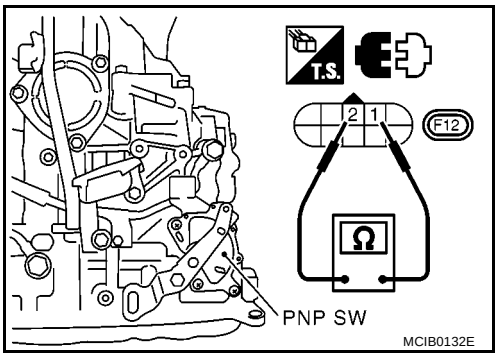
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.
Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace PNP switch.



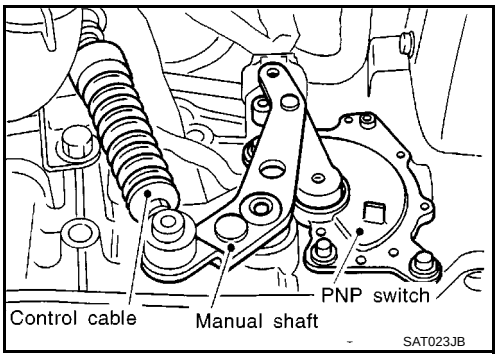
3. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 4.

NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



4. CHECK STARTING SYSTEM

Check starting system. Refer to SC-39, "STARTING SYSTEM" .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

In “P” Position, Vehicle Moves Forward Or Backward When Pushed

ECS008QW

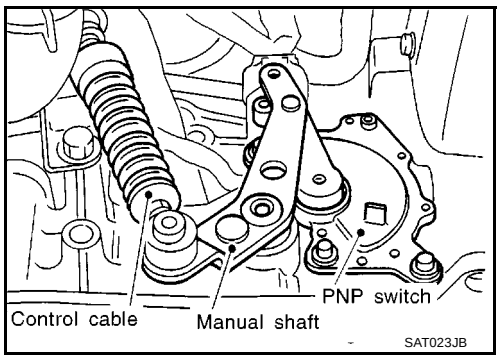
SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

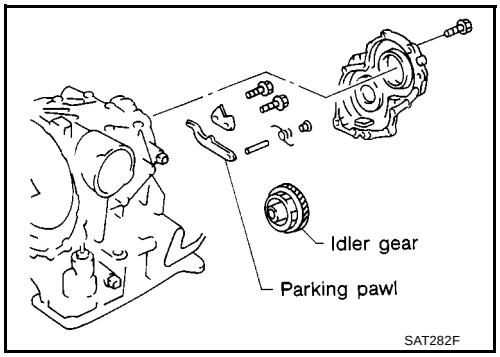


2. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-433, "OVERHAUL" .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.



In “N” Position, Vehicle Moves

ECS008QX

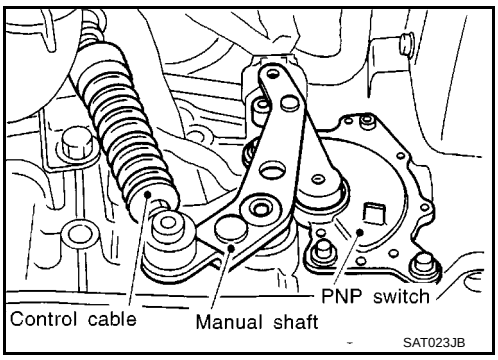
SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

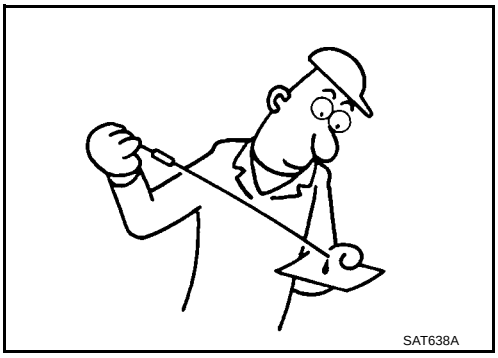


2. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

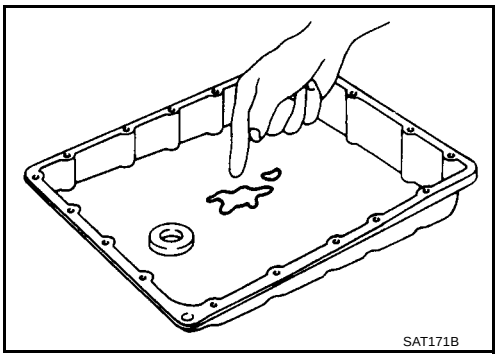


3. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 4.
NG >> 1. Disassemble A/T.
2. Check the following items:
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly



4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Large Shock. “N” → “R” Position

ECS008QY

SYMPTOM:
There is large shock when changing from “N” to “R” position.

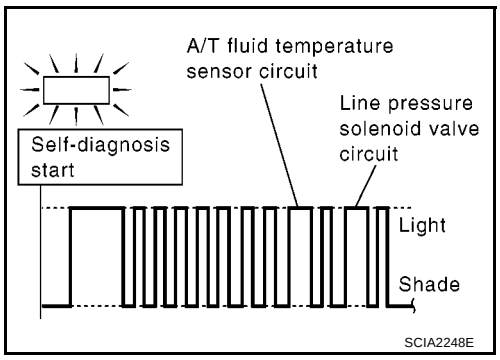
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve circuit?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-405, "LINE PRESSURE SOLENOID VALVE"
- AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"

No >> GO TO 2.



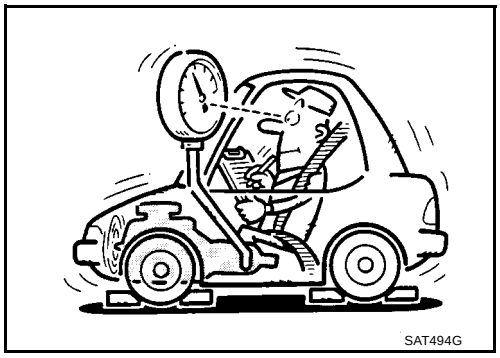
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-272, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- Oil pump assembly



3. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Vehicle Does Not Creep Backward In “R” Position

ECS008QZ

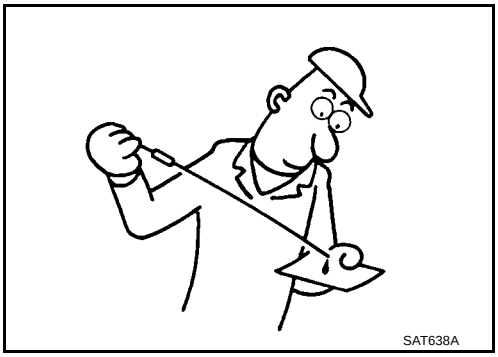
SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.


SAT638A

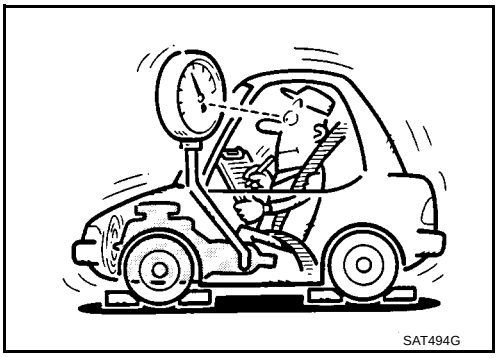
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “R” position. Refer to AT-272, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve (AT-405, "LINE PRESSURE SOLENOID VALVE")

3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly


SAT494G

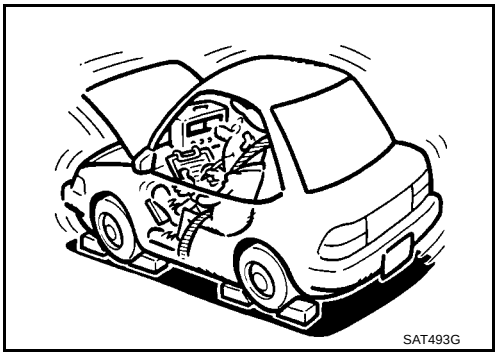
3. CHECK STALL TEST

Check stall revolution with selector lever in “1” and “R” positions.
Refer to AT-269, "Stall Test" .

OK or NG

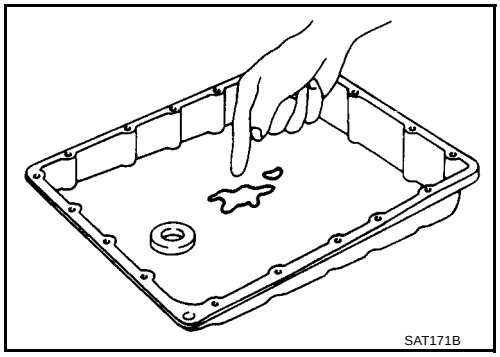
OK >> GO TO 4.
OK in “1” position, NG in “R” position>>1.Disassemble A/T.
2. Check the following items:
- Reverse clutch assembly
- Low & reverse brake assembly

NG in both “1” and “R” positions>>GO TO 6.


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Forward clutch assembly
- Overrun clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position

ECS008R0

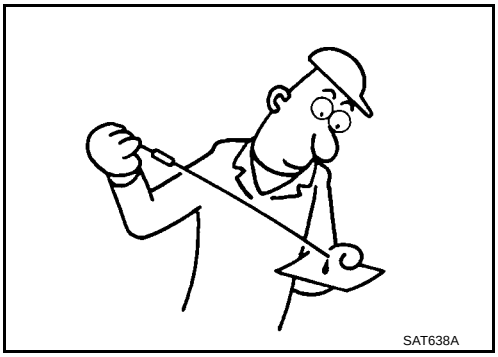
SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.



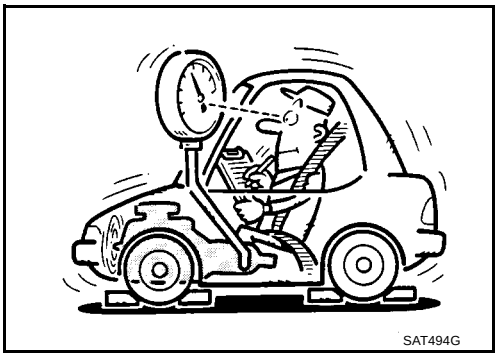
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-272, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve (AT-405, "LINE PRESSURE SOLENOID VALVE")

3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

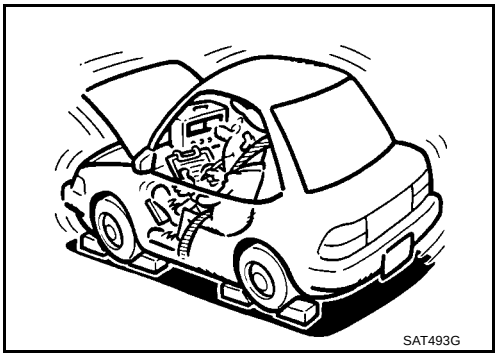


3. CHECK STALL TEST

Check stall revolution with selector lever in “D” position. Refer to AT-269, "Stall Test" .

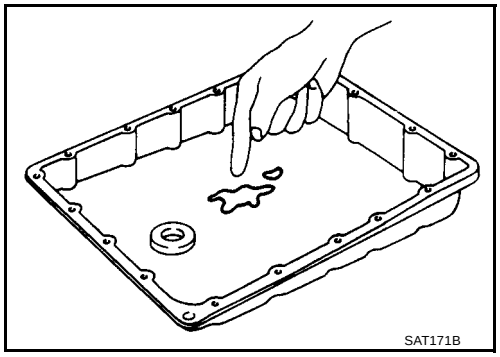
OK or NG

OK >> GO TO 4.
NG >> GO TO 6.



4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Reverse clutch assembly
- High clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

Vehicle Cannot Be Started From D1

ECS008R1

SYMPTOM:
Vehicle cannot be started from D1 on Cruise test — Part 1.

1. CHECK SYMPTOM

Is Vehicle Does Not Creep Backward In “R” Position OK?

Yes or No

Yes >> GO TO 2
No >> Go to Vehicle Does Not Creep Backward In “R” Position, AT-329, "Vehicle Does Not Creep Backward In “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B, overrun clutch solenoid valve, vehicle speed sensor·MTR after cruise test?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-367, "DTC VEHICLE SPEED SENSOR MTR"
- AT-376, "SHIFT SOLENOID VALVE A"
- AT-381, "SHIFT SOLENOID VALVE B"
- AT-386, "OVERRUN CLUTCH SOLENOID VALVE"

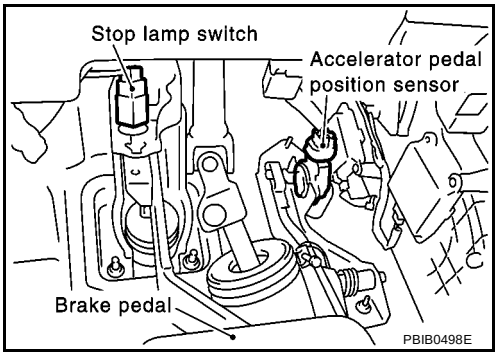
No >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

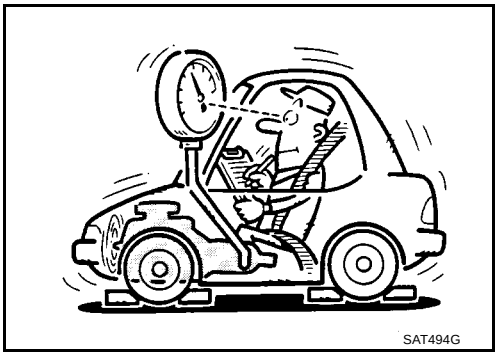


4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-272, "Line Pressure Test" .

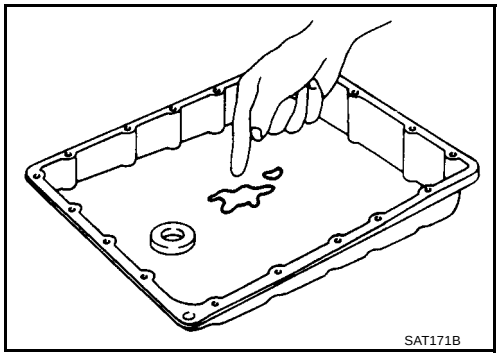
OK or NG

OK >> GO TO 5.
NG >> GO TO 8.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 8.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Forward clutch assembly
- Torque converter
- Oil pump assembly
- Reverse clutch assembly
- Low & reverse clutch assembly

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2

ECS008R2

SYMPTOM:
A/T does not shift from D1 to D2 at the specified speed.
A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D1 OK?

Yes or No

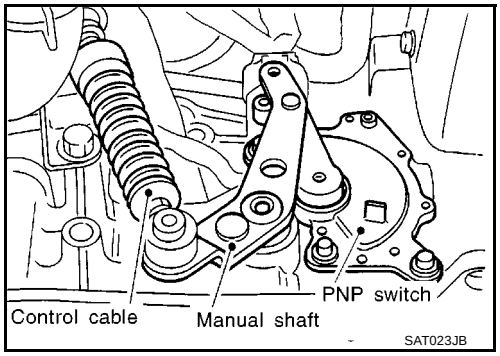
Yes >> GO TO 2
No >> Go to AT-331, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-333, "Vehicle Cannot Be Started From D1" .

2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-367, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

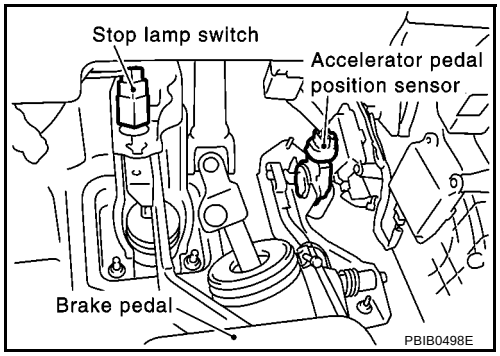
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

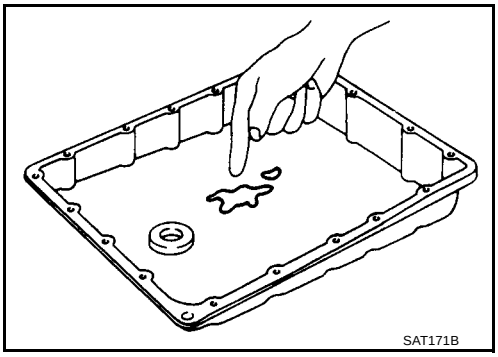
OK or NG

OK >> GO TO 5
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6
NG >> GO TO 8

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 7
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_2 \rightarrow D_3$

ECS008R3

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed.

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D_1 OK?

Yes or No

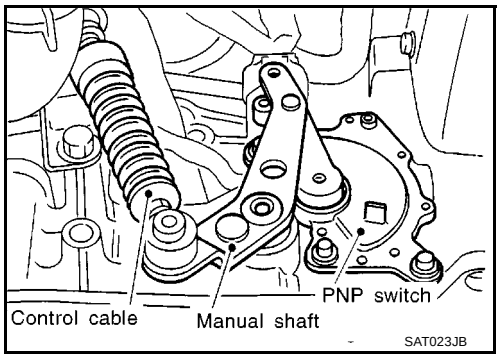
Yes >> GO TO 2.
No >> Go to AT-331, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-333, "Vehicle Cannot Be Started From D_1" .

2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-367, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

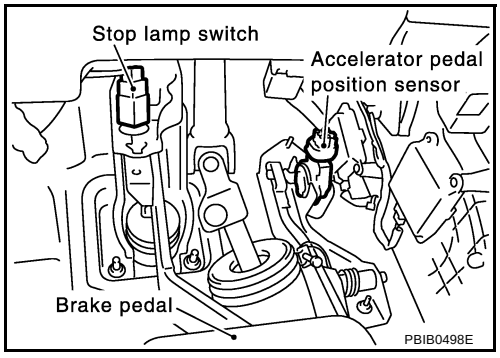
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

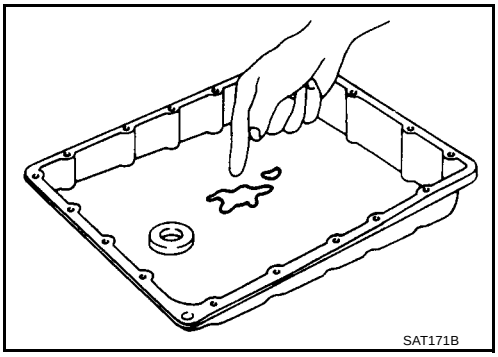
OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 8.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- High clutch assembly
- Brake band

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_3 \rightarrow D_4$

ECS008R4

SYMPTOM:

- **A/T does not shift from D_3 to D_4 at the specified speed.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1. CHECK SYMPTOM

Are Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position and Vehicle Cannot Be Started From D_1 OK?

Yes or No

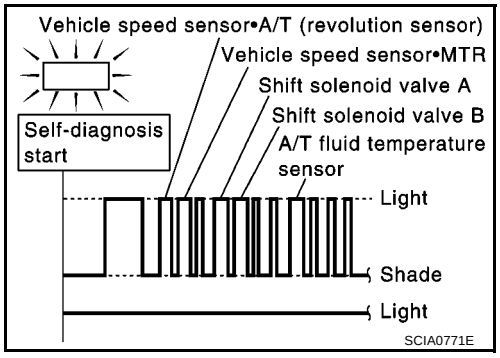
Yes >> GO TO 2.
No >> Go to AT-331, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

With CONSULT-II

Does self-diagnosis, after cruise test, show damage to any of the following circuits?

- PNP switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor·A/T (revolution sensor)
- Shift solenoid valve A or B
- Vehicle speed sensor·MTR



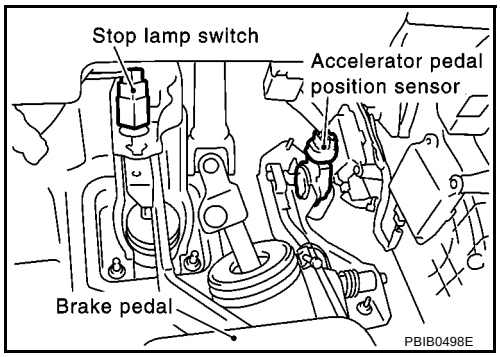
Yes or No

Yes >>
- Check damaged circuit. Refer to the following items.
  - AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
  - AT-376, "SHIFT SOLENOID VALVE A"
  - AT-381, "SHIFT SOLENOID VALVE B"
  - AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
  - AT-367, "DTC VEHICLE SPEED SENSOR MTR"
  - AT-358, "TCM Self-diagnosis Does Not Activate"

No >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

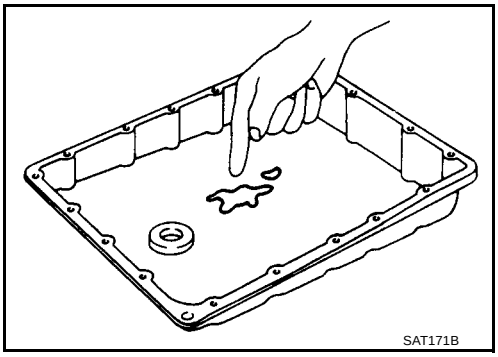


OK or NG

OK >> GO TO 4
NG >> Repair or replace accelerator pedal position (APP) sensor.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5
NG >> GO TO 7

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

A/T Does Not Perform Lock-up

ECS008R5

SYMPTOM:
A/T does not perform lock-up at the specified speed.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to PNP switch, A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), vehicle speed sensor·MTR, engine speed signal or torque converter clutch solenoid valve circuit after cruise test?

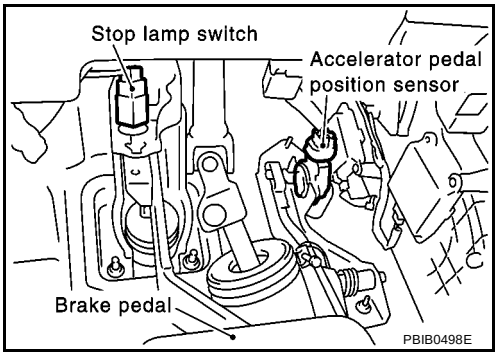
Yes or No

Yes >> Check damaged circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" , AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE" , AT-395, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" , AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-367, "DTC VEHICLE SPEED SENSOR MTR" , AT-401, "ENGINE SPEED SIGNAL" .

No >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .



OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position (APP) sensor.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Torque converter clutch control valve
- Torque converter relief valve
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check torque converter.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Hold Lock-up Condition

ECS008R6

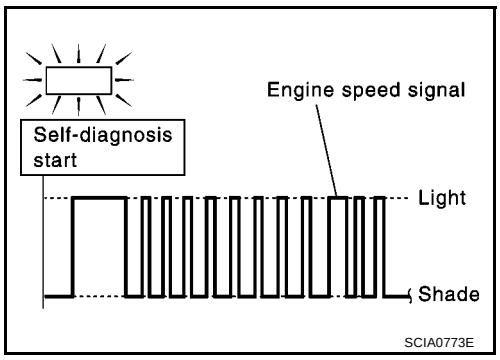
SYMPTOM:
A/T does not hold lock-up condition for more than 30 seconds.

1. CHECK DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes or No

Yes >> Check engine speed signal circuit. Refer to AT-401, "ENGINE SPEED SIGNAL" .
No >> GO TO 2.

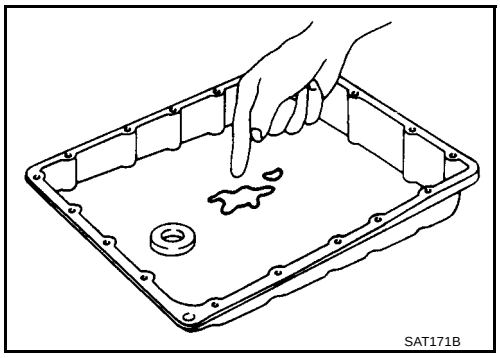


2. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 3.
NG >> GO TO 5.



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following item:

- Torque converter

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

Lock-up Is Not Released

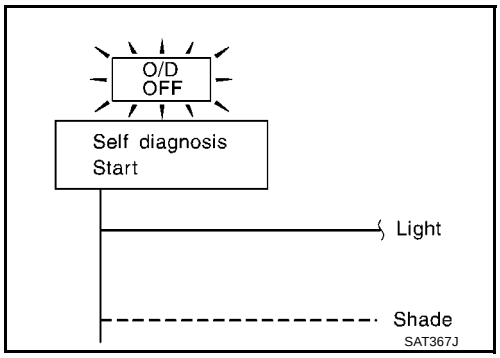
ECS008R7

SYMPTOM:
Lock-up is not released when accelerator pedal is released.

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage accelerator pedal position (APP) sensor circuit?

Without CONSULT-II
Does self-diagnosis show damage to accelerator pedal position (APP) sensor circuit?



Yes or No

Yes >> Check accelerator pedal position (APP) sensor circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .
No >> GO TO 2.

2. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Engine Speed Does Not Return To Idle (Light Braking D4 → D3)

ECS008R8

SYMPTOM:

- **Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .**
- **Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.**
- **Vehicle does not decelerate by engine brake when shifting A/T from "D" to "2" position.**

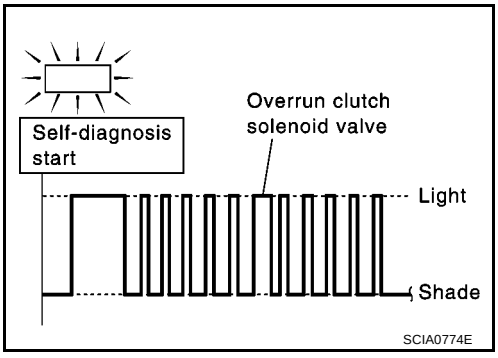
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes or NO

Yes >> Check overrun clutch solenoid valve circuit. Refer to AT-386, "OVERRUN CLUTCH SOLENOID VALVE" .

No >> GO TO 2.



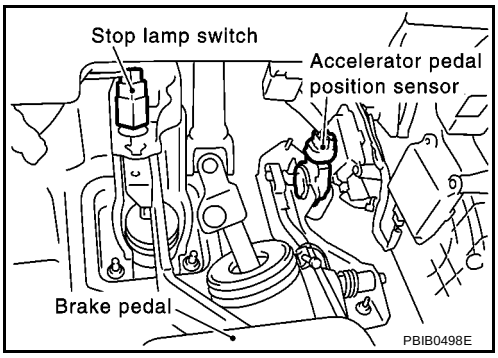
2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position (APP) sensor.



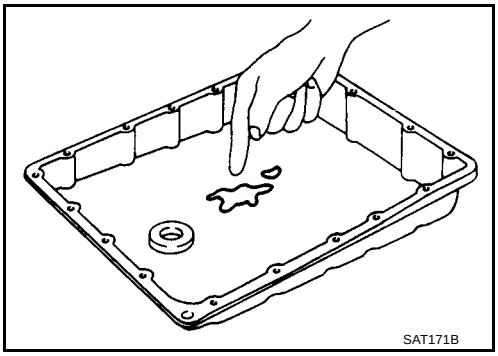
3. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.

OK or NG

OK >> GO TO 4.

NG >> GO TO 6.



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T.
4. Check the following item:

- Overrun clutch assembly

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

Vehicle Does Not Start From D1

ECS008R9

SYMPTOM:
Vehicle does not start from D1 on Cruise test — Part 2.

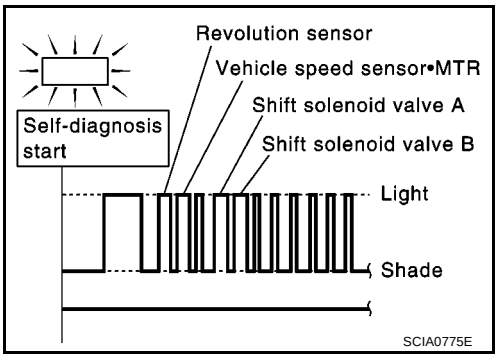
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.
- AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-376, "SHIFT SOLENOID VALVE A"
- AT-381, "SHIFT SOLENOID VALVE B"
- AT-367, "DTC VEHICLE SPEED SENSOR MTR"

No >> GO TO 2.

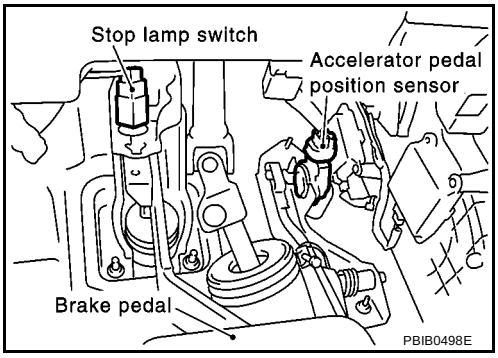


2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position (APP) sensor.

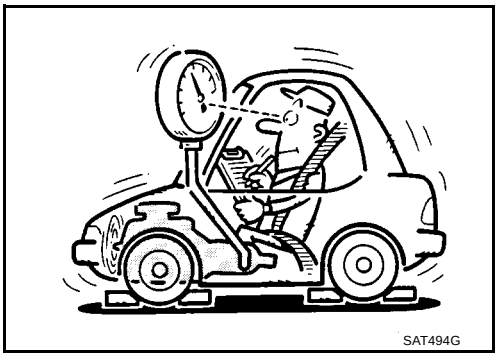


3. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-272, "Line Pressure Test" .

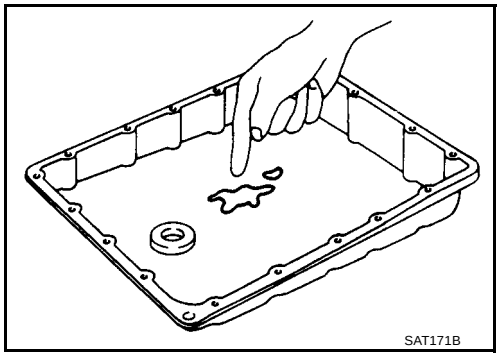
OK or NG

OK >> GO TO 4.
NG >> GO TO 7.



4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 5.
NG >> GO TO 7.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> Go to AT-333, "Vehicle Cannot Be Started From D1" .
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-426, "REMOVAL" .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Reverse clutch assembly
- Forward clutch assembly
- Low & reverse clutch assembly
- Torque converter
- Oil pump assembly

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”

ECS008RA

SYMPTOM:
A/T does not shift from D_4 to D_3 when changing overdrive control switch to “OFF” position.

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

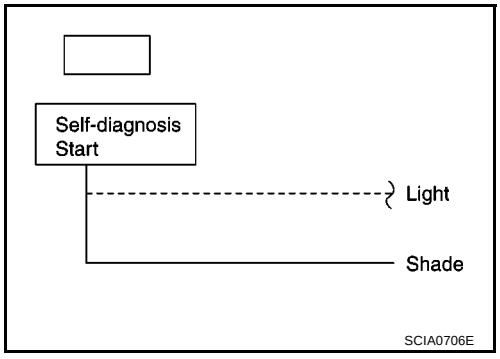
With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to overdrive control switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to overdrive control switch circuit?

Yes or No

Yes >> Check overdrive control switch circuit. Refer to AT-359, "DIAGNOSTIC PROCEDURE" .

No >> Go to AT-338, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .



A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position

ECS008RB

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from “D” to “2” position.

1. CHECK PNP SWITCH CIRCUIT

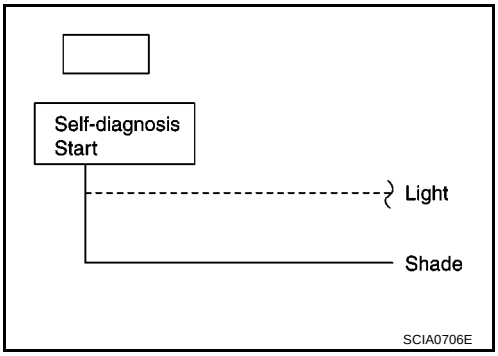
With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .

No >> Go to AT-336, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kick down: $D_4 \rightarrow D_2$" .



A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position

ECS008RC

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from "2" to "1" position.

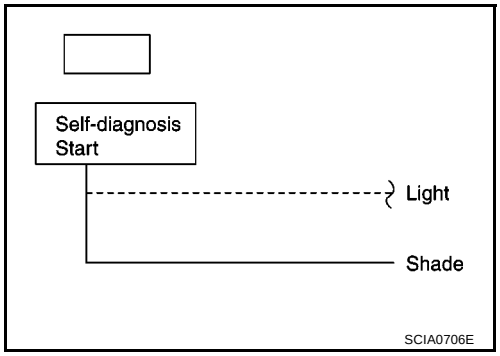
1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .
No >> GO TO 2

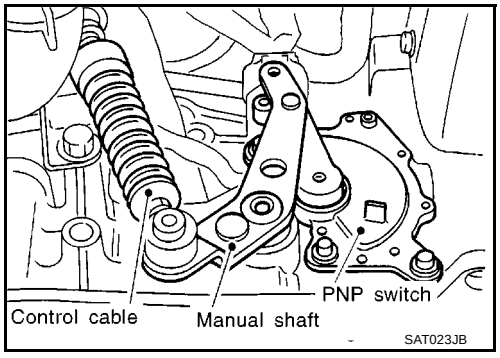


2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .



3. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

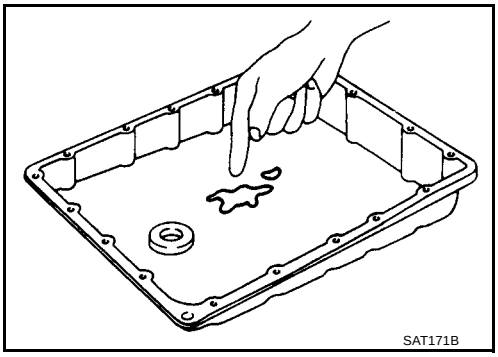
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-367, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- Brake band

OK or NG

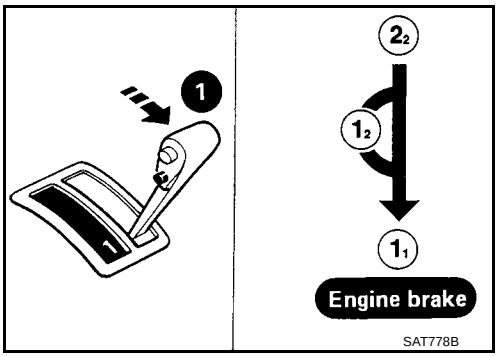
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



Vehicle Does Not Decelerate By Engine Brake

ECS008RD

SYMPTOM:
Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

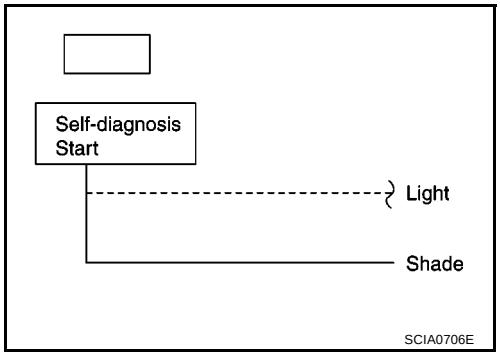
1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to AT-358, "TCM Self-diagnosis Does Not Activate" .
No >> GO TO 2

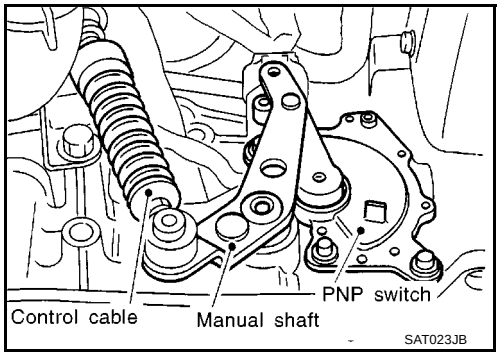


2. CHECK CONTROL CABLE

Check control cable. Refer to AT-427, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .

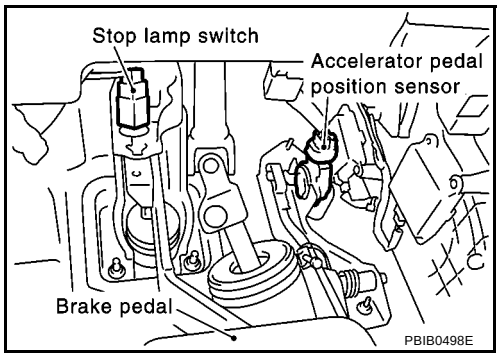


3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.



4. CHECK VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR·MTR CIRCUIT

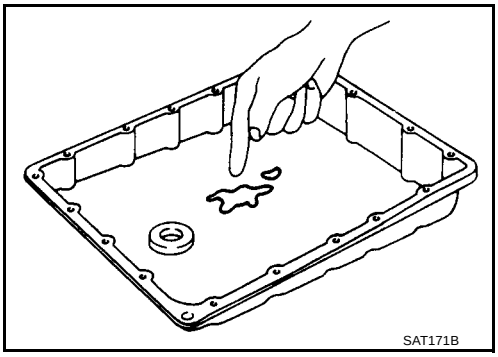
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-362, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-367, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan.
2. Check A/T fluid condition.



OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
- Overrun clutch assembly
- Low & reverse bake assembly

OK or NG

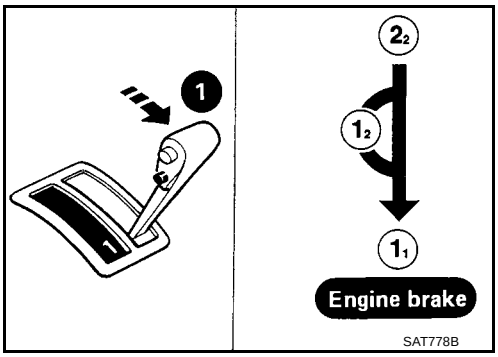
OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



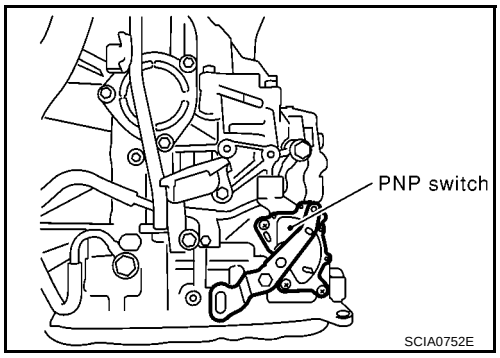
TCM Self-diagnosis Does Not Activate

ECS008RE

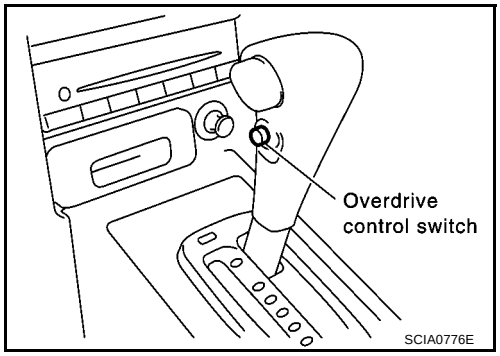
SYMPTOM:
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

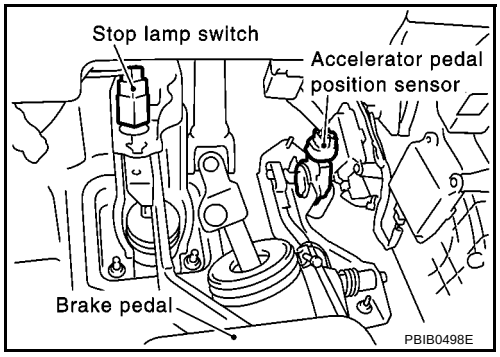
- PNP switch
  The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.



- Overdrive control switch
  Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.



- Closed throttle position signal and wide-open throttle position signal
  ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.



DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P/N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.
   Check that the signal of the selector lever position is indicated properly.

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

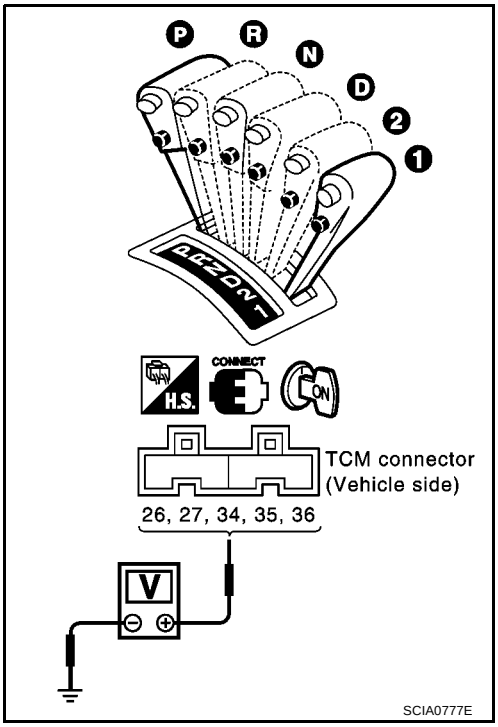
SAT701J

Without CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Voltage:
B: Battery voltage
0: 0V

Lever position	Terminal No.				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B



SCIA0777E

OK or NG

OK >> GO TO 2.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- PNP switch (Refer to AT-361, "COMPONENT INSPECTION" .)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Harness for short or open between combination meter and TCM
- Harness for short or open between combination meter and PNP switch

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SWITCH”.
   Check the signal of the overdrive control switch is indicated properly.
   (Overdrive control switch “ON” displayed on CONSULT-II means overdrive “OFF”.)

DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

OK or NG

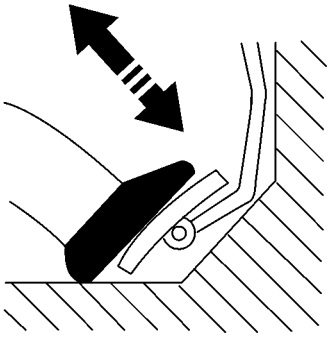
OK >> GO TO 3.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Overdrive control switch (Refer to AT-361, "COMPONENT INSPECTION" .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

3. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for A/T with CONSULT-II.
3. Read out “CLOSED THL/SW” and “W/O THRL-SW” depressing and releasing accelerator pedal.
   Check the signal of throttle position signal is indicated properly.



DATA MONITOR	
MONITORING	
POWERSHIFT SW	OFF
CLOSED THL/SW	OFF
W/O THRL/P-SW	OFF
HOLD SW	OFF
BRAKE SW	ON

SAT646J

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

OK >> GO TO 4.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position sensor — Refer to AT-371, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .
- Harness for short or open between accelerator pedal position sensor and ECM

4. CHECK DTC

Perform “SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)”. Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

OK or NG

OK >> **INSPECTION END**

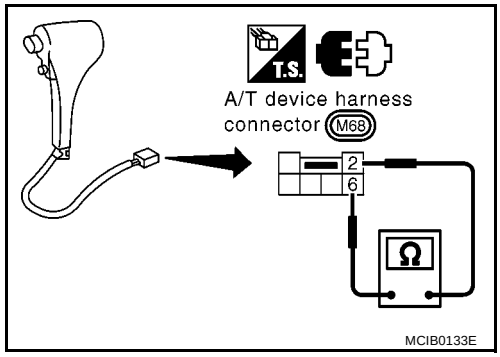
NG >> ● Perform TCM input/output signal inspection.
● If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

● Check continuity between two terminals 2 and 6.

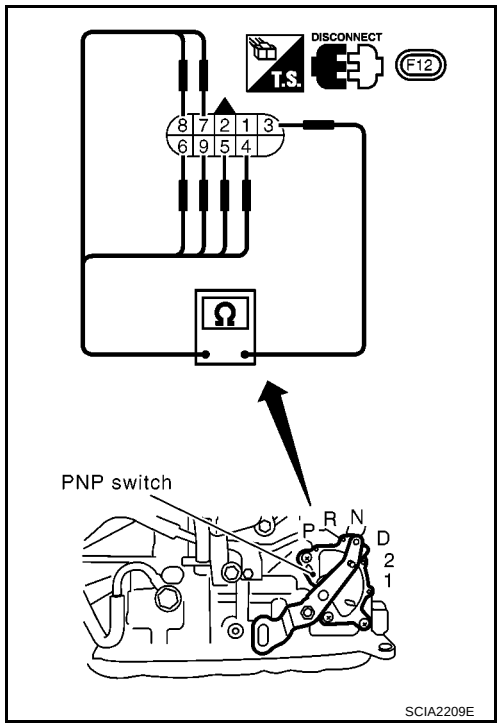
Switch position	Continuity
ON	No
OFF	Yes



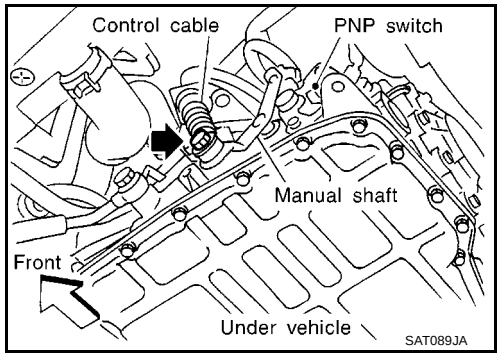
PNP Switch

1. Check continuity between terminals 1 and 2, and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 — 7	1 — 2
R	3 — 8	
N	3 — 9	1 — 2
D	3 — 6	
2	3 — 5	
1	3 — 4	



2. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control cable. Refer to AT-427, "Control Cable Adjustment" .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to AT-427, "Control Cable Adjustment" .
6. If NG on step 4, replace PNP switch.



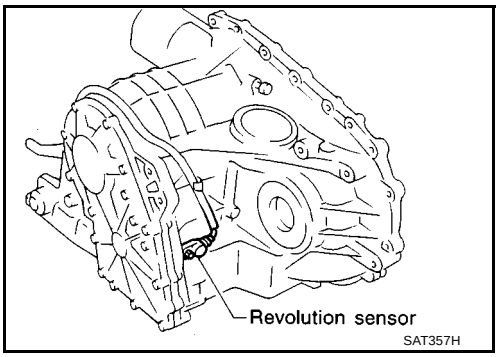
VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

PFP:32702

Description

ECS008RH

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	OR	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Throttle position sensor (Ground)	Always		0V

ON BOARD DIAGNOSIS LOGIC

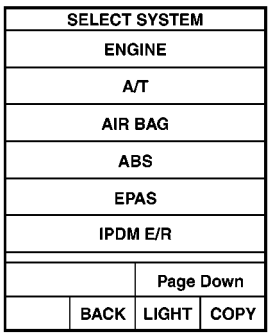
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P) : VHCL SPEED SEN·AT	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Revolution sensor
(X) : 1st judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

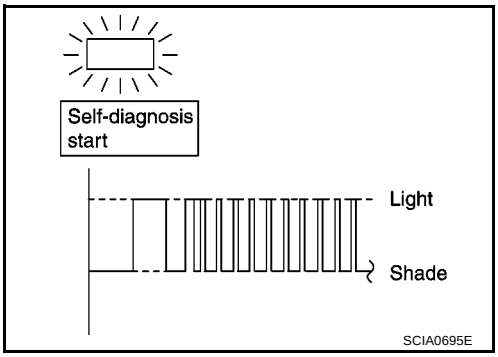
(P) With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 30 km/h (19 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.



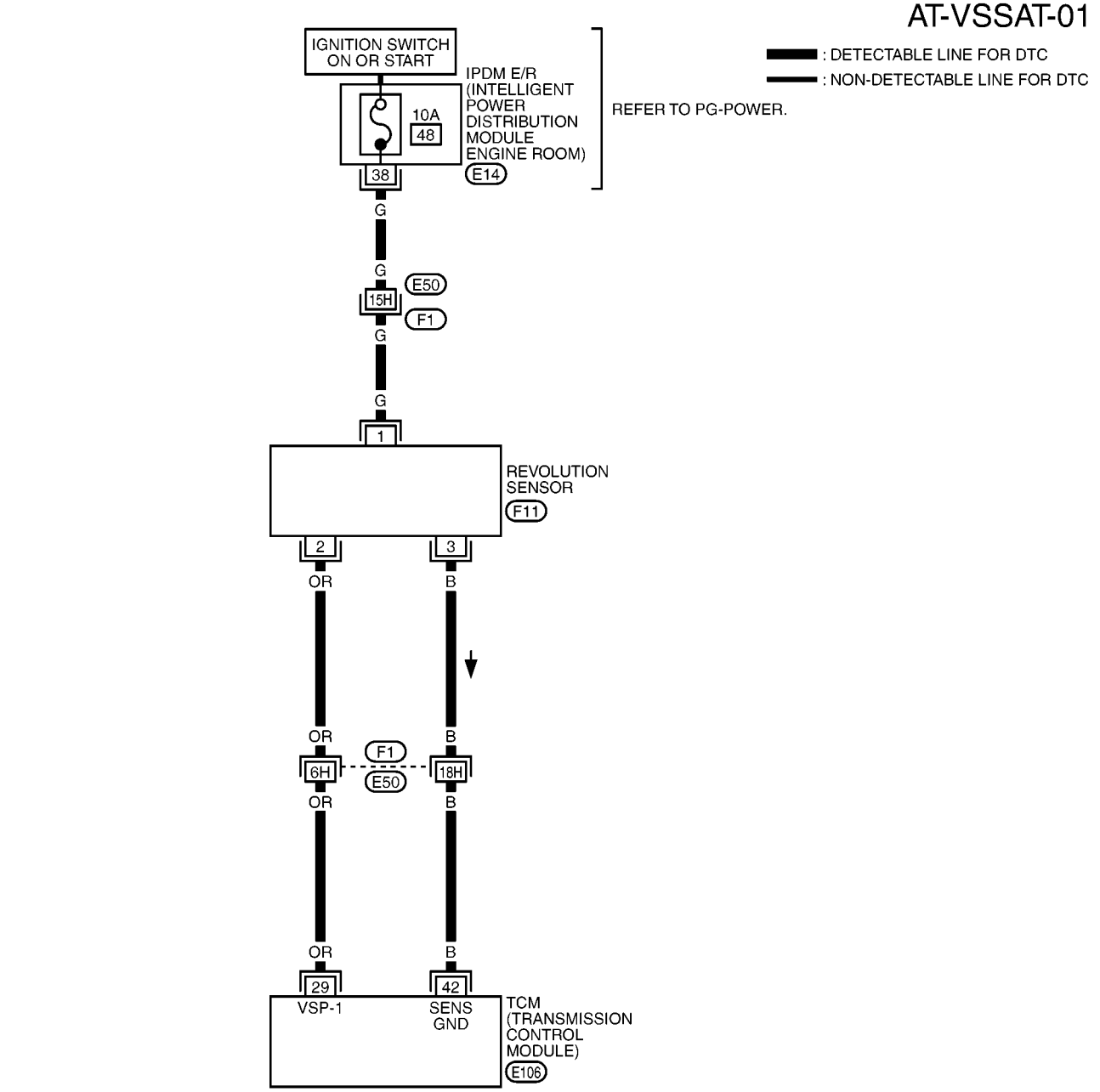
Without CONSULT-II

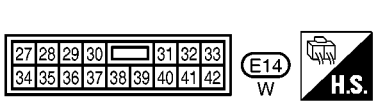
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 30 km/h (19 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

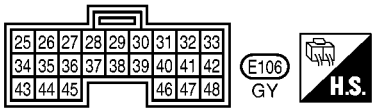


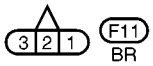
Wiring Diagram — AT — VSSA/T

ECS008RI









REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0073E

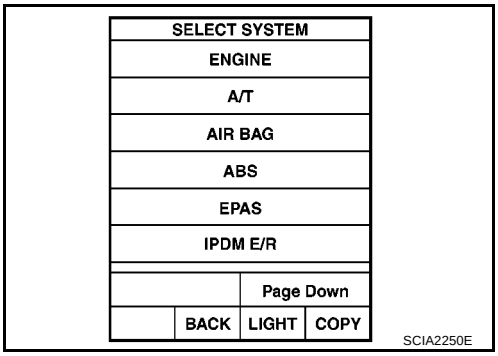
Diagnostic Procedure

ECS008RJ

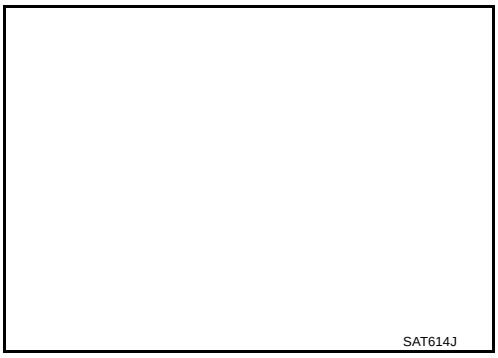
1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “VHCL/S SE·A/T” while driving. Check the value changes according to driving speed.



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL0575

OK or NG

OK >> GO TO 3.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM, ECM and revolution sensor
- Harness for short or open between fuse and revolution sensor

3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure, AT-362, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

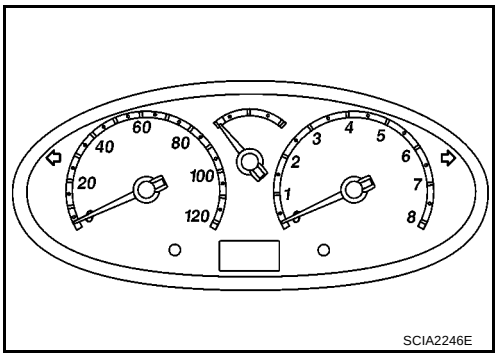
DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS008RK

The vehicle speed sensor·MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor·MTR.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	G	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V

ON BOARD DIAGNOSIS LOGIC

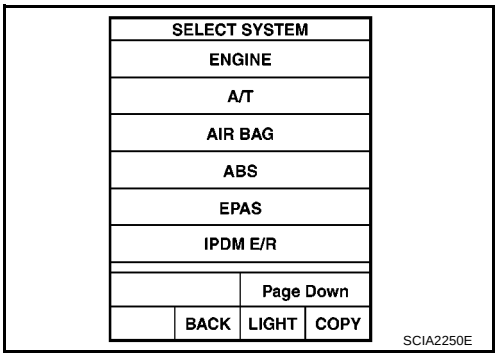
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: VHCL SPEED SEN·MTR : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

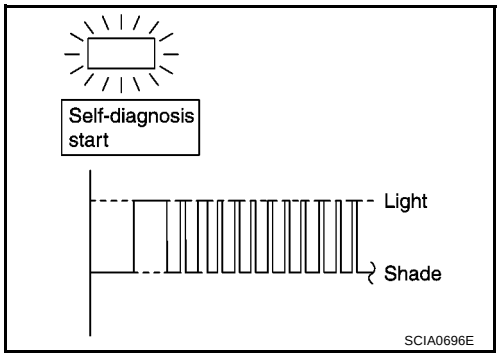
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position and vehicle speed higher than 20 km/h (12 MPH).



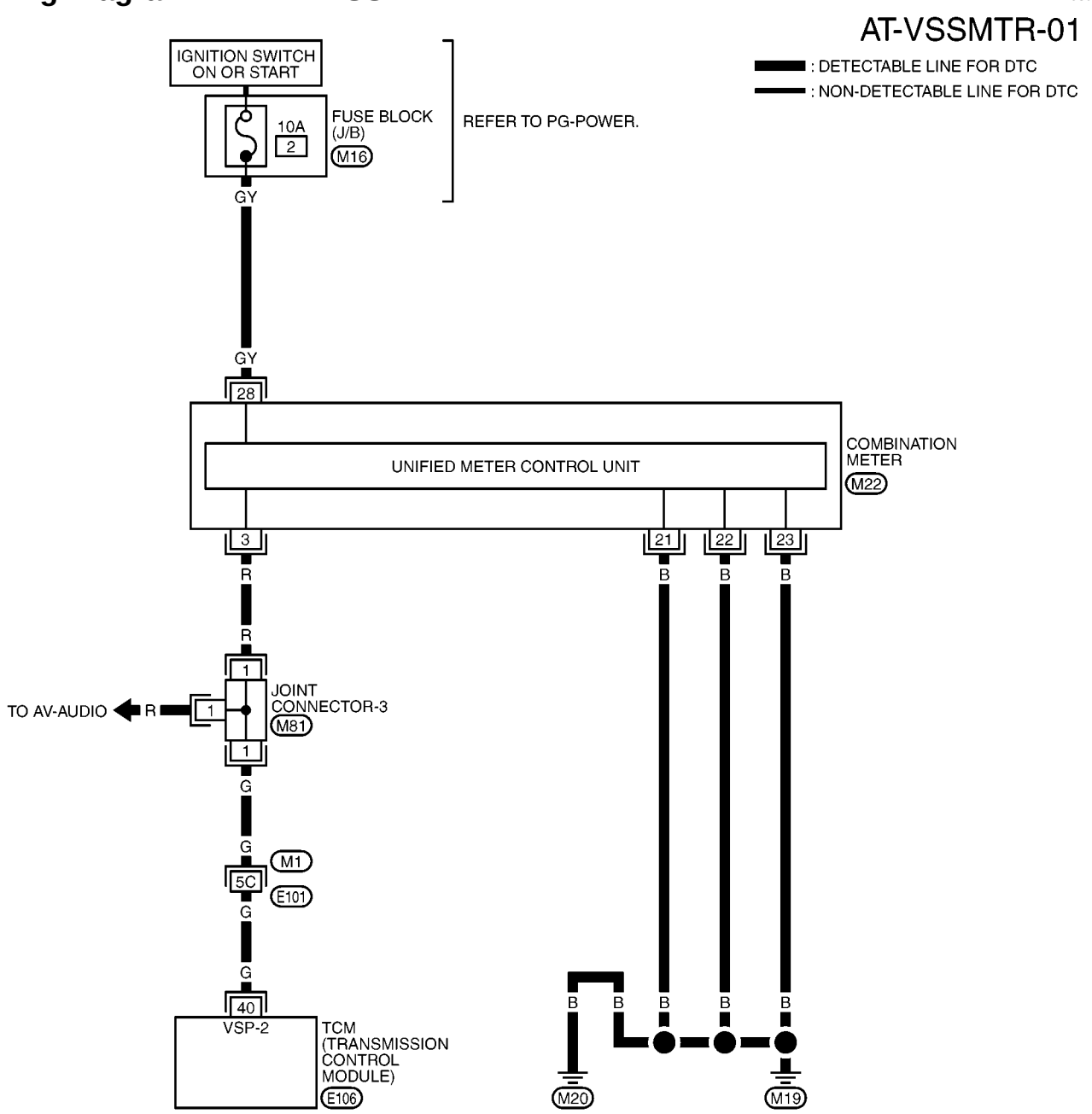
Without CONSULT-II

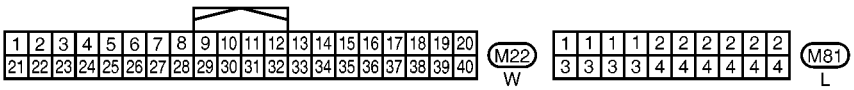
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position and vehicle speed higher than 20 km/h (12 MPH).
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

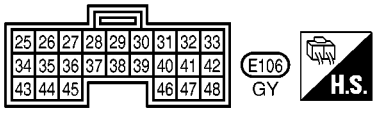


Wiring Diagram — AT — VSSMTR

ECS008RL







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0122E

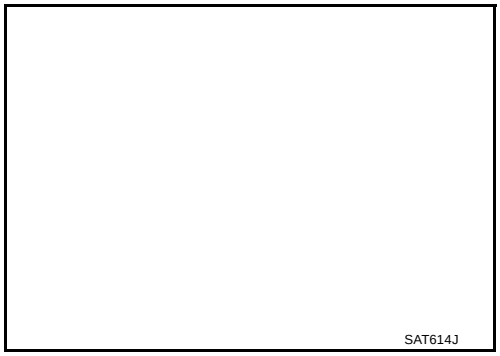
Diagnostic Procedure

ECS008RM

1. CHECK INPUT SIGNAL

With CONSULT-II

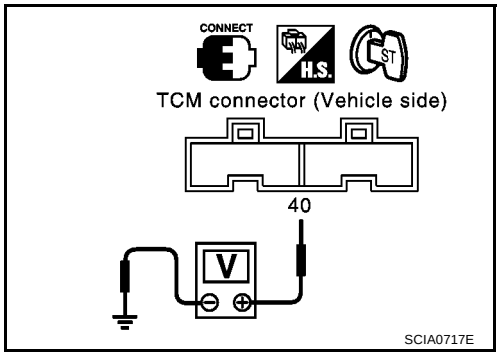
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.

   Voltage: Voltage varies between less than 1V and more than 4.5V.



OK or NG

OK >> GO TO 2
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Combination meter
  Refer to DI-5, "COMBINATION METERS" .
- Harness for short or open between TCM and combination meter
- Harness for short or open between combination meter and vehicle speed sensor

2. CHECK DTC

Perform Self-diagnosis Code confirmation procedure, AT-367, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

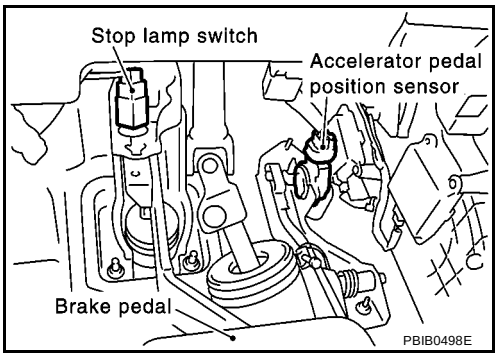
ACCELE RATOR PEDAL POSITION (APP) SENSOR

PFP:22620

Description

ECS008RN

- Accelerator pedal position (APP) sensor
  Electric throttle control actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The actuator sends a signal to the TCM.



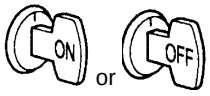
CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position (APP) sensor (THRTL POS SEN)	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
32	OR	Throttle position sensor (Power source)		When turning ignition switch “ON”.	4.5 - 5.5V
				When turning ignition switch “OFF”.	0V
41	Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Ground (Throttle position sensor)	Always		0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: THROTTLE POSI SEN*	TCM receives an excessively low or high voltage from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Accelerator pedal position (APP) sensor
: 3rd judgement flicker		

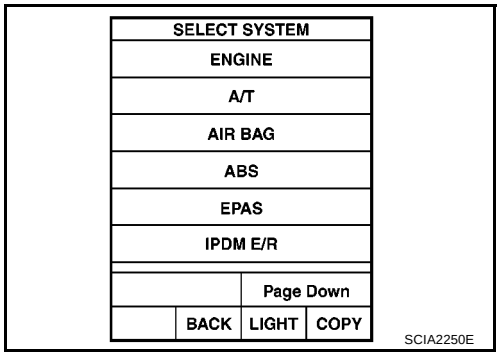
*:This code means Accelerator pedal position (APP) sensor in reality.

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

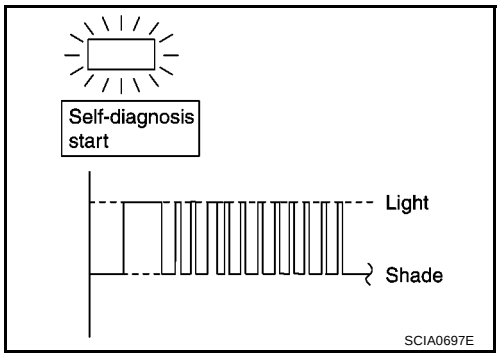
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/2 of the full throttle position and driving for more than 3 seconds.



Without CONSULT-II

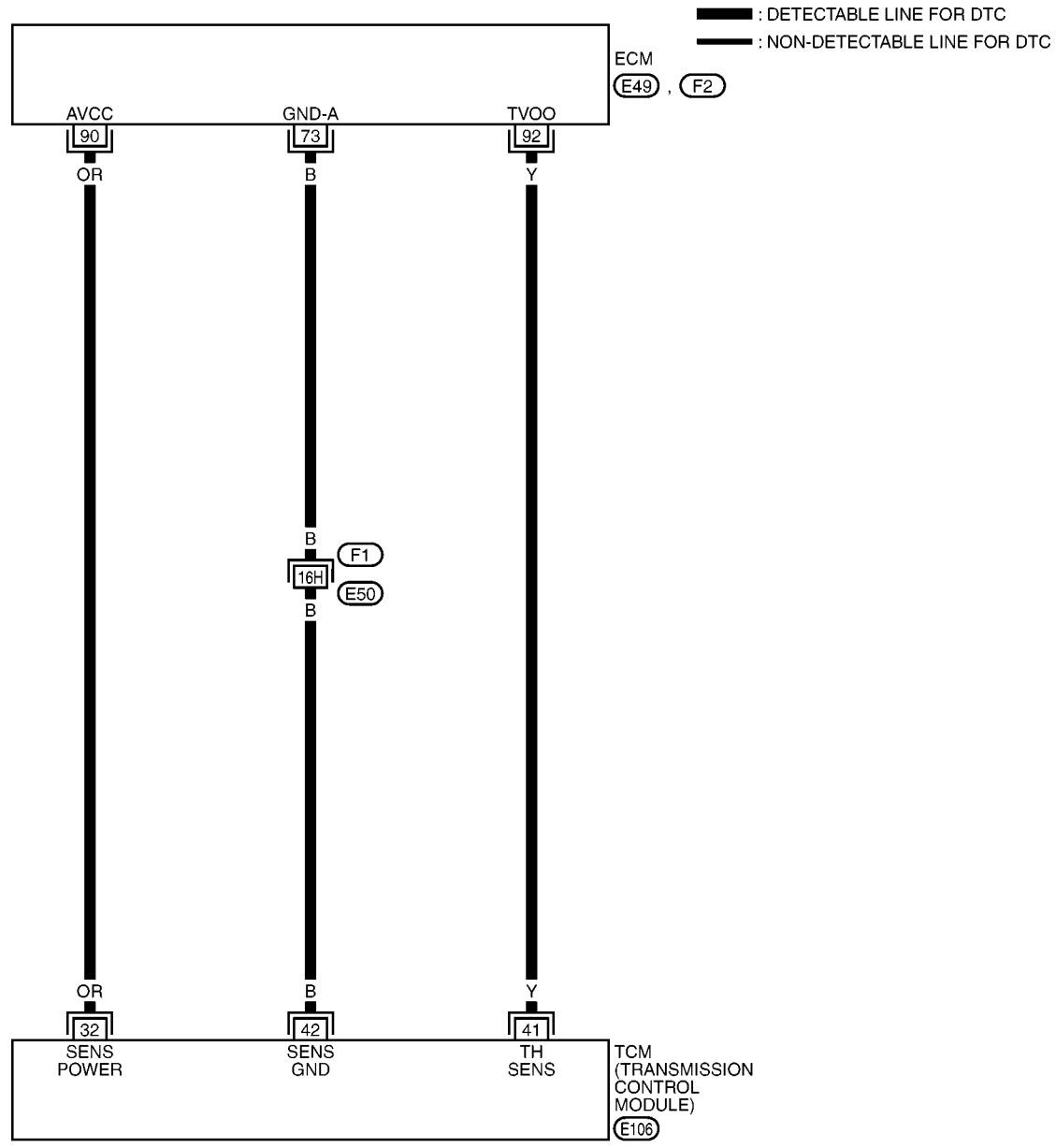
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/2 of the full throttle position and driving for more than 3 seconds.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

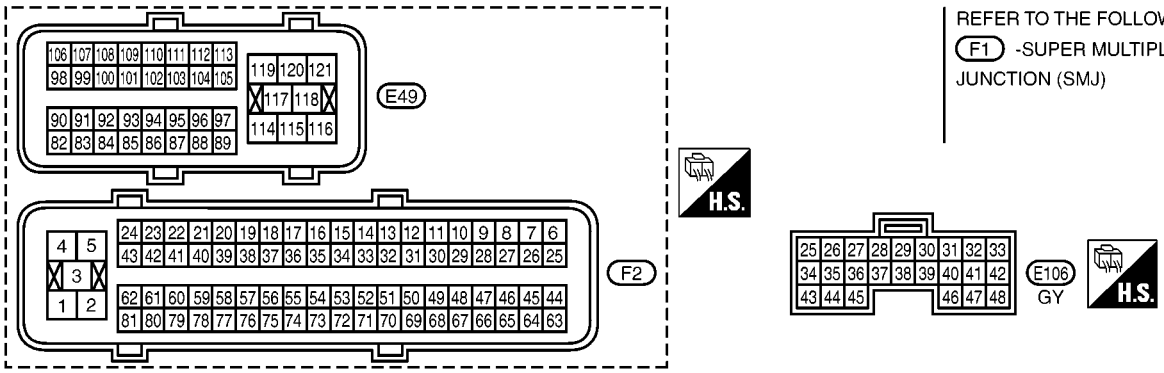


Wiring Diagram — AT — TPS

ECS008RO

AT-TPS-01





MCWA0083E

Diagnostic Procedure

ECS008RP

1. CHECK DTC WITH ECM

- Check P code with CONSULT-II “ENGINE”.

Turn ignition switch ON and select “SELF DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-II. Refer to EC-60, "Malfunction Indicator (MI)" .

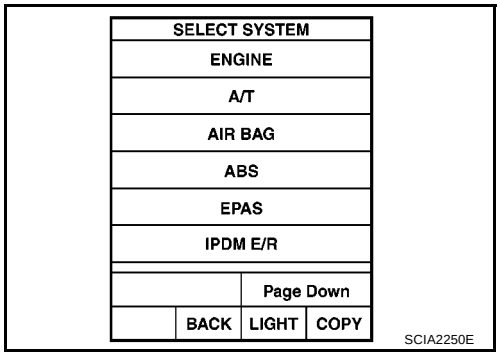
OK or NG

OK >> GO TO 2.
NG >> Check throttle position sensor circuit for engine control.

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

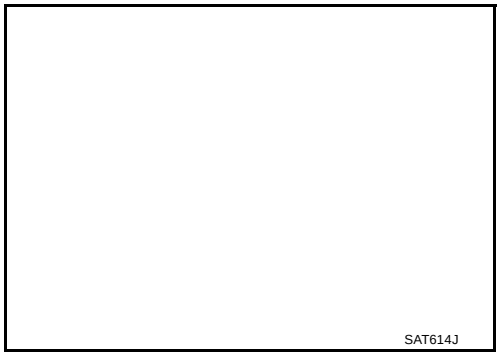
With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “THRTL POS SEN”.

Voltage:
Fully-closed throttle :Approximately 0.5V
Fully-open throttle :Approximately 4V



Without CONSULT-II

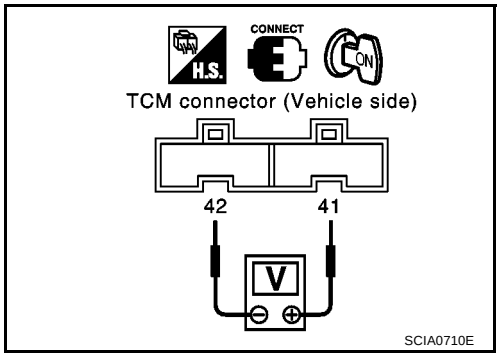
1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 41 and 42 while accelerator pedal is depressed slowly.

Voltage:
Fully-closed throttle valve :Approximately 0.5V
Fully-open throttle valve :Approximately 4V

(Voltage rises gradually in response to throttle position.)

OK or NG

OK >> GO TO 3.
NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-372, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

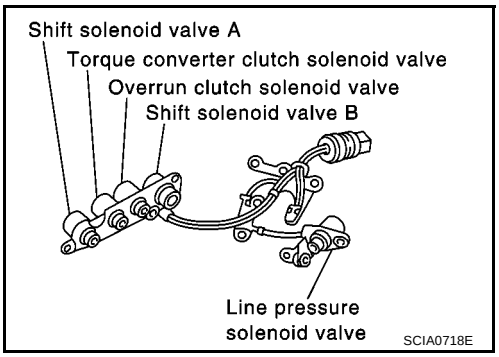
SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS008RQ

Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.



Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	OR	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V

ON BOARD DIAGNOSIS LOGIC

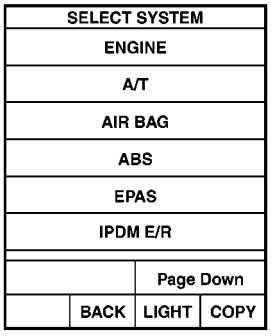
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: SHIFT SOLENOID/VA	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve A
: 4th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

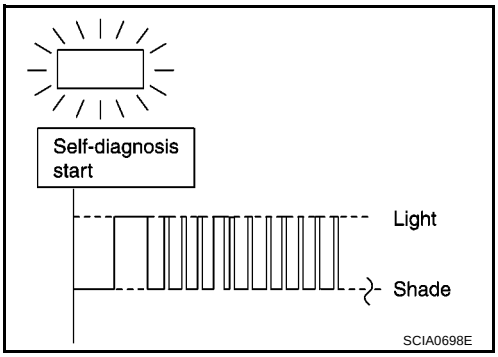
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle in $D_1 \rightarrow D_2$ position.



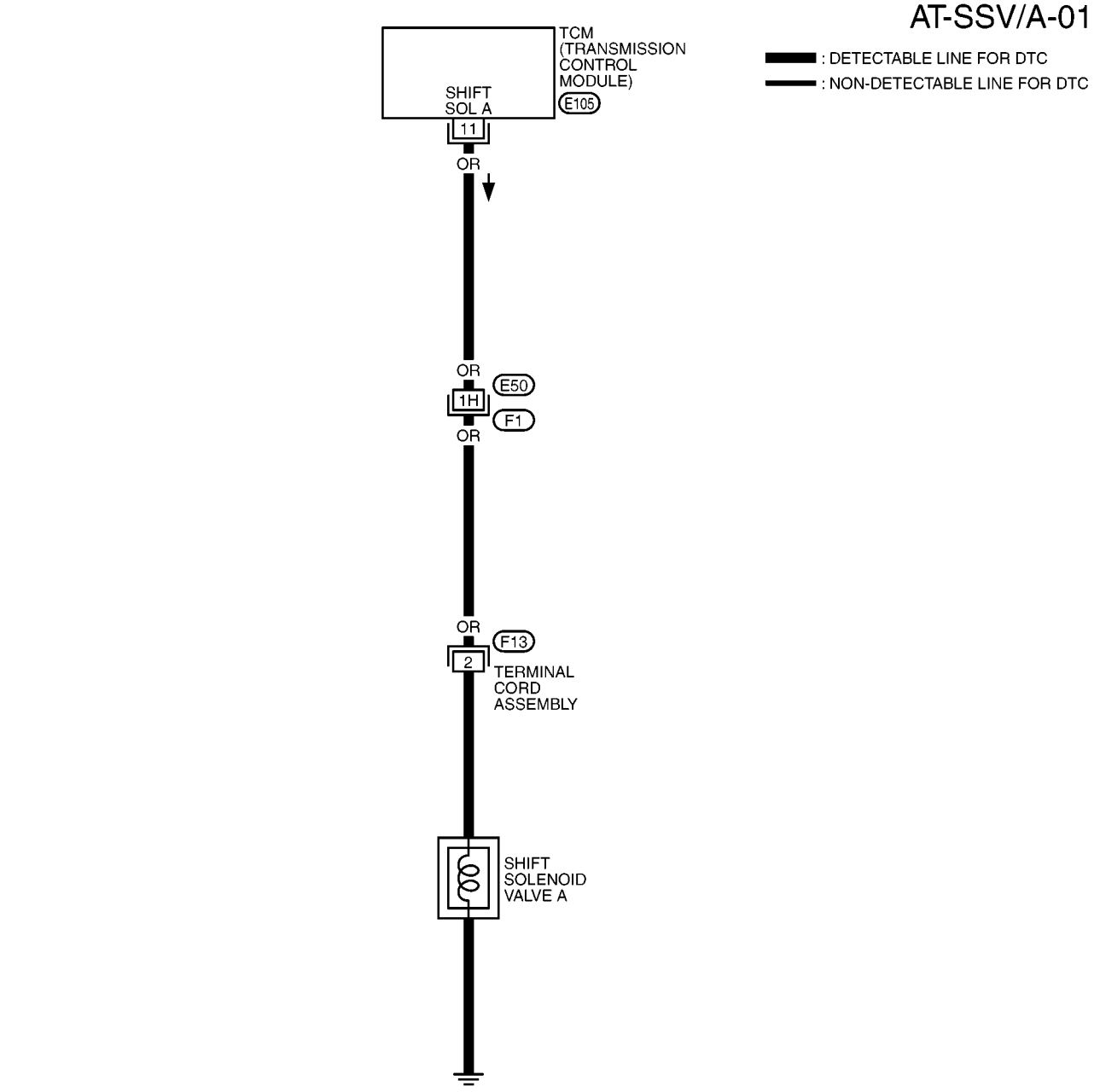
Without CONSULT-II

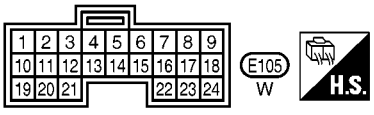
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2$ position.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

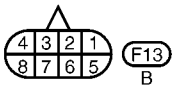


Wiring Diagram — AT — SSV/A

ECS008RR







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0081E

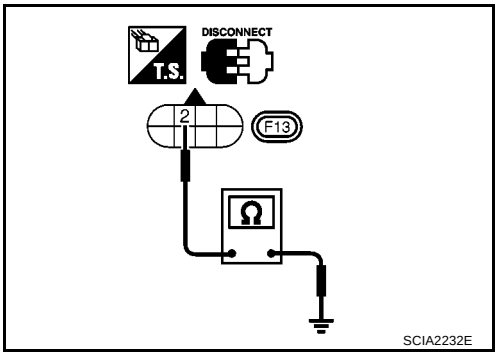
Diagnostic Procedure

ECS008RS

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 2 and ground.

Resistance : 20 - 30Ω



OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
Shift solenoid valve A
Refer to AT-379, "Component Inspection" .
Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 2 and TCM harness connector terminal 11.

Continuity should exist.

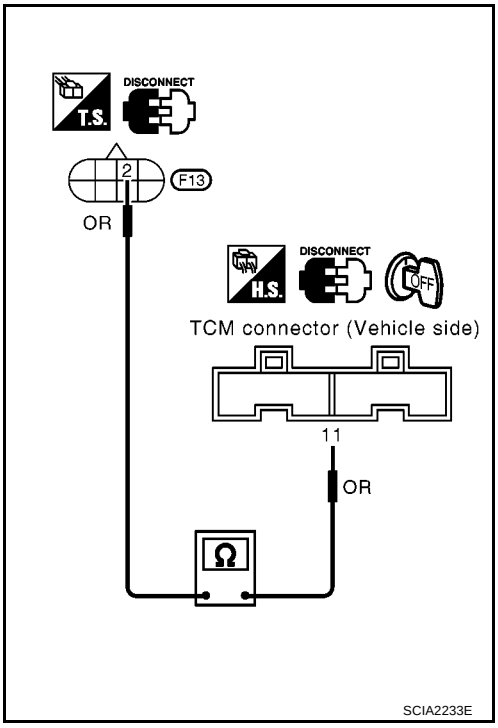
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-376, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008RT

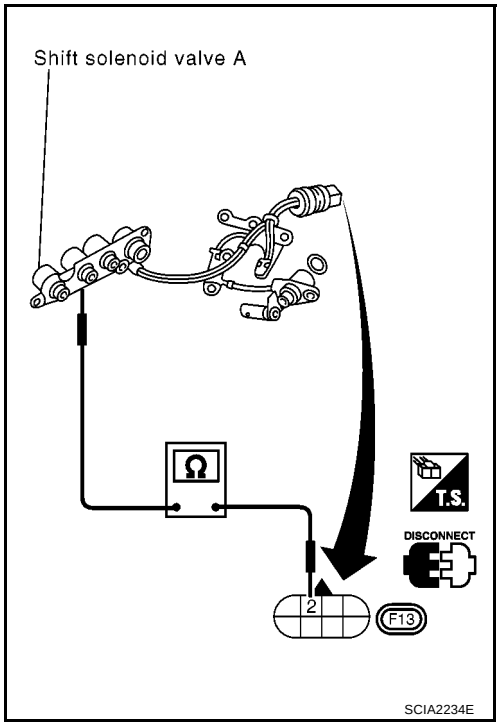
SHIFT SOLENOID VALVE A

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

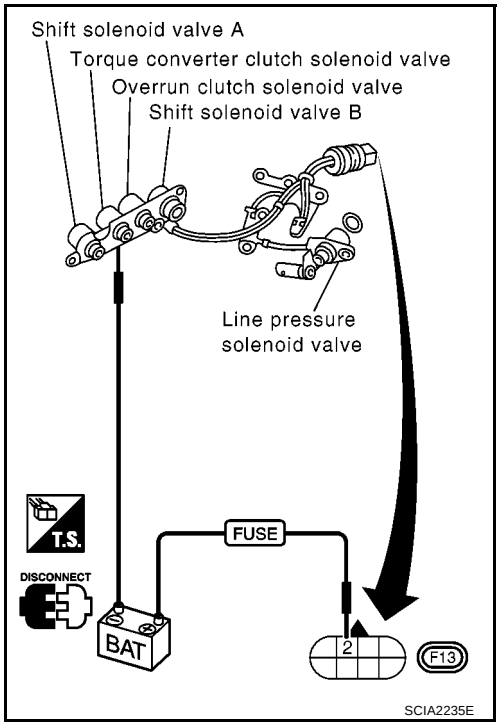
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



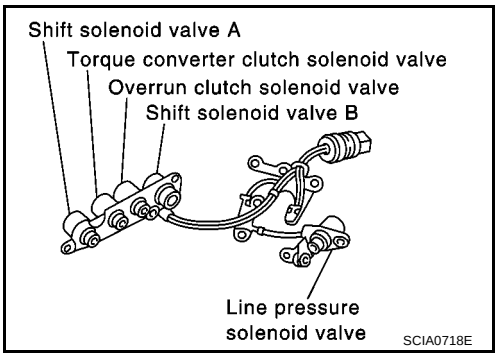
SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS008RU

Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.



Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	L	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

ON BOARD DIAGNOSIS LOGIC

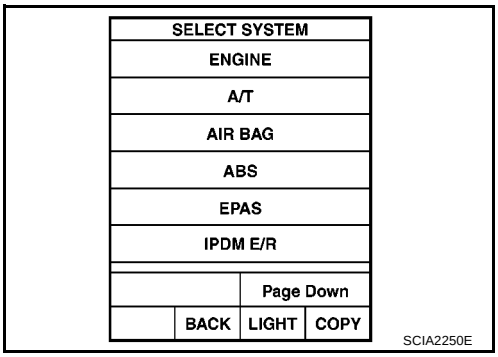
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: SHIFT SOLENOID/VB	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve B
: 5th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

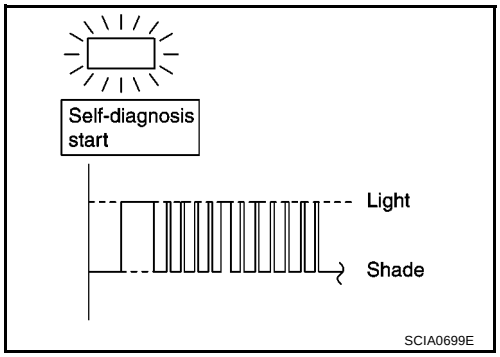
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3$ position.



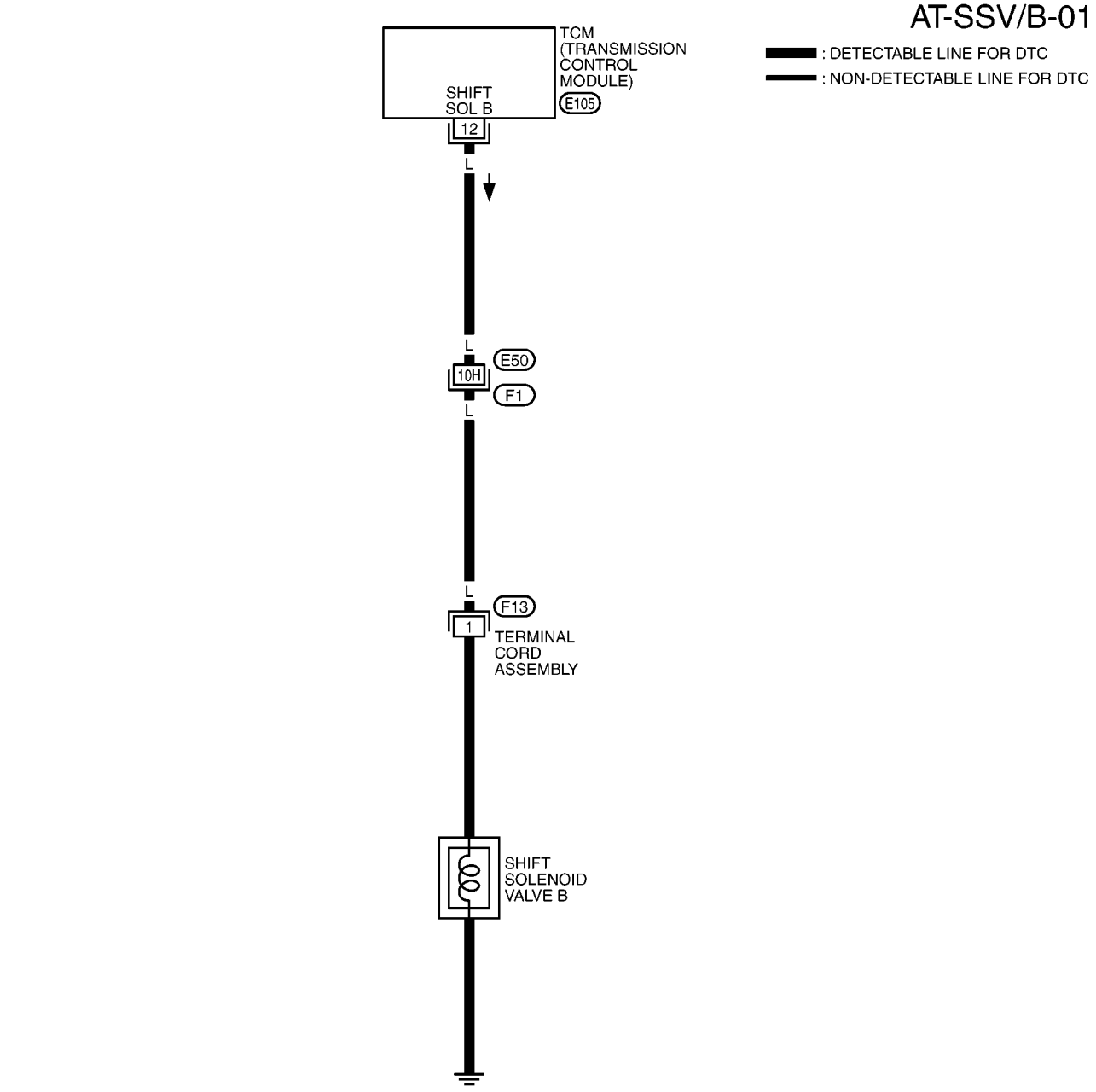
Without CONSULT-II

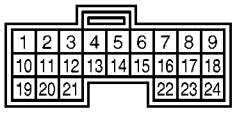
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3$ position.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .



Wiring Diagram — AT — SSV/B

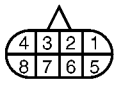
ECS008RV





E105
W

H.S.



F13
B

REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0082E

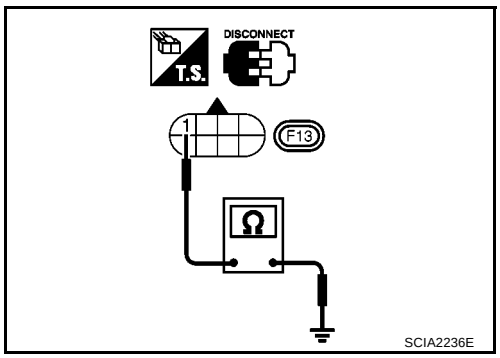
Diagnostic Procedure

ECS008RW

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 1 and ground.

Resistance : 5 - 20Ω



OK or NG

OK >> GO TO 2.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
Shift solenoid valve B
Refer to AT-384, "Component Inspection" .
Harness of terminal cord assembly for short or open

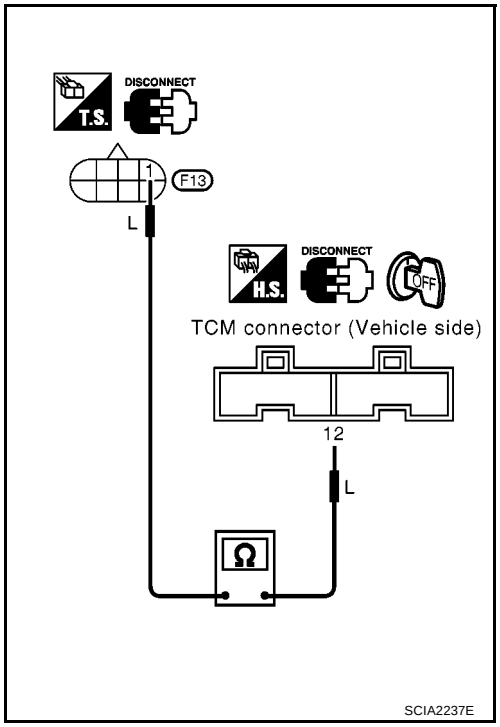
2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 12 and TCM harness connector terminal 1.

Continuity should exist.

If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.

3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-381, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008RX

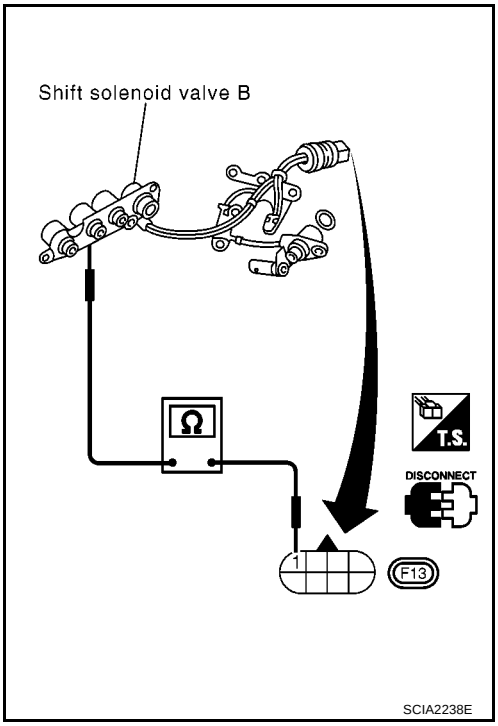
SHIFT SOLENOID VALVE B

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

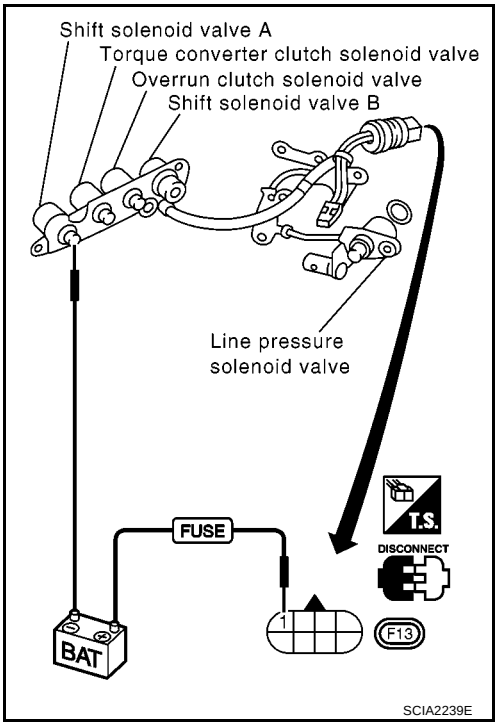
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



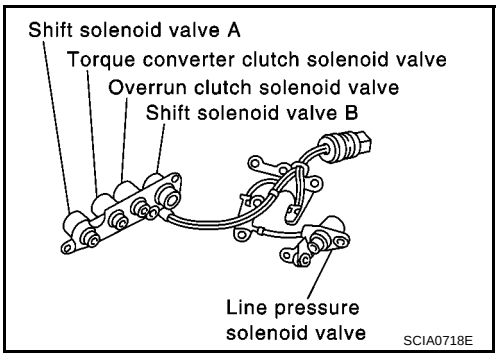
OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS008RY

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the inhibitor switch, overdrive control switch, vehicle speed and throttle position sensors. The overrun clutch operation will then be controlled.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
20	Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V

ON BOARD DIAGNOSIS LOGIC

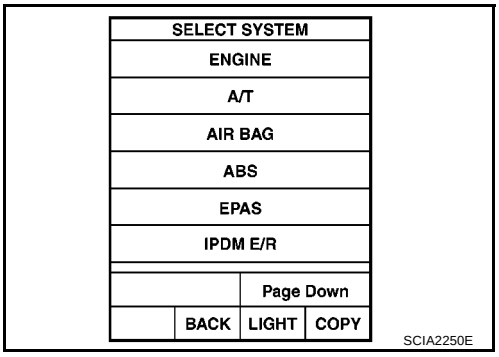
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: OVERRUN CLUTCH S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve
: 6th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

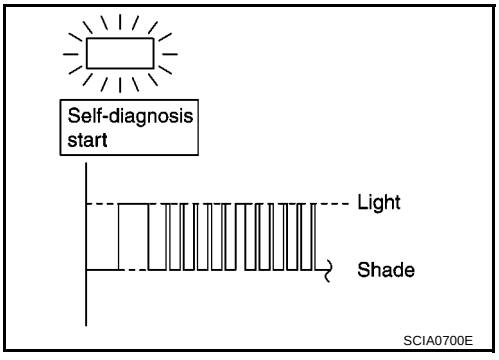
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position, overdrive control switch in “OFF” position and vehicle speed higher than 10 km/h (6 MPH).



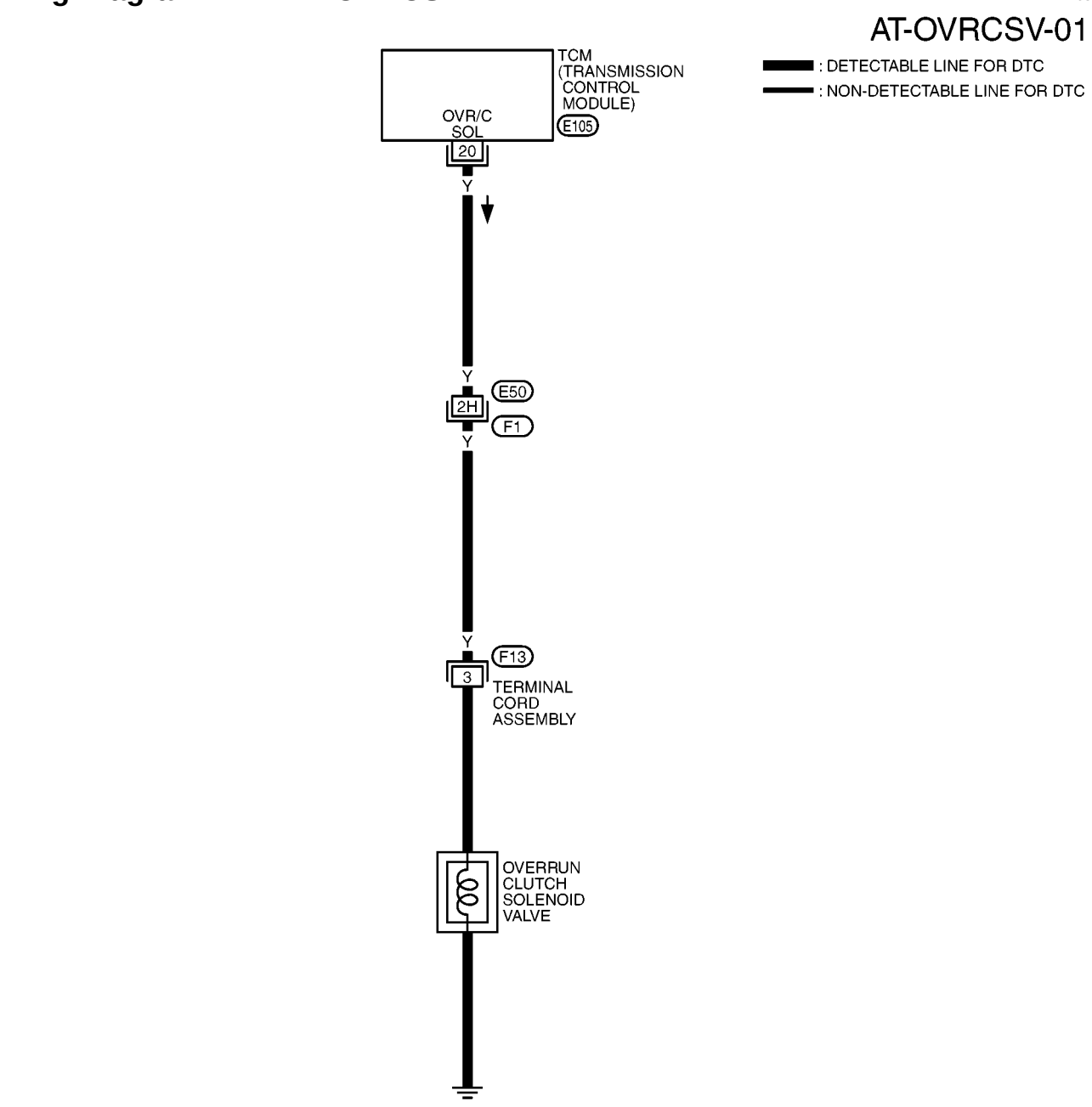
Without CONSULT-II

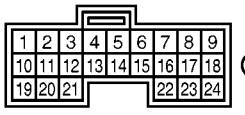
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position, overdrive control switch in “OFF” position and vehicle speed higher than 10 km/h (6 MPH).
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .



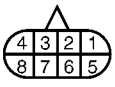
Wiring Diagram — AT — OVRCSV

ECS008RZ





E105
W



F13
B

REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0084E

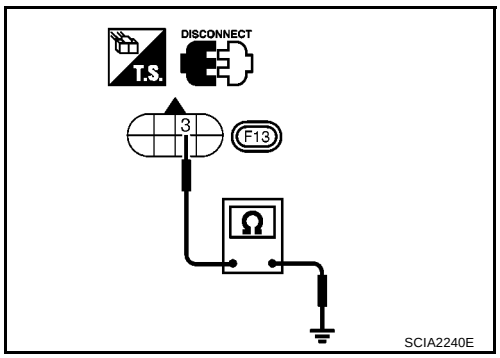
Diagnostic Procedure

ECS008S0

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 3 and ground.

Resistance : 20 - 30Ω



OK or NG

OK >> GO TO 2.
NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items:
Overrun clutch solenoid valve
Refer to AT-388, "Component Inspection" .
Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 3 and TCM harness connector terminal 20.

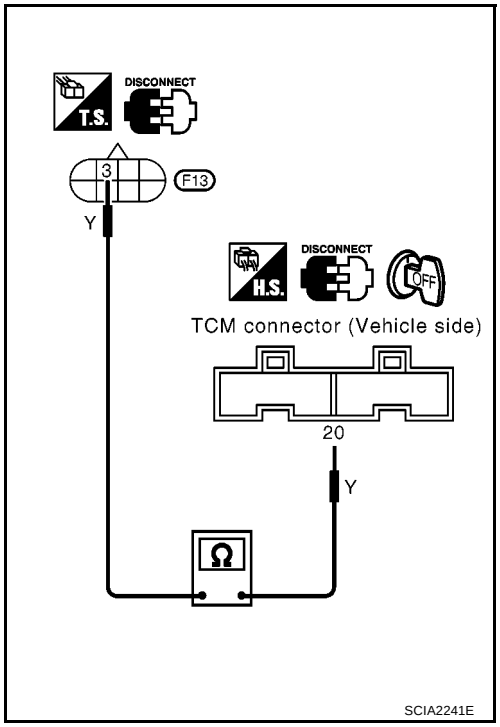
Continuity should exist.

If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-386, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008S1

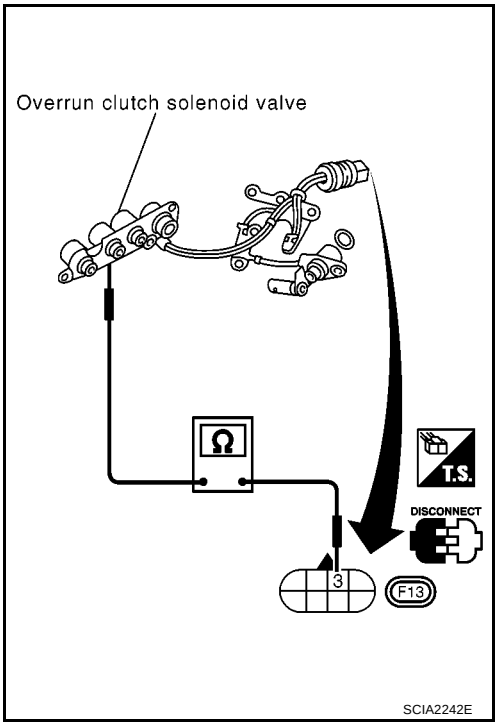
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

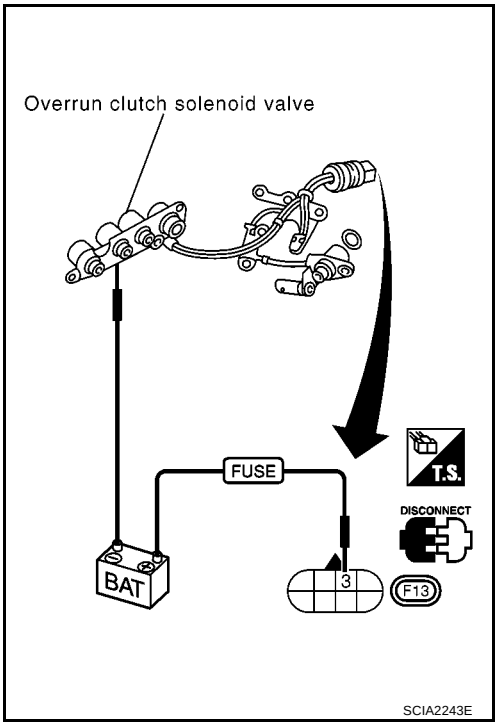
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



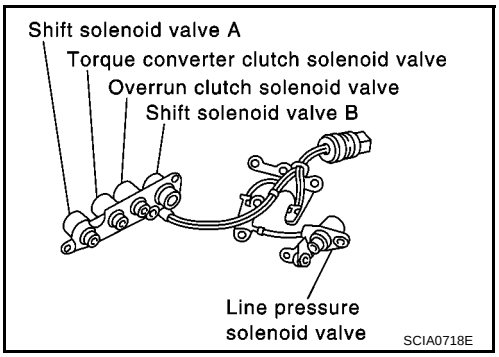
TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS008S2

The torque converter clutch solenoid valve is activated, with the gear in "D_4 ", by the TCM in response to signals sent from the vehicle speed and throttle position sensors. Lock-up piston operation will then be controlled.
Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓ Lock-up "ON"	Approximately 4% ↓ Approximately 94%

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
3	GY	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

ON BOARD DIAGNOSIS LOGIC

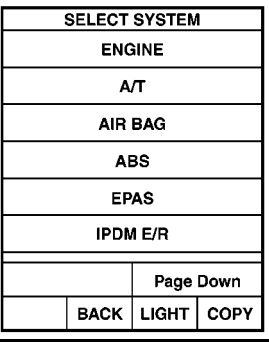
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: T/C CLUTCH SOL/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
: 7th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

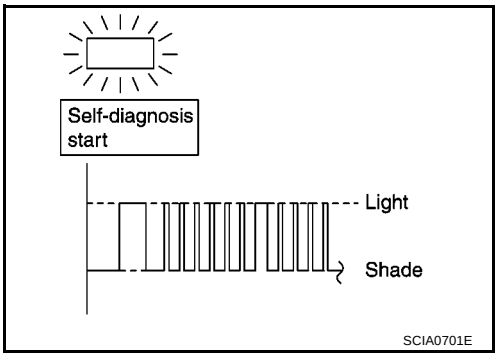
With CONSULT-II

1. Start engine.
2. Select "SELF-DIAG RESULTS" mode for A/T with CONSULT-II.
3. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.



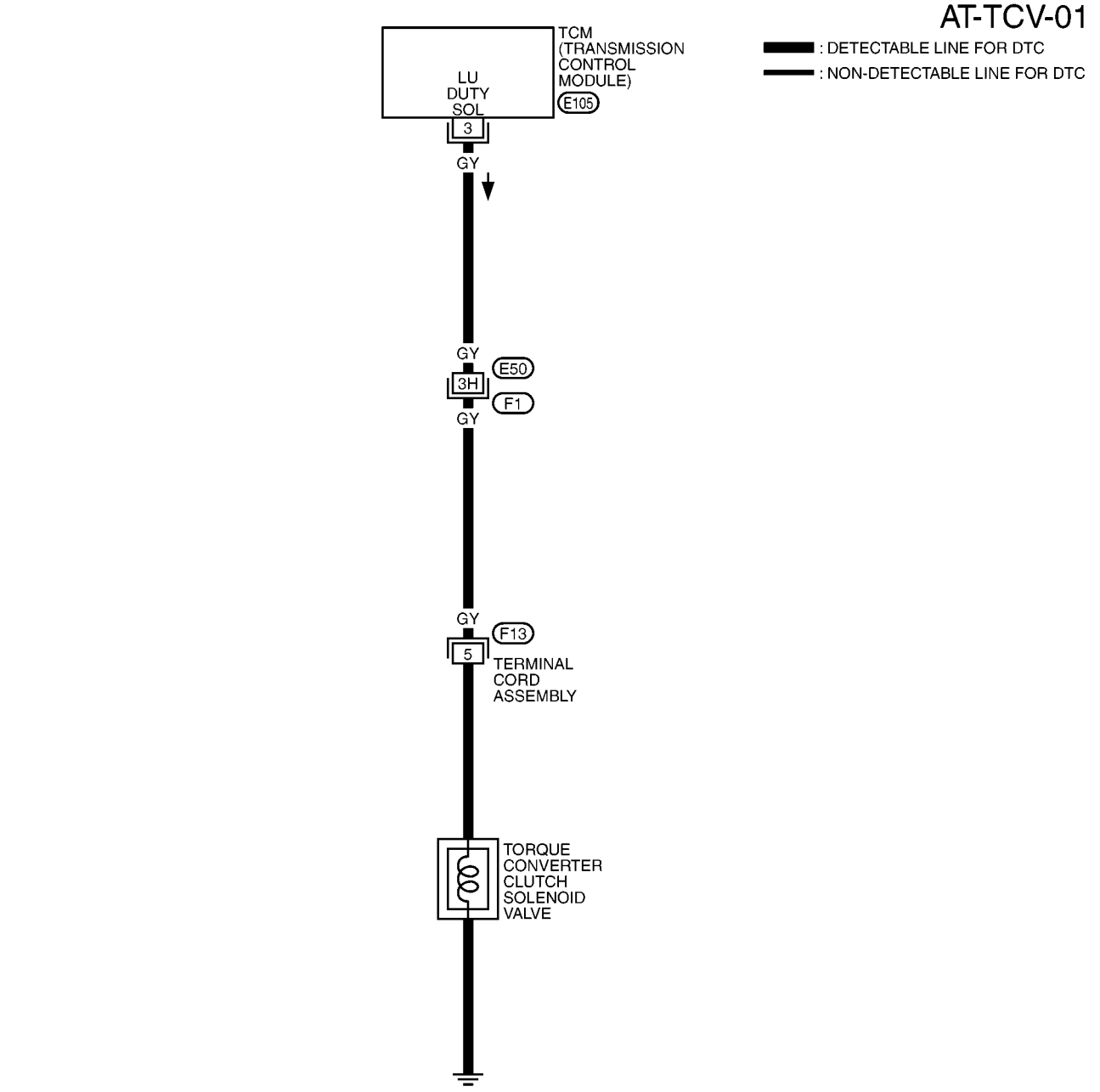
Without CONSULT-II

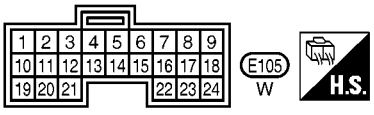
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

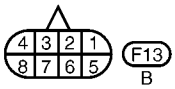


Wiring Diagram — AT — TCV

ECS008S3







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0079E

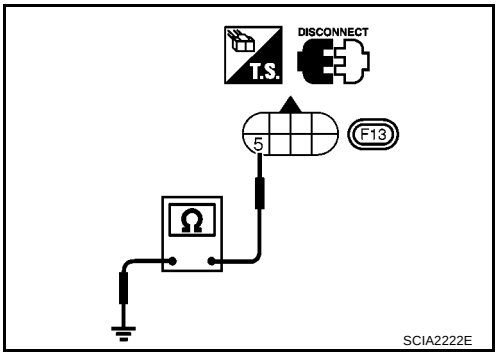
Diagnostic Procedure

ECS008S4

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 5 and ground.

Resistance: 5 - 20Ω



OK or NG

OK >> GO TO 2.
NG >> 1. Remove oil pan. Refer to AT-426, "REMOVAL" .
2. Check the following items:
Torque converter clutch solenoid valve
Refer to AT-393, "Component Inspection" .
Harness of terminal cord assembly for short or open

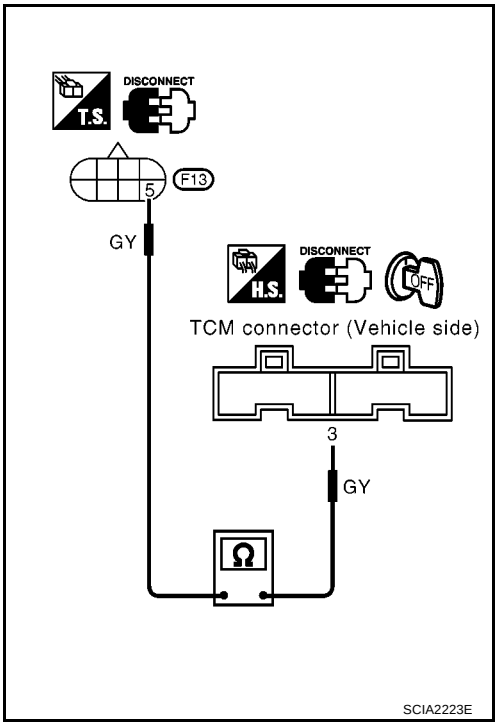
2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 5 and TCM harness connector terminal 3.

Continuity should exist.

If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.

3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-390, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008S5

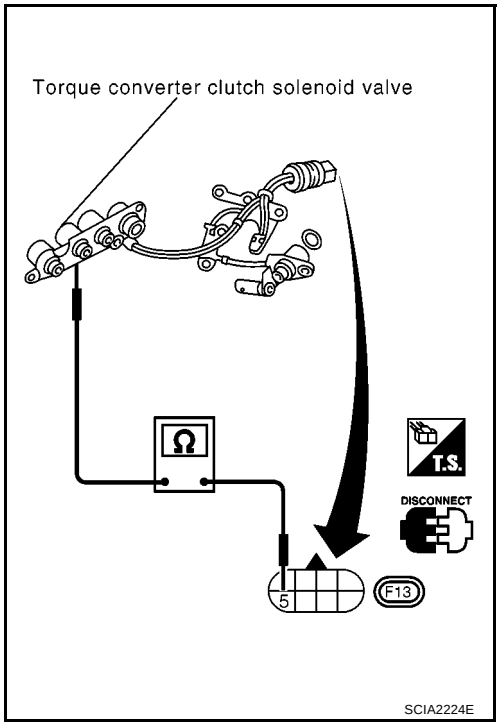
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

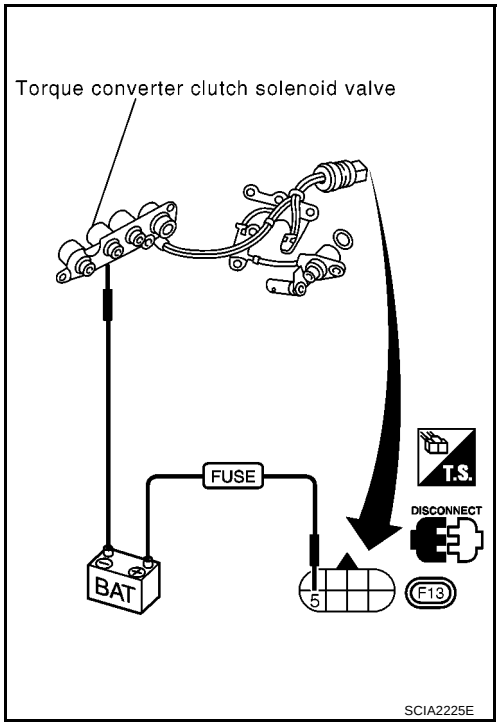
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



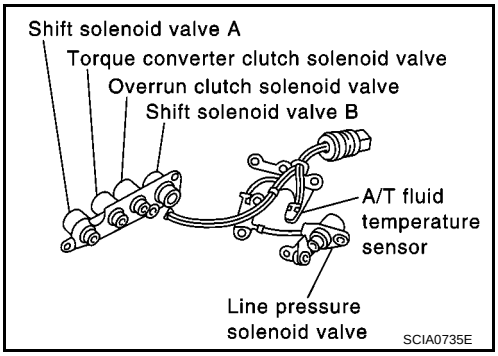
BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

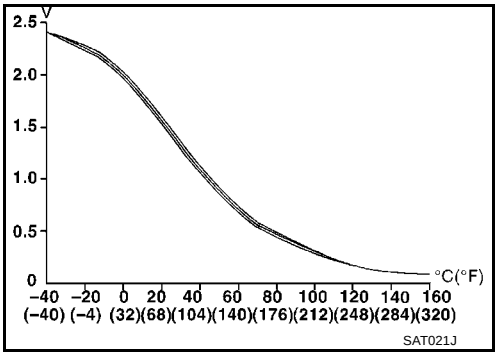
PFP:31940

Description

ECS008S6

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.





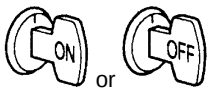
CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	G	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V
19	G	Power source		Same as No. 10	
28	GY	Power source (Memory back-up)	Always		Battery voltage
42	B	Ground (A/T fluid temperature sensor)	Always		0V
47	PU	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

ON BOARD DIAGNOSIS LOGIC

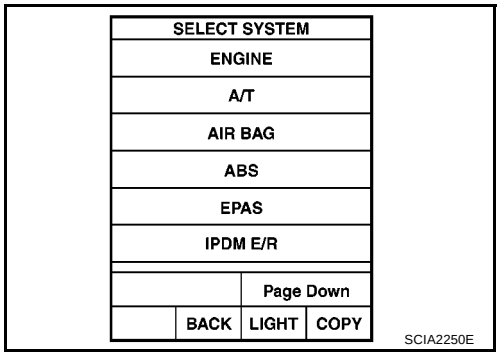
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: BATT/FLUID TEMP SEN	TCM receives an excessively low or high voltage from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor
: 8th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

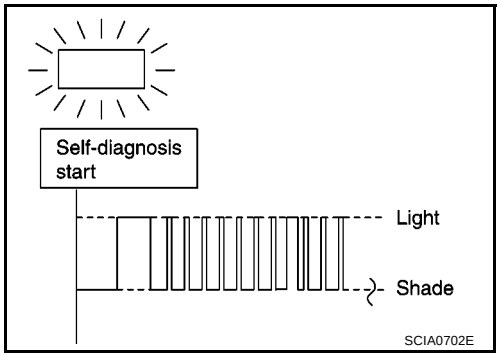
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full open position, engine speed higher than 450 rpm and driving for more than 10 minutes.



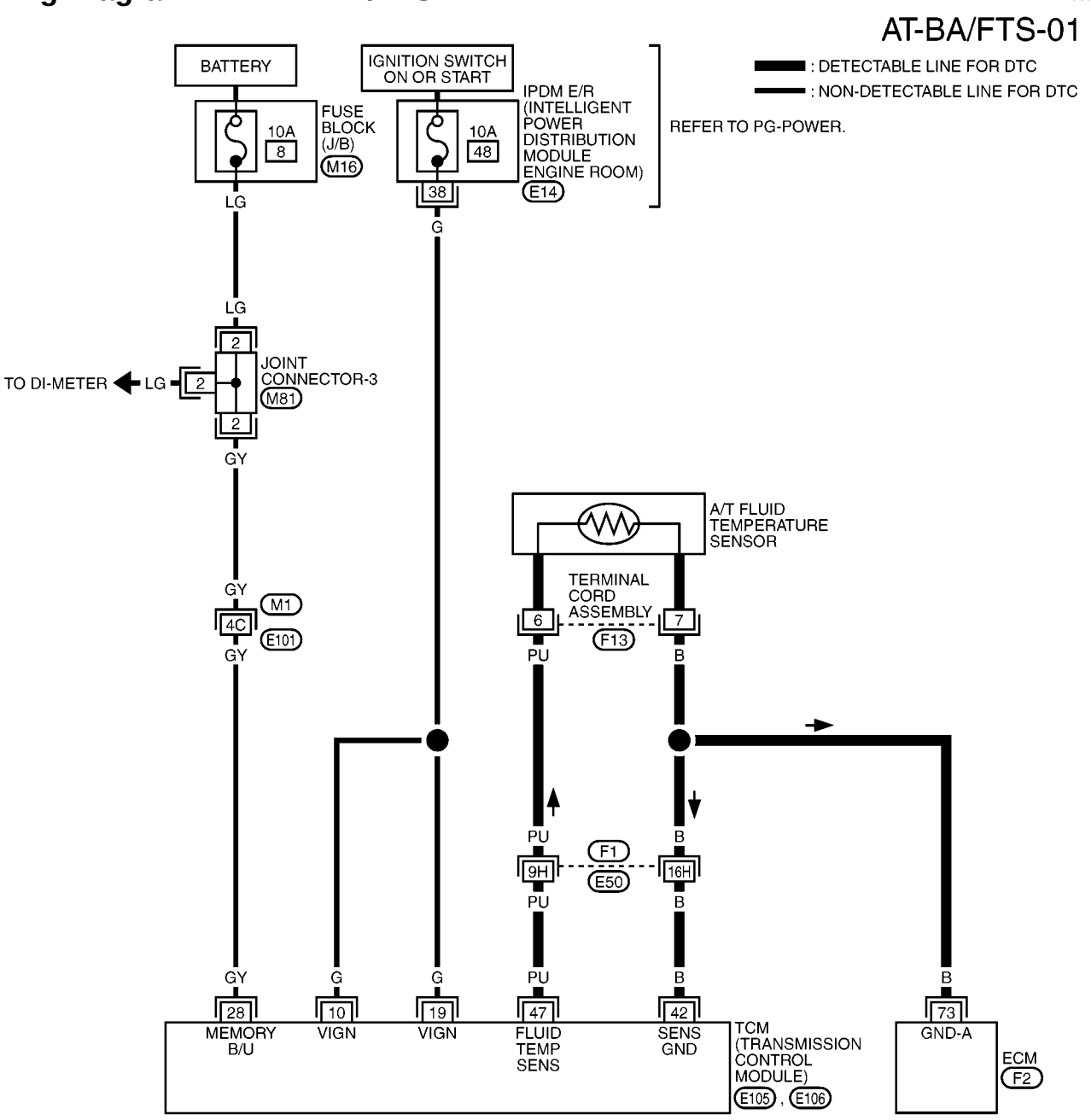
Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full open position, engine speed higher than 450 rpm and driving for more than 10 minutes.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .



Wiring Diagram — AT — BA/FTS

ECS008S7



MCWA0121E

Diagnostic Procedure

ECS008S8

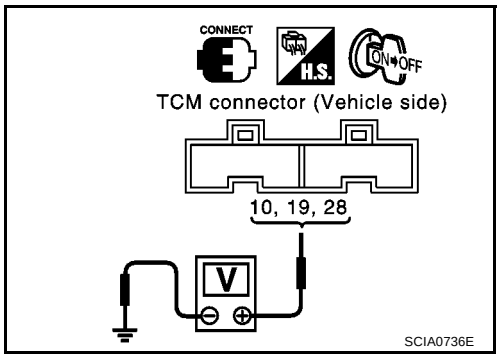
1. CHECK TCM POWER SOURCE

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage: Battery voltage

3. Turn ignition switch to “OFF” position.
4. Check voltage between TCM terminal 28 and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between battery, ignition switch and TCM
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING" .

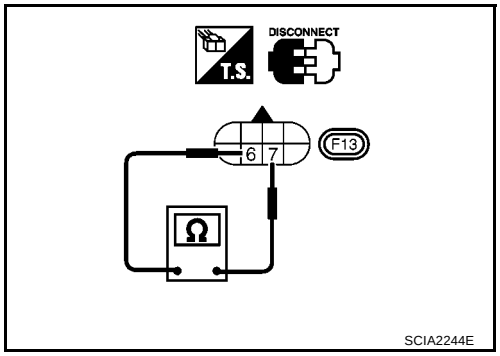
2. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold.

Resistance Cold[20°C(68°F)]

: Approximately 2.5 kΩ

4. Reinstall any part removed.



OK or NG

OK >> GO TO 3.

NG >> 1. Remove oil pan.

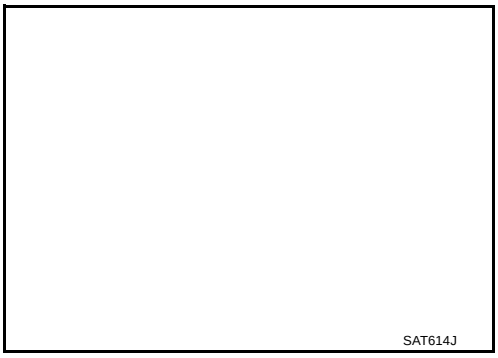
2. Check the following items. If any items are damaged, repair or replace damaged parts.
   A/T fluid temperature sensor
   Refer to AT-400, "Component Inspection" .
   Harness of terminal cord assembly for short or open

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

Voltage
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V→0.5V

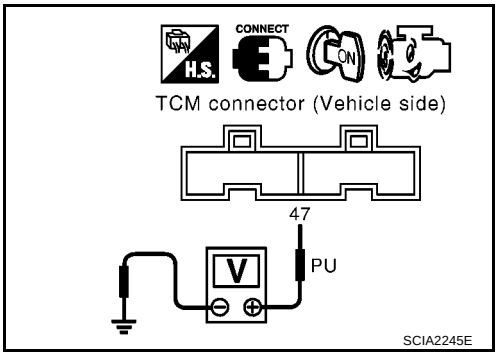


Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

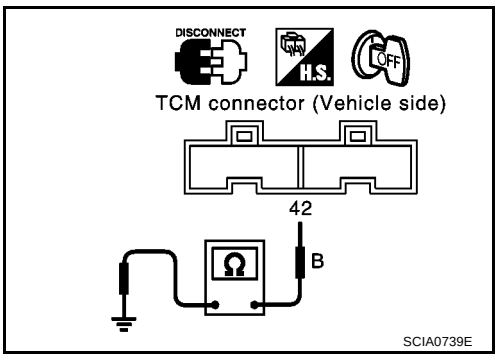
Voltage
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V→0.5V

3. Turn ignition switch to “OFF” position.
4. Disconnect TCM harness connector.



5. Check resistance between terminal 42 and ground.

Continuity should exist.



OK or NG

OK >> GO TO 4.
NG >> Check the following item. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to EC-289, "DTC P1065 ECM POWER SUPPLY" .

4. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-396, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

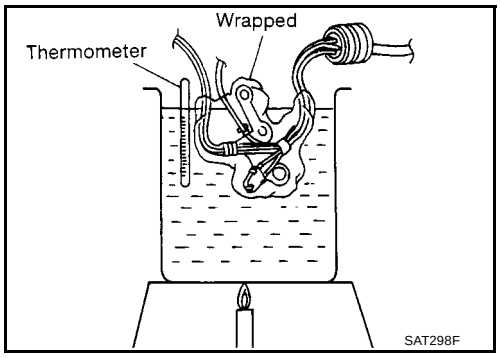
Component Inspection

ECS008S9

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-426, "REMOVAL" .
- Check resistance between two terminals while changing temperature as shown in the figure.

Temperature °C (°F)	Resistance
20 (68)	Approximately 2.5 kΩ
80 (176)	Approximately 0.3 kΩ



ENGINE SPEED SIGNAL

PFP:24825

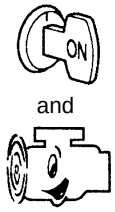
Description

ECS008SA

The engine speed signal is sent from the ECM to the TCM.

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	L	Engine speed signal	 and	—	Refer to EC-94, "ECM INSPECTION TABLE"

ON BOARD DIAGNOSIS LOGIC

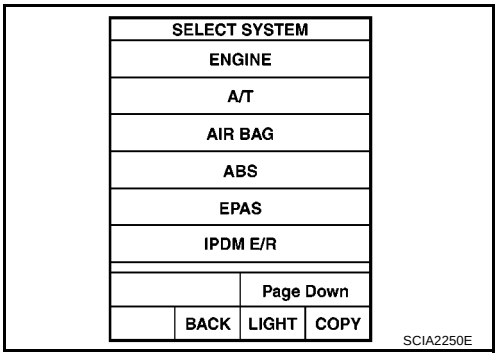
Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
: ENGINE SPEED SIG : 9th judgement flicker	TCM does not receive the proper voltage signal from ECM.	● Harness or connectors (The sensor circuit is open or shorted.)

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

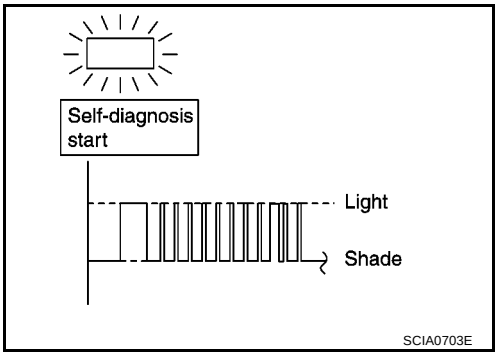
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 10 seconds.



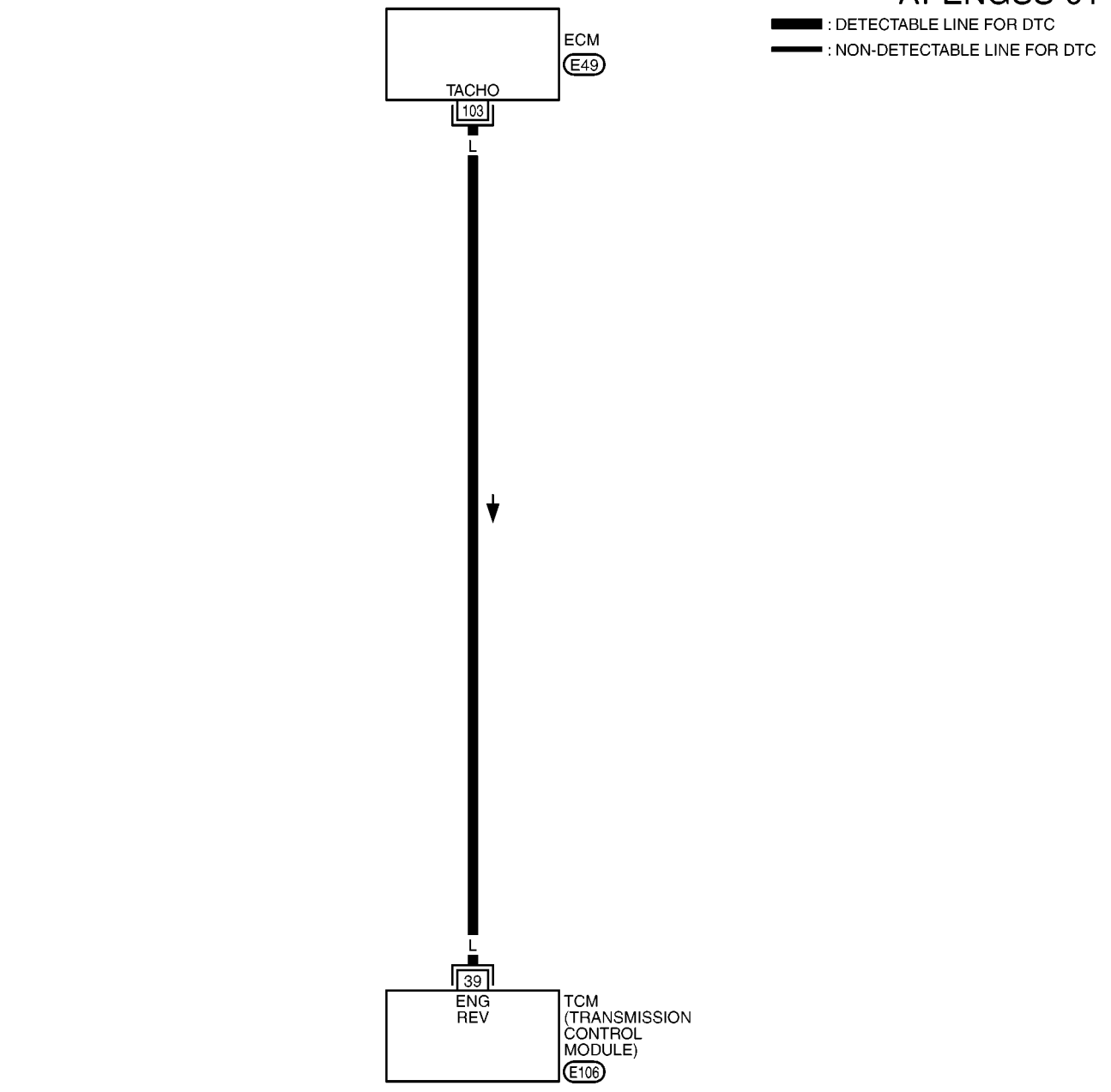
Without CONSULT-II

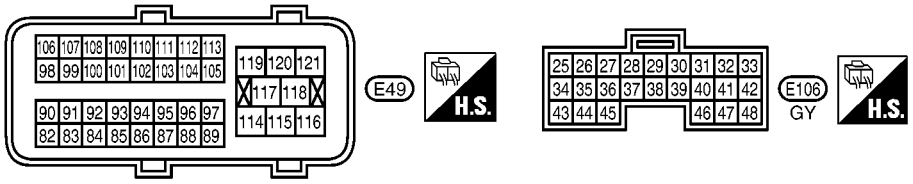
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 10 seconds.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .



Wiring Diagram — AT — ENGSS

ECS008SB





MCWA0074E

Diagnostic Procedure

ECS008SC

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

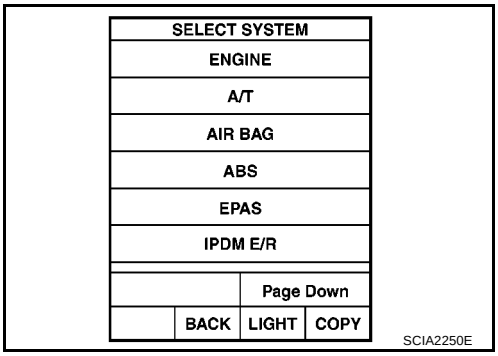
OK or NG

OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to EC-435, "IGNITION SIGNAL" .

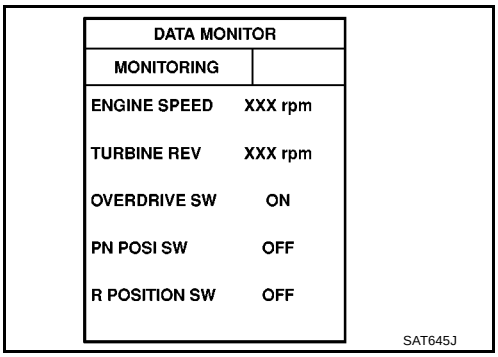
2. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM terminal 39 and ground.

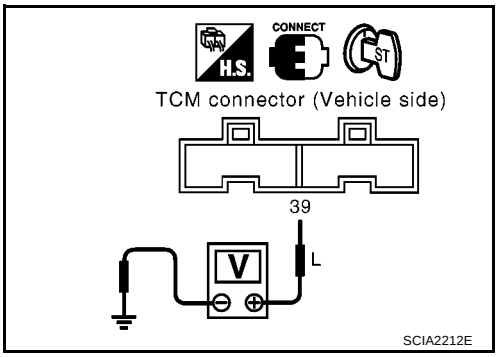
Voltage (Idle speed):

Refer to EC-94, "ECM INSPECTION TABLE" .

OK or NG

OK >> GO TO 3.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-435, "IGNITION SIGNAL" .



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-401, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

LINE PRESSURE SOLENOID VALVE

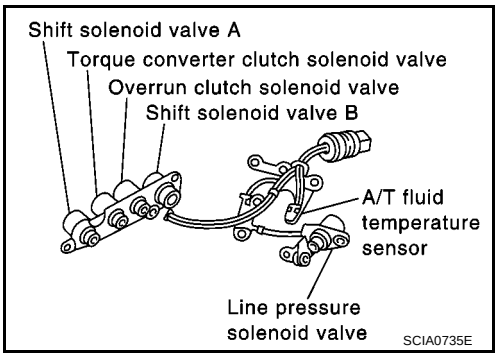
PFP:31940

Description

ECS008SD

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

The line pressure duty cycle value is not consistent when the closed throttle position switch is “ON”. To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is “OFF”.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

NOTE:

The line pressure duty cycle value is not consistent when the closed throttle position switch is “ON”. To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is “OFF”.

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	PU	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BP	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

ON BOARD DIAGNOSIS LOGIC

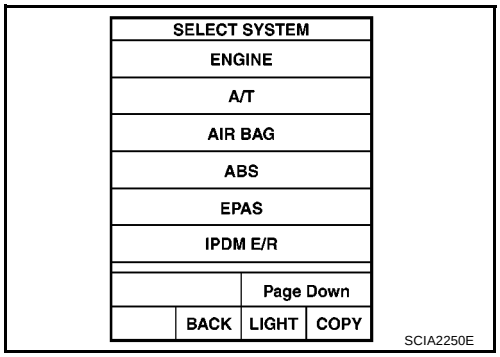
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: LINE PRESSURE S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Line pressure solenoid valve
: 10th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

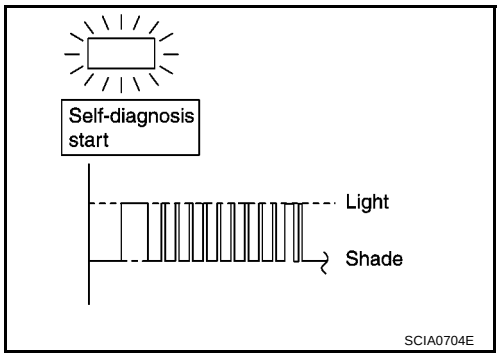
With CONSULT-II

1. Start engine.
2. Select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
3. With brake pedal depressed, shift the lever from “P” → “N” → “D” → “N” → “P” positions.



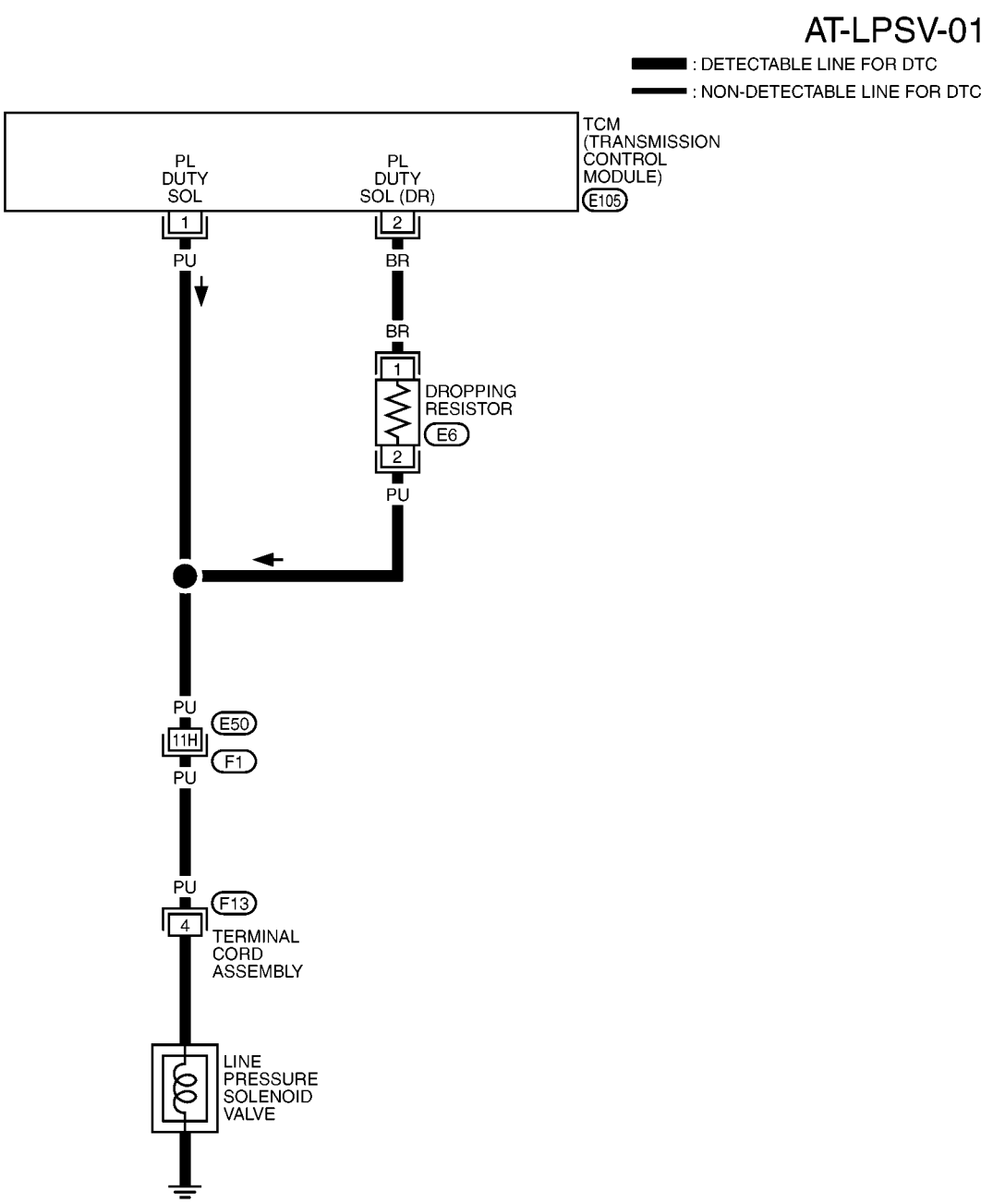
Without CONSULT-II

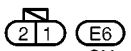
1. Start engine.
2. With brake pedal depressed, shift the lever from “P” → “N” → “D” → “N” → “P” positions.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

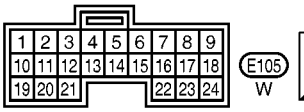


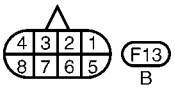
Wiring Diagram — AT — LPSV

ECS008SE









REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0080E

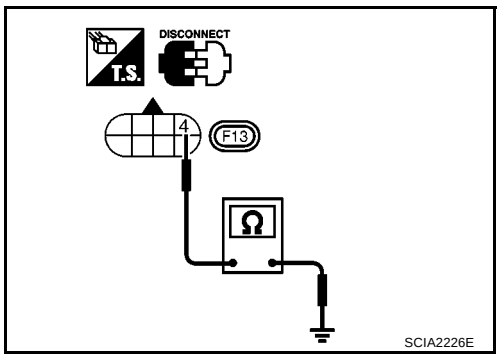
Diagnostic Procedure

ECS008SF

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to “OFF” position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 4 and ground.

Resistance: 2.5 - 5Ω



OK or NG

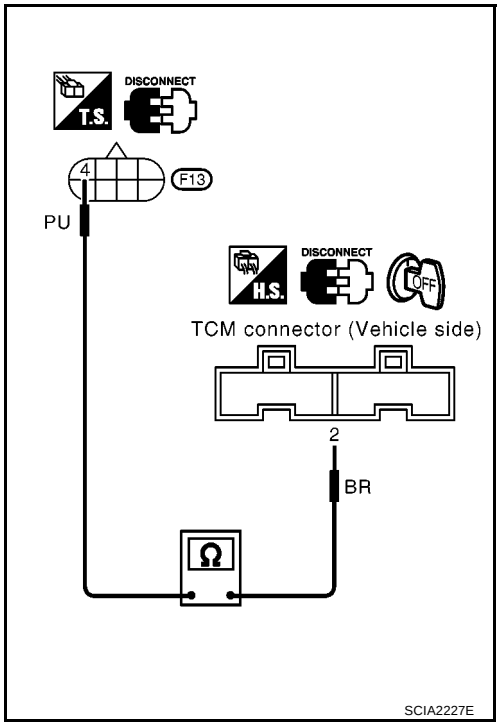
OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to AT-426, "REMOVAL" .
2. Check the following items. If any items are damaged, repair or replace damaged parts.
- Line pressure solenoid valve
  Refer to AT-410, "Component Inspection" .
- Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal 4 and TCM harness connector terminal 2.

Resistance: 10 - 15Ω



OK or NG

OK >> GO TO 3.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.
- Dropping resistor
  Refer to AT-410, "Component Inspection" .
- Harness for short or open between TCM terminal 2 and terminal cord assembly

3. CHECK POWER SOURCE CIRCUIT

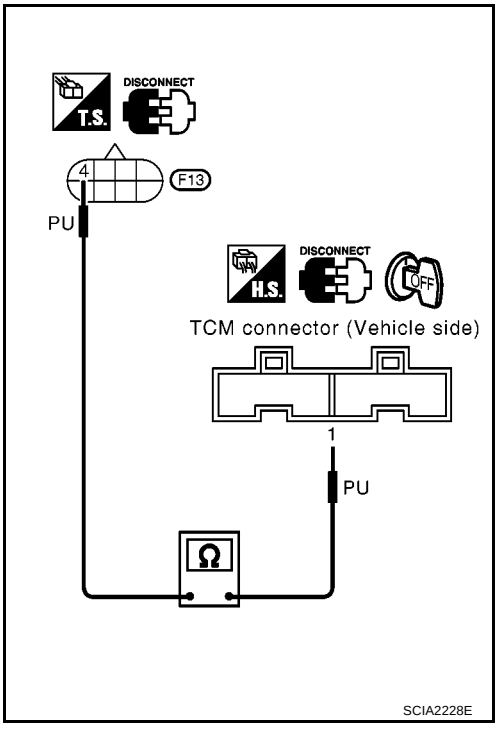
1. Turn ignition switch to “OFF” position.
2. Check resistance between terminal 4 and TCM harness connector terminal 1.

   Resistance: Approx. 0Ω

   If OK, check harness for short to ground and short to power.
3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



4. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to AT-405, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection

ECS008SG

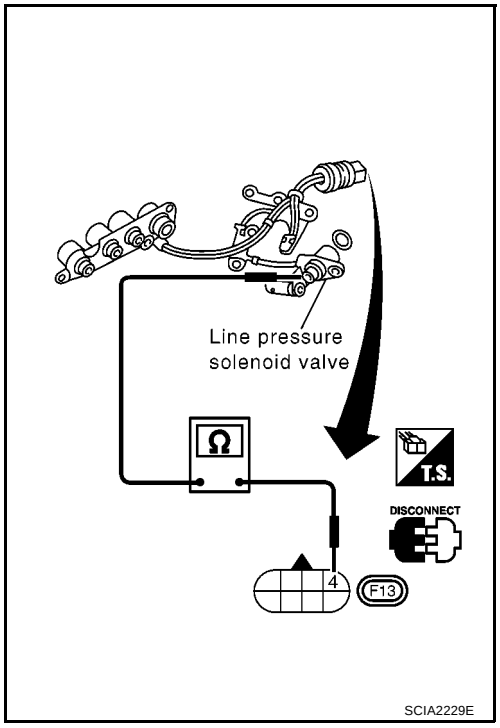
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-426, "REMOVAL" .

Resistance Check

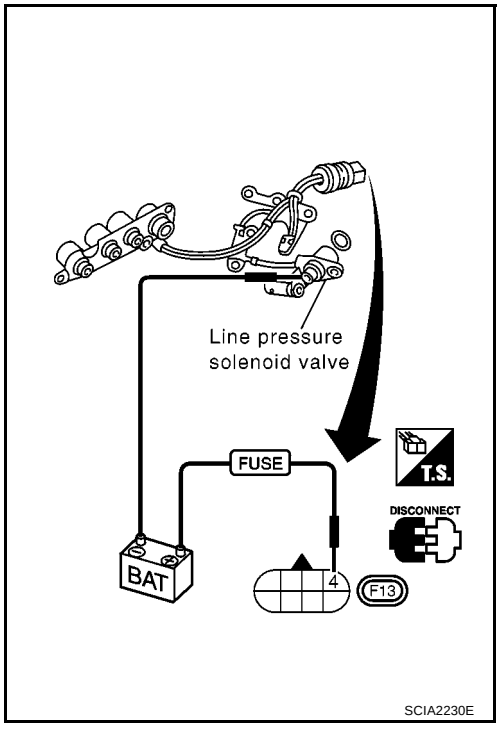
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω



Operation Check

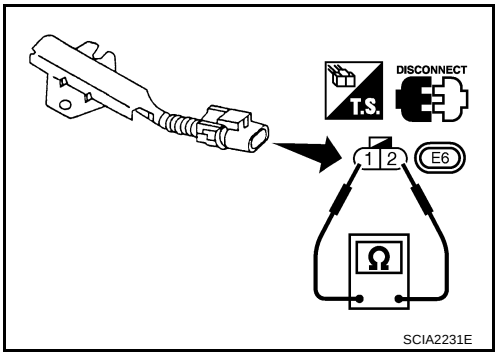
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between two terminals.

Resistance: 10 - 15Ω



CAN COMMUNICATION LINE

PFP:31940

Description

ECS008SH

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	R	CAN-H (high)	—	—
6	W	CAN-L (low)	—	—

On Board Diagnosis Logic

ECS008SI

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: CAN COMM CIRCUIT	When a malfunction is detected in CAN communication line.	● Harness or connectors (CAN communication line is open or shorted.)
: 11th judgement flicker		

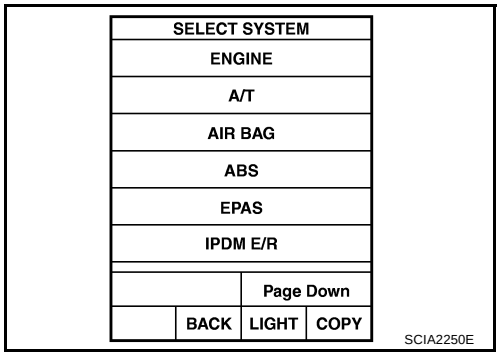
Self-Diagnosis Code Confirmation Procedure

ECS008SJ

After the repair, perform the following procedure to confirm the malfunction is eliminated.

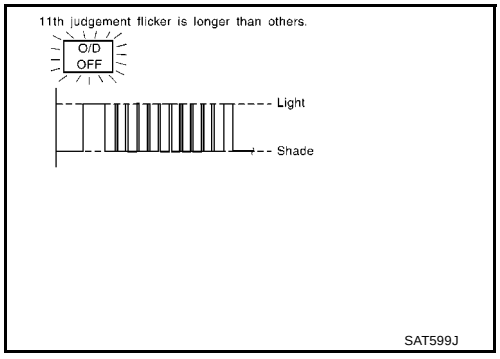
WITH CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Wait at least 6 seconds or start engine and wait for at least 6 seconds.



WITHOUT CONSULT-II

1. Turn ignition switch “ON”.
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis.
   Refer to AT-257, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .

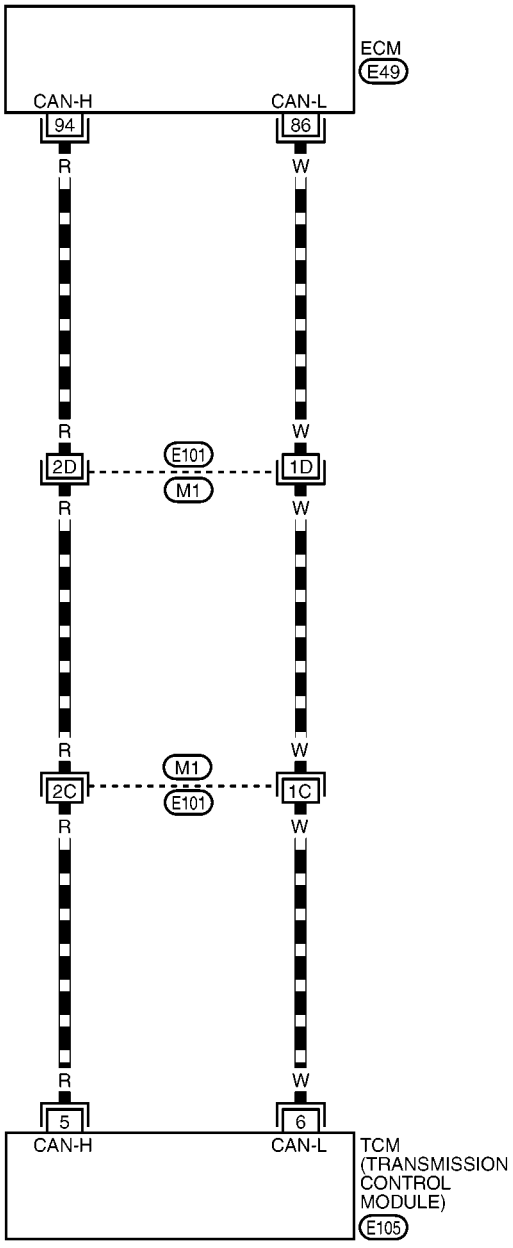


Wiring Diagram — AT — CAN

ECS008SK

AT-CAN-01

: DATA LINE



REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MCWA0085E

Diagnostic Procedure

ECS008SL

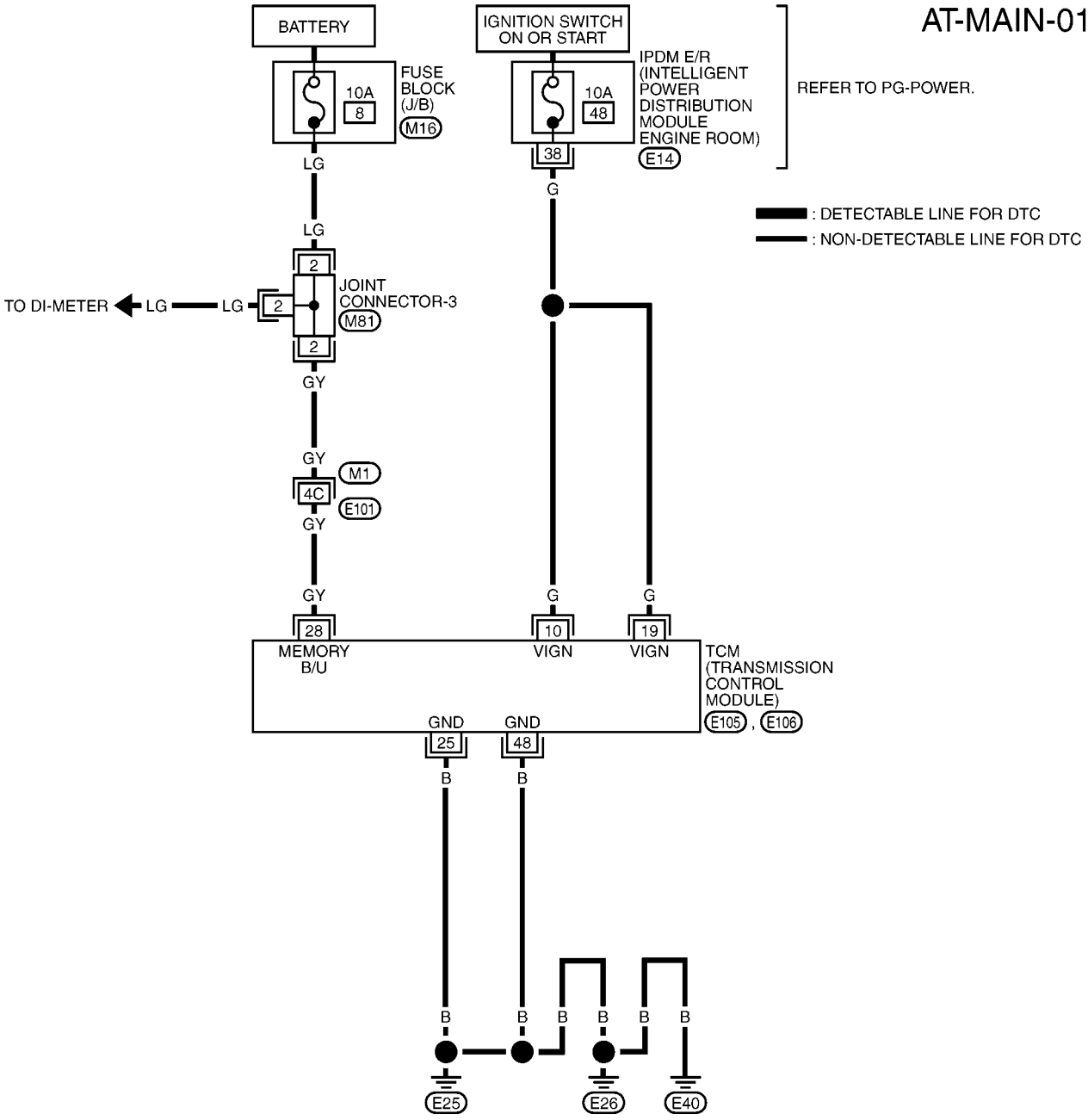
Go to LAN-6, "CAN COMMUNICATION" .

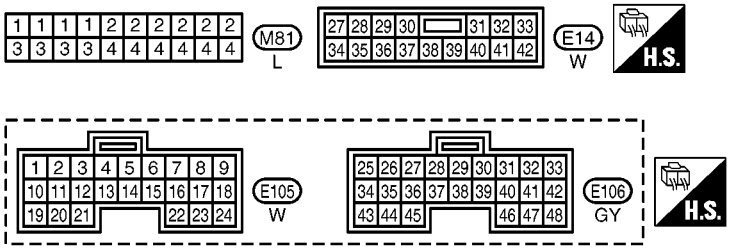
MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:00100

Wiring Diagram — AT — MAIN

ECS008RF



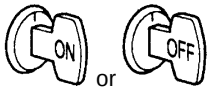
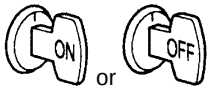


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0124E

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	G	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V
19	G	Power source		Same as No. 10	
25	B	Ground	Always		0V
28	GY	Power source (Memory back-up)		When turning ignition switch to “OFF”.	Battery voltage
				When turning ignition switch to “ON”.	Battery voltage
48	B	Ground	Always		0V

Diagnostic Procedure

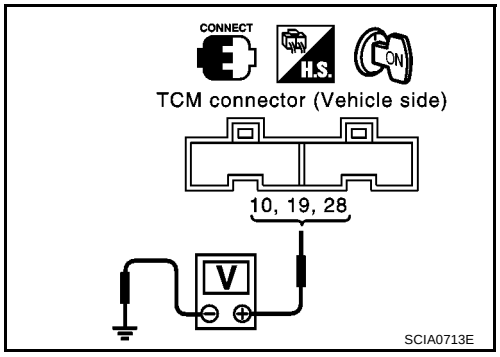
ECS008RG

1. CHECK TCM POWER SOURCE STEP 1

1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

OK or NG

OK >> GO TO 2
NG >> GO TO 3

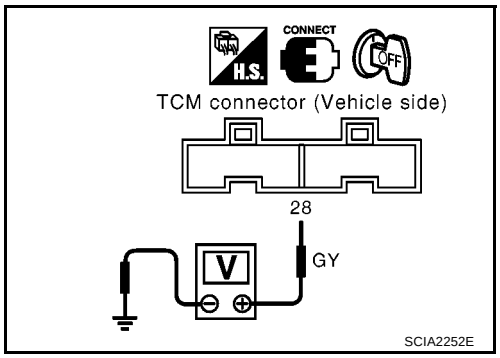


2. CHECK TCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM terminal 28 and ground.

OK or NG

OK >> GO TO 4
NG >> GO TO 3



3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between fuse and TCM terminals 10, 19 and 28
- Fuse
- Ignition switch
  Refer to PG-4, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 4
NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground. Refer to wiring diagram — AT — MAIN.

   Continuity should exist.

   If OK, check harness for short to ground and short to power.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.

A/T SHIFT LOCK SYSTEM

PFP:34950

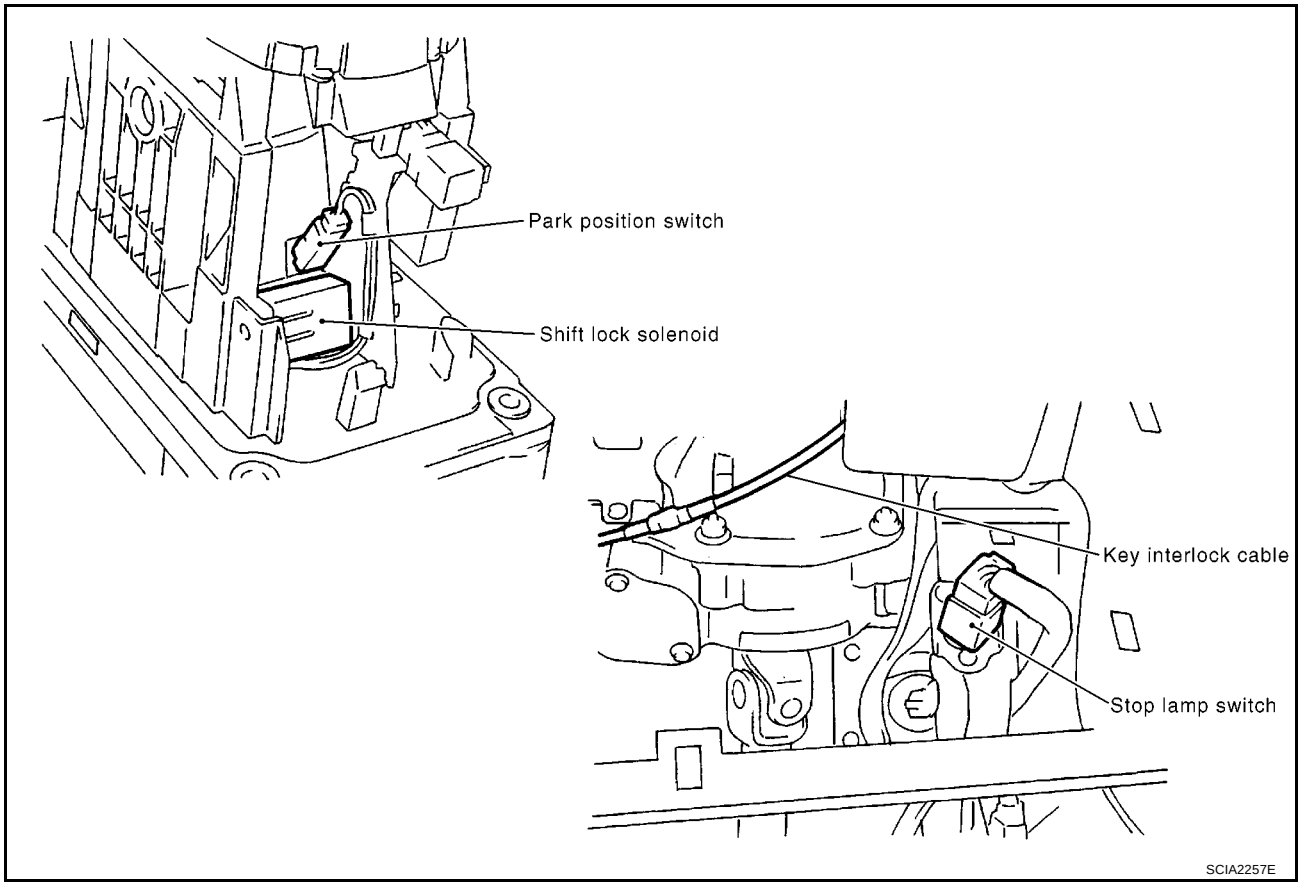
Description

ECS008HO

- The mechanical key interlock mechanism also operates as a shift lock:
  With the key switch turned to ON, the selector lever cannot be shifted from “P” (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from “P” to any other position.
  The key cannot be removed unless the selector lever is placed in “P”.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

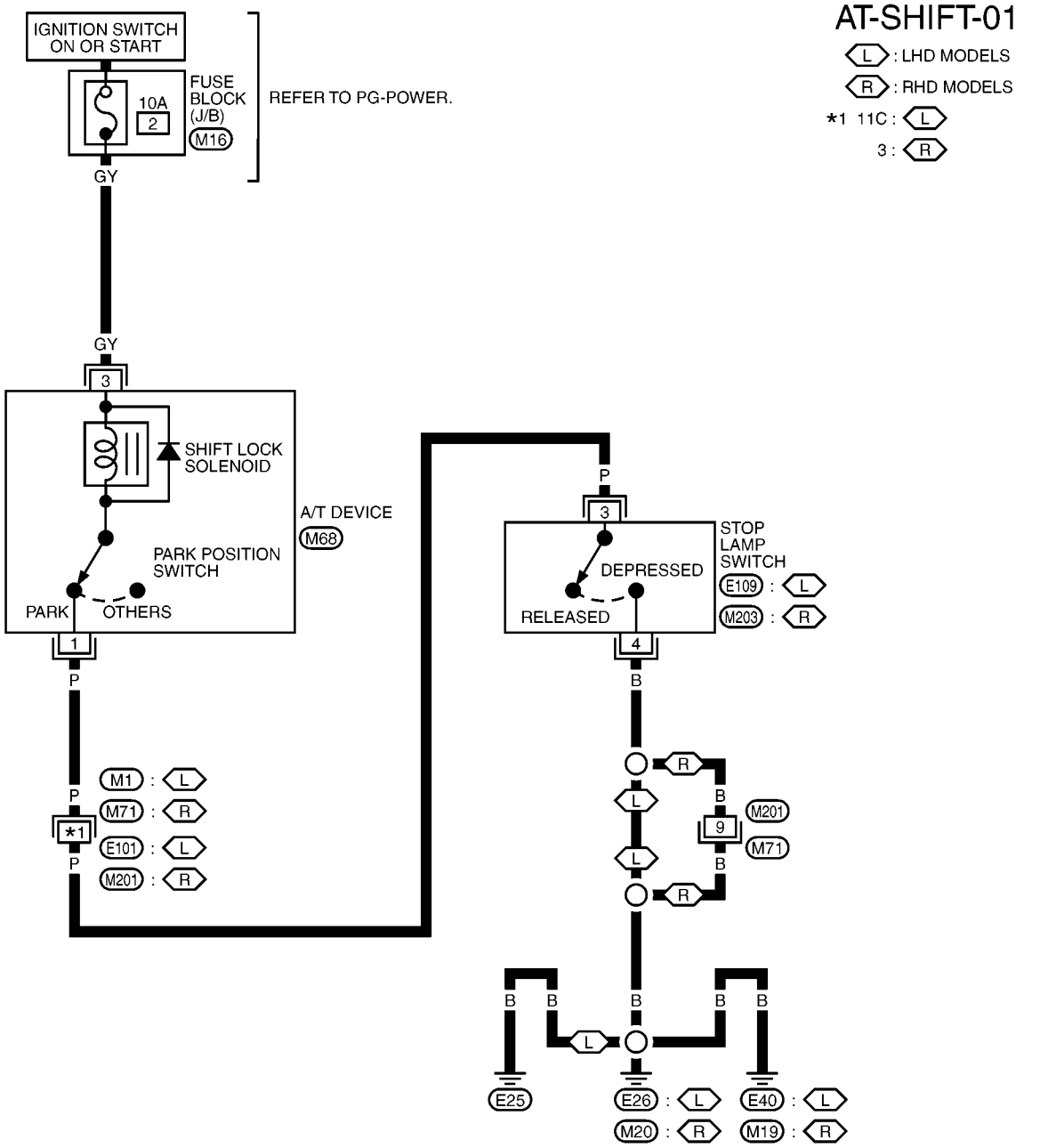
Shift Lock System Electrical Parts Location

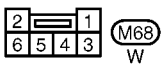
ECS008HP

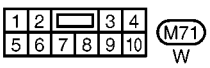


Wiring Diagram — AT — SHIFT

ECS008HQ







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MCWA0091E

Diagnostic Procedure

ECS008HR

SYMPTOM 1:

- **Selector lever cannot be moved from “P” position with key in ON position and brake pedal applied.**
- **Selector lever can be moved from “P” position with key in ON position and brake pedal released.**
- **Selector lever can be moved from “P” position when key is removed from key cylinder.**

SYMPTOM 2:

Ignition key cannot be removed when selector lever is set to “P” position. It can be removed when selector lever is set to any position except “P”.

1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2
NG >> Repair key interlock cable. Refer to AT-423, "KEY INTERLOCK CABLE" .

2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

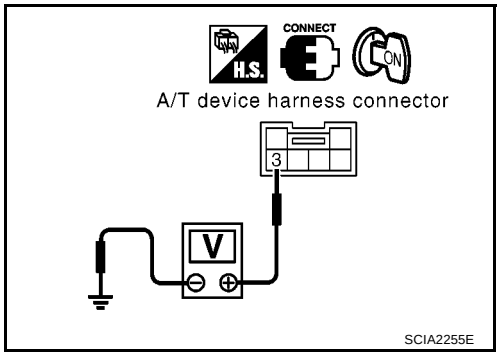
OK or NG

OK >> GO TO 3
NG >> Check selector lever. Refer to AT-428, "Park/Neutral Position (PNP) Switch Adjustment" .

3. CHECK POWER SOURCE

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Check the voltage between A/T device harness connector M68 terminal 3 (G/Y) and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

Check the following items:

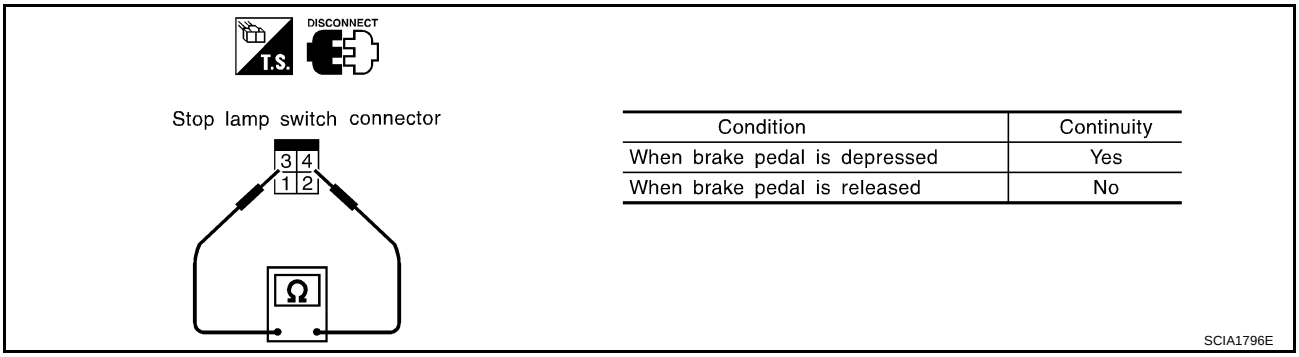
1. Harness for short or open between fuse and A/T device harness terminal 3
2. 10A fuse [No.2, located in the fuse block (J/B)]
3. Ignition switch (Refer to PG-4, "POWER SUPPLY ROUTING" .)

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK STOP LAMP SWITCH

1. Turn ignition switch to “OFF” position.
2. Disconnect stop lamp switch connector.
3. Check continuity between stop lamp switch connector LHD:E109, RHD:M203 terminals 3 (P) and 4 (B).



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal — refer to **BR-6, "BRAKE PEDAL"** .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK GROUND CIRCUIT

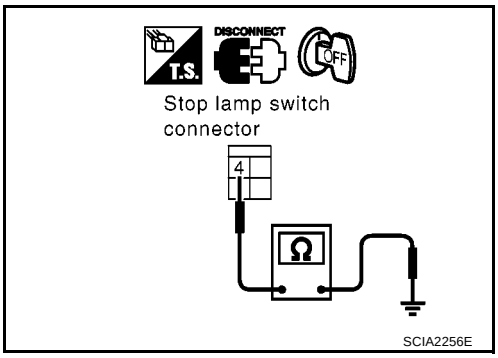
1. Check continuity between stop lamp switch connector LHD:E109, RHD:M203 terminal 4 (B) and ground.

   Continuity should exist.

   If OK, check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace open circuit or short to ground or short to power in harness or connectors.



7. CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Connect stop lampswitch harness connector.
2. Turn ignition switch to “ON” position. (Do not start engine.)
3. Selector lever is set in “P” position.
4. Check shift lock solenoid and park position switch operation.

Condition	Brake pedal	Operation
When ignition switch is turned to “ON” position and selector lever is set in “P” position.	Depressed	Yes
	Released	No

OK or NG

OK >> INSPECTION END
NG >> GO TO 8.

8. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between stop lamp switch connector LHD:E109, RHD:M203 terminal 3 (P) and A/T device harness connector M68 terminal 1 (P).

OK or NG

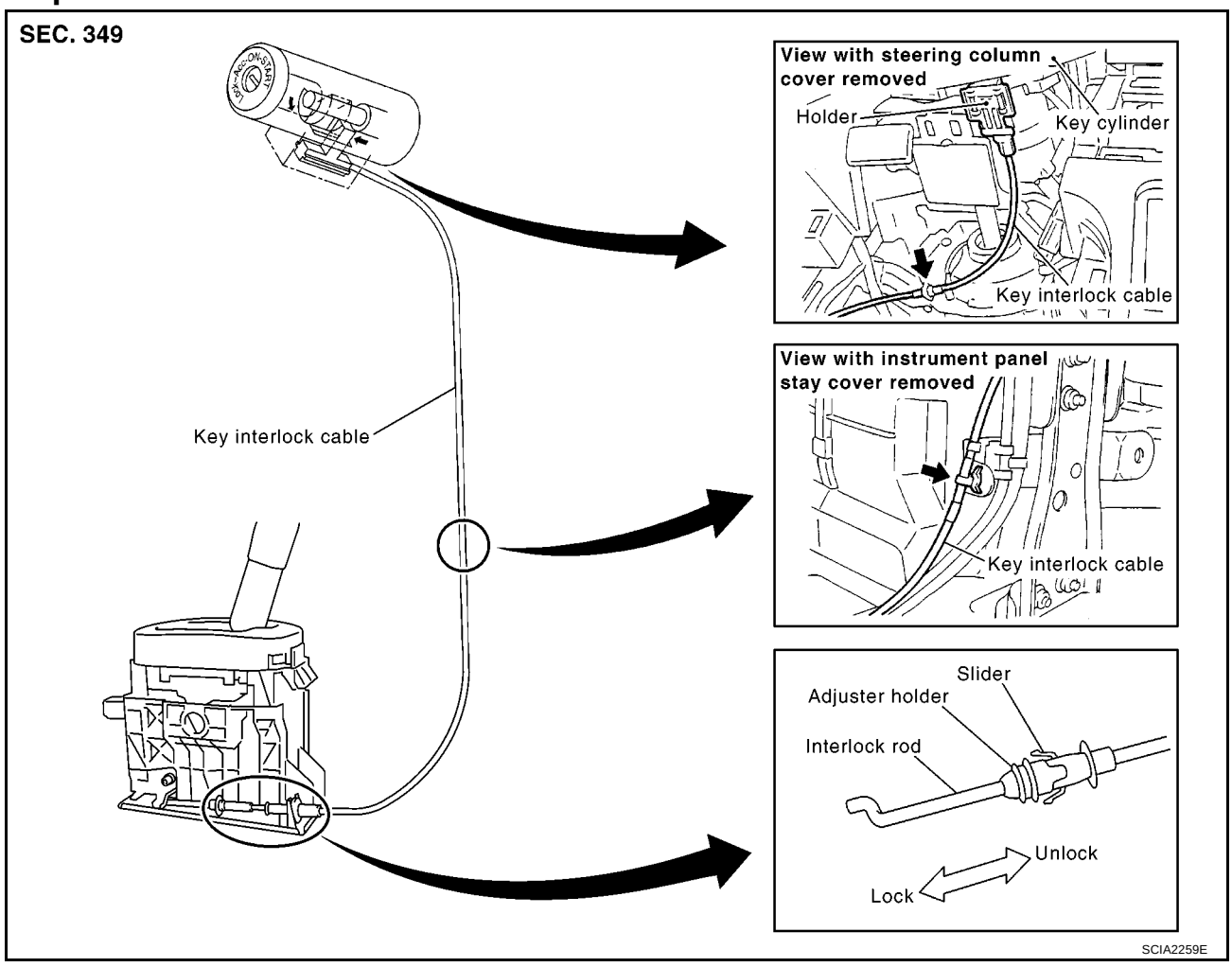
OK >> Replace shift lock solenoid or park position switch.
NG >> Repair or replace damaged parts.

KEY INTERLOCK CABLE

PFP:34908

Components

ECS008HS



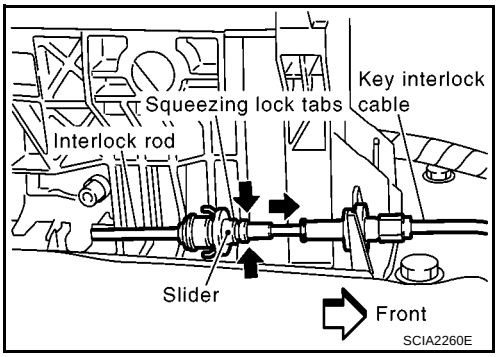
CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions.**

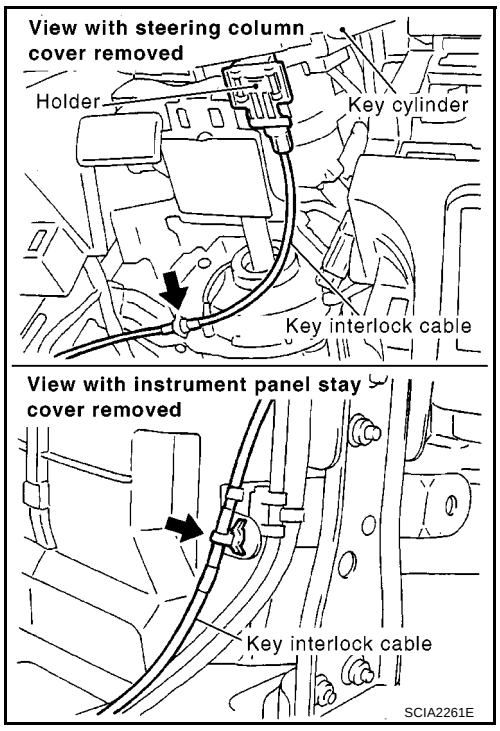
Removal

ECS008SY

1. Unlock slider by squeezing lock tabs on slider from adjuster holder.
2. Remove casing cap from bracket of control device and remove interlock rod from cable.



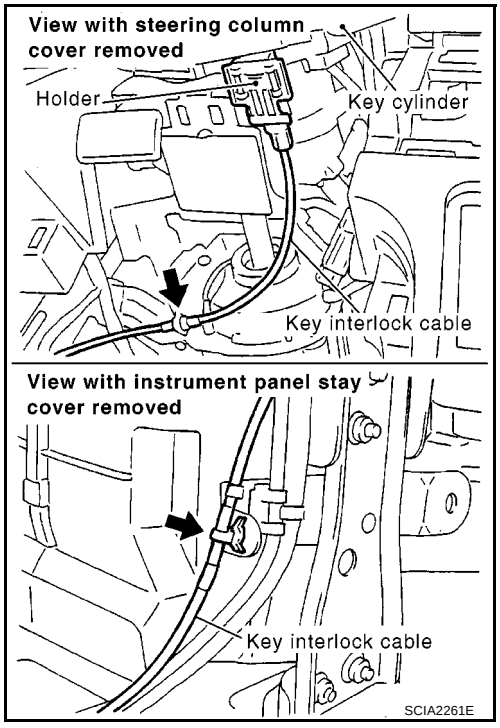
3. Remove holder from key cylinder and remove key interlock cable.



Installation

ECS008SZ

1. Set key interlock cable to key cylinder and install holder.
2. Clamp cable and fix to control cable with band.
3. Turn ignition key to lock position.
4. Set selector lever to P position.

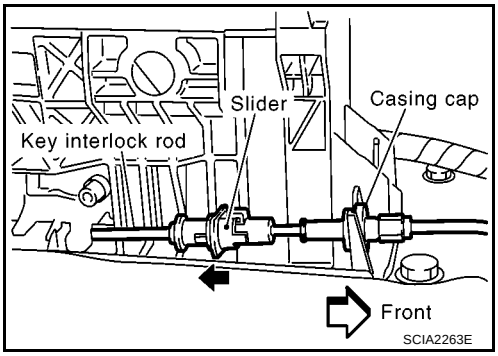


5. Insert interlock rod into adjuster holder.
6. Install casing cap to bracket.
7. Move slider in order to fix adjuster holder to interlock rod.

CAUTION:

Do not touch any adjacent parts of key interlock cable when slider is being held.

Insert slider into key interlock rod straightly.



ON-VEHICLE SERVICE

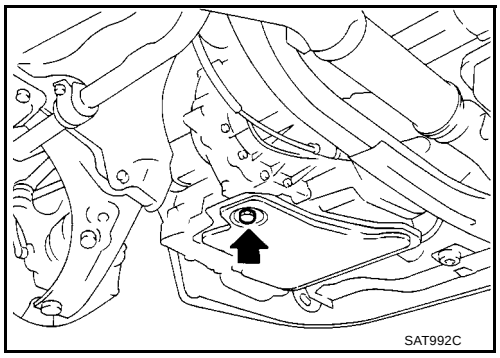
PFP:00000

Control Valve Assembly and Accumulators

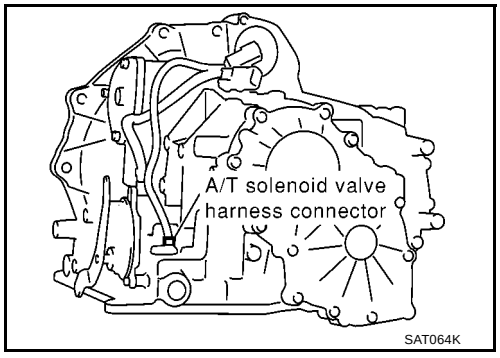
ECS008HV

REMOVAL

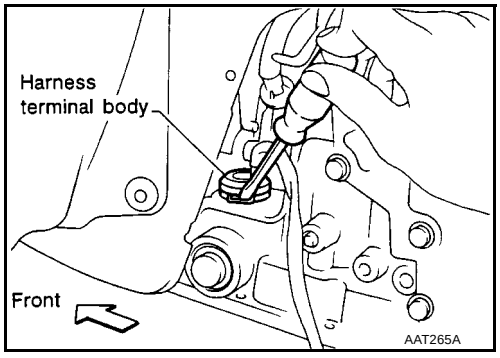
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



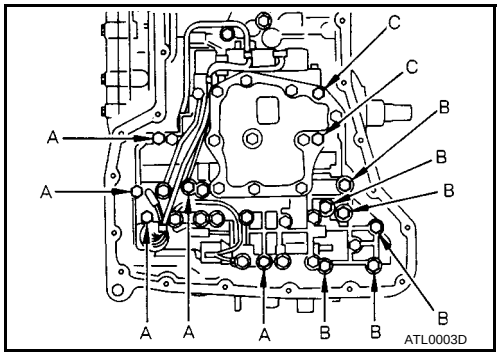
3. Disconnect A/T solenoid valve harness connector.



4. Remove snap ring from A/T solenoid valve harness terminal body.
5. Remove A/T solenoid valve harness by pushing terminal body into transmission case.



6. Remove control valve assembly by removing fixing bolts.

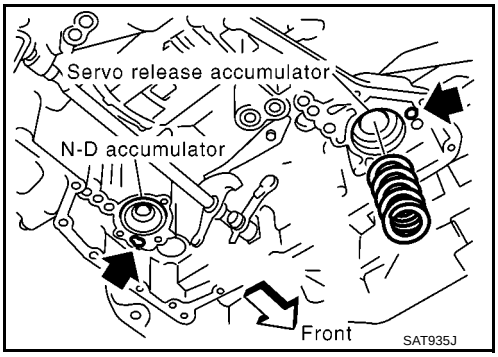


Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length " ℓ " mm (in)	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

- **Be careful not to drop manual valve and servo release accumulator return springs.**

7. Disassemble and inspect control valve assembly if necessary. Refer to AT-426, "REMOVAL" .
8. Remove servo release and N-D accumulators by applying compressed air if necessary.
   - **Hold each piston with a rag.**



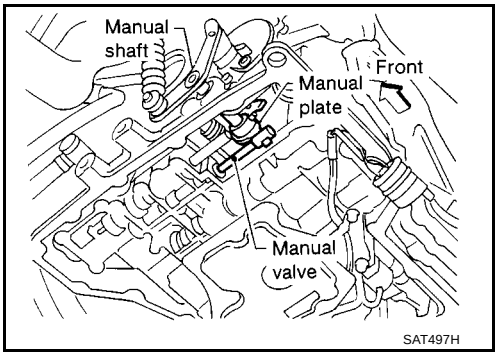
INSTALLATION

Install in the reverse order of removal.

- **Tighten fixing bolts to specification.**

  : 7 - 9 N-m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

- **Set manual shaft in Neutral position, then align manual plate with groove in manual valve.**
- **After installing control valve assembly to transmission case, make sure that selector lever can be moved to all positions.**



Control Cable Adjustment

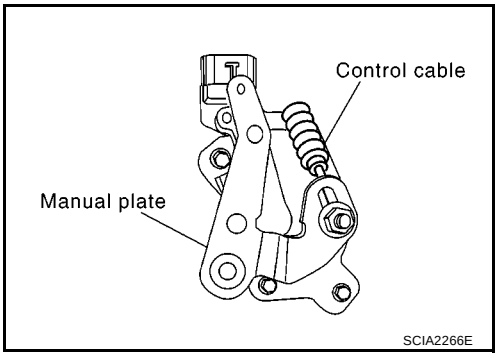
ECS008HW

1. Loosen lock nut connecting manual plate to control cable so control cable can move freely.
2. Place manual plate and selector lever in the P position.

   CAUTION:
   Rotate wheels at least a quarter turn and be certain Park position mechanism is fully engaged.
3. Hold the end of the control cable. Pull and push it two or three times and then apply 9.8 N (1 kg) of pressure to it. Release the cable and temporarily tighten lock nut.
4. Tighten the lock nut for the control cable to the torque specified below:

   Tightening torque **:12.5 - 16.9N·m (1.3 - 1.7kg-m, 10 - 12ft-lb)**

   CAUTION:
   Tighten the lock nut with the manual plate secured.

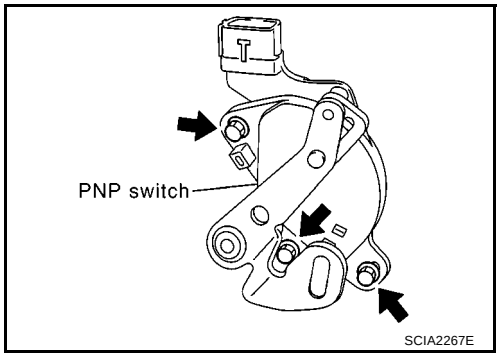


Park/Neutral Position (PNP) Switch Adjustment

ECS008HX

REMOVAL

1. Remove control cable from manual plate.
2. Place manual plate in the N position.
3. Remove bolts to remove PNP switch.



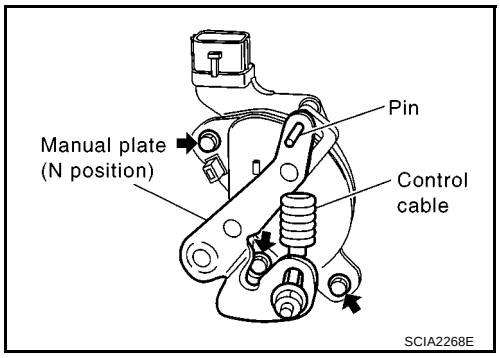
INSTALLATION

Install in the reverse order of removal. Be careful of the following:

- For installation, align the PNP switch hole with the manual plate hole while the transaxle is in N, and insert a pin into the aligned holes.
- When installing PNP switch, tighten to torque specified below:

Tightening torque	**: 2.6 – 3.9N·m (0.27 – 0.39kg–m, 23 – 34in–lb)**

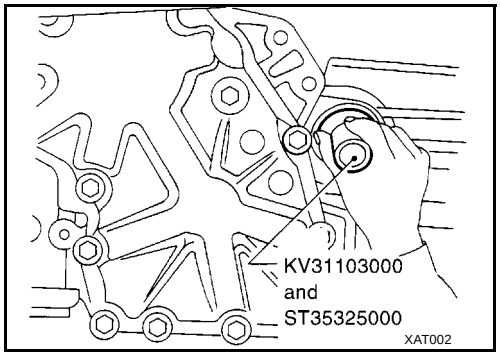
- After installation, perform A/T position adjustment and inspection (refer to AT-427, "Control Cable Adjustment"), and PNP switch continuity (refer to AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH").



Differential Side Oil Seal Replacement

ECS008HY

1. Remove drive shaft assemblies. Refer to FAX-10, "FRONT DRIVE SHAFT" .
2. Remove oil seals.
3. Install oil seals.
   - **Apply ATF to oil seal surface before installing.**
   - **Drift for installing**

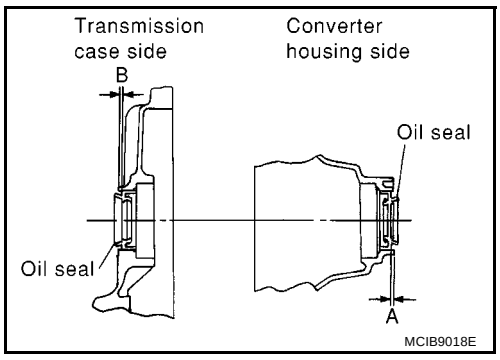


   - **Install oil seals so that dimensions “A” and “B” are within specifications.**

Unit: mm (in)

A	B
5.5 to 6.5 (0.217 to 0.256)	–0.5 to 0.5 (–0.020 to 0.020)

4. Reinstall any part removed.

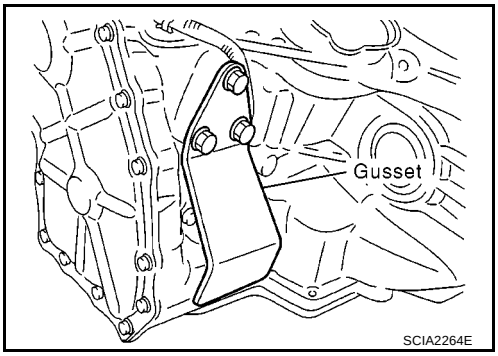


Revolution Sensor Replacement

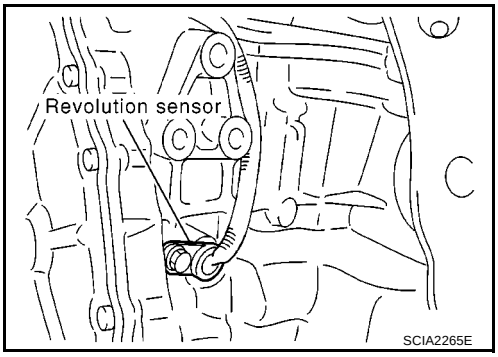
ECS008HZ

REMOVAL

1. Remove drive shaft assemblies. Refer to FAX-10, "FRONT DRIVE SHAFT" .
2. Remove gusset.



3. Remove revolution sensor.



INSTALLATION

- **Install the removed parts in the reverse order of the removal, while paying attention to the following work.**

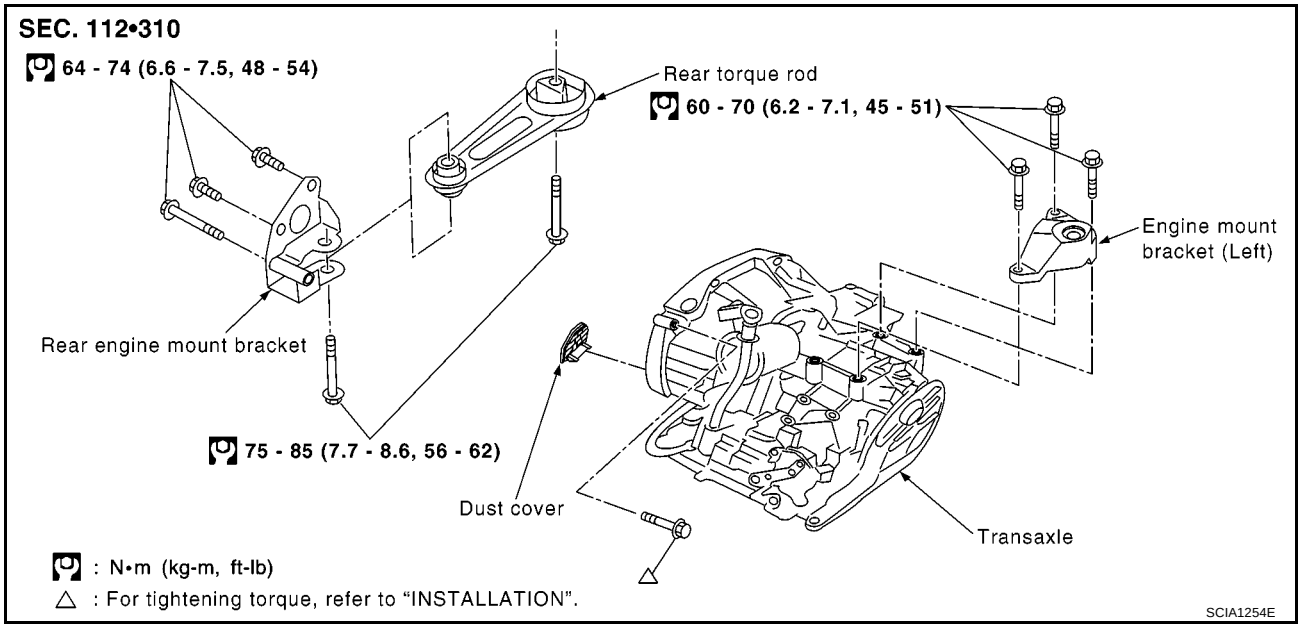
Gusset	**: 45 - 53 N-m (4.6 - 5.4 kg-m, 34 - 39 ft-lb)**
Revolution sensor	**: 5.0 - 6.8 N-m (0.51 - 0.69 kg-m, 45 - 60 in-lb)**

REMOVAL AND INSTALLATION

PFP:00000

Removal

ECS008I0

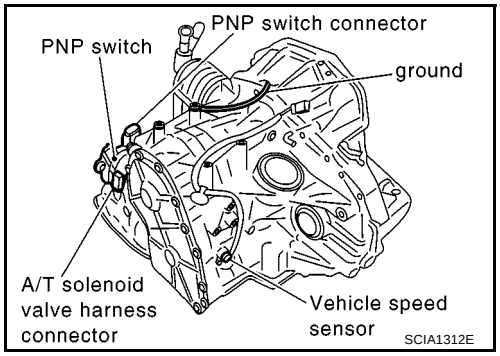


CAUTION:

When removing the A/T assembly from engine, first remove the crankshaft position sensor (POS) from the A/T assembly.

Be careful not to damage sensor edge.

1. Remove battery and air duct.
2. Remove air breather hose.
3. Remove crankshaft position sensor (POS) from A/T assembly.
4. Disconnect PNP switch, A/T solenoid valve harness connector, vehicle speed sensor and ground.



5. Remove control cable from transaxle.
6. Remove front exhaust tube with power tool. Refer to EX-3, "Removal and Installation" .
7. Remove drive shafts. Refer to FAX-13, "Removal and Installation" .
8. Remove oil cooler hose.
9. Remove starter motor. Refer to SC-45, "Removal and Installation (CR Engine Models)" .
10. Remove dust cover from converter housing.
11. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.

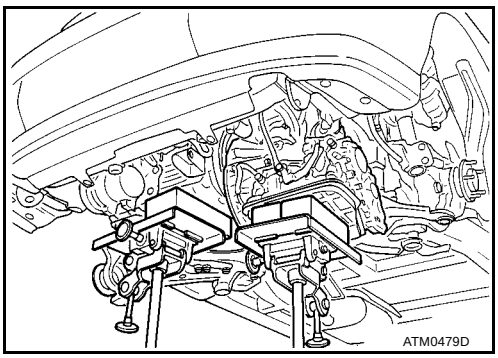
    CAUTION:

    When turning crankshaft, turn it clockwise as viewed from the front of the engine.

12. Support A/T assembly with a jack.

CAUTION:
When setting the transmission jack, be careful not to allow it to collide against the drain plug.

13. Remove rear engine mount brackt and rear torque rod.
14. Remove bolts fixing transaxle to engine mount brackt (Left).
15. Support engine with a jack.
16. Remove bolts fixing transaxle to engine.
17. Remove bolts fixing A/T assembly to engine with power tool.

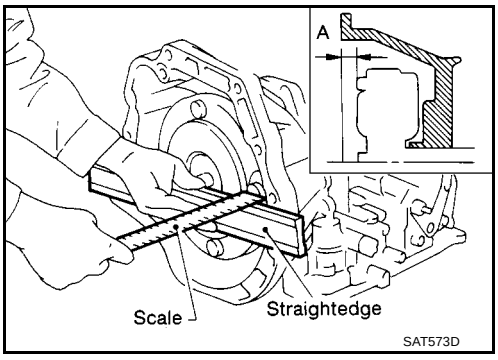


Installation

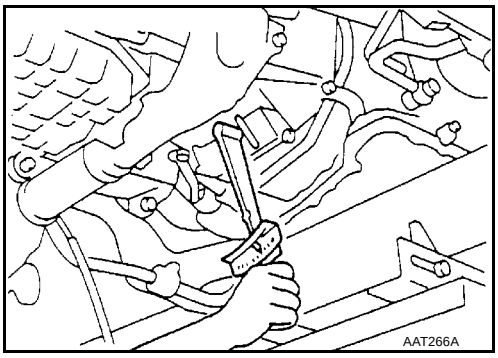
ECS008I1

1. When connecting torque converter to transaxle, measure distance “A” to be certain that they are correctly assembled.

Distance “A”: 21.1 mm (0.831 in) or more

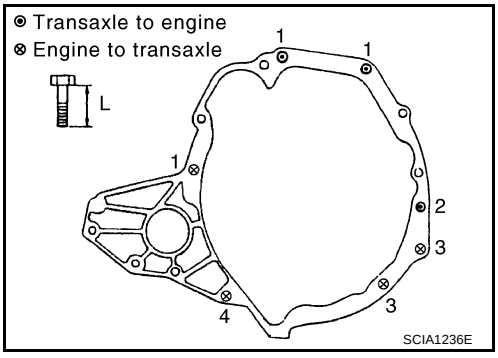


2. Install torque converter to drive plate.
   - **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**

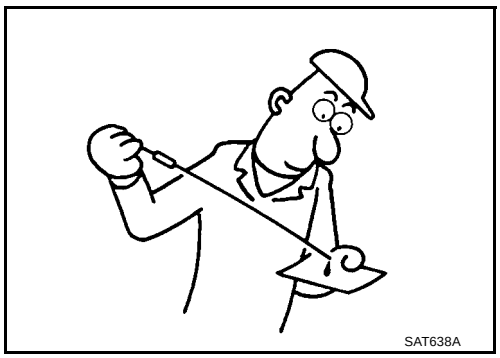


3. Tighten bolts fixing transaxle.

Bolt No.	Tightening torque N-m (kg-m, ft-lb)	Bolt length “ L ” mm (in)
1	31 - 40 (3.2 - 4.0, 13 - 29)	50 (1.97)
2		135 (5.31)
3	17 - 23 (1.8 - 2.3, 13 - 16)	20 (0.79)
4		30 (1.18)



4. Reinstall any part removed.
5. Adjust control cable. Refer to AT-427, "Control Cable Adjustment" .
6. Check continuity of PNP switch. Refer to AT-114, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .
7. Refill transaxle with ATF and check fluid level.
8. Move selector lever through all positions to be sure that transaxle operates correctly. With parking brake applied, idle engine. Move selector lever through “N” to “D”, to “2”, to “1” and “R” positions. A slight shock should be felt through the hand gripping the selector each time the transaxle is shifted.
9. Perform road test. Refer to AT-66, "Road Test" .

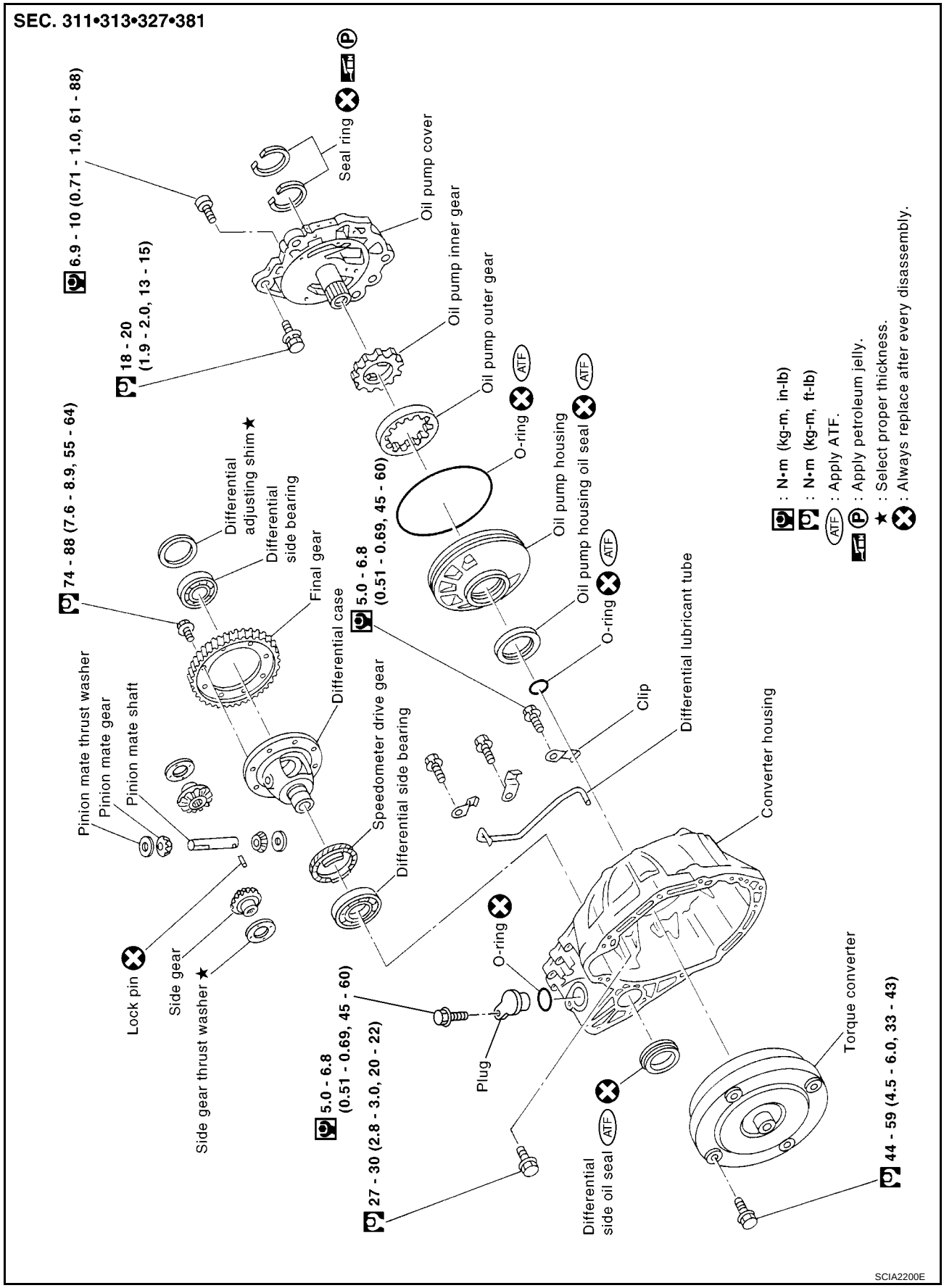


OVERHAUL

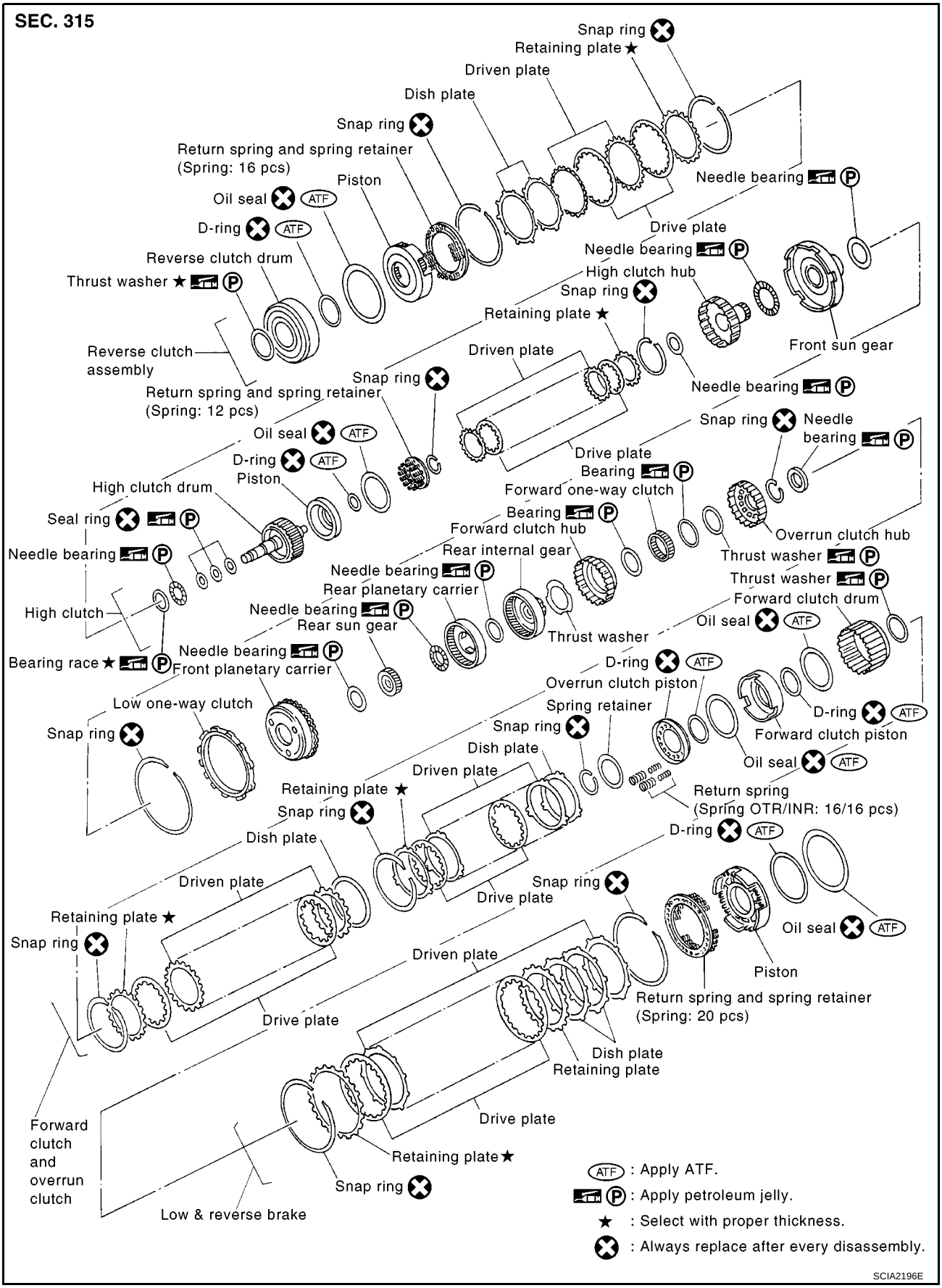
PFP:00000

Components

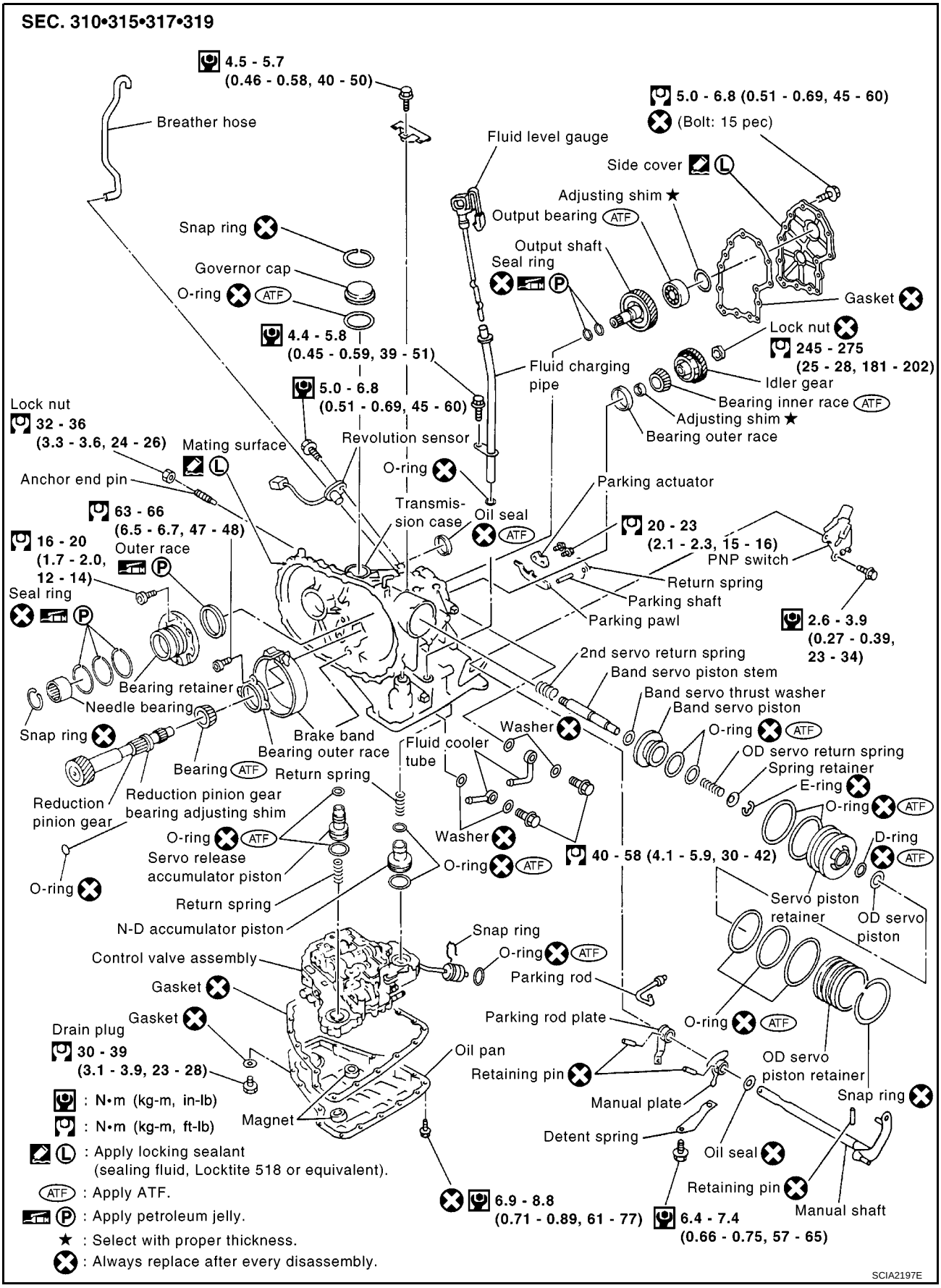
ECS008I2



SEC. 315

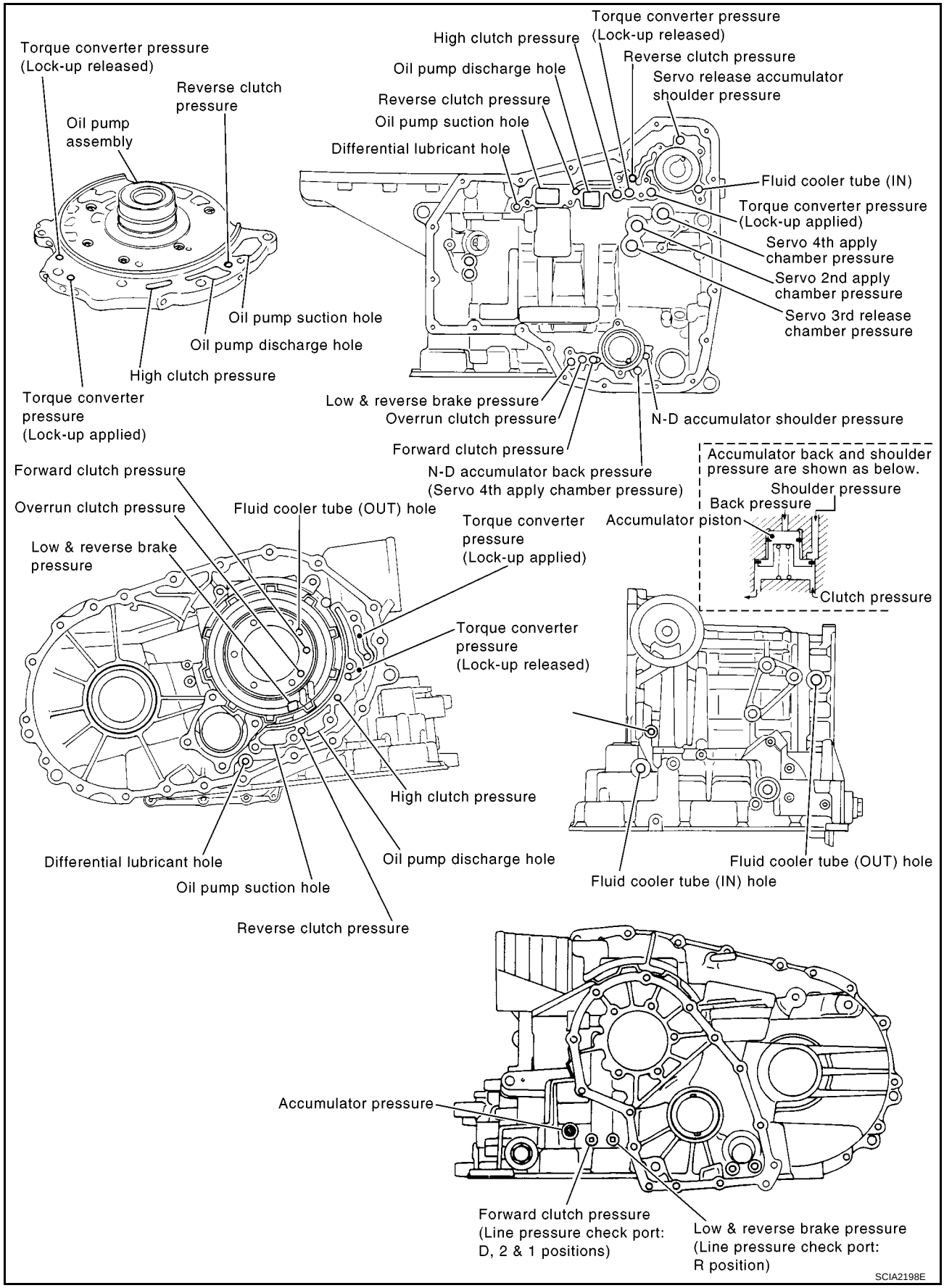

Snap ring
Retaining plate ★
Driven plate
Dish plate
Snap ring
Return spring and spring retainer
(Spring: 16 pcs)
Piston
Oil seal ATF
D-ring ATF
Reverse clutch drum
Thrust washer ★ P
Needle bearing P
Drive plate
Needle bearing P
High clutch hub
Snap ring
Retaining plate ★
Front sun gear
Reverse clutch assembly
Driven plate
Snap ring
Return spring and spring retainer
(Spring: 12 pcs)
Needle bearing P
Snap ring
Needle bearing P
Oil seal ATF
D-ring ATF
Drive plate
Bearing P
Forward one-way clutch
High clutch drum
Piston
Bearing P
Forward clutch hub
Overrun clutch hub
Seal ring P
Needle bearing P
Rear internal gear
Thrust washer P
Needle bearing P
Thrust washer P
Rear planetary carrier
Forward clutch drum
High clutch
Needle bearing P
Rear sun gear
Oil seal ATF
Thrust washer
Bearing race ★ P
Needle bearing P
Front planetary carrier
D-ring ATF
Overrun clutch piston
Low one-way clutch
Spring retainer
D-ring ATF
Snap ring
Snap ring
Forward clutch piston
Dish plate
Oil seal ATF
Driven plate
Retaining plate ★
Return spring
(Spring OTR/INR: 16/16 pcs)
Snap ring
D-ring ATF
Dish plate
Driven plate
Snap ring
Drive plate
Retaining plate ★
Oil seal ATF
Snap ring
Driven plate
Piston
Return spring and spring retainer
(Spring: 20 pcs)
Drive plate
Dish plate
Retaining plate
Forward clutch and overrun clutch
Drive plate
Retaining plate ★
Snap ring
Low & reverse brake
ATF : Apply ATF.
P : Apply petroleum jelly.
★ : Select with proper thickness.
: Always replace after every disassembly.
SCIA2196E

SEC. 310•315•317•319



Oil Channel

ECS008I3



Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

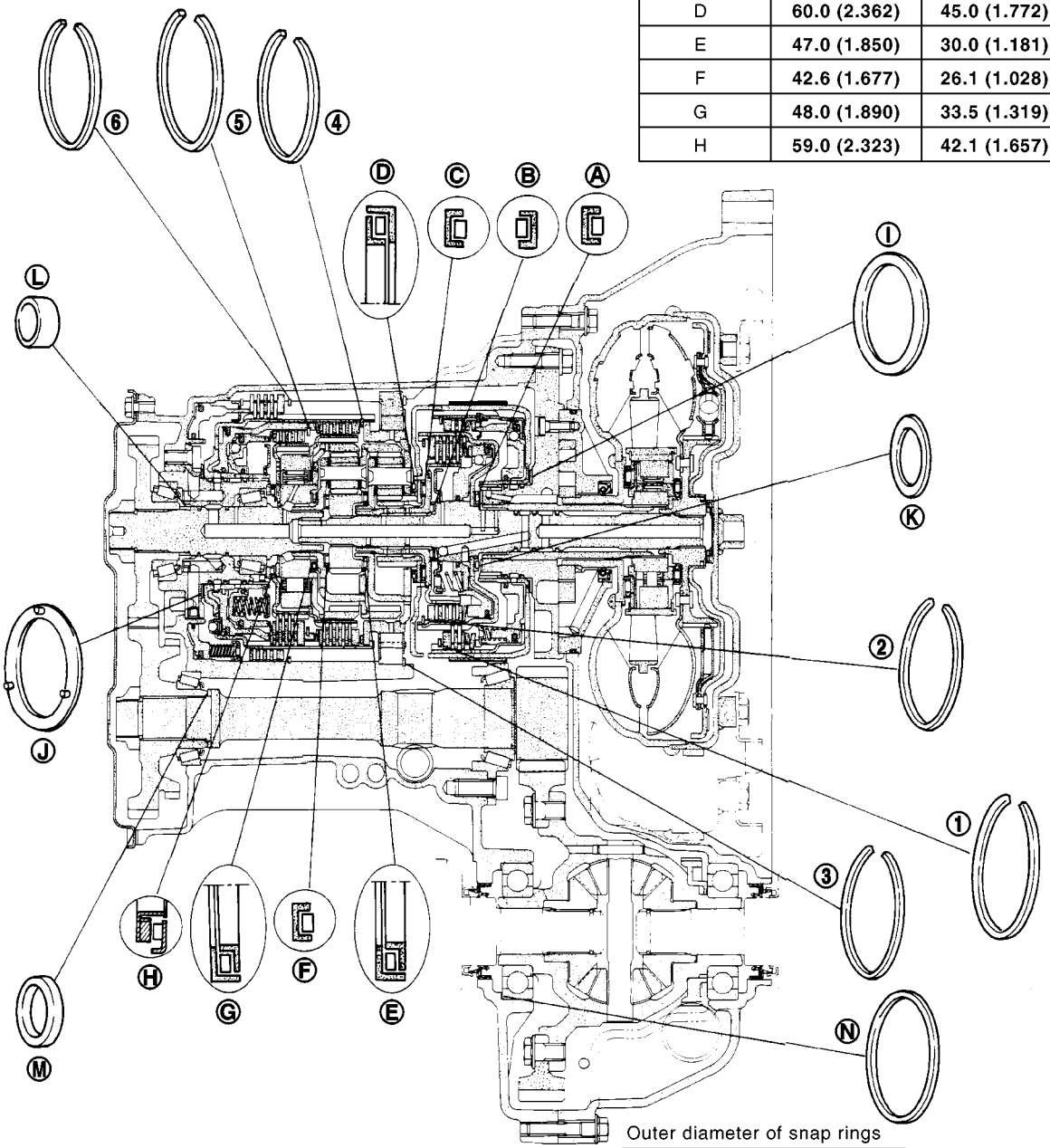
ECS008I4

Outer diameter and color of thrust washers

Item number	Outer diameter mm (in)	Color
Ⓘ	72.0 (2.835)	Black
Ⓙ	78.5 (3.091)	

Outer & inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)
A	47.0 (1.850)	32.0 (1.260)
B	35.0 (1.378)	20.1 (0.791)
C	60.0 (2.362)	42.0 (1.654)
D	60.0 (2.362)	45.0 (1.772)
E	47.0 (1.850)	30.0 (1.181)
F	42.6 (1.677)	26.1 (1.028)
G	48.0 (1.890)	33.5 (1.319)
H	59.0 (2.323)	42.1 (1.657)



Outer & inner diameter of bearing race and adjusting shims

Item number	Outer diameter mm (in)	Inner diameter mm (in)
Ⓚ	48.0 (1.890)	33.0 (1.299)
Ⓛ	29.0 (1.142)	25.0 (0.984)
Ⓜ	34.3 (1.350)	26.0 (1.024)
Ⓝ	79.5 (3.130)	72.0 (2.835)

★: Select proper thickness.

Outer diameter of snap rings

Item number	Outer diameter mm (in)
①	142.0 (5.591)
②	113.0 (4.449)
③	162.4 (6.394)
④	135.4 (5.331)
⑤	126.0 (4.961)
⑥	162.3 (6.390)

SCIA2199E

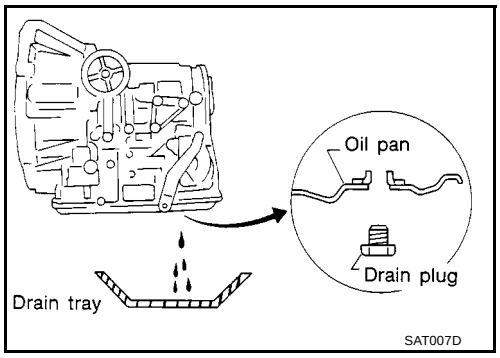
DISASSEMBLY

PFP:31020

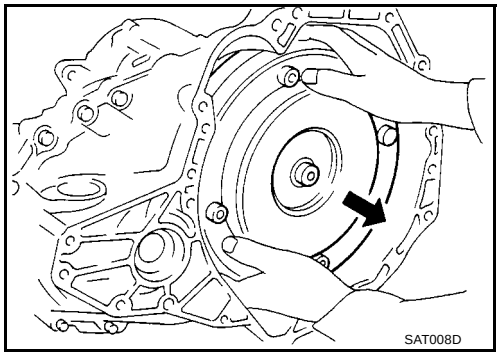
Disassembly

ECS008I5

1. Drain ATF through drain plug.



2. Remove torque converter.

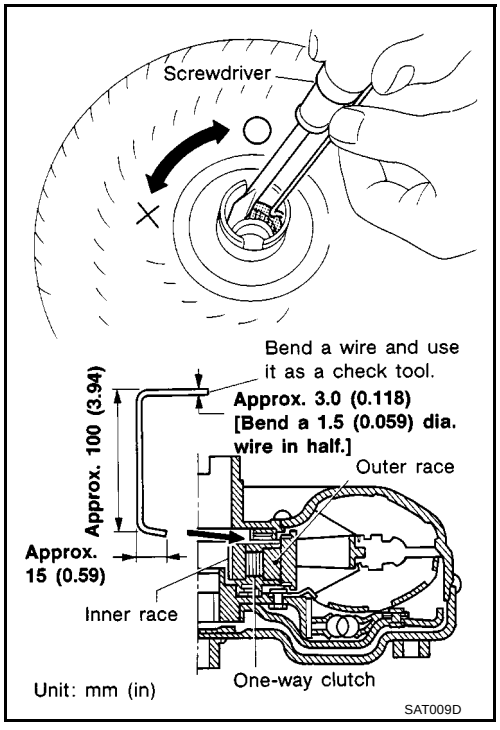


3. Check torque converter one-way clutch using check tool as shown at right.

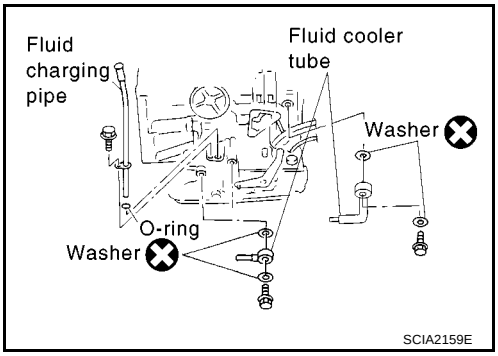
a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.

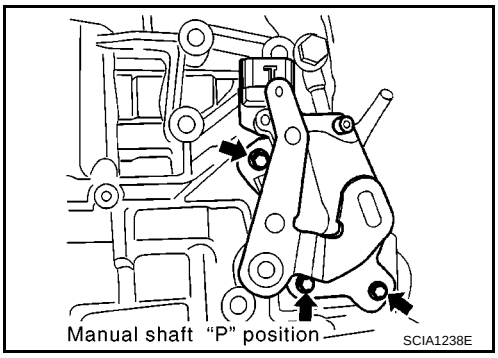
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



4. Remove A/T fluid charging pipe and fluid cooler tube.



5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.

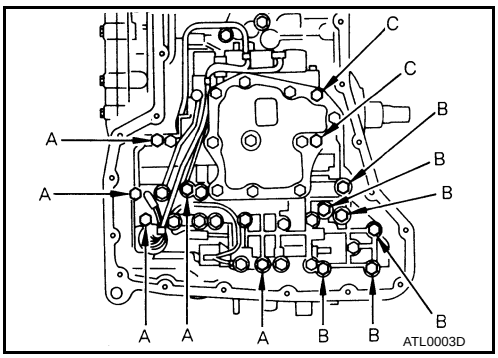


7. Remove oil pan and oil pan gasket.
   - **Do not reuse oil pan bolts.**
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
   - **If frictional material is detected, replace radiator after repair of A/T. Refer to CO-11, "RADIATOR".**
9. Remove control valve assembly according to the following procedures.

a. Remove snap ring from the terminal body and push the terminal body into the transaxle case by hand.

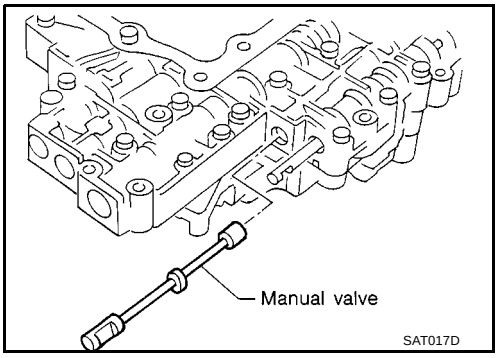
b. Remove bolts securing control valve.

Bolt symbol	A	B	C
Length under head (mm)	40.0	33.0	43.5
Quantity	5	6	2

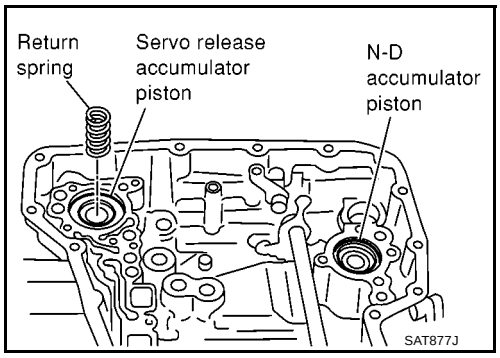


c. Remove control valve assembly from the transaxle assembly.

10. Remove manual valve from control valve assembly as a precaution.



11. Remove return spring from servo release accumulator piston.

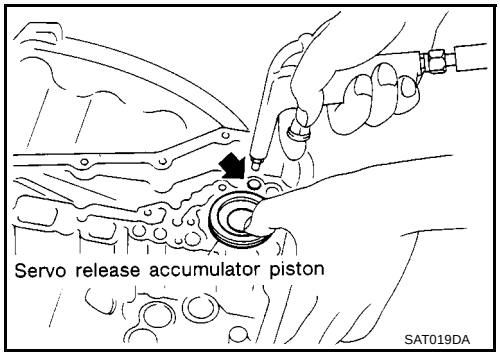


12. Remove servo release accumulator piston with compressed air.

CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil. To avoid this, cover the area with paper towels and blow air little by little.**
- **Wrap the removed accumulator piston in a paper towel.**

13. Remove O-rings from servo release accumulator piston.

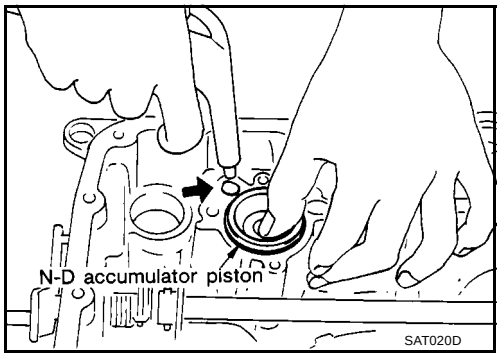


14. Remove N-D accumulator piston and return spring with compressed air.

CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil. To avoid this, cover the area with paper towels and blow air little by little.**
- **Wrap the removed accumulator piston in a paper towel.**

15. Remove O-rings from N-D accumulator piston.

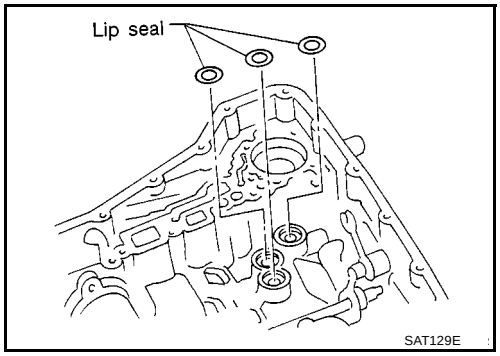


16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.

Return spring:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

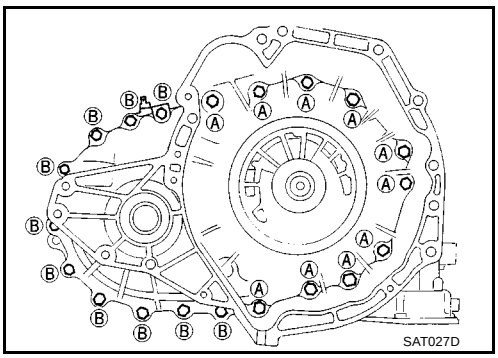
18. Remove lip seals from band servo oil port.



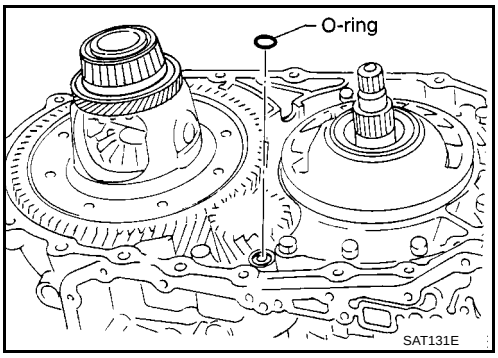
19. Remove converter housing according to the following procedures.

a. Remove converter housing mounting bolts A and B.

b. Remove converter housing by tapping it lightly.

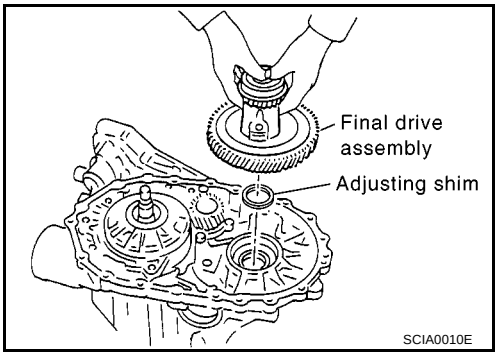


c. Remove O-ring from differential oil port.



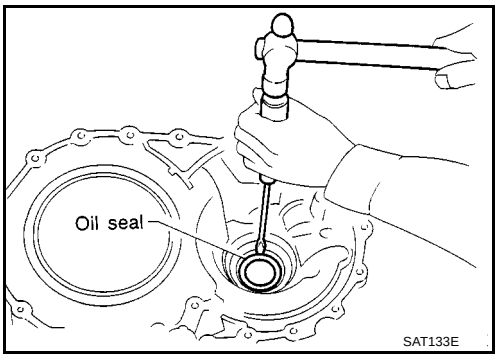
20. Remove final drive assembly from transmission case.

21. Remove adjusting shim from transmission case.

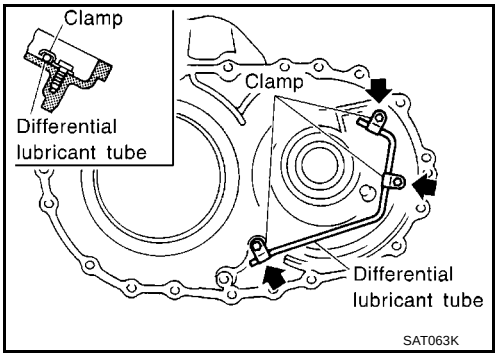


22. Remove oil seal with screwdriver from converter housing.

- **Be careful not to damage case.**

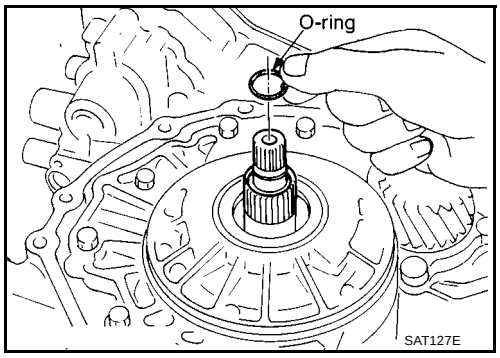


23. Remove differential lubricant tube from converter housing.

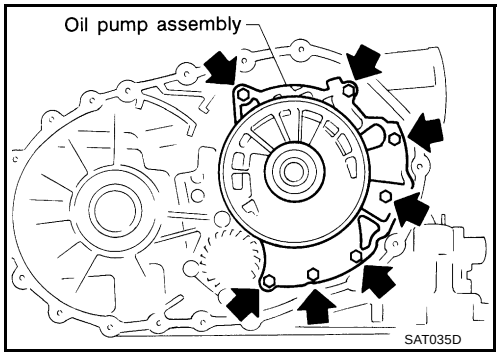


24. Remove oil pump according to the following procedures.

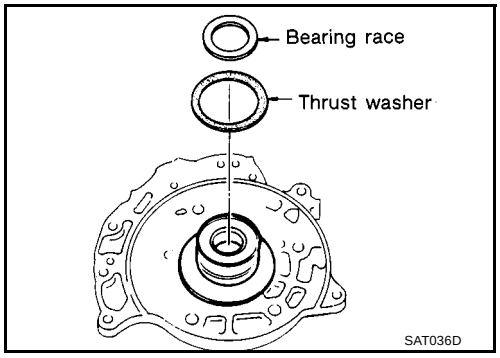
a. Remove O-ring from input shaft.



b. Remove oil pump assembly from transmission case.



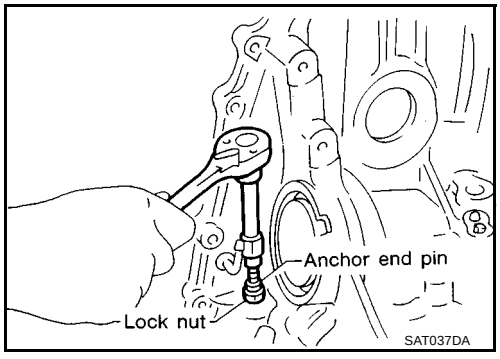
c. Remove thrust washer and bearing race from oil pump assembly.



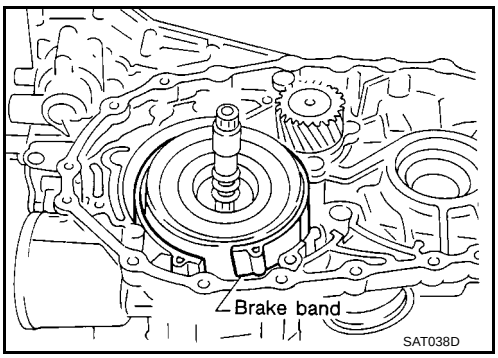
25. Remove brake band according to the following procedures.

a. Loosen lock nut, then back off anchor end pin.

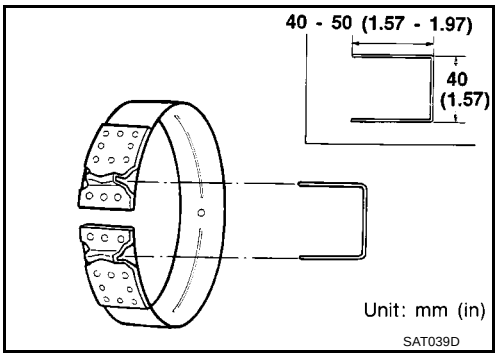
- **Do not reuse anchor end pin.**



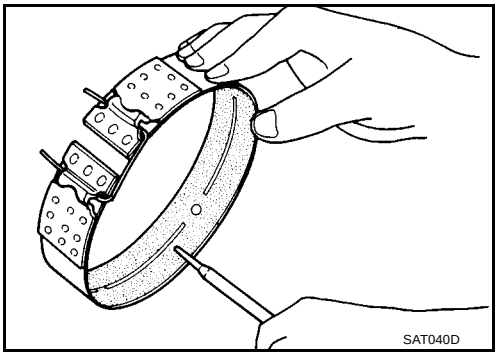
b. Remove brake band and strut from transmission case.



- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown in the figure at right.**
  Leave the clip in position after removing the brake band.

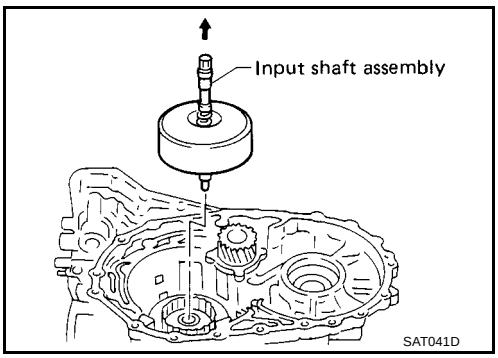


c. Check brake band facing for damage, cracks, wear or burns.

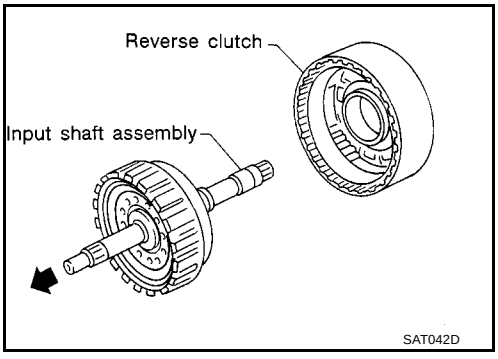


26. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

a. Remove input shaft assembly (high clutch) with reverse clutch.

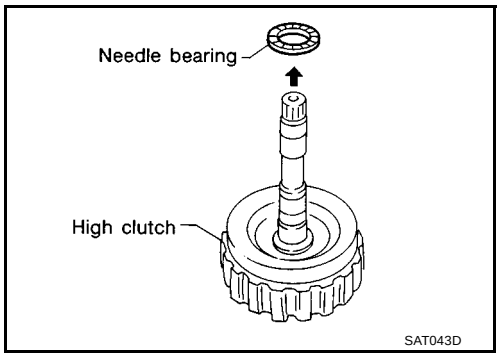


b. Remove input shaft assembly (high clutch) from reverse clutch.

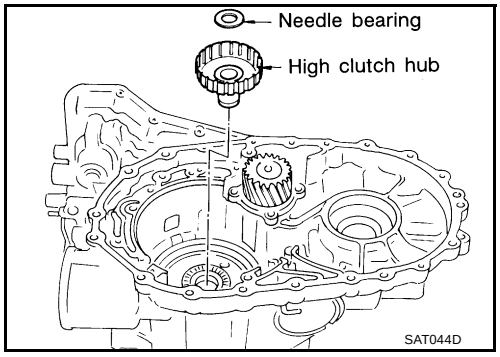


c. Remove needle bearings from high clutch drum.

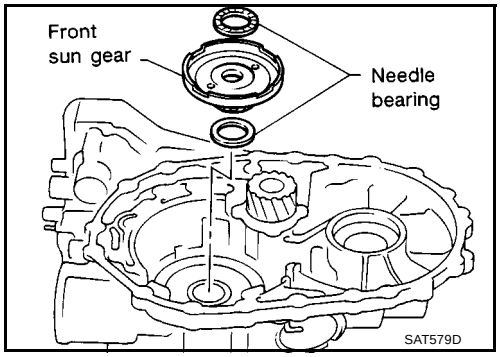
d. Check input shaft assembly and needle bearing for damage or wear.



27. Remove high clutch hub and needle bearing from trans mission case.
    - Check high clutch hub and needle bearing for damage or wear.

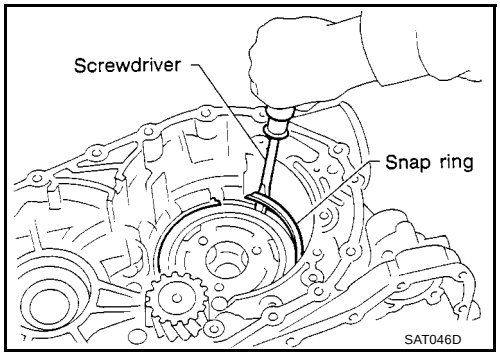


28. Remove high clutch hub and front sun gear from transmission case.
    - Check front sun gear and needle bearings for damage or wear.

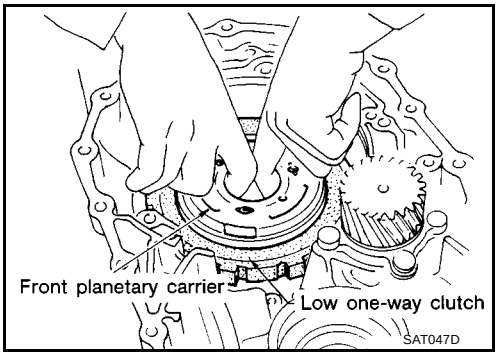


29. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.

a. Remove snap ring with flat-bladed screwdriver.

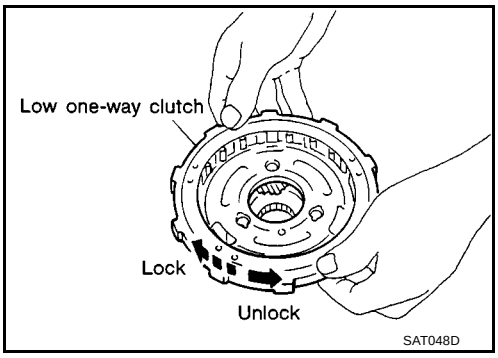


b. Remove front planetary carrier with low one-way clutch.



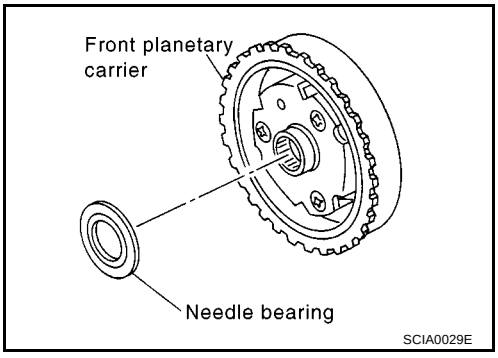
c. Check that low one-way clutch rotates in the direction of the arrow and lochs in the opposite direction.

d. Remove low one-way clutch front planetary carrier by rotating it in the direction of arrow.



e. Remove needle bearing front planetary carrier.

f. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

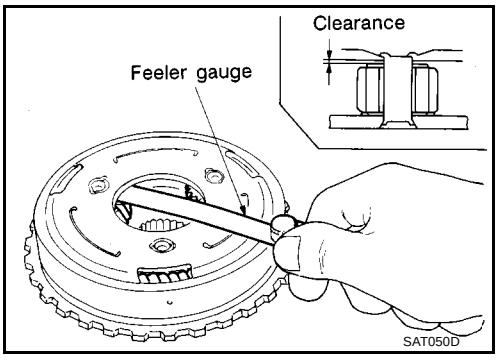


g. Check clearance between pinion washer and planetary carrier using feeler gauge.

Standard clearance: 0.15 - 0.70 mm (0.0059 - 0.0276 in)

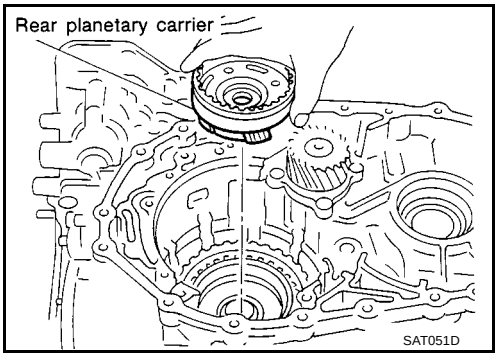
Allowable limit: 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

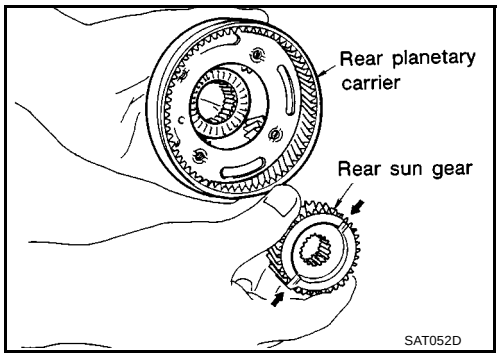


30. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

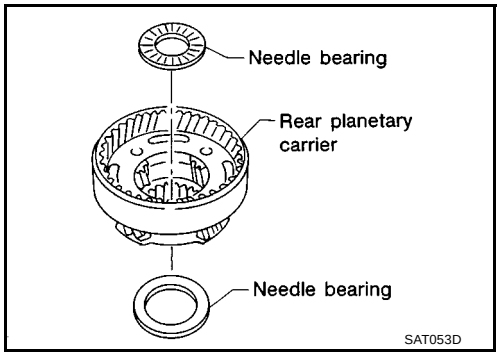
a. Remove rear planetary carrier assembly from transmission case.



b. Remove rear sun gear from rear planetary carrier.



c. Remove needle bearings from rear planetary carrier assembly.
d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

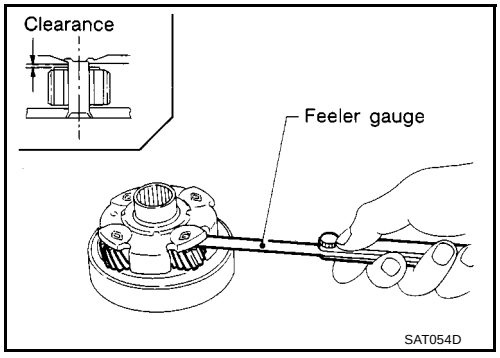


e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

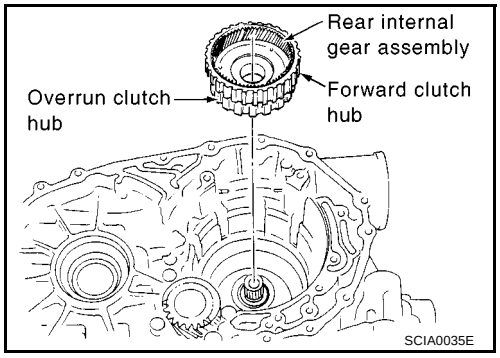
Standard clearance: 0.15 - 0.70 mm (0.0059 - 0.0276 in)

Allowable limit: 0.80 mm (0.0315 in)

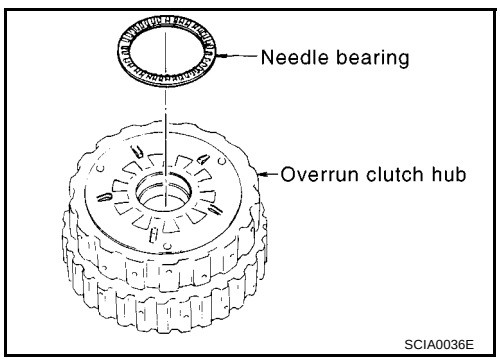
Replace rear planetary carrier if the clearance exceeds allowable limit.



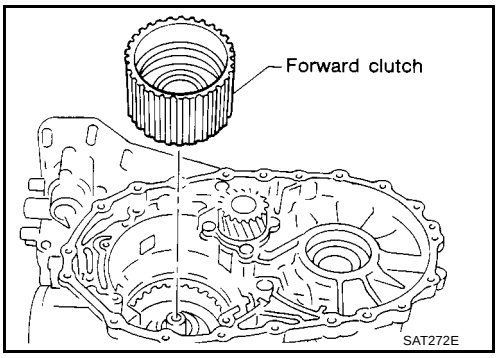
31. Remove rear internal gear assembly, forward clutch hub and overrun clutch hub from transmission case.



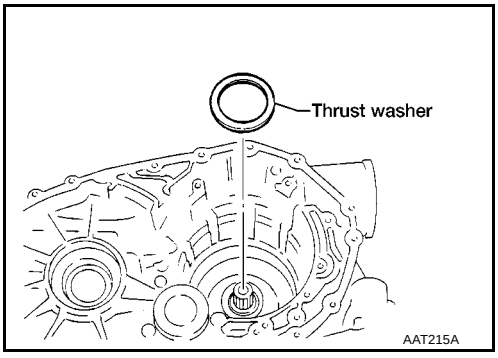
32. Remove needle bearing from overrun clutch hub.
    - Check needle bearing for damage or wear.



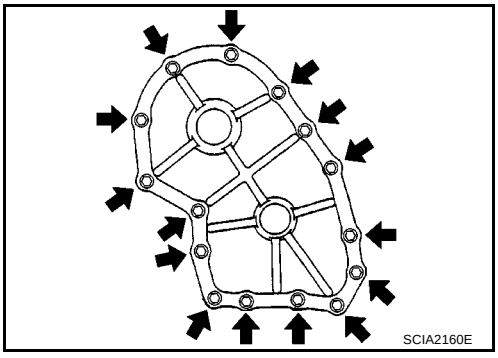
33. Remove forward clutch assembly from transmission case.



34. Remove thrust washer from transmission case.



35. Remove side cover and gasket.



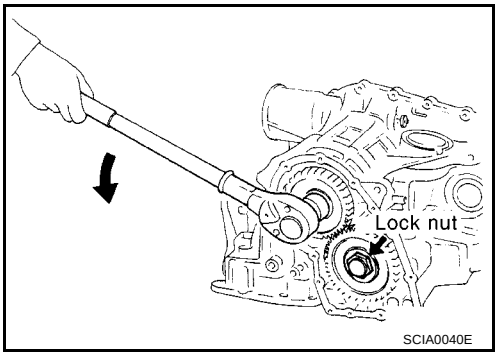
36. Remove output shaft and reduction pinion gear with the following procedure:

a. Put manual shaft in P position, fix idler gear using a parking pole.

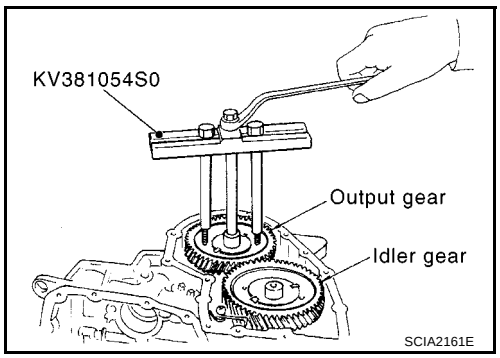
b. Disconnect the caulking parts between output gear and idler gear, remove locknut.

CAUTION:

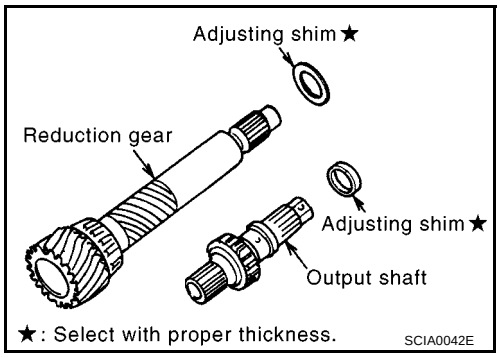
The locknut is not reusable. Never reuse the locknut.



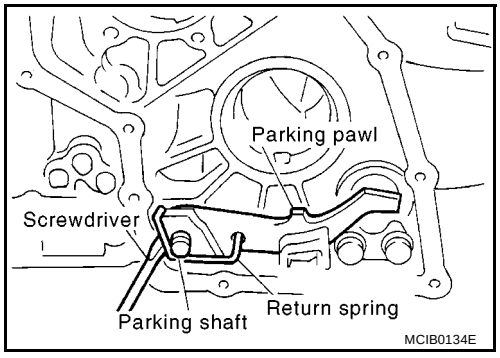
c. Using a puller, remove output gear and idler gear.



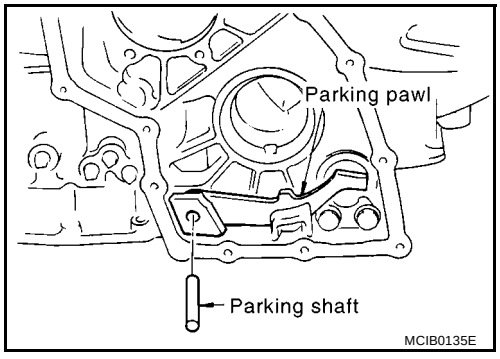
d. Remove adjusting shim from output shaft and reduction pinion gear.



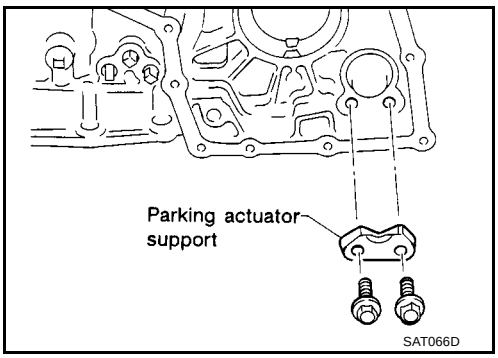
37. Remove return spring from parking shaft with screwdriver.



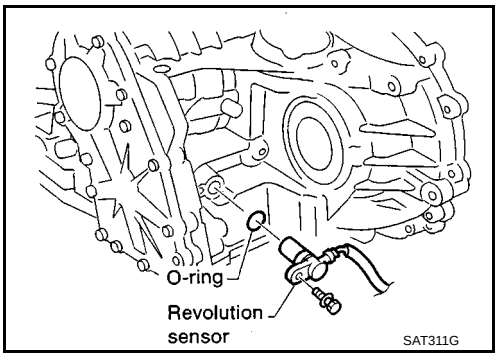
38. Draw out parking shaft and remove parking pawl from transmission case.
    - Check parking pawl and shaft for damage or wear.



39. Remove parking actuator support from transmission case.
    - Check parking actuator support for damage or wear.



40. Remove revolution sensor from transmission case.



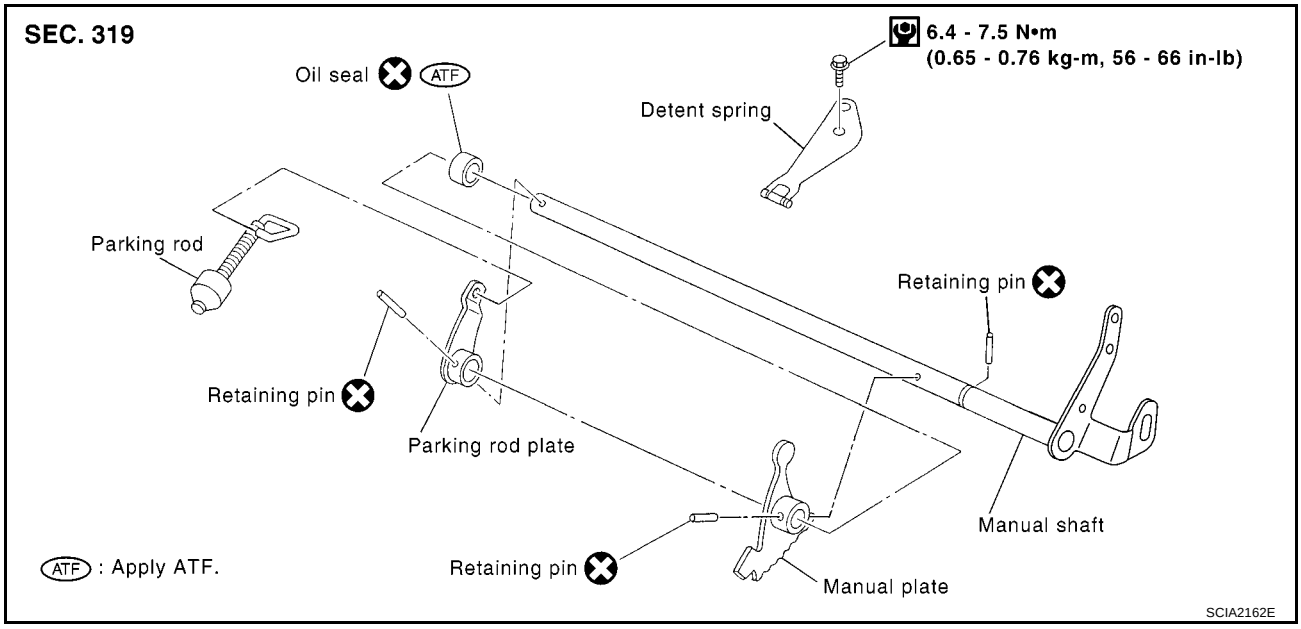
REPAIR FOR COMPONENT PARTS

PFP:00000

Manual Shaft

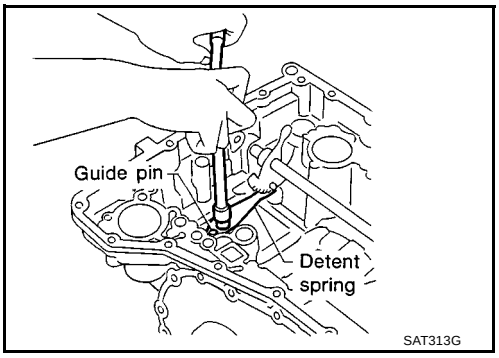
ECS008I6

COMPONENTS

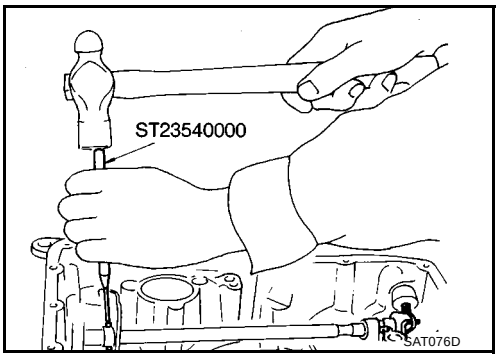


REMOVAL

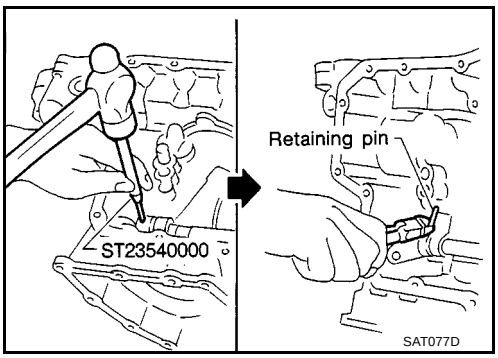
1. Remove detent spring from transmission case.



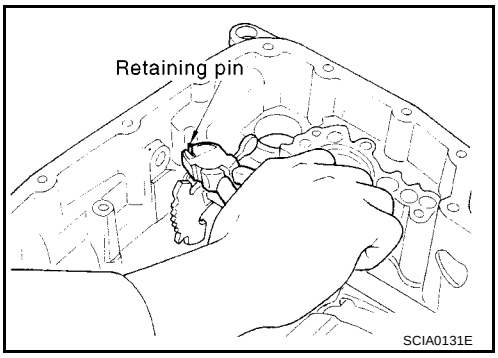
2. Drive out manual plate retaining pin.



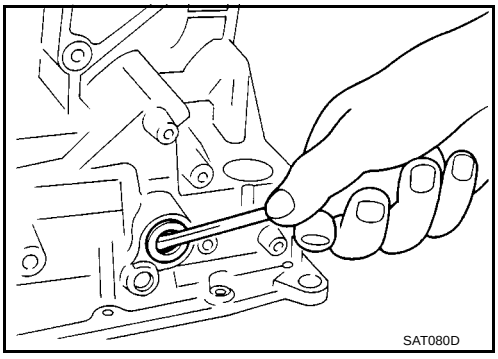
3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.



8. Remove manual shaft oil seal.

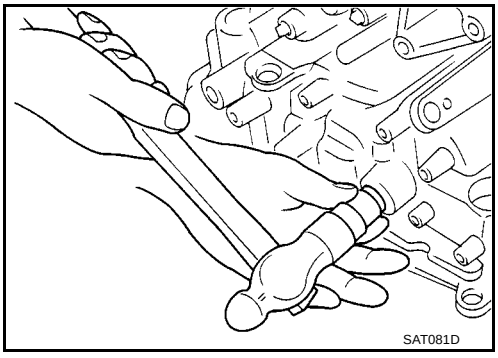


INSPECTION

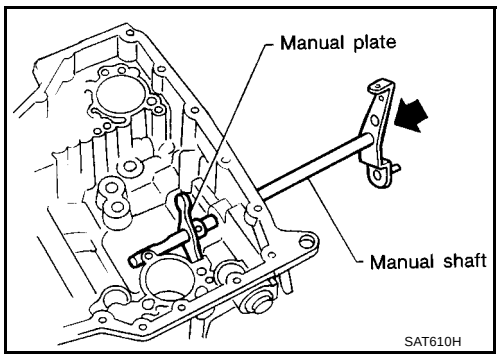
- Check component parts for wear or damage. Replace if necessary.

INSTALLATION

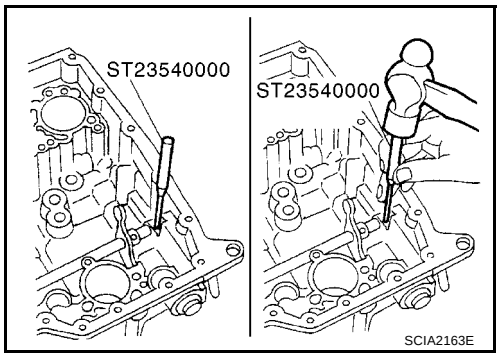
1. Install manual shaft oil seal.
   - **Apply ATF to outer surface of oil seal.**



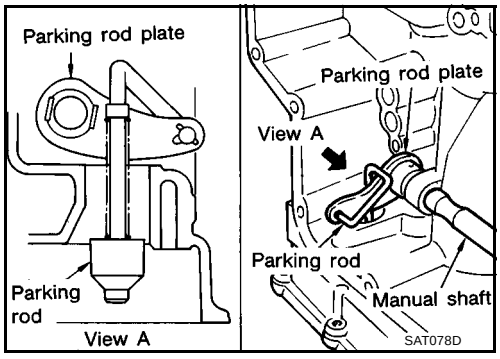
2. Install manual shaft and manual plate.



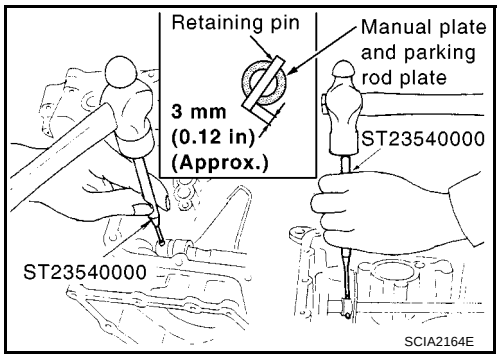
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin.



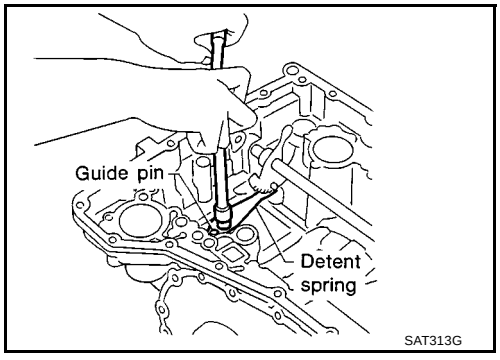
5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft.



7. Drive manual plate retaining pin and parking rod plate retaining pin.
   - **Both ends of pin should protrude.**



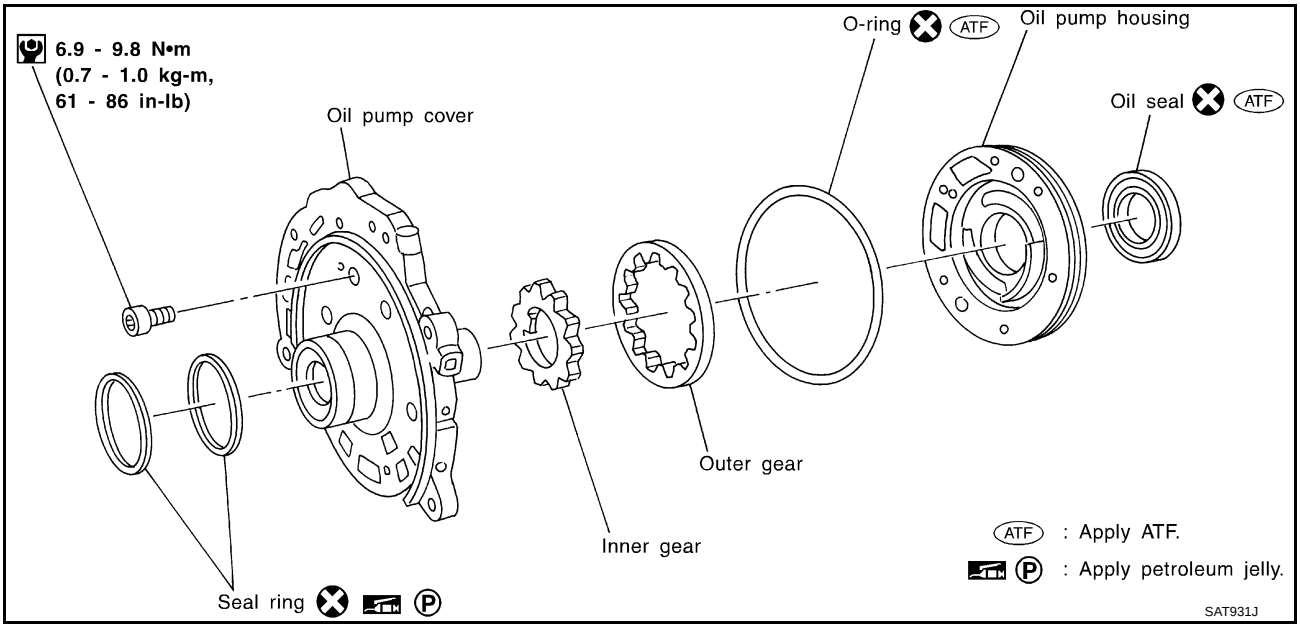
8. Install detent spring.



Oil Pump

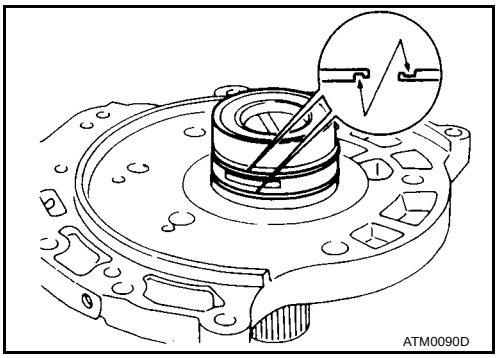
ECS008I7

COMPONENTS

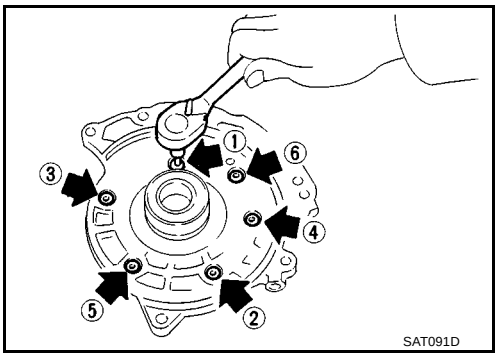


DISASSEMBLY

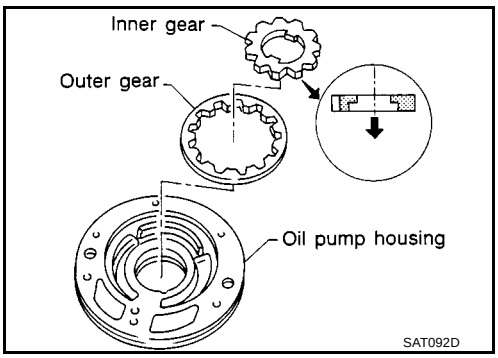
1. Remove seal rings.



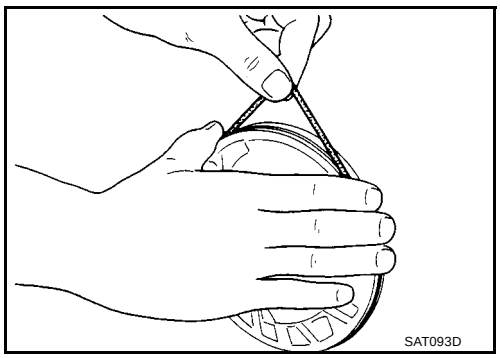
2. Loosen bolts in a crisscross pattern and remove oil pump cover.



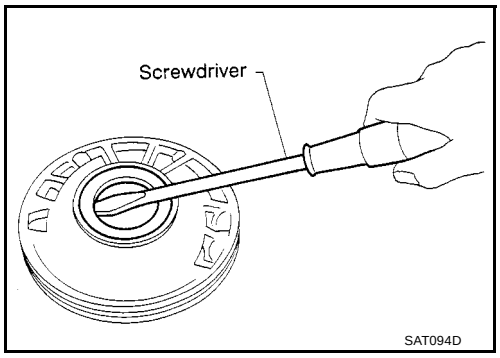
3. Remove inner and outer gear from oil pump housing.



4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal.



INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

- Check for wear or damage.

Side Clearances

- Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified positions.

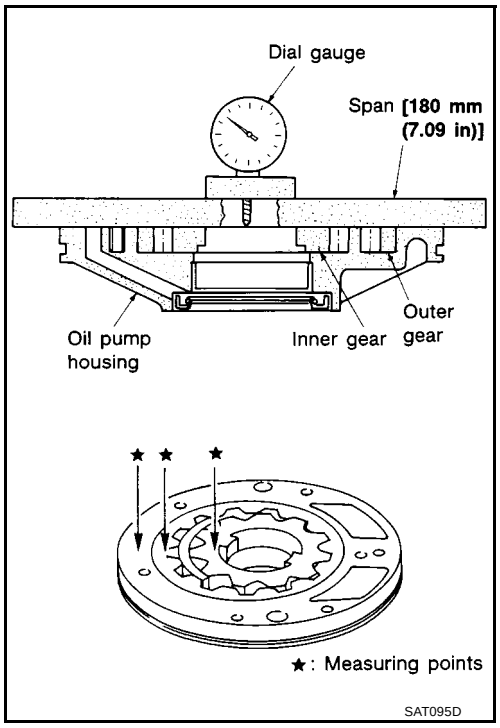
  Standard clearance: 0.02 - 0.04 mm (0.0008 - 0.0016 in)

- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

  Inner and outer gear:

  Refer to **AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"**

- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

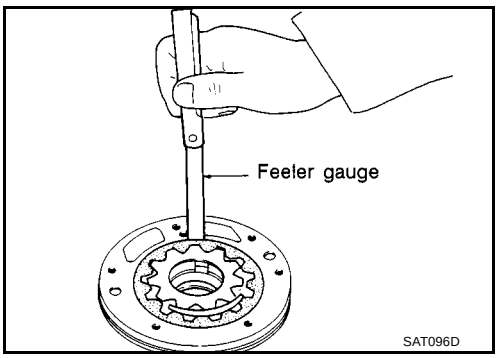


- Measure clearance between outer gear and oil pump housing.

  Standard clearance: 0.08 - 0.15 mm (0.0031 - 0.0059 in)

  Allowable limit: 0.15 mm (0.0059 in)

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



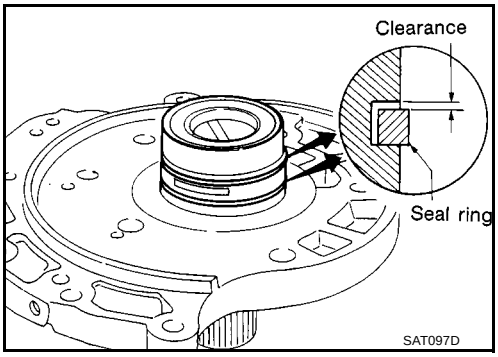
Seal Ring Clearance

- Install new seal rings onto oil pump cover.
- Measure clearance between seal ring and ring groove.

  Standard clearance: 0.1 - 0.25 mm (0.0039 - 0.0098 in)

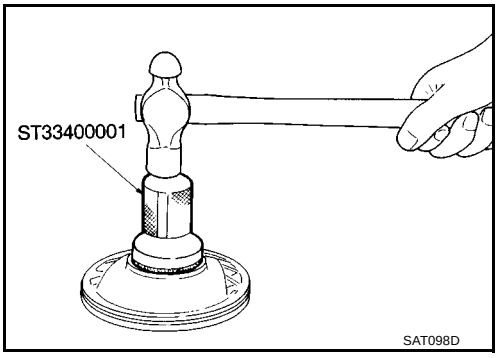
  Allowable limit: 0.25 mm (0.0098 in)

- If not within allowable limit, replace oil pump cover assembly.

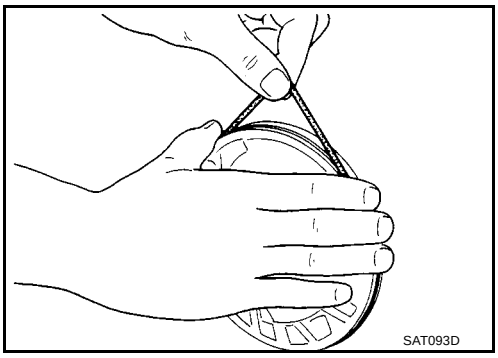


ASSEMBLY

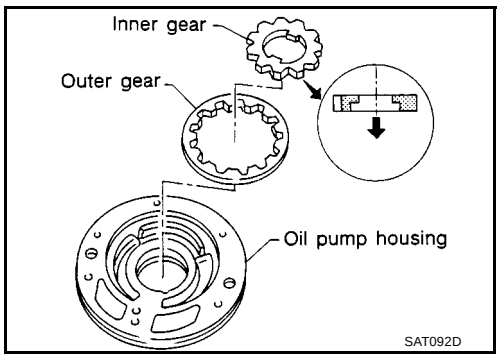
1. Install oil seal on oil pump housing.
   - Apply ATF to oil seal.



2. Install O-ring on oil pump housing.
   - **Apply ATF to O-ring.**



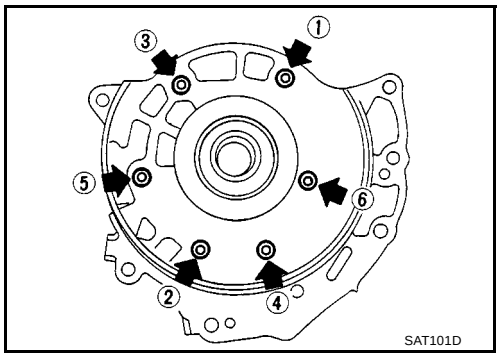
3. Install inner and outer gears on oil pump housing.
   - **Take care with the direction of inner gear.**



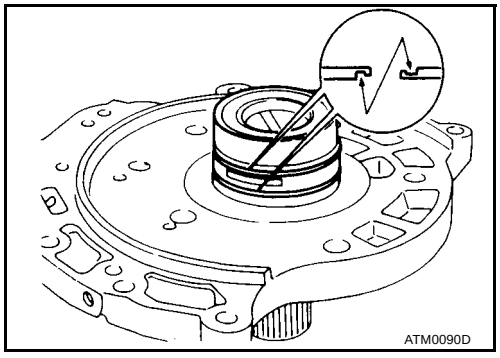
4. Install oil pump cover on oil pump housing.

a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-453, "COMPONENTS" .



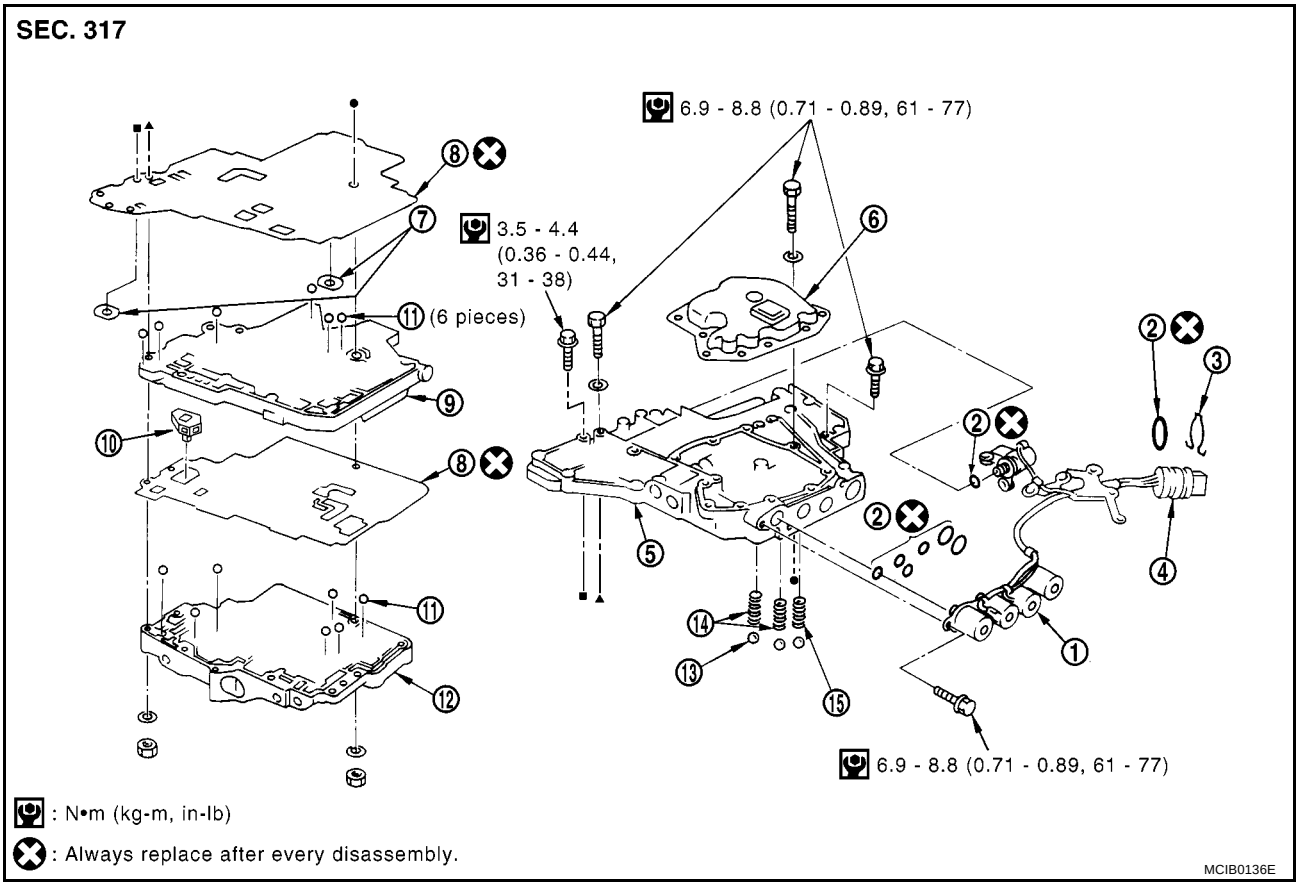
5. Install new seal rings carefully after packing ring groove with petroleum jelly.
   - **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**



Control Valve Assembly

ECS008I8

COMPONENTS



1.	Solenoid valve assembly	2.	O-ring	3.	Clip
4.	Terminal body	5.	Control valve lower body	6.	Oil strainer
7.	Support plate	8.	Separating plate	9.	Control valve inter body
10.	Pilot filter	11.	Steel ball	12.	Control valve upper body
13.	Check ball	20.	Fluid cooler relief valve spring	15.	Valve spring

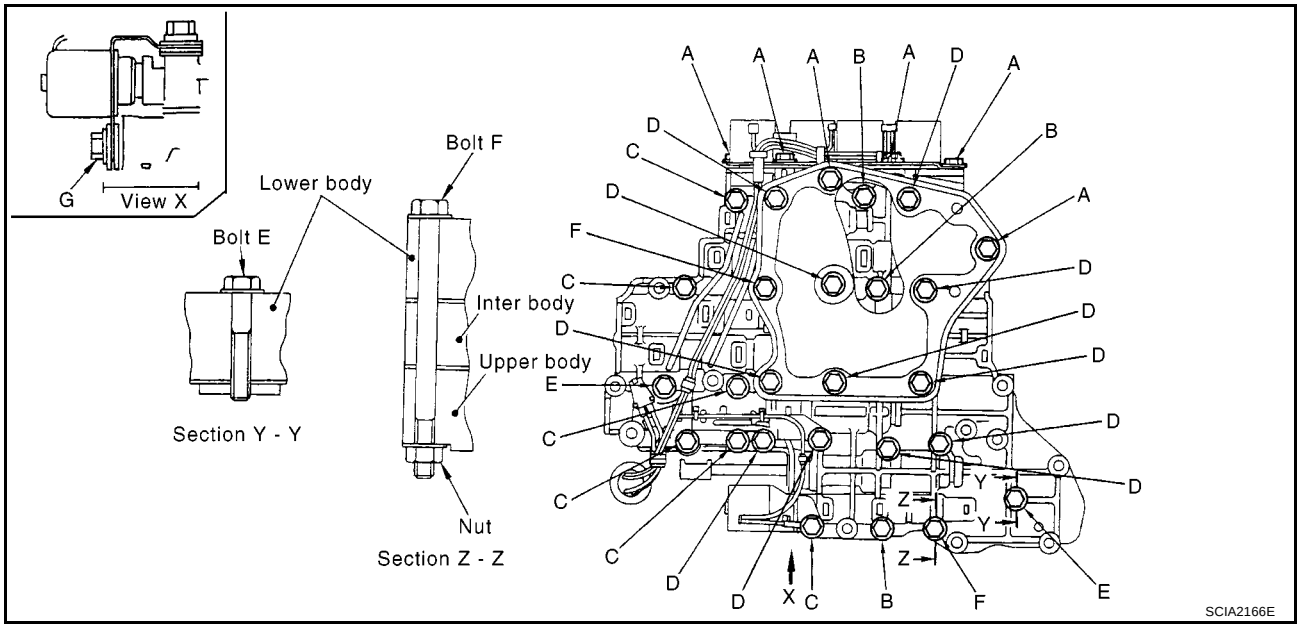
DISASSEMBLY

- Disassemble upper, inter and lower bodies.

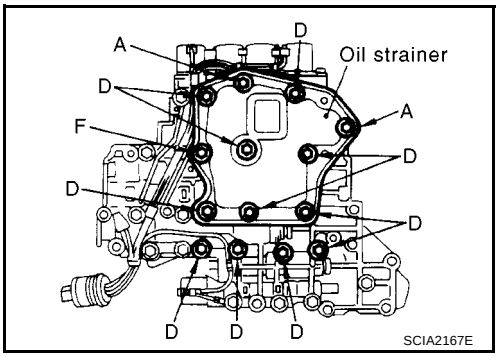
Bolt length, number and location:

Bolt symbol	A	B	C	D	E	F	G
Bolt length "ℓ"	13.5 mm (0.531 in)	58.0 mm (2.283 in)	40.0 mm (1.575 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

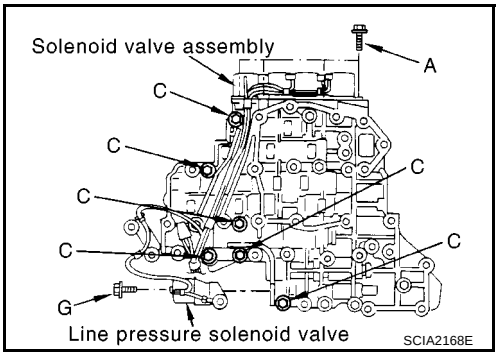
F: Reamer bolt and nut



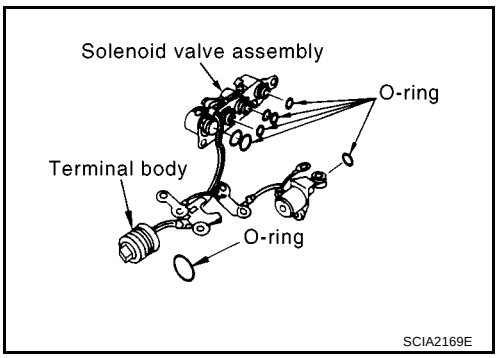
1. Remove bolts A, D and F, and remove oil strainer from control valve assembly.



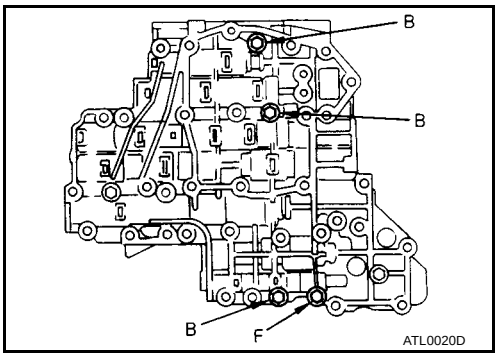
2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.
   - **Be careful not to lose the line pressure solenoid valve spring**.



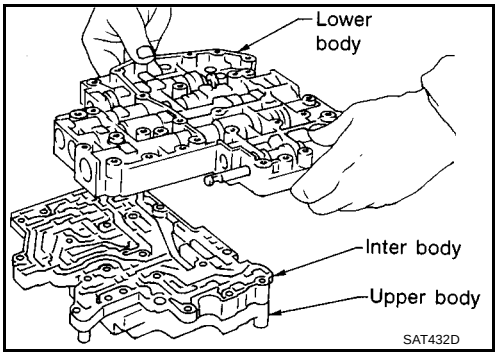
3. Remove O-rings from solenoid valves and terminal body.



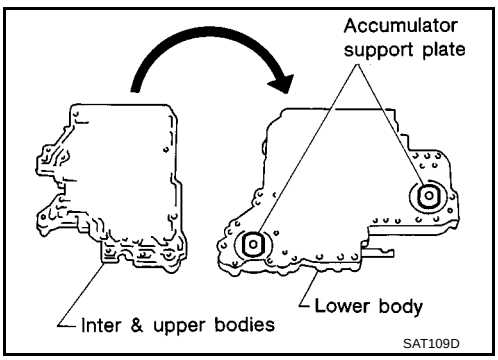
4. Place upper body facedown, and remove bolts B and F.



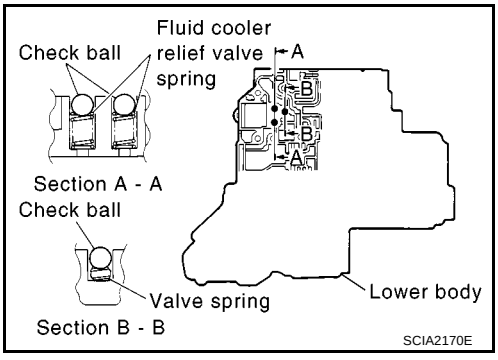
5. Remove lower body from inter body.



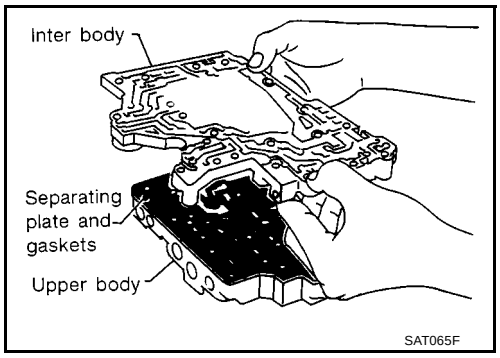
6. Turn over lower body, and accumulator support plates.
7. Remove bolts E, separating plate and separating gaskets from lower body.



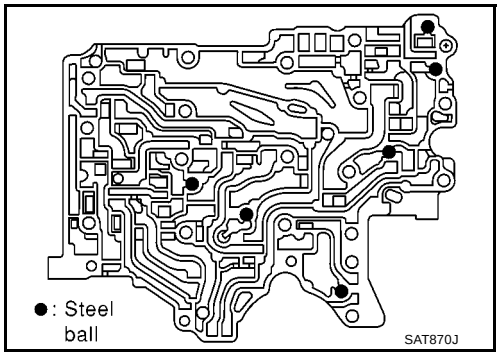
8. Remove check balls, fluid cooler relief valve springs and T/C pressure holding spring from lower body.
   - **Be careful not to lose steel balls and relief valve springs.**



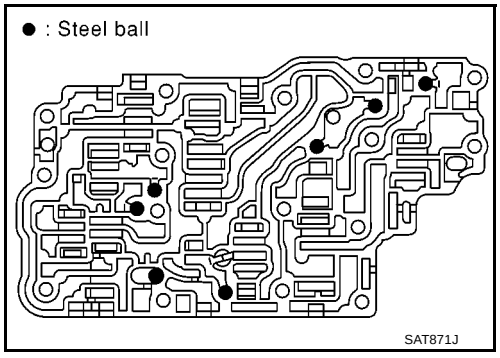
9. Remove inter body from upper body.
10. Remove pilot filter, separating plate and gaskets from upper body.



11. Check to see that steel balls are properly positioned in inter body and then remove them.
    - **Be careful not to lose steel balls.**



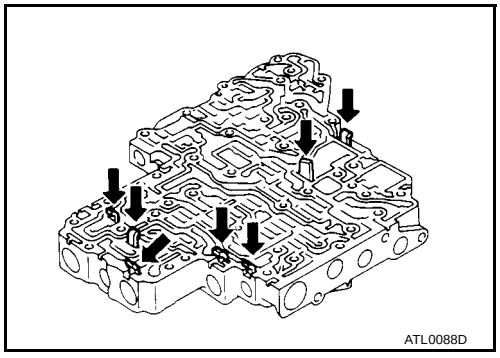
12. Check to see that steel balls are properly positioned in upper body and then remove them.
    - **Be careful not to lose steel balls.**



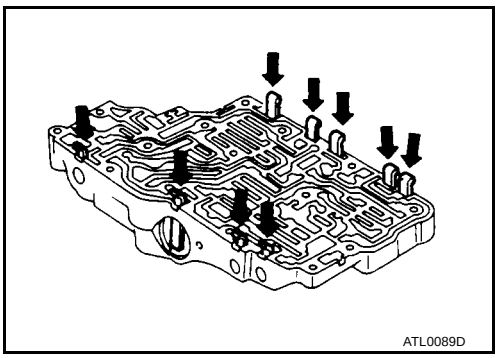
INSPECTION

Lower and Upper Bodies

- Check to see that retainer plates are properly positioned in lower body.

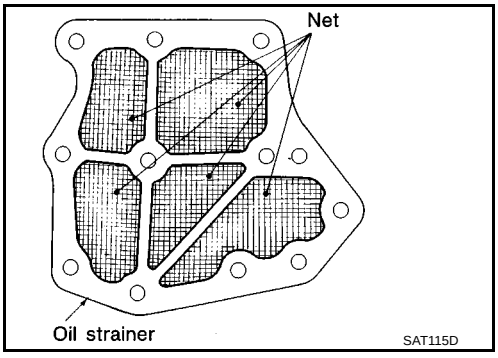


- Check to see that retainer plates are properly positioned in upper body.
- **Be careful not to lose these parts.**



Oil Strainer

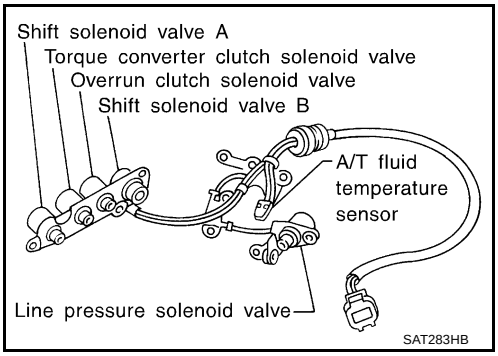
- Check wire netting of oil strainer for damage.



Shift Solenoid Valves “A” and “B”, Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

Measure resistance.
Except for EURO-OBD:

- For shift solenoid valve A, refer to AT-376, "SHIFT SOLENOID VALVE A" .
- For shift solenoid valve B, refer to AT-381, "SHIFT SOLENOID VALVE B" .
- For line pressure solenoid valve, refer to AT-405, "LINE PRESSURE SOLENOID VALVE" .
- For torque converter clutch solenoid valve, refer to AT-390, "TORQUE CONVERTER CLUTCH SOLENOID VALVE" .
- For overrun clutch solenoid valve, refer to AT-386, "OVERRUN CLUTCH SOLENOID VALVE" .



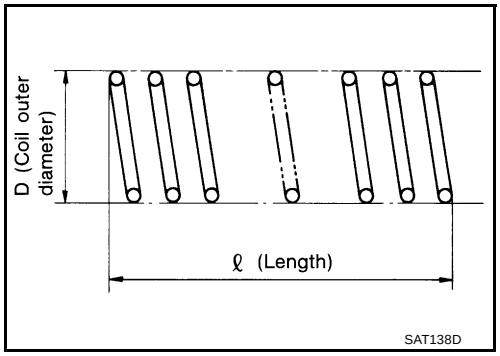
EURO-OBD:

- For shift solenoid valve A, refer to AT-173, "DTC P0750 SHIFT SOLENOID VALVE A" .
- For shift solenoid valve B, refer to AT-178, "DTC P0755 SHIFT SOLENOID VALVE B" .
- For line pressure solenoid valve, refer to AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE" .
- For torque converter clutch solenoid valve, refer to AT-161, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" .
- For overrun clutch solenoid valve, refer to AT-188, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .

Fluid Cooler Relief Valve Spring

- Check springs for damage or deformation.
- Measure free length and outer diameter.

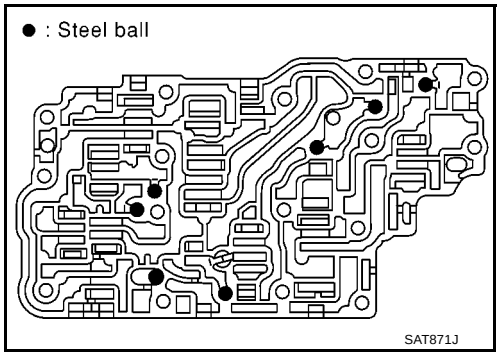
Inspection standard: Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



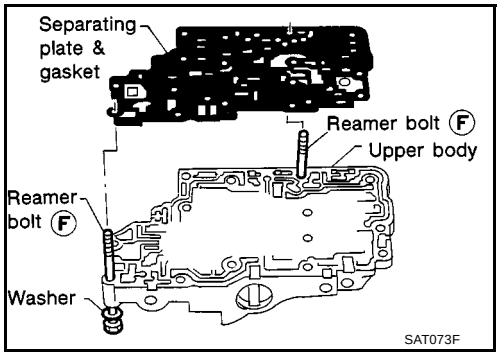
ASSEMBLY

1. Install upper, inter and lower body.

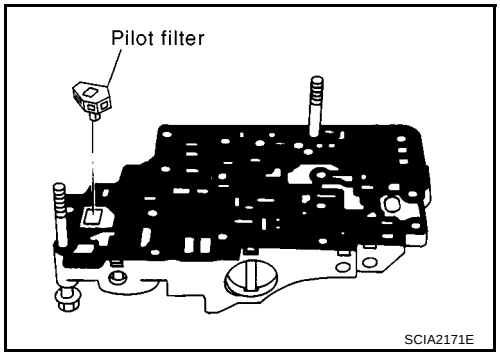
a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



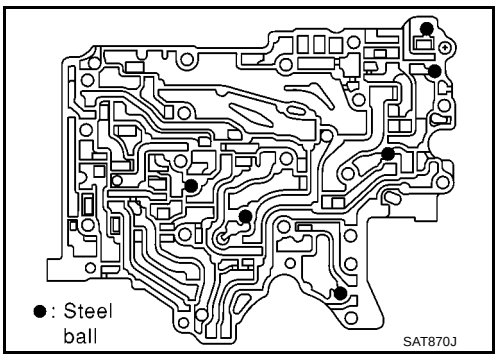
b. Install reamer bolts "**F** " from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.



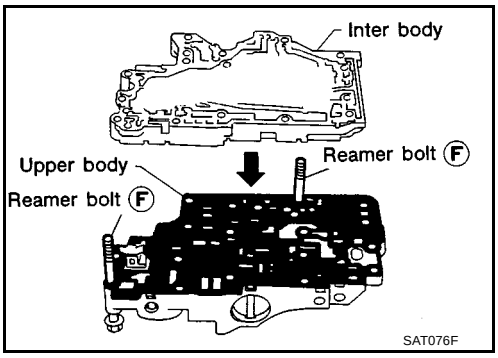
c. Install pilot filter.



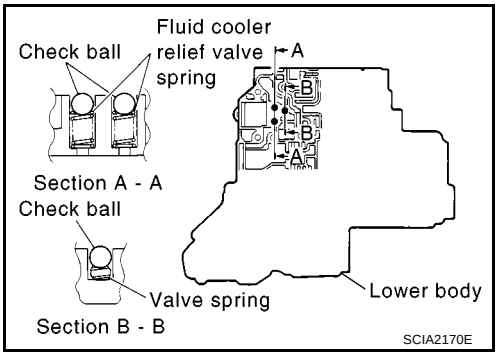
d. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.



e. Install inter body on upper body using reamer bolts **"F"** as guides.
   - **Be careful not to dislocate or drop steel balls.**

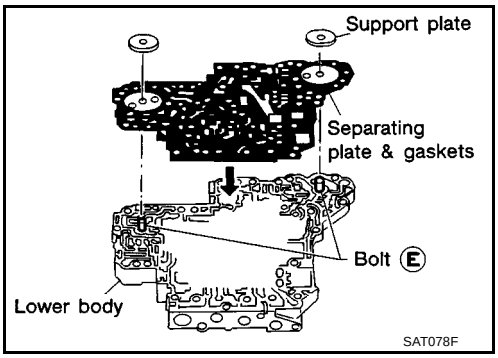


f. Install check balls, fluid cooler relief valve springs and T/C pressure holding spring in their proper positions in lower body.

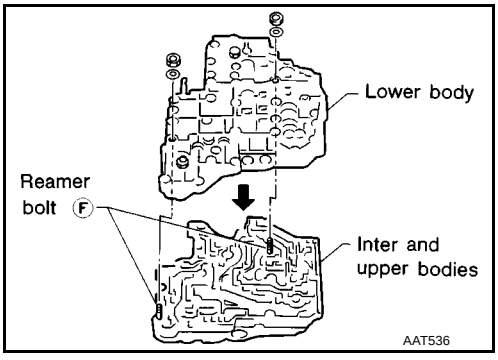


g. Install bolts **"E"** from bottom of lower body. Using bolts **"E"** as guides, install separating plate and gaskets as a set.

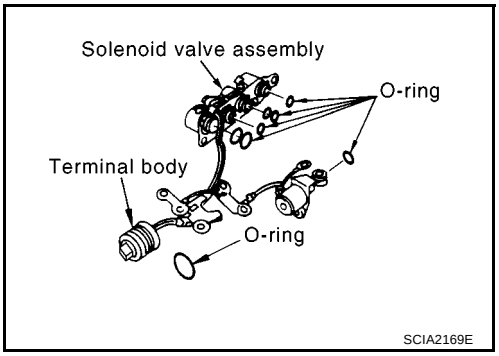
h. Temporarily install support plates on lower body.



i. Install lower body on inter body using reamer bolts "**F**" as guides and tighten reamer bolts **"F"** slightly.



2. Install O-rings to solenoid valves and terminal body.
   - **Apply ATF to O-rings.**

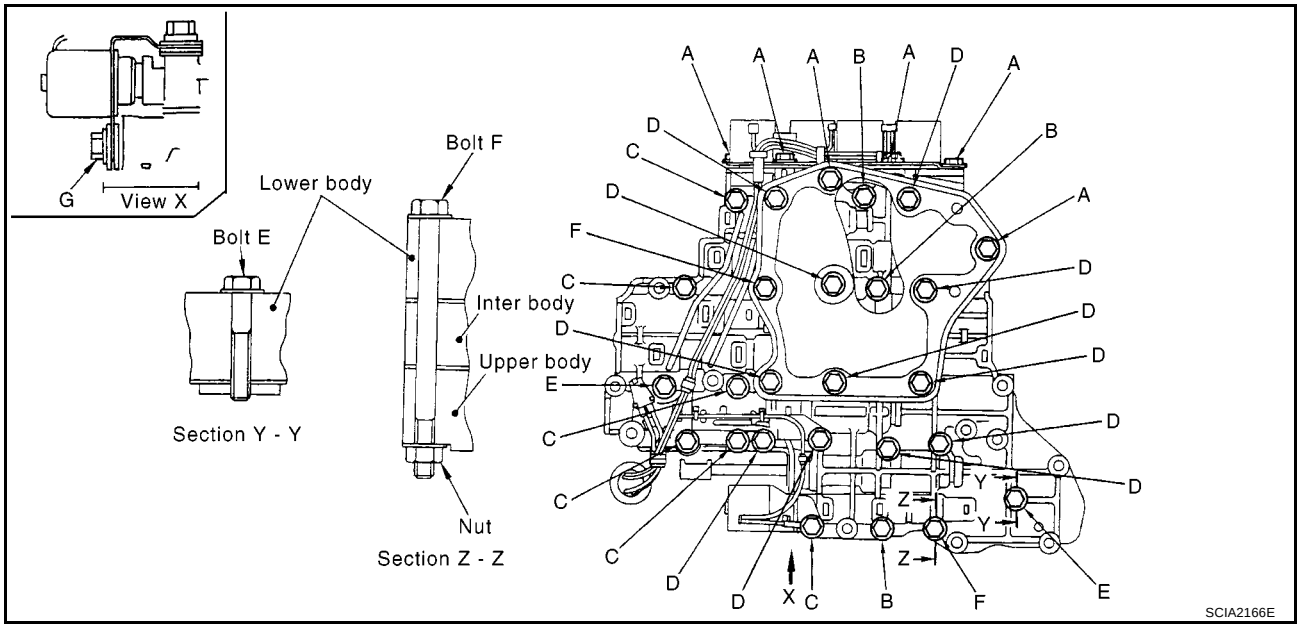


3. Install and tighten bolts.

   Bolt length, number and location:

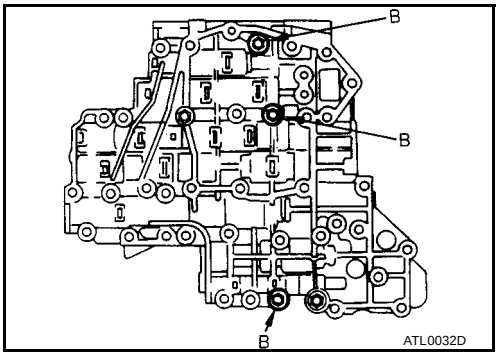
Bolt symbol	A	B	C	D	E	F	G
Bolt length "ℓ"	13.5 mm (0.531 in)	58.0 mm (2.283 in)	40.0 mm (1.575 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

F: Reamer bolt and nut

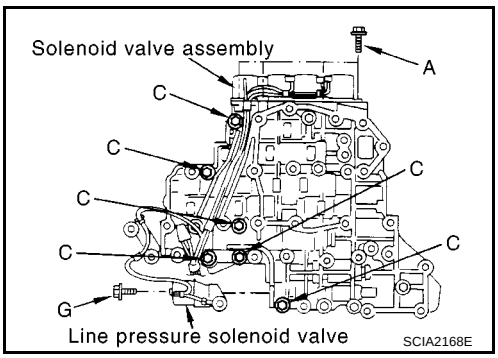


a. Install and tighten bolts **B** to specified torque.

   : 7 - 9 N-m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

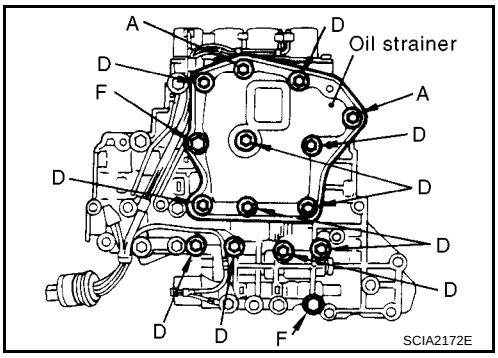


b. Install solenoid valve assembly and line pressure solenoid valve from control valve assembly.



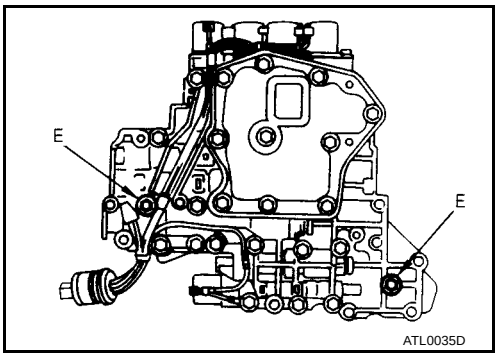
c. Set oil strainer, then tighten bolts **A** , **C** , **D** and nuts **F** to specified torque.

: 7 - 9 N-m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



d. Tighten bolts **E** to specified torque.

: 3.4 - 4.4 N-m (0.35 - 0.45 kg-m, 30 - 39 in-lb)

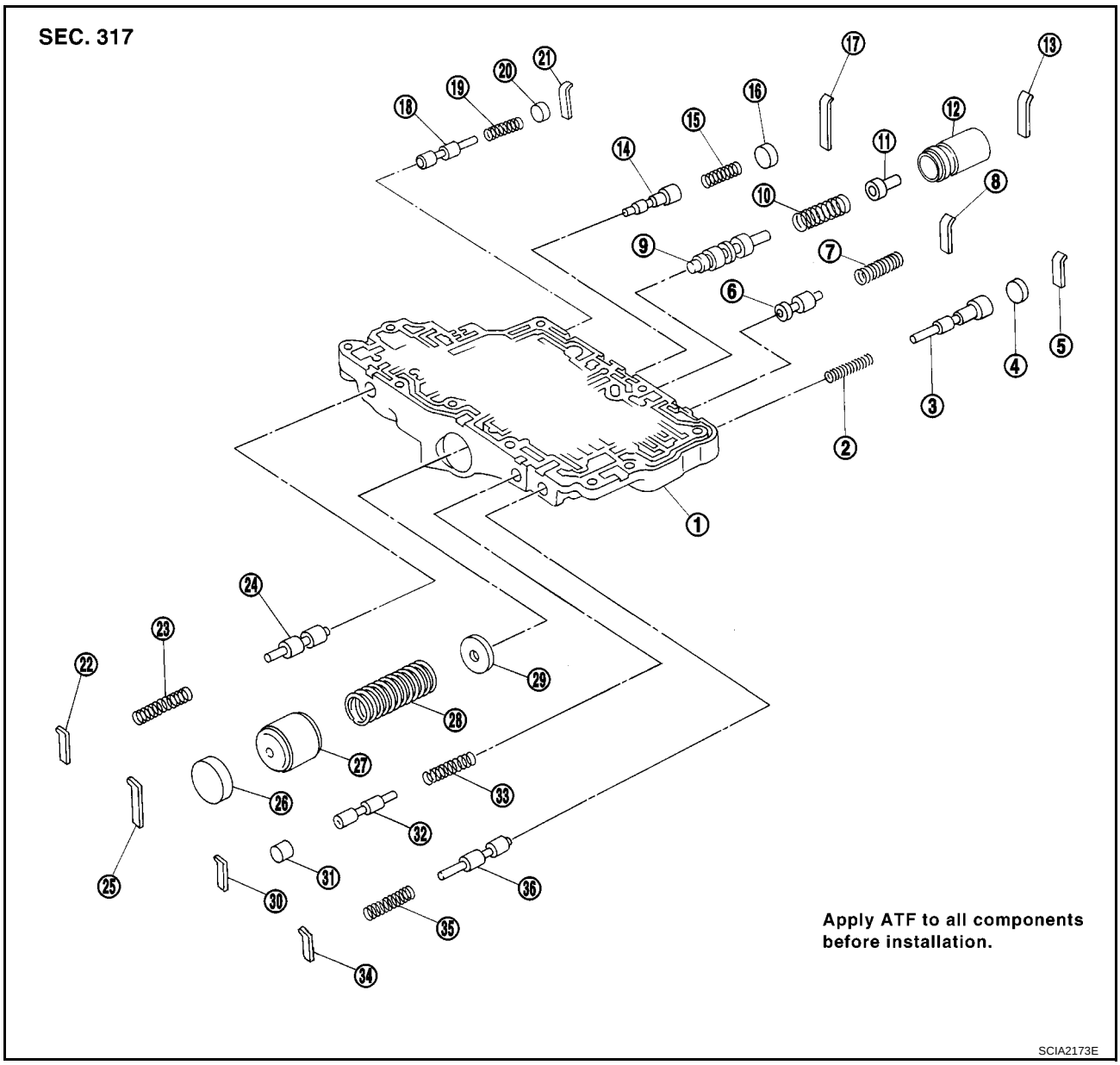


Control Valve Upper Body

ECS008I9

COMPONENTS

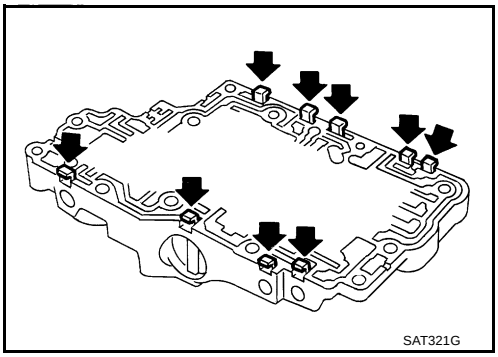
Numbers preceding valve springs correspond with those shown in AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



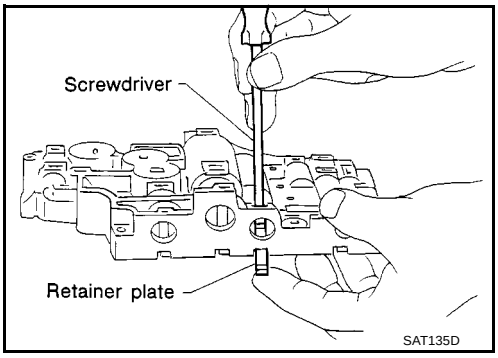
1. Control valve upper body
2. Return spring
3. Overrun clutch reducing valve
4. Plug
5. Retainer plate
6. Torque converter relief valve
7. Return spring
8. Retainer plate
9. Torque converter clutch control valve
10. Return spring
11. Plug
12. Sleeve
13. Retainer plate
14. 1-2 accumulator valve
15. Return spring
16. Plug
17. Retainer plate
18. Cooler check valve
19. Return spring
20. Plug
21. Retainer plate
22. Retainer plate
23. Return spring
24. Pilot valve
25. Retainer plate
26. Plug
27. 1-2 accumulator piston
28. Return spring
29. 1-2 accumulator retainer plate
30. Retainer plate
31. Plug
32. 1st reducing valve
33. Return spring
34. Retainer plate
35. Return spring
36. 3-2 timing valve

DISASSEMBLY

1. Remove valves at retainer plates.
   - **Do not use a magnetic pick-up tool.**

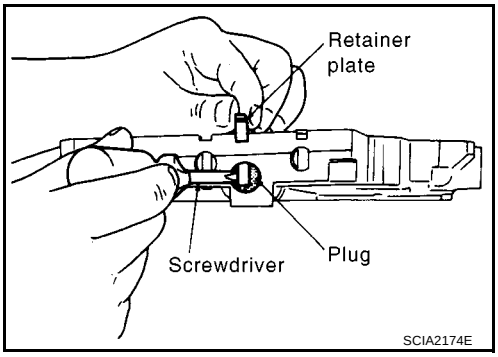


a. Use a screwdriver to remove retainer plates.

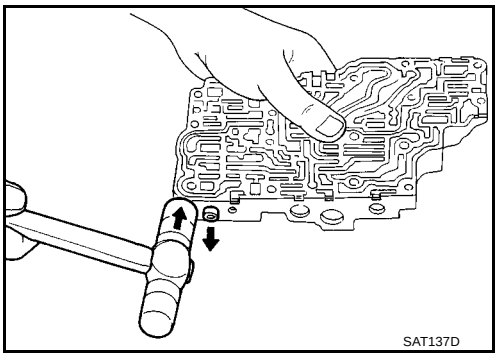


b. Insert plug or return spring using a screwdriver to prevent inside parts from popping out as shown in the figure. And remove retainer plate by hand.

CAUTION:
Be careful not to damage the valve body.



c. Place mating surface of valve body face down, and remove internal parts.
   - **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
   - **Be careful not to drop or damage valves and sleeves.**



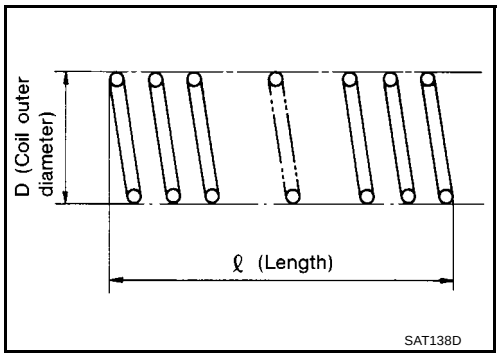
INSPECTION

Valve Spring

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

  Inspection standard :Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

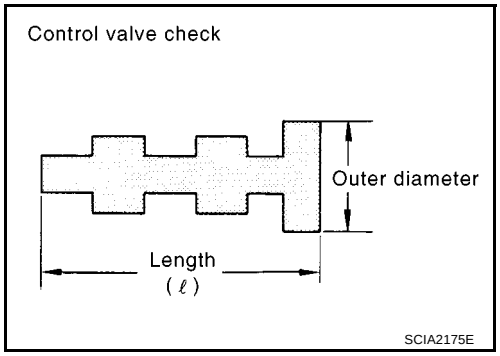
- Replace valve springs if deformed or fatigued.



Control Valves

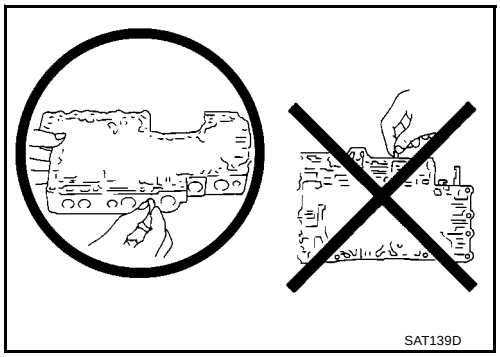
- Check sliding surfaces of control valve, sleeve and plug. If damage is detected, replace them.

  Inspection standard :Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

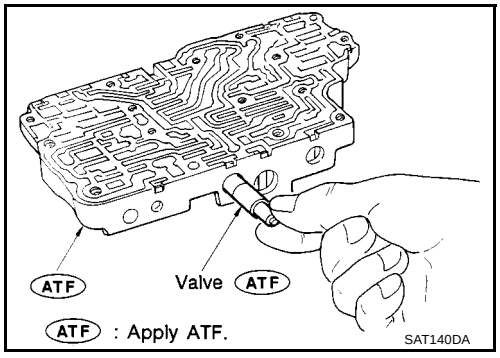


ASSEMBLY

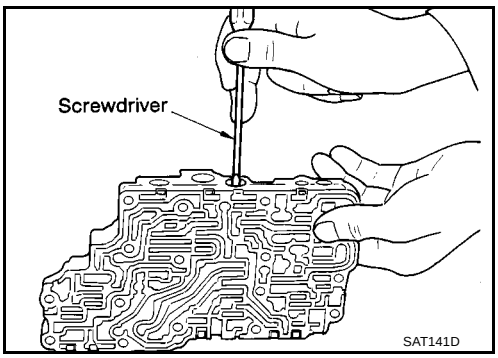
- **Lay control valve body down when installing valves. Do not stand the control valve body upright.**



1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.
   - **Be careful not to scratch or damage valve body.**

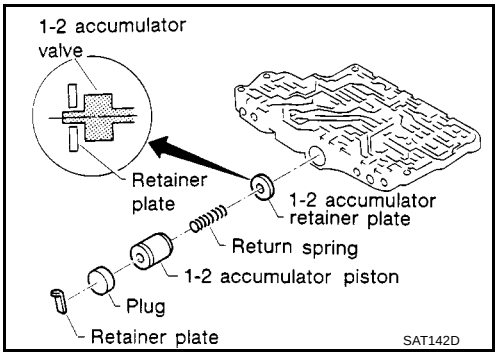


- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

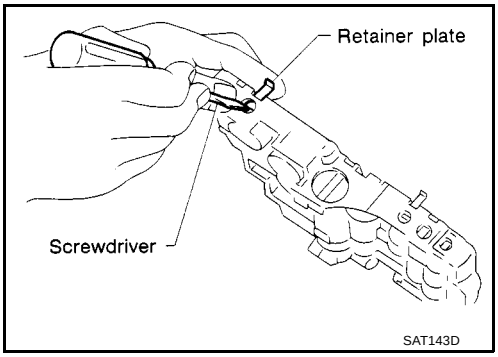


1-2 Accumulator Valve

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



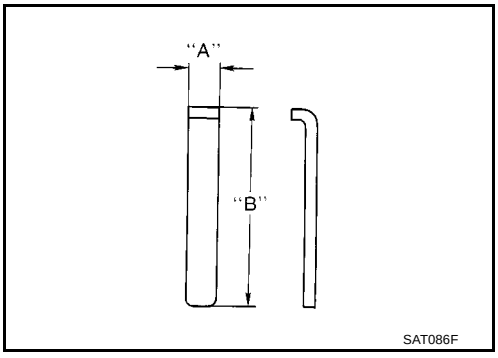
1. Install retainer plates.
   - Install retainer plate while pushing plug or return spring.



Retainer Plate (Upper Body)

Unit: mm (in)

No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
8	Torque converter relief valve		
17	1-2 accumulator valve		40.5 (1.594)
25	1-2 accumulator piston		
5	Overrun clutch reducing valve		24.0 (0.945)
21	Cooler check valve		
13	Torque converter clutch control valve		28.0 (1.102)



- Install proper retainer plates.
  Refer to AT-466, "Control Valve Upper Body" .

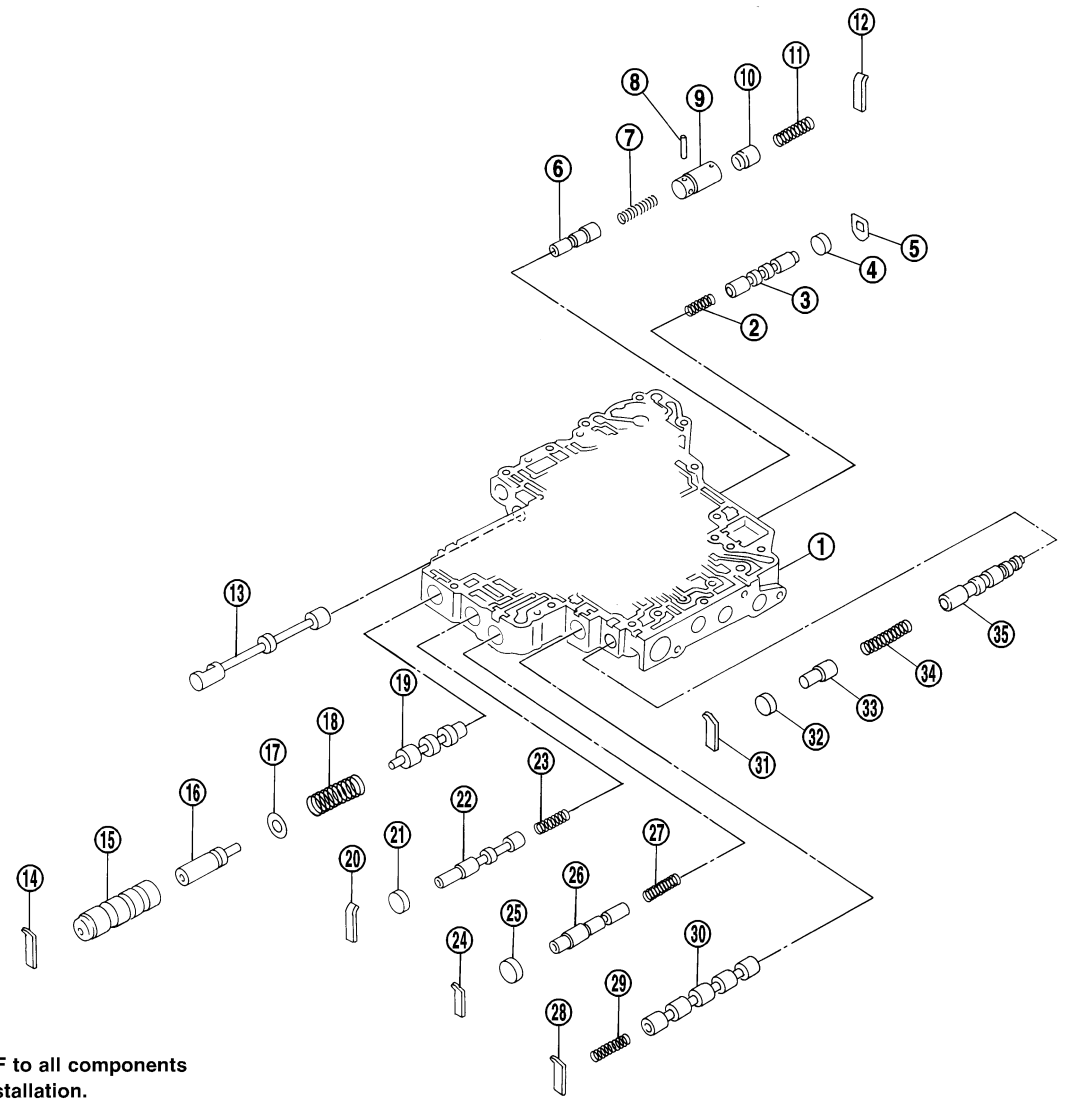
Control Valve Lower Body

ECS008IA

COMPONENTS

Numbers preceding valve springs correspond with those shown in AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

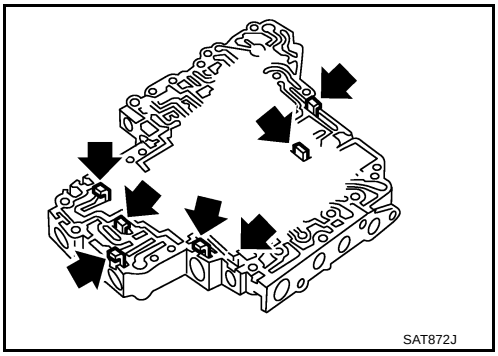
SEC. 317



1. Control valve lower body
2. Return spring
3. Shift valve B
4. Plug
5. Retainer plate
6. Pressure modifier valve
7. Return spring
8. Parallel pin
9. Sleeve
10. Piston
11. Return spring
12. Retainer plate
13. Manual valve
14. Retainer plate
15. Sleeve
16. Plug
17. Spring seat
18. Return spring
19. Pressure regulator valve
20. Retainer plate
21. Plug
22. Overrun clutch control valve
23. Return spring
24. Retainer plate
25. Plug
26. Accumulator control valve
27. Return spring
28. Retainer plate
29. Return spring
30. Shift valve A
31. Retainer plate
32. Plug
33. Plug
34. Return spring
35. Shuttle control valve

DISASSEMBLY

- Remove valves at retainer plate.
  For removal procedures, refer to AT-467, "DISASSEMBLY" .



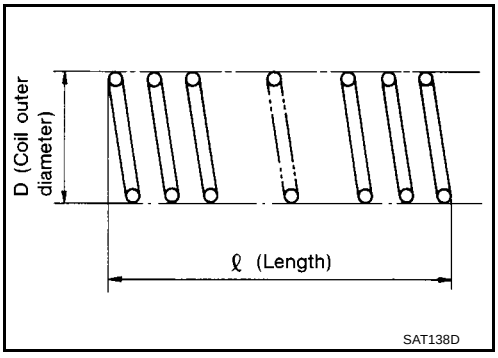
INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.

  Inspection standard :Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

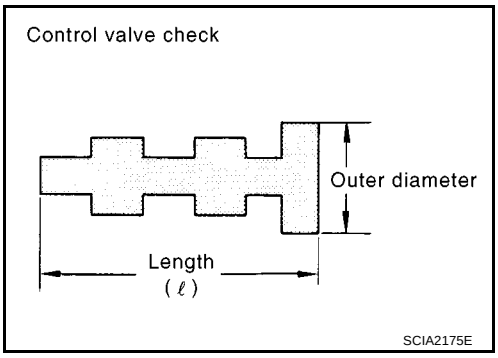
- Replace valve springs if deformed or fatigued.



Control Valves

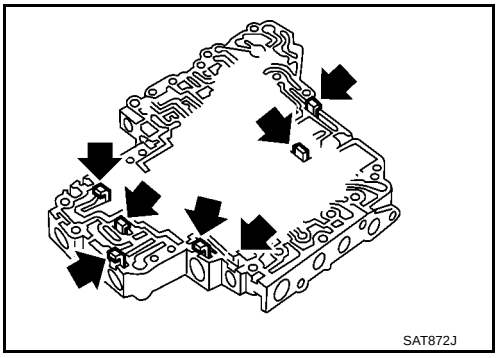
- Check sliding surfaces of control valve, sleeve and plug. If damage is detected, replace them.

  Inspection standard :Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



ASSEMBLY

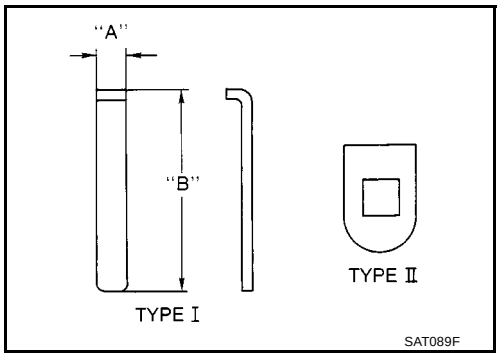
- Install control valves.
  For installation procedures, refer to AT-468, "ASSEMBLY" .



Retainer Plate (for control valve lower body)

Unit: mm (in)

No.	Name of control valve	Length A	Length B	Type
14	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
24	Accumulator control valve			
28	Shift valve A			
20	Overrun clutch control valve			
12	Pressure modifier valve			
31	Shuttle control valve			
5	Shift valve B	17.0 (0.67)	24.0 (0.94)	II

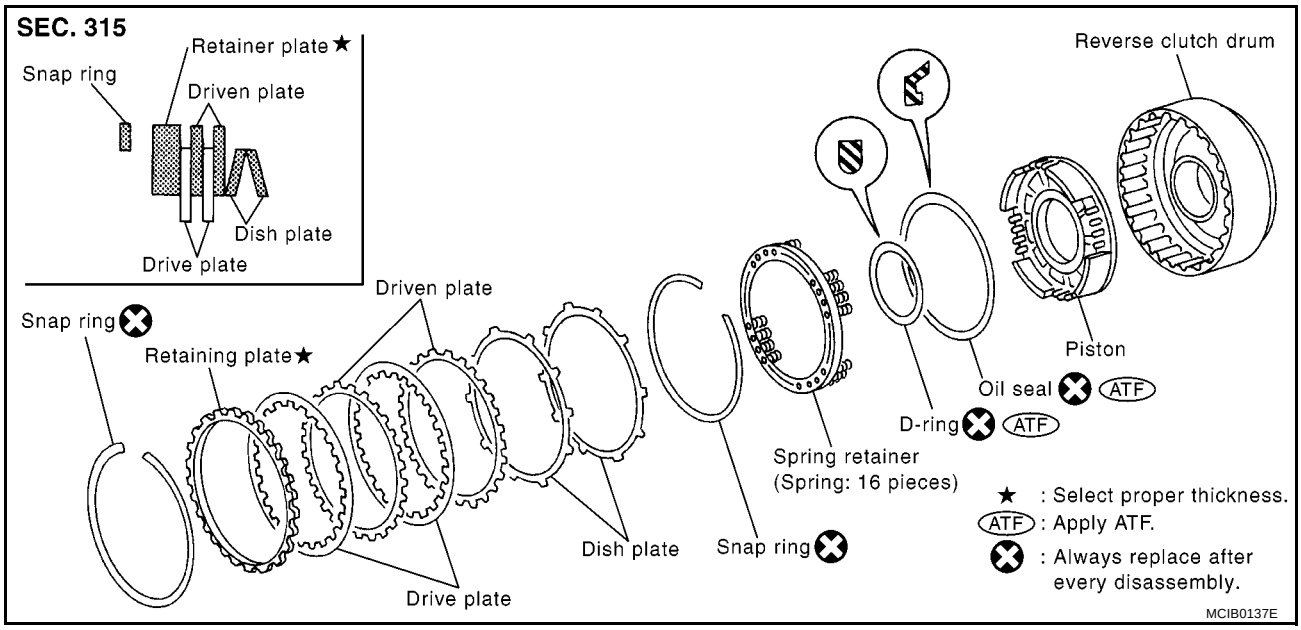


- Install proper retainer plates.
  Refer to AT-470, "Control Valve Lower Body" .

Reverse Clutch

ECS008IB

COMPONENTS



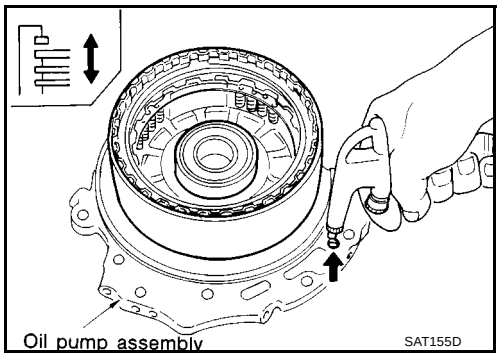
DISASSEMBLY

1. Check operation of reverse clutch

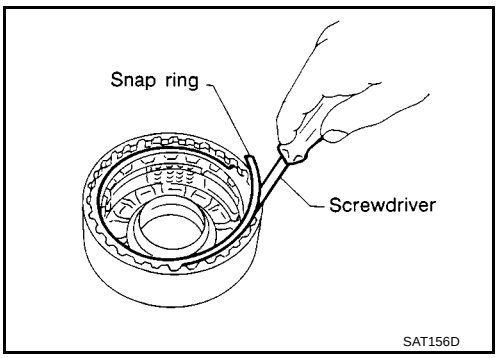
a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

b. Check to see that retaining plate moves to snap ring.

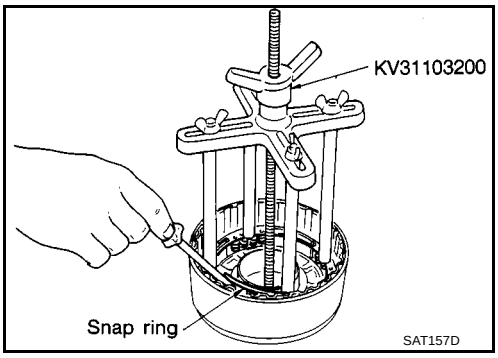
c. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Oil seal might be damaged.
   - Fluid might be leaking past piston check ball.



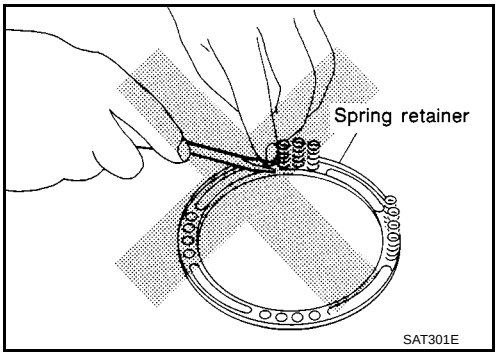
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



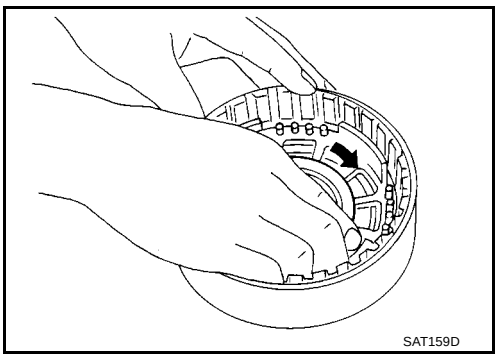
4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
   - **Set Tool directly over springs.**
   - **Do not expand snap ring excessively.**
5. Remove spring retainer and return springs.



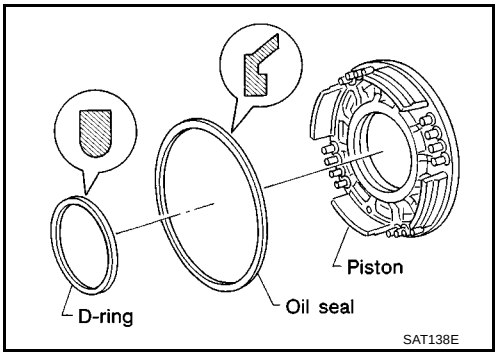
- **Do not remove return spring from spring retainer.**



6. Remove piston from reverse clutch drum by turning it.



7. Remove D-ring and oil seal from piston.



INSPECTION

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

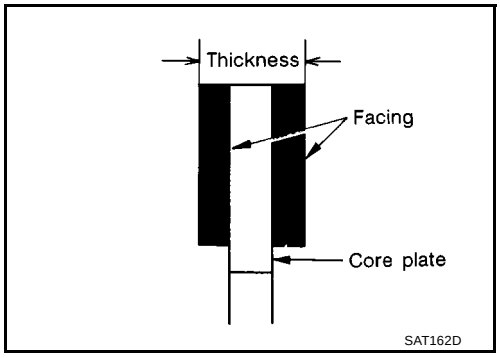
- Check for deformation, fatigue or damage.
- If necessary, replace.
- When replacing spring retainer and return springs, replace them as a set.

Reverse Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:
Standard value: 2.0 mm (0.079 in)
Wear limit: 1.8 mm (0.071 in)

- If not within wear limit, replace.

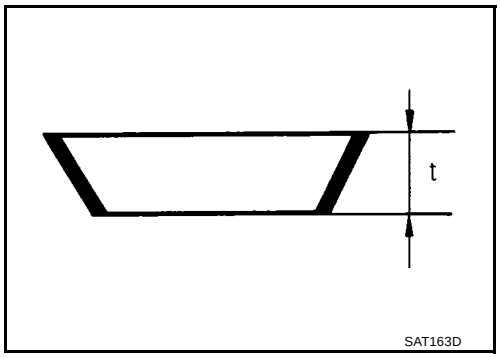


Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

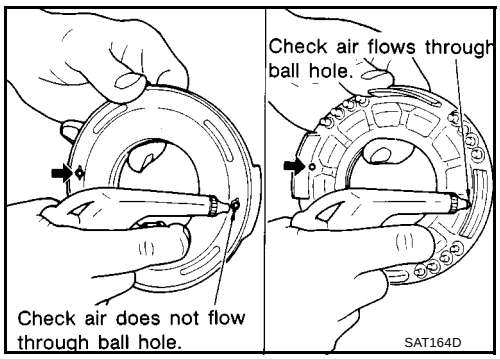
Thickness of dish plate "T": 2.92 mm (0.115 in)

- If deformed or fatigued, replace.



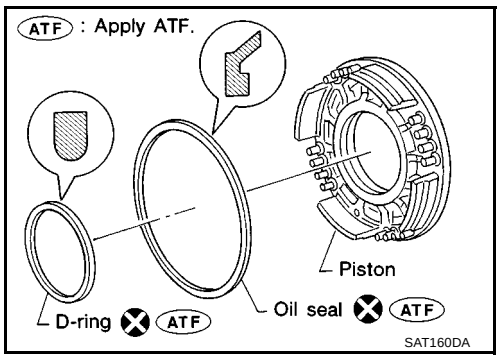
Reverse Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

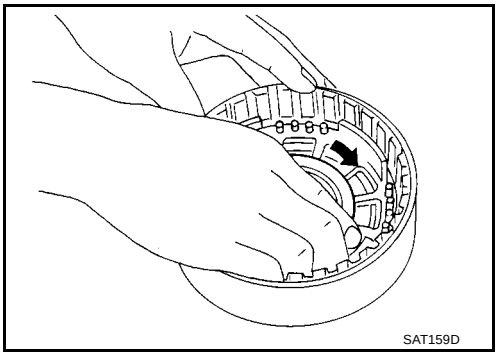


ASSEMBLY

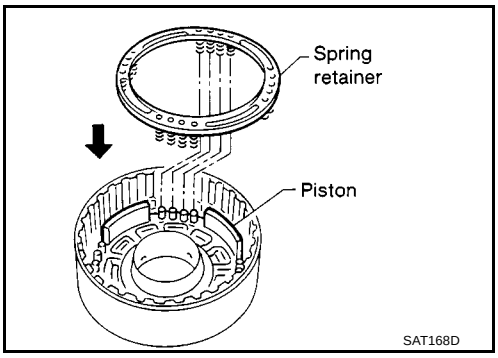
1. Install D-ring and oil seal on piston.
   - **Take care with the direction of oil seal.**
   - **Apply ATF to both parts.**



2. Install piston assembly by turning it slowly.
   - **Apply ATF to inner surface of drum.**


SAT159D

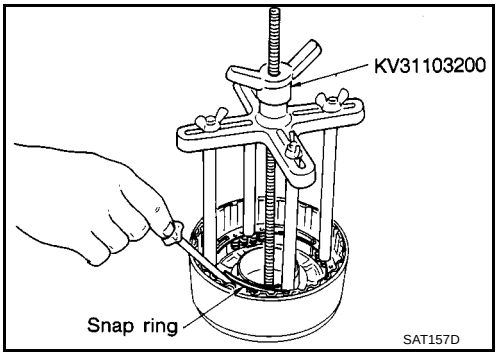
3. Install return springs and spring retainer on piston.



SAT168D

4. Set a clutch spring compressor to return spring of spring retainer and install snap ring using a screwdriver.

   CAUTION:
   - **Do not reuse the snap ring.**
   - **Set a clutch spring compressor right above return spring.**
   - **Install return spring without tilt.**
   - **Make sure snap ring is assembled securely into groove on reverse clutch drum.**

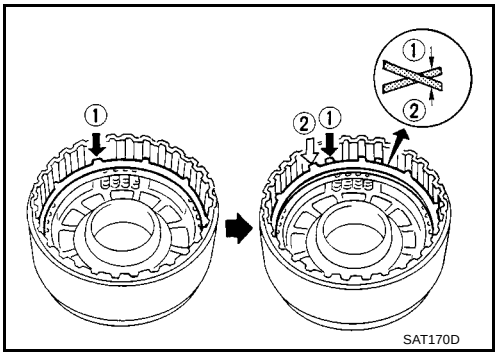


SAT157D

5. Assemble drive plate, driven plate, retaining plate and dish plate.

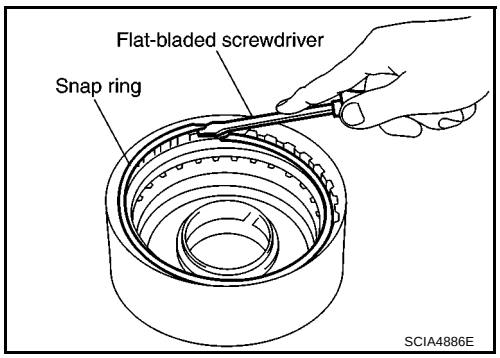
   CAUTION:
   - **Install two dish plates by aligning installation directions as shown in the figure and dislocating clutch drum groove position.**
   - **Be sure to assemble each plate in the correct order.**

6. Install drive plates, driven plates, retaining plate and dish plates.
   - **Do not align the projections of any two dish plates.**
   - **Take care with order and direction of plates.**



SAT170D

7. Install snap ring.



8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

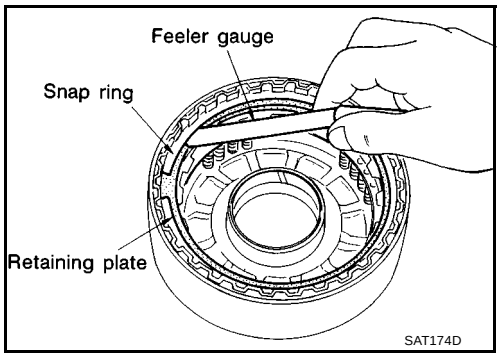
Specified clearance:

Standard: 0.5 - 0.8mm (0.020 - 0.031 in)

Allowable limit: 1.2 mm (0.047 in)

Retaining plate:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



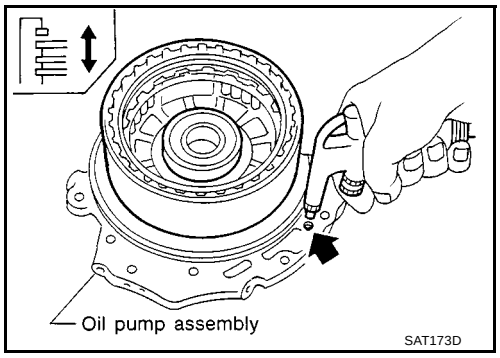
9. Check operation of reverse clutch.

a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

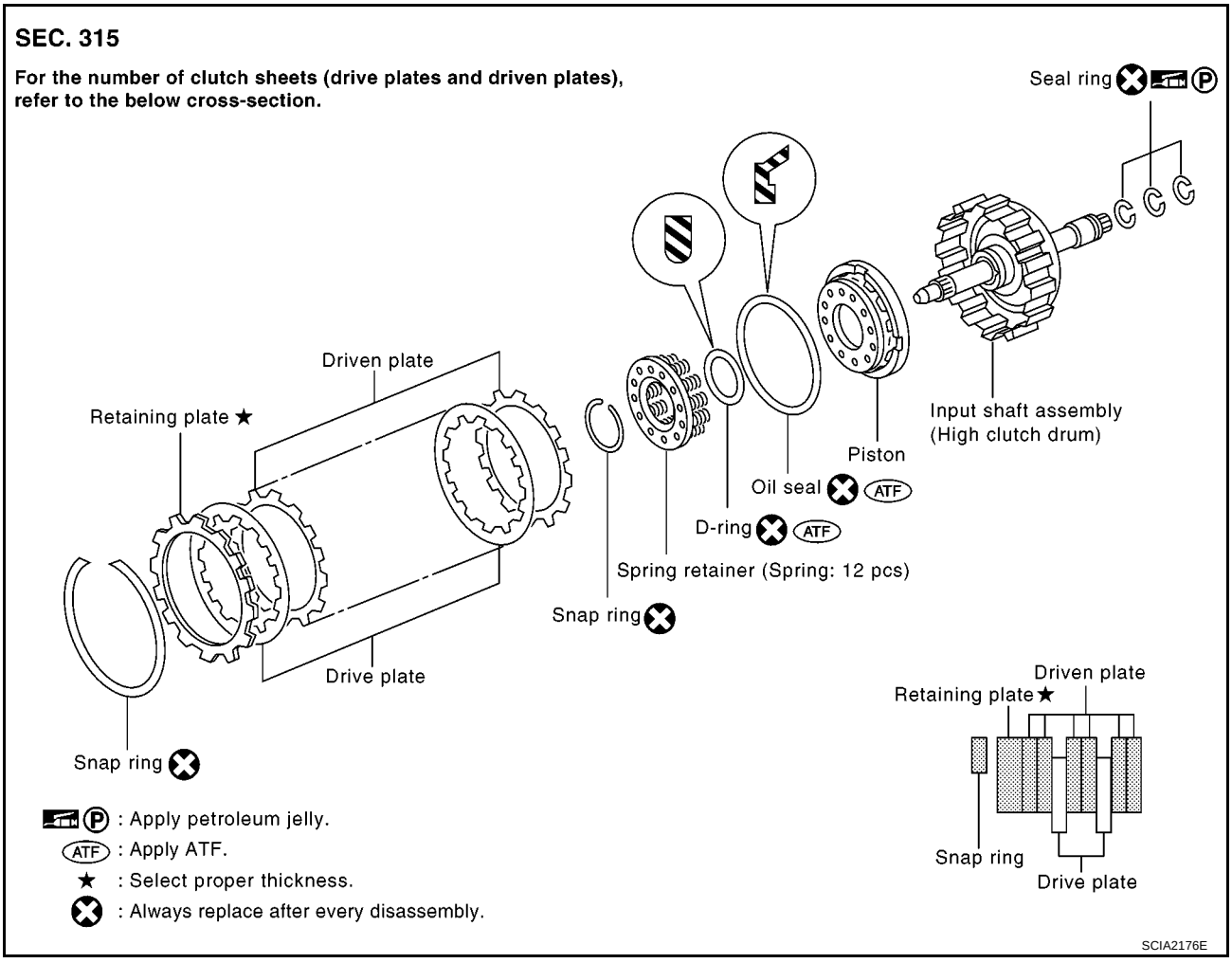
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.



High Clutch

ECS008IC

COMPONENTS



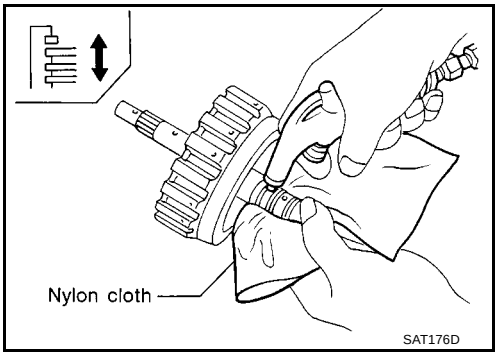
DISASSEMBLY

1. Check operation of high clutch.

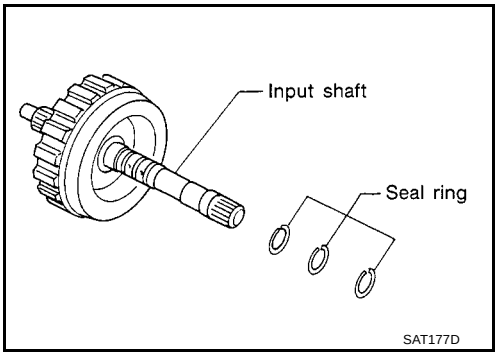
a. Apply compressed air to oil hole of input shaft with nylon cloth.
   - **Stop up hole on opposite side of input shaft with nylon cloth.**

b. Check to see that retaining plate moves to snap ring.

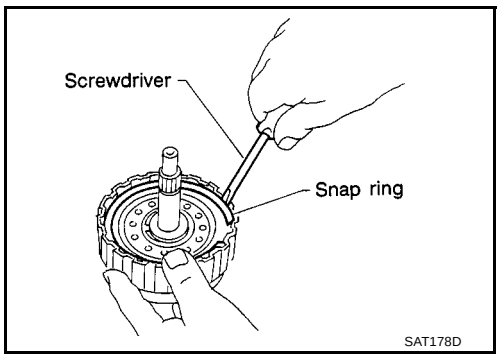
c. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Oil seal might be damaged.
   - Fluid might be leaking past piston check ball.



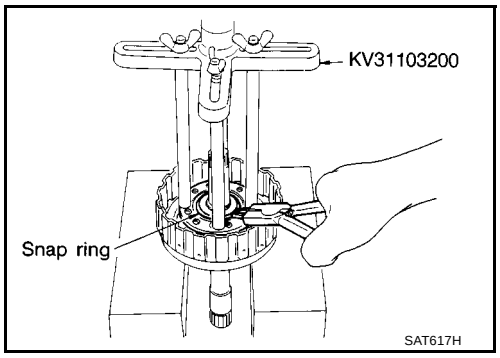
2. Remove seal rings from input shaft.
   - **Always replace when removed.**



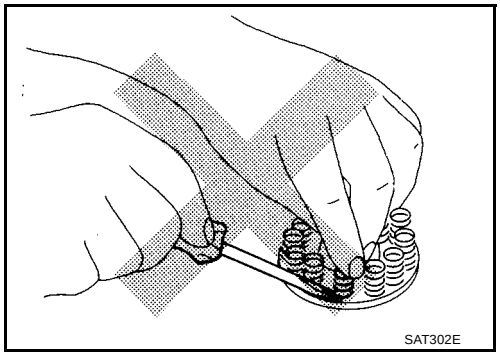
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



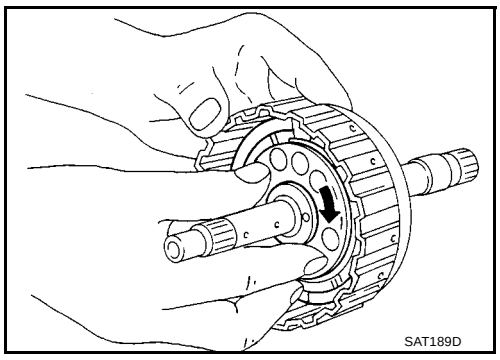
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
   - **Set Tool directly over springs.**
   - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



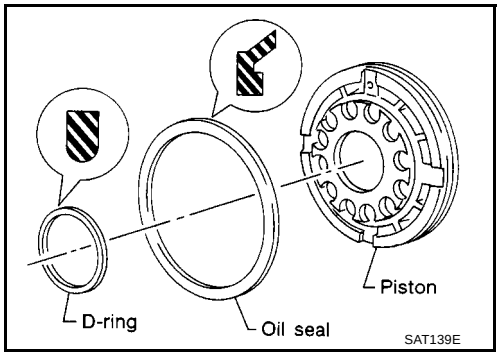
   - **Do not remove return spring from spring retainer.**



7. Remove piston from high clutch drum by turning it.



8. Remove D-ring and oil seal from piston.



INSPECTION

High Clutch Snap Ring, Spring Retainer and Return Springs

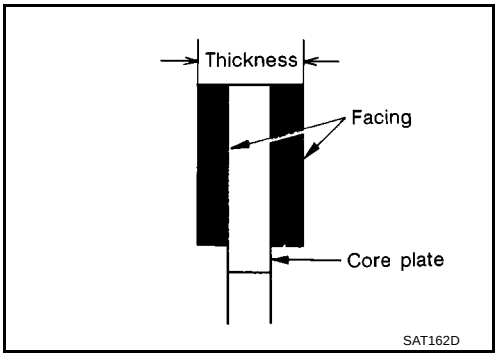
- Check for deformation, fatigue or damage.
- If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

High Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

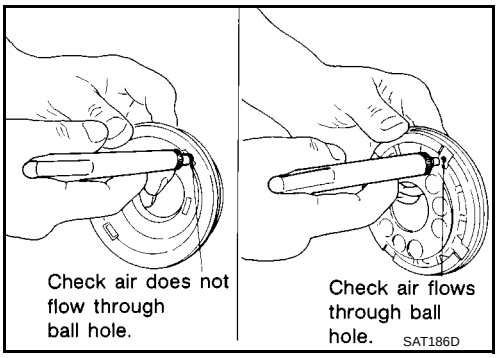
Thickness of drive plate:
Standard value 2.0 mm (0.079 in)
Wear limit 1.8 mm (0.071 in)

- If not within wear limit, replace.



High Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

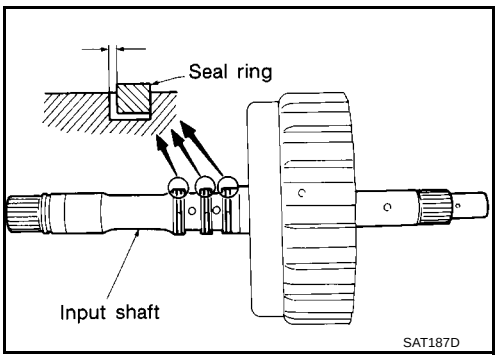


Seal Ring Clearance

- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.

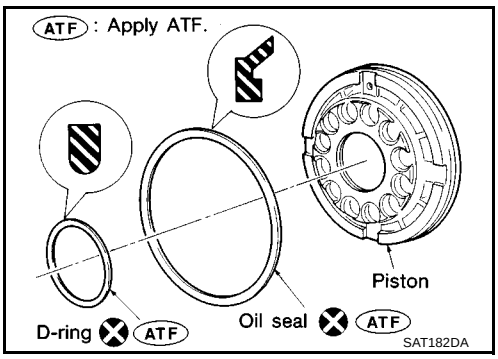
Standard clearance: 0.08 - 0.23 mm (0.0031 - 0.0091 in)
Allowable limit: 0.23 mm (0.0091 in)

- If not within allowable limit, replace input shaft assembly.

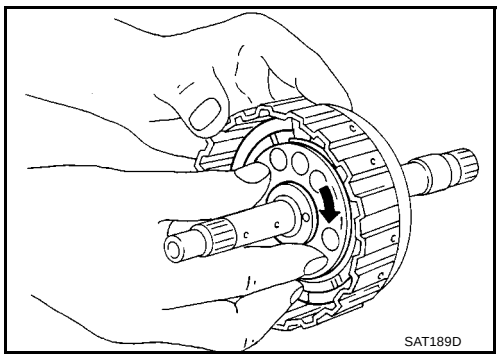


ASSEMBLY

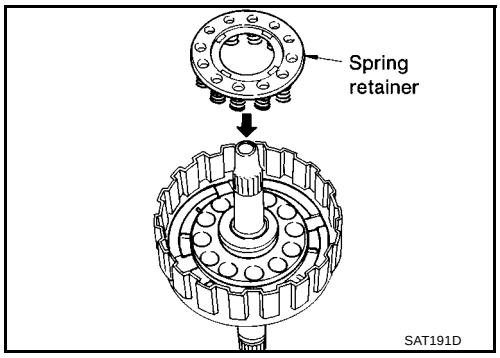
1. Install D-ring and oil seal on piston.
   - **Take care with the direction of the oil seal.**
   - **Apply ATF to both parts.**



2. Install piston assembly by turning it slowly.
   - **Apply ATF to inner surface of drum.**

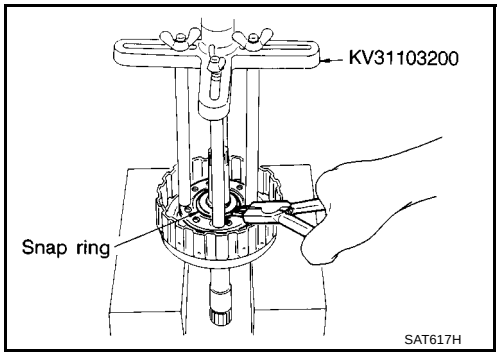


3. Install return springs and spring retainer on piston.



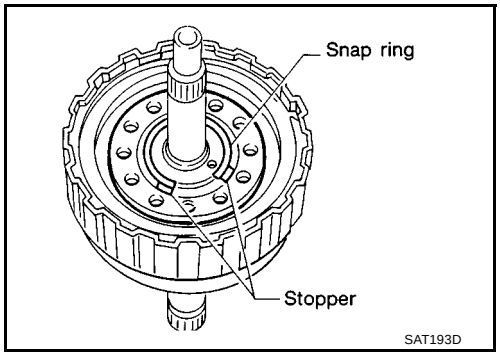
4. Set Tool on spring retainer and install snap ring while compressing return springs.

   CAUTION:
   - **Do not reuse the snap ring.**
   - **Set a clutch spring compressor (special service tool) right above return spring.**
   - **Install return spring without tilt.**

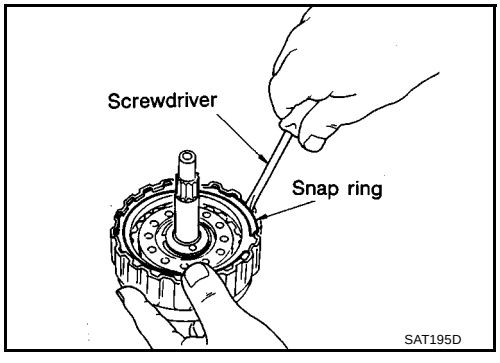


   - **Do not align snap ring end gap to spring retainer stopper.**
   - **Install snap ring securely to spring retainer inside stopper and assemble it securely to high clutch drum groove.**

5. Install drive plates, driven plates and retaining plate.
   - **Take care with the order and direction of plates.**



6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

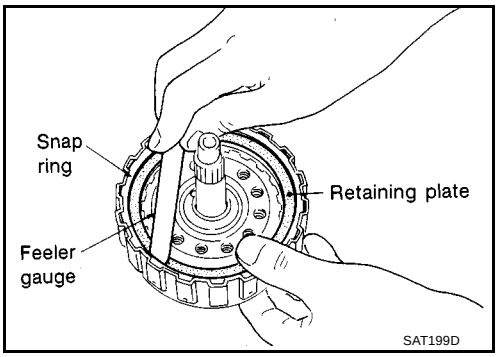
Specified clearance:

Standard 1.4 - 1.8 mm (0.055 - 0.071 in)

Allowable limit 2.4 mm (0.094 in)

Retaining plate:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

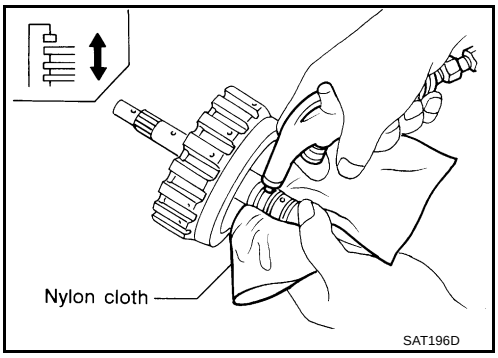


8. Check operation of high clutch.

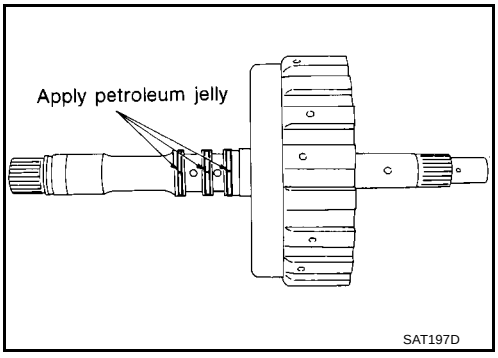
a. Apply compressed air to oil hole of input shaft with nylon cloth.
- **Stop up hole on opposite side of input shaft with nylon cloth.**

b. Check to see that retaining plate moves to snap ring.

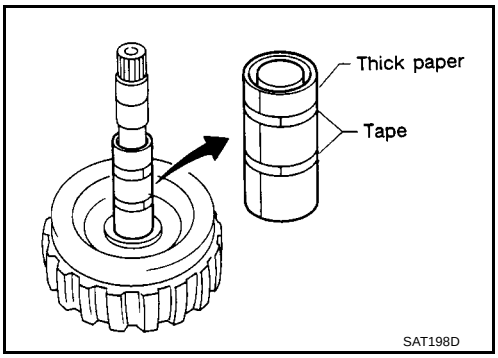
c. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.



9. Install seal rings to input shaft.
- **Apply petroleum jelly to seal rings.**
- **Always replace when removed.**



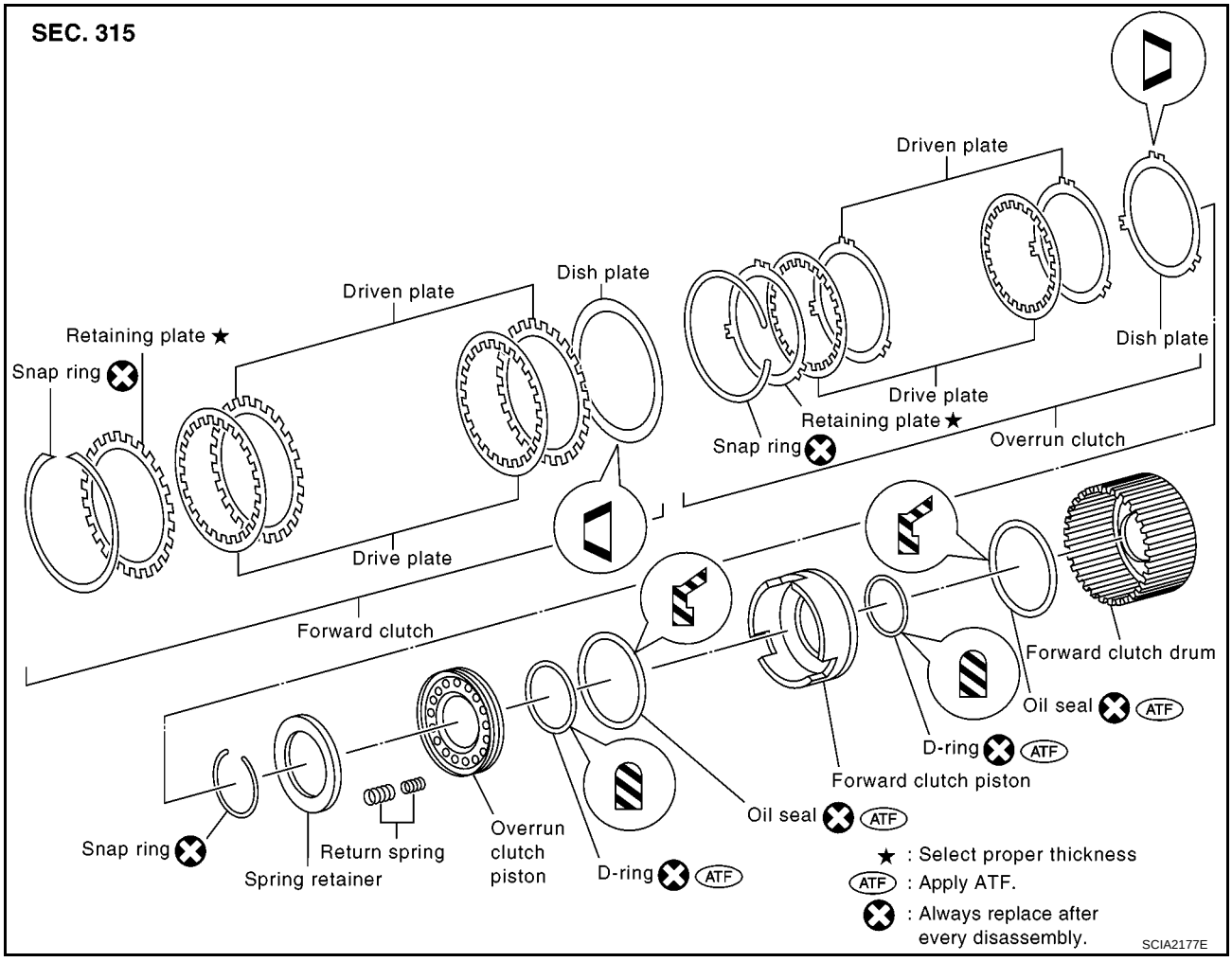
- **Roll paper around seal rings to prevent seal rings from spreading.**

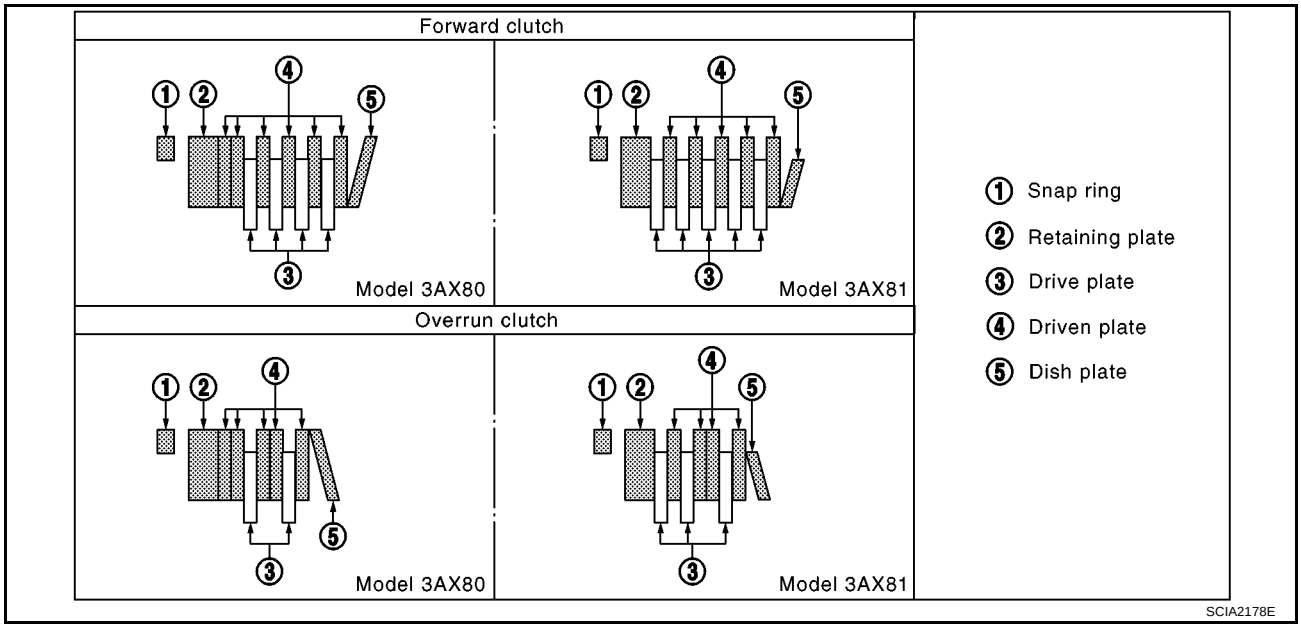


Forward and Overrun Clutches

ECS008ID

COMPONENTS





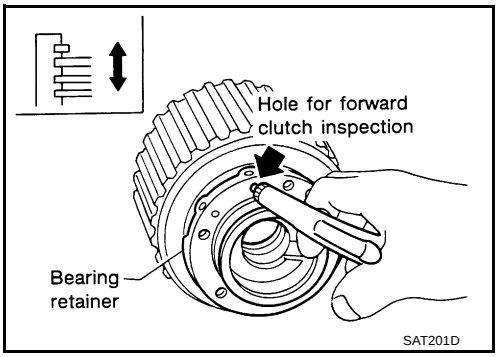
DISASSEMBLY

1. Check operation of forward clutch and overrun clutch.

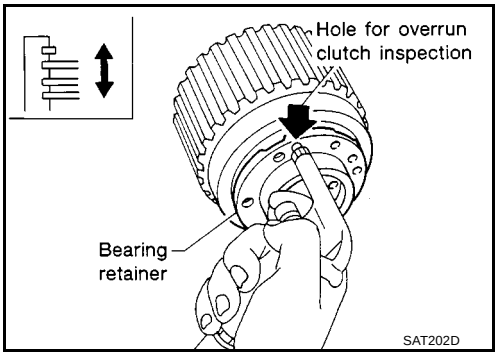
a. Install bearing retainer on forward clutch drum.

b. Apply compressed air to oil hole of forward clutch drum.

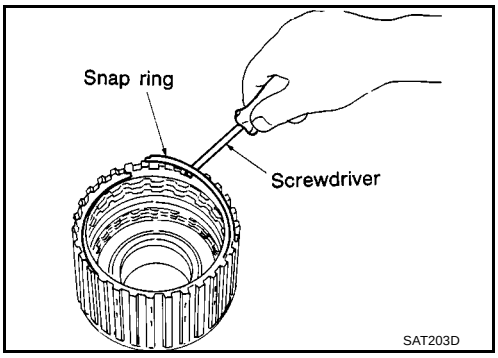
c. Check to see that retaining plate moves to snap ring.



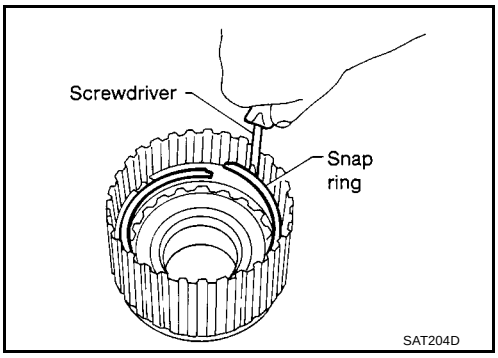
d. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Oil seal might be damaged.
   - Fluid might be leaking past piston check ball.



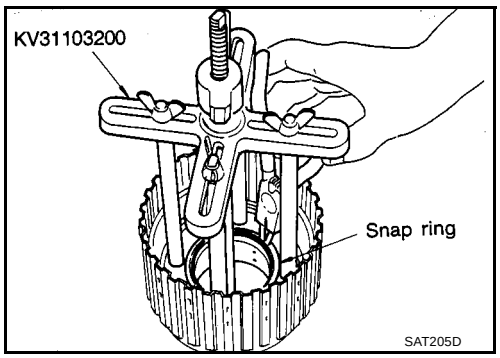
2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.



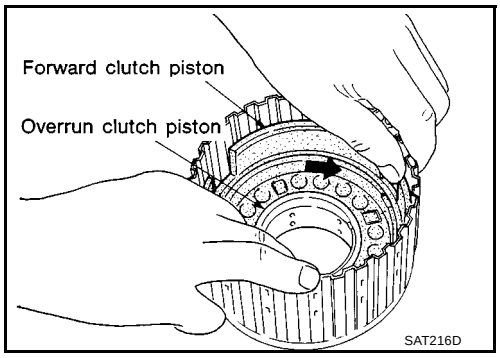
4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



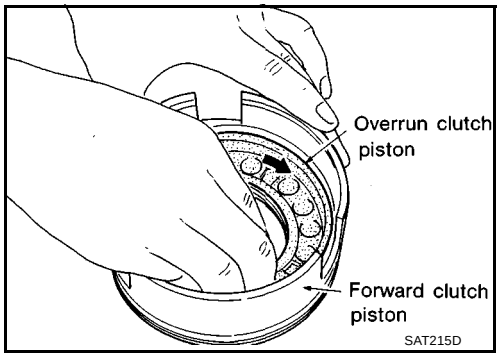
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
   - **Set Tool directly over return springs.**
   - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.
   - **Do not remove return springs from spring retainer.**



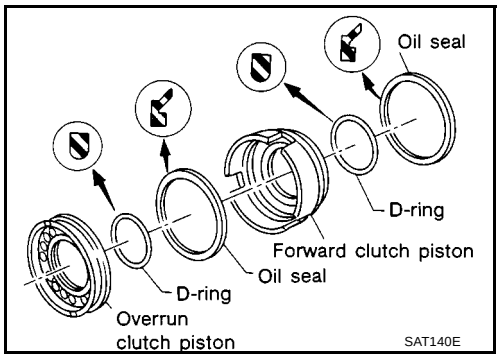
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.



INSPECTION

Snap Rings, Spring Retainer

- Check for deformation, fatigue or damage.
- Replace if necessary.

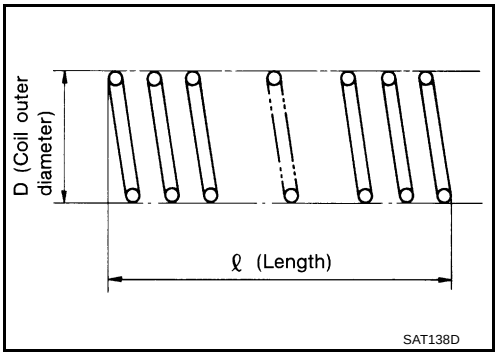
Forward Clutch and Overrun Clutch Return Spring

- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

- Replace if deformed or fatigued.



Forward Clutch and Overrun Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:

Forward clutch

Standard value: 1.8 mm (0.071 in)

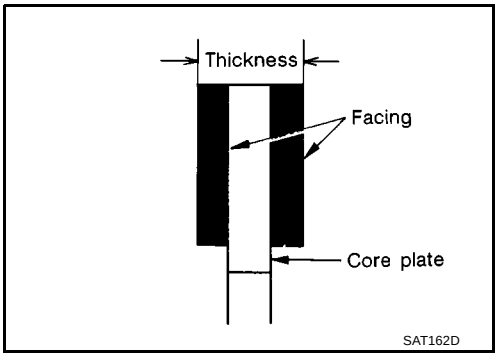
Wear limit: 1.6 mm (0.063 in)

Overrun clutch

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.4 mm (0.055 in)

- If not within wear limit, replace.



Forward Clutch and Overrun Clutch Dish Plates

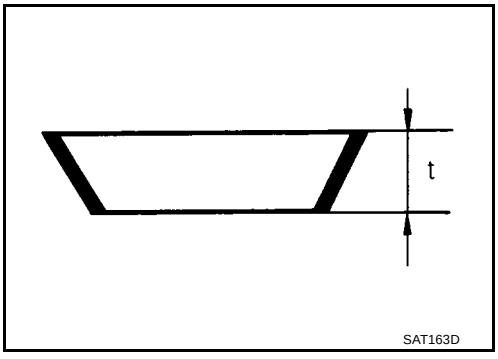
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate "t":

Forward clutch 2.5 mm (0.098 in)

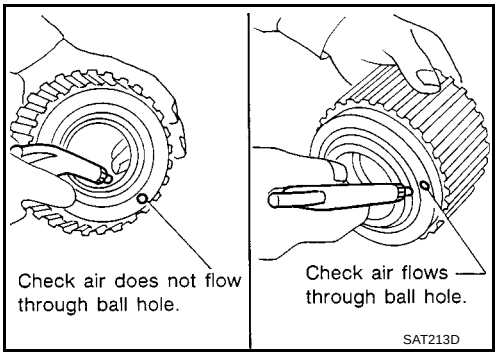
Overrun clutch 2.15 mm (0.0846 in)

- If deformed or fatigued, replace.



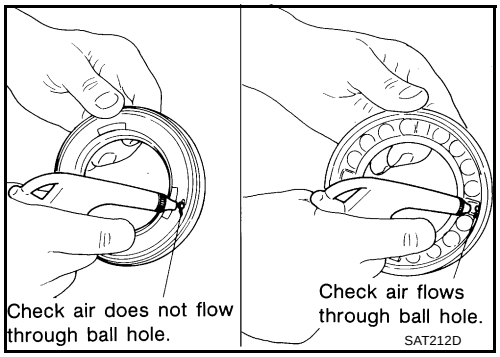
Forward Clutch Drum

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



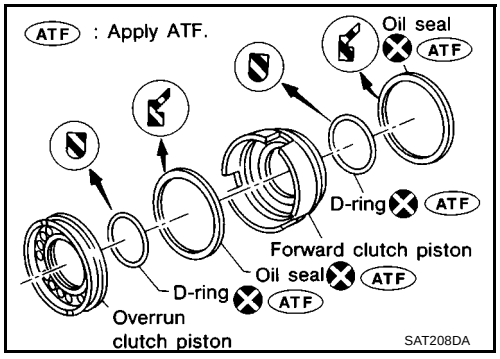
Overrun Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.

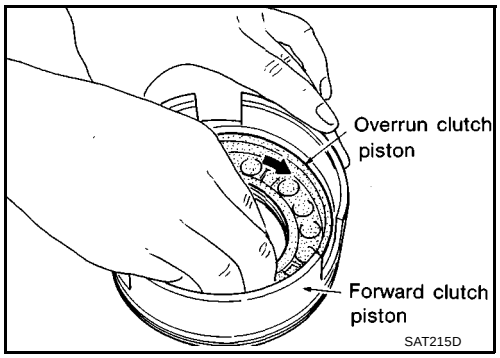


ASSEMBLY

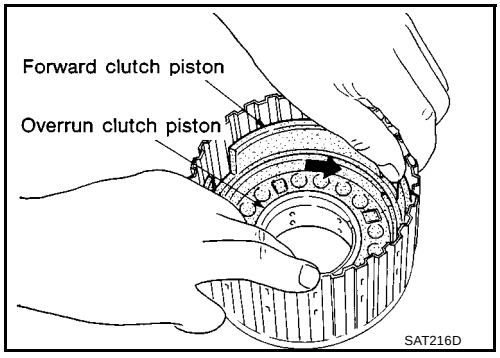
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
   - **Take care with direction of oil seal.**
   - **Apply ATF to both parts.**



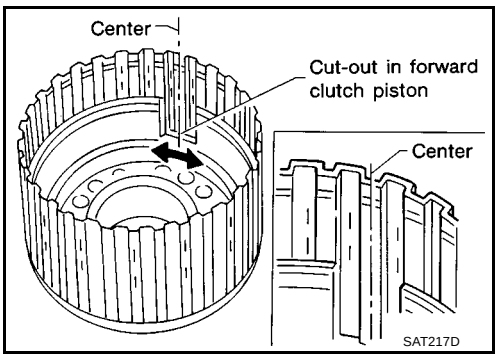
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
   - **Apply ATF to inner surface of forward clutch piston.**



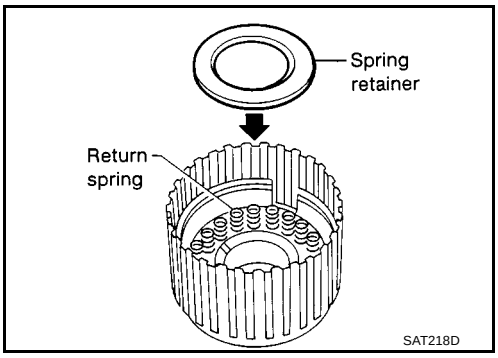
3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
   - **Apply ATF to inner surface of drum.**



4. Align notch in forward clutch piston with groove in forward clutch drum.



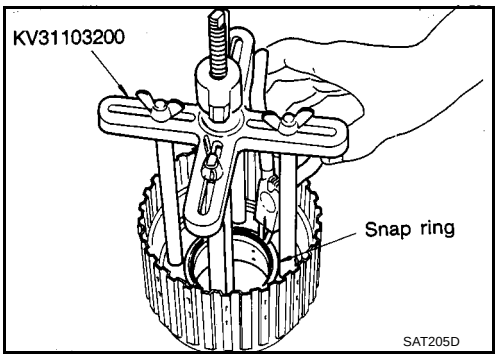
5. Install return spring on piston.
6. Install spring retainer on return springs.



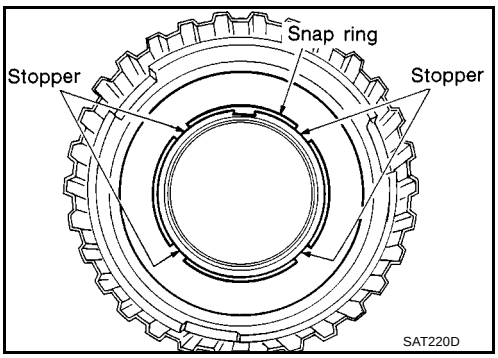
7. Set Tool on spring retainer and install snap ring while compressing return springs.

CAUTION:

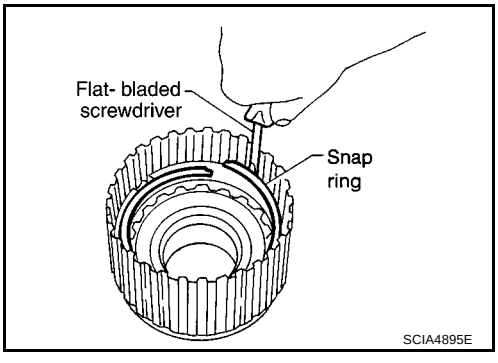
- **Do not reuse the snap ring.**
- **Set a clutch spring compressor right above return spring.**
- **Install return spring without tilt.**



- **Make sure snap ring is assembled securely into groove on reverse clutch drum.**



8. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
   - **Take care with order of plates.**
9. Install snap ring for overrun clutch.



10. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

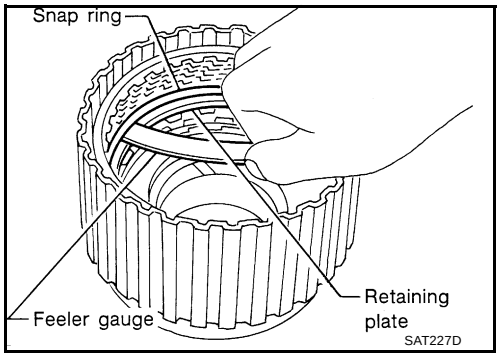
Specified clearance:

Standard 1.0 - 1.4 mm (0.039 - 0.055 in)

Allowable limit 2.0 mm (0.079 in)

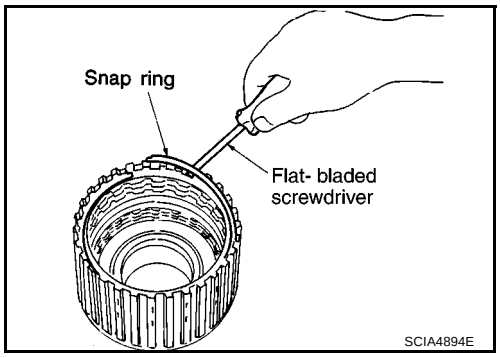
Overrun clutch retaining plate:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



11. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.
- **Take care with order and direction of plates.**

12. Install snap ring for forward clutch.



13. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

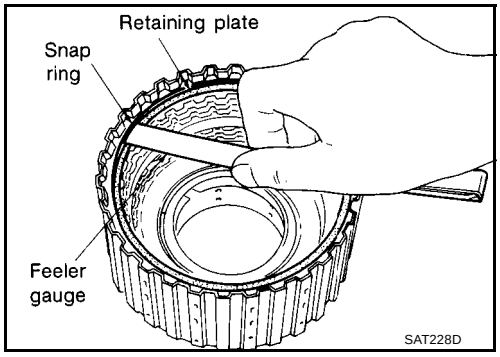
Specified clearance:

Standard 0.45 - 0.85 mm (0.0177 - 0.0335 in)

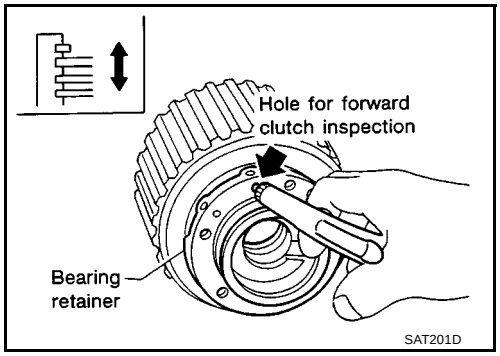
Allowable limit 1.85 mm (0.0728 in)

Forward clutch retaining plate:

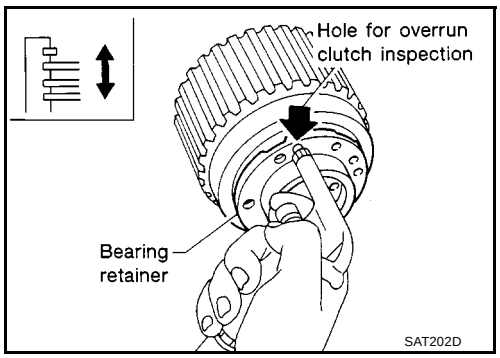
Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



14. Check operation of forward clutch.
Refer to AT-482, "Forward and Overrun Clutches" .



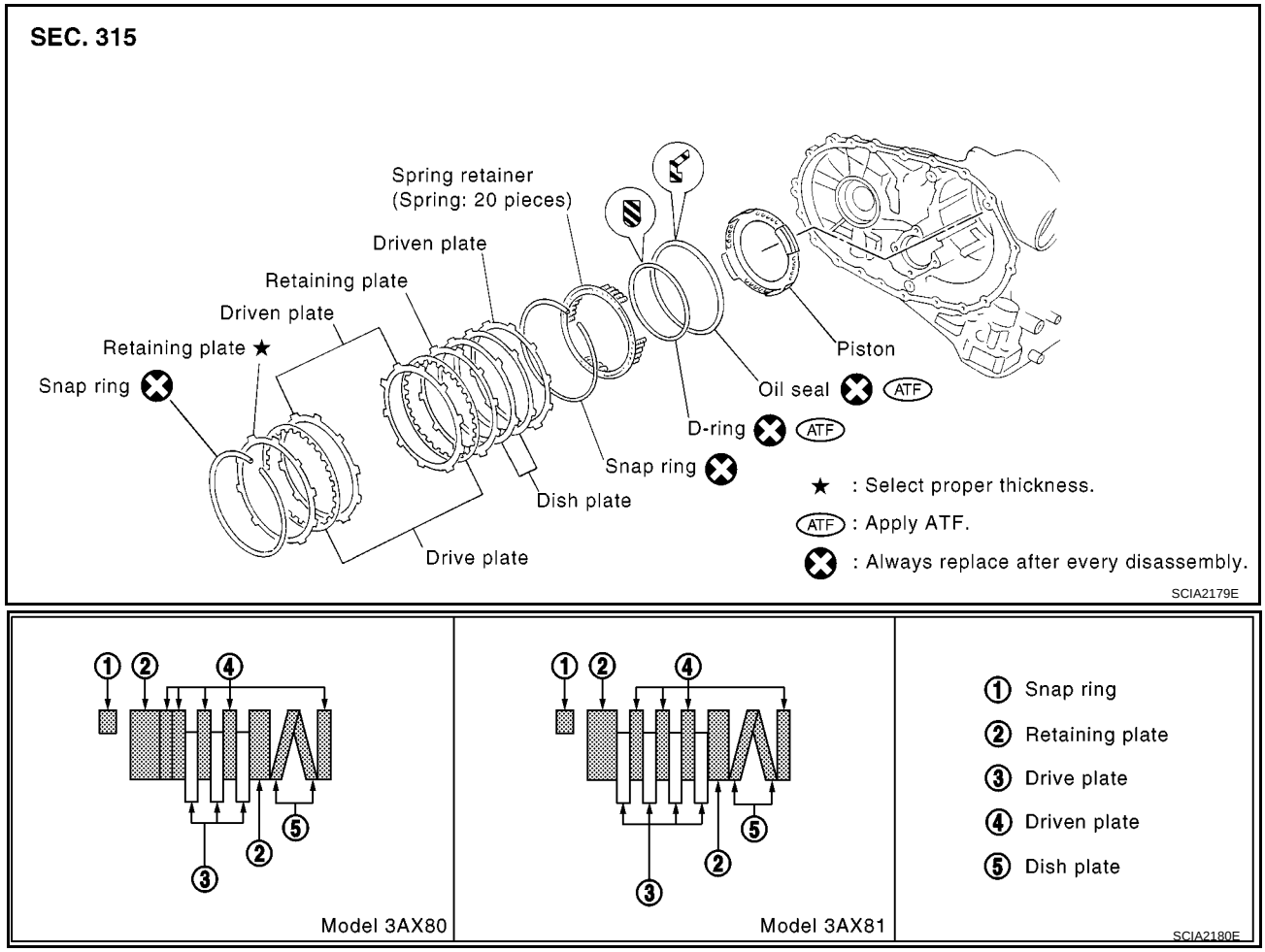
15. Check operation of overrun clutch.
Refer to AT-482, "Forward and Overrun Clutches" .



Low & Reverse Brake

ECS008IE

COMPONENTS



DISASSEMBLY

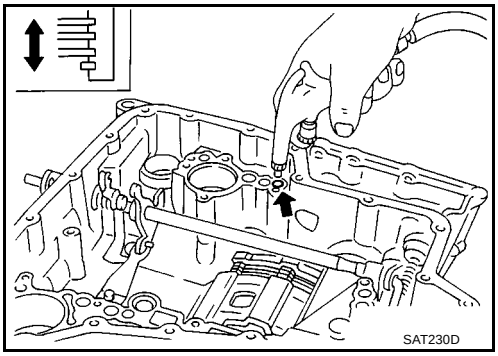
1. Check operation of low & reverse brake.

a. Apply compressed air to oil hole of transmission case.

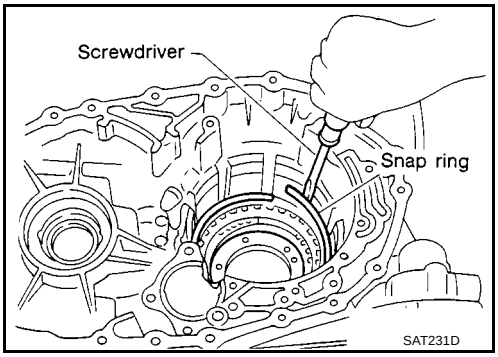
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

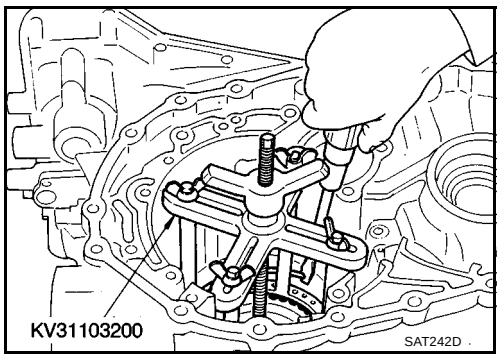
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.



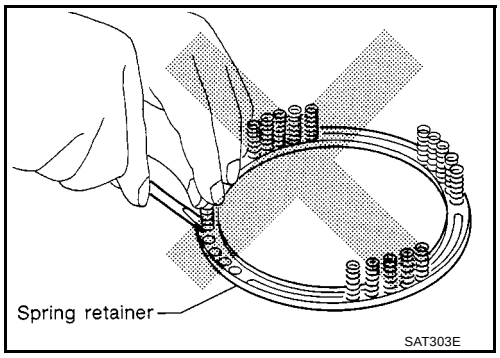
2. Stand transmission case.
3. Remove snap ring.
4. Remove drive plates, driven plates, retaining plate from transmission case.



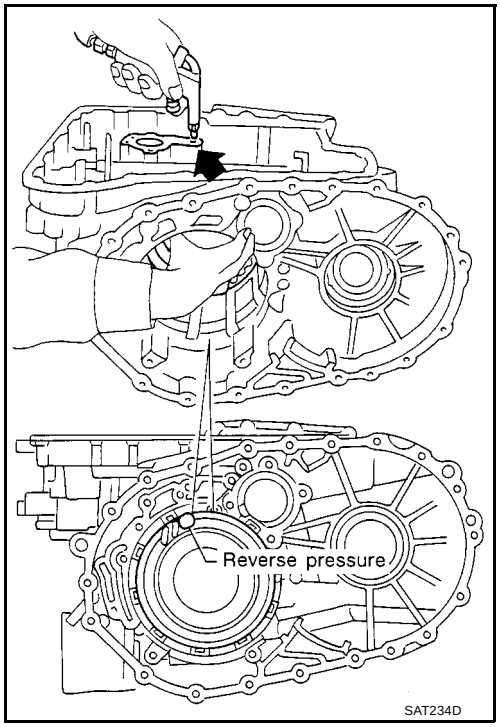
5. Set Tool on spring retainer and remove snap ring while compressing return springs.
   - **Set Tool directly above return springs.**
   - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



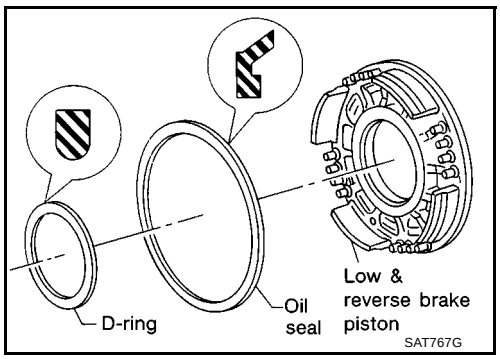
- **Do not remove return springs from spring retainer.**



7. Apply compressed air to oil hole of transmission case while holding piston.
8. Remove piston from transmission case by turning it.



9. Remove D-ring and oil seal from piston.



INSPECTION

Low & Reverse Brake Snap Ring, Spring Retainer and Return Springs

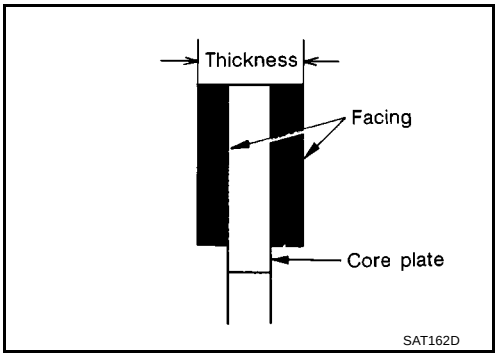
- Check for deformation, fatigue or damage.
- If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

Low & Reverse Brake Drive Plate

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:
Standard value 2.0 mm (0.079 in)
Wear limit 1.8 mm (0.071 in)

- If not within wear limit, replace.

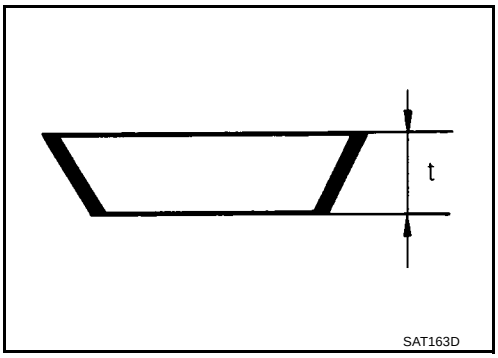


Low & Reverse Brake Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

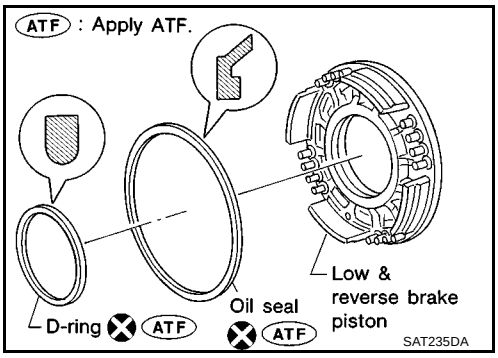
Thickness of dish plate "t": 3.15 mm (0.124 in)

- If deformed or fatigued, replace.

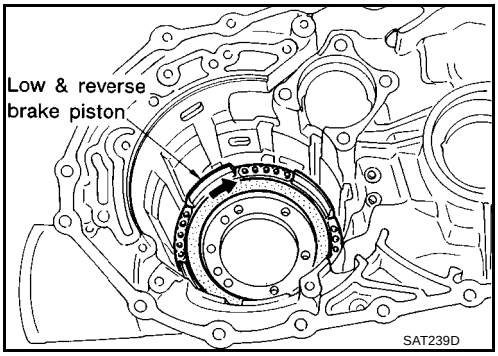


ASSEMBLY

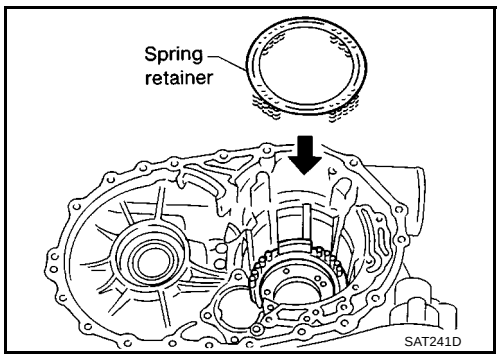
1. Install D-ring and oil seal on piston.
   - **Take care with the direction of the oil seal.**
   - **Apply ATF to both parts.**



2. Stand transmission case.
3. Install piston assembly on transmission case while turning it slowly.
   - **Apply ATF to inner surface of transmission case.**



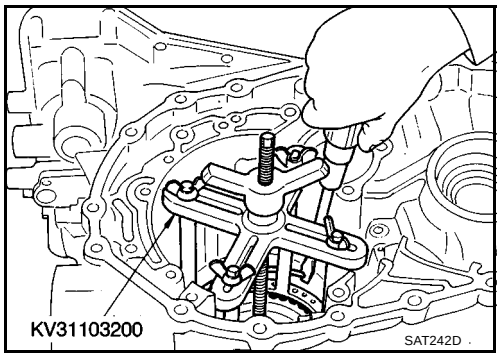
4. Install return springs and spring retainer on piston.



5. Install snap ring while compressing return springs.

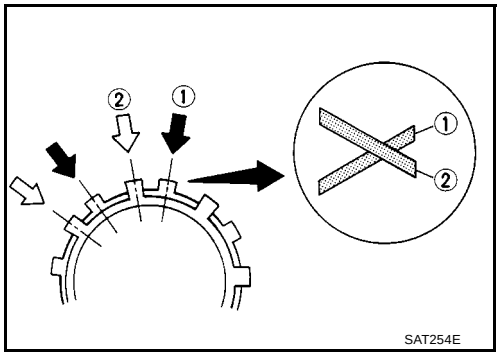
CAUTION:

- **Do not reuse the snap ring.**
- **Set a clutch spring compressor right above return spring.**
- **Install return spring without tilt.**
- **Make sure snap ring is assembled securely into groove on reverse clutch drum.**

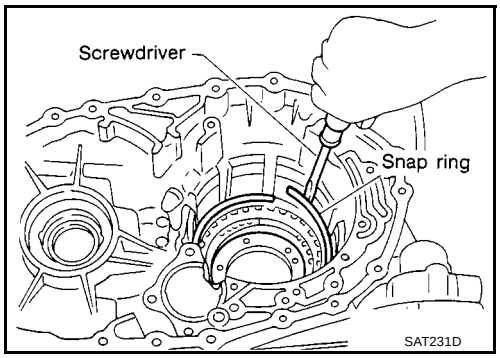


6. Install drive plates, driven plates, retaining plates and dished plates.

- **Do not align the projections on the two dished plates.**
- **Make sure to put the plates in the correct order and direction.**



7. Install snap ring.



8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).

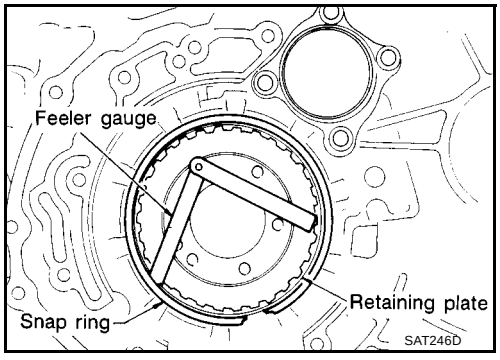
Specified clearance:

Standard 1.4 - 1.8 mm (0.055 - 0.071 in)

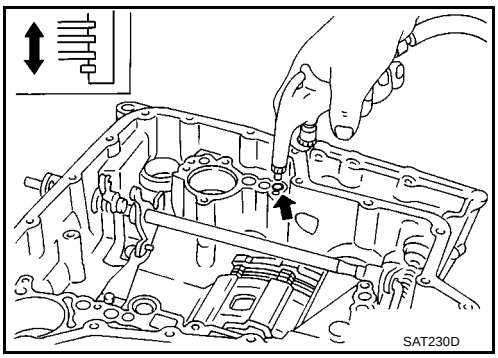
Allowable limit 2.8 mm (0.110 in)

Retaining plate:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



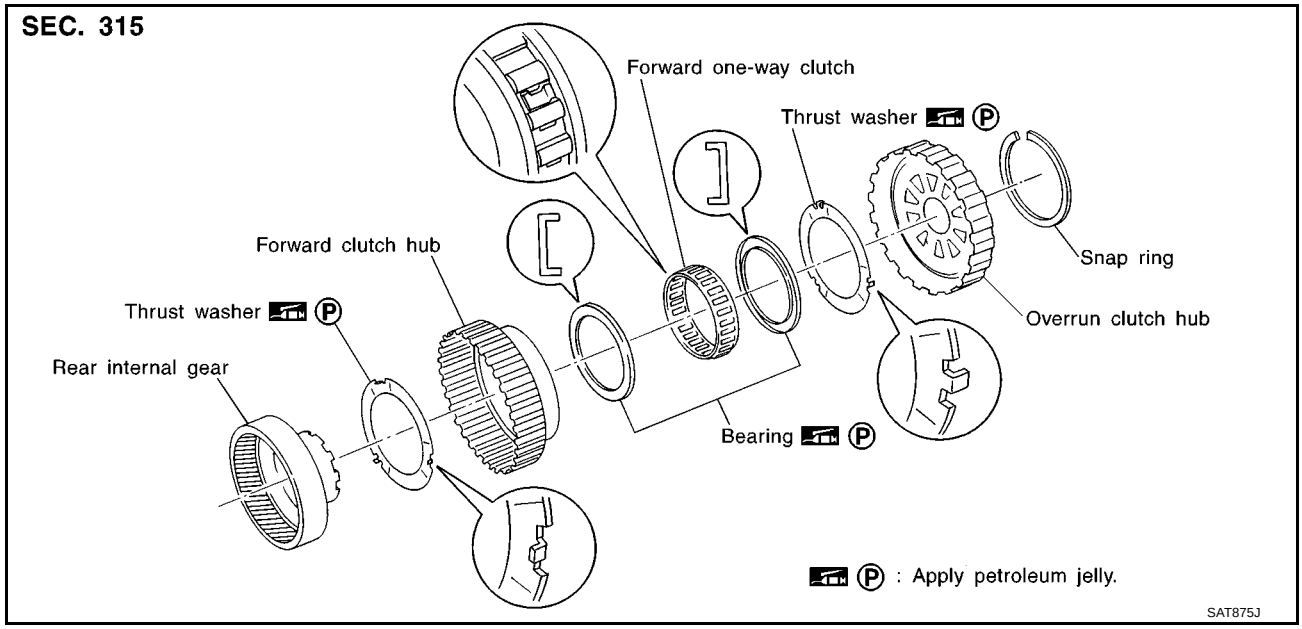
9. Check operation of low & reverse brake. Refer to AT-489, "DISASSEMBLY" .



Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

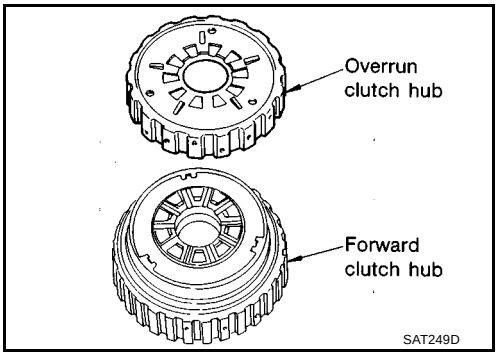
ECS008IF

COMPONENTS

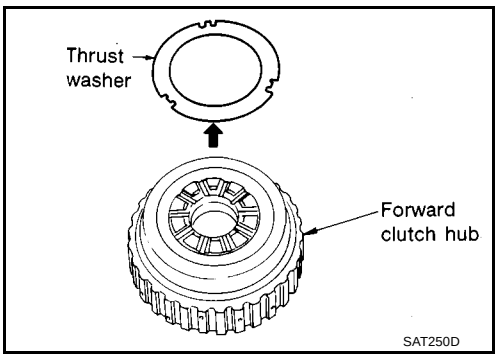


DISASSEMBLY

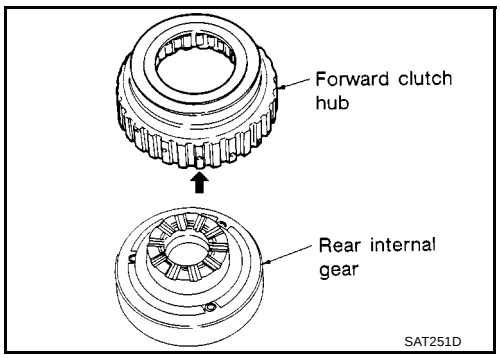
1. Remove snap ring from overrun clutch hub.
2. Remove overrun clutch hub from forward clutch hub.



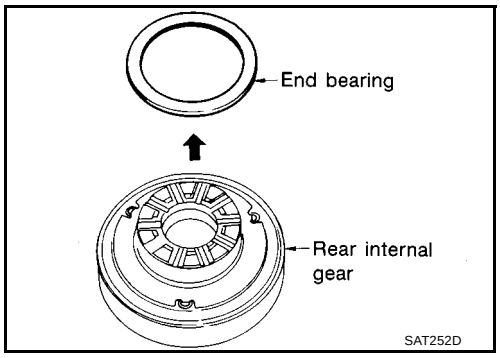
3. Remove thrust washer from forward clutch hub.



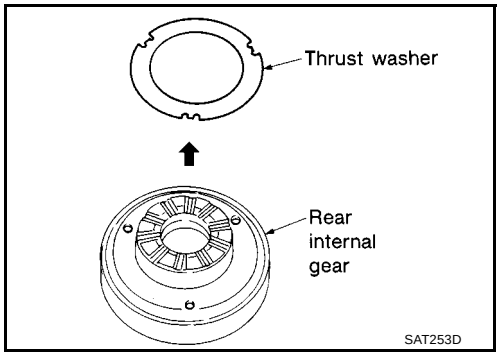
4. Remove forward clutch hub from rear internal gear.



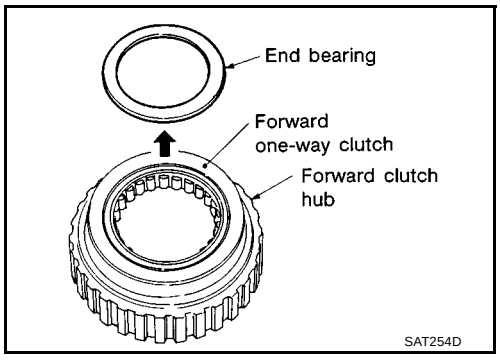
5. Remove end bearing from rear internal gear.



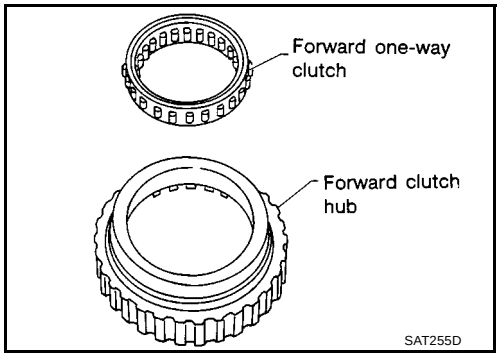
6. Remove thrust washer from rear internal gear.



7. Remove end bearing from forward one-way clutch.



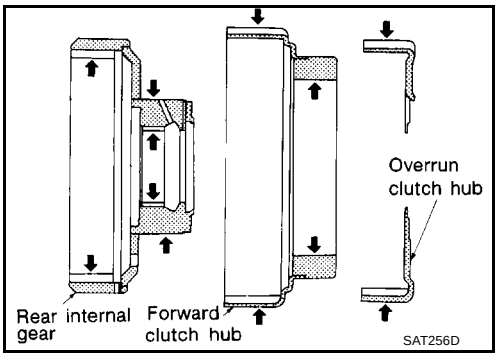
8. Remove forward one-way clutch from forward clutch hub.



INSPECTION

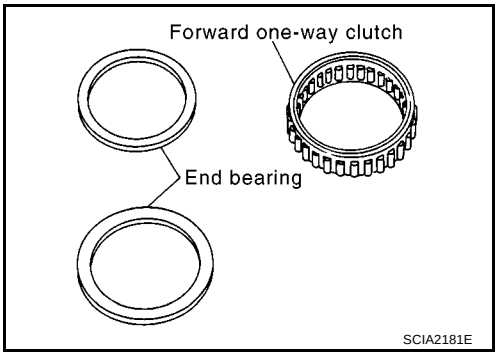
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



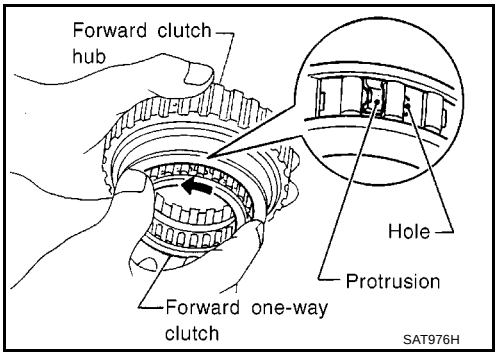
End Bearings and Forward One-way Clutch

- Check end bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

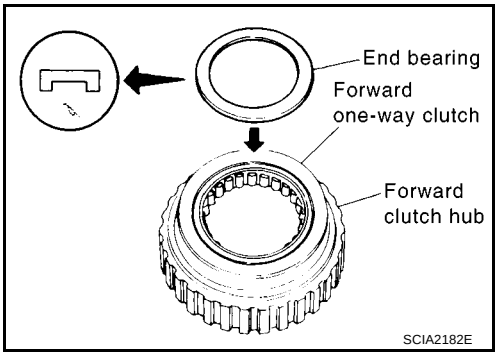


ASSEMBLY

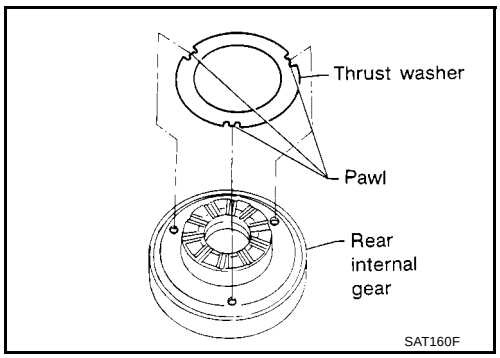
1. Install forward one-way clutch on forward clutch.
   - **Take care with the direction of forward one-way clutch.**



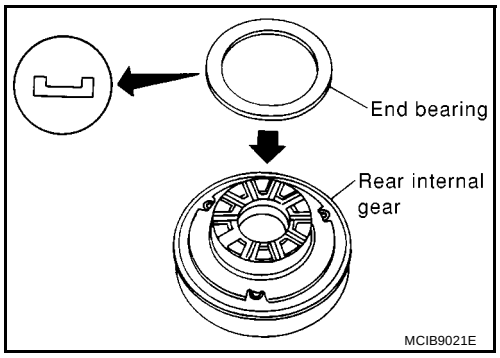
2. Install end bearing on forward one-way clutch.
   - **Apply petroleum jelly to bearing.**



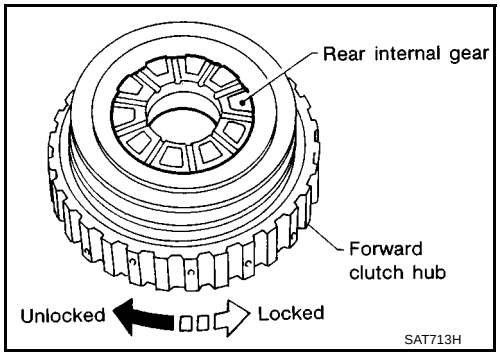
3. Install thrust washer on rear internal gear.
   - **Apply petroleum jelly to thrust washer.**
   - **Align hooks of thrust washer with holes of rear internal gear.**



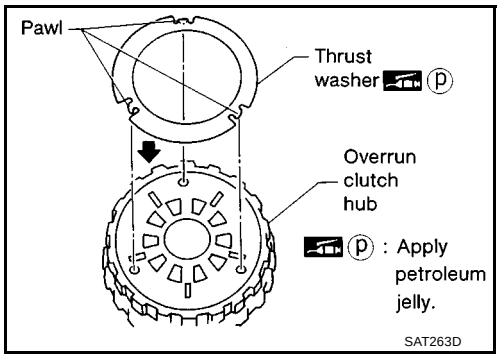
4. Install end bearing on rear internal gear.
   - **Apply petroleum jelly to end bearing.**



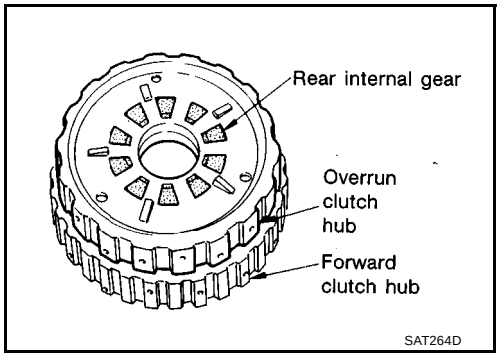
5. Install forward clutch hub on rear internal gear.
   - **Check operation of forward one-way clutch.**
     Hold rear internal gear and turn forward clutch hub.
     Check forward clutch hub for correct locking and unlocking directions.
   - **If not as shown in illustration, check installation direction of forward one-way clutch.**



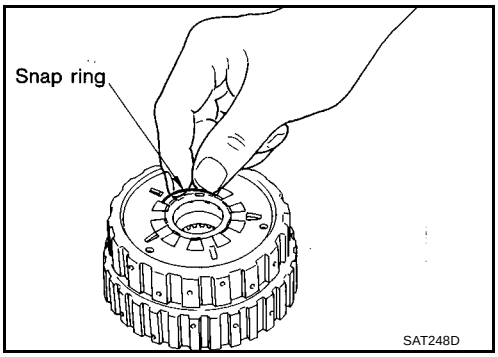
6. Install thrust washer and overrun clutch hub.
   - **Apply petroleum jelly to thrust washer.**
   - **Align pawls of thrust washer with holes of overrun clutch hub.**



7. Install overrun clutch hub on rear internal gear.
   - **Align projections of rear internal gear with holes of overrun clutch hub.**



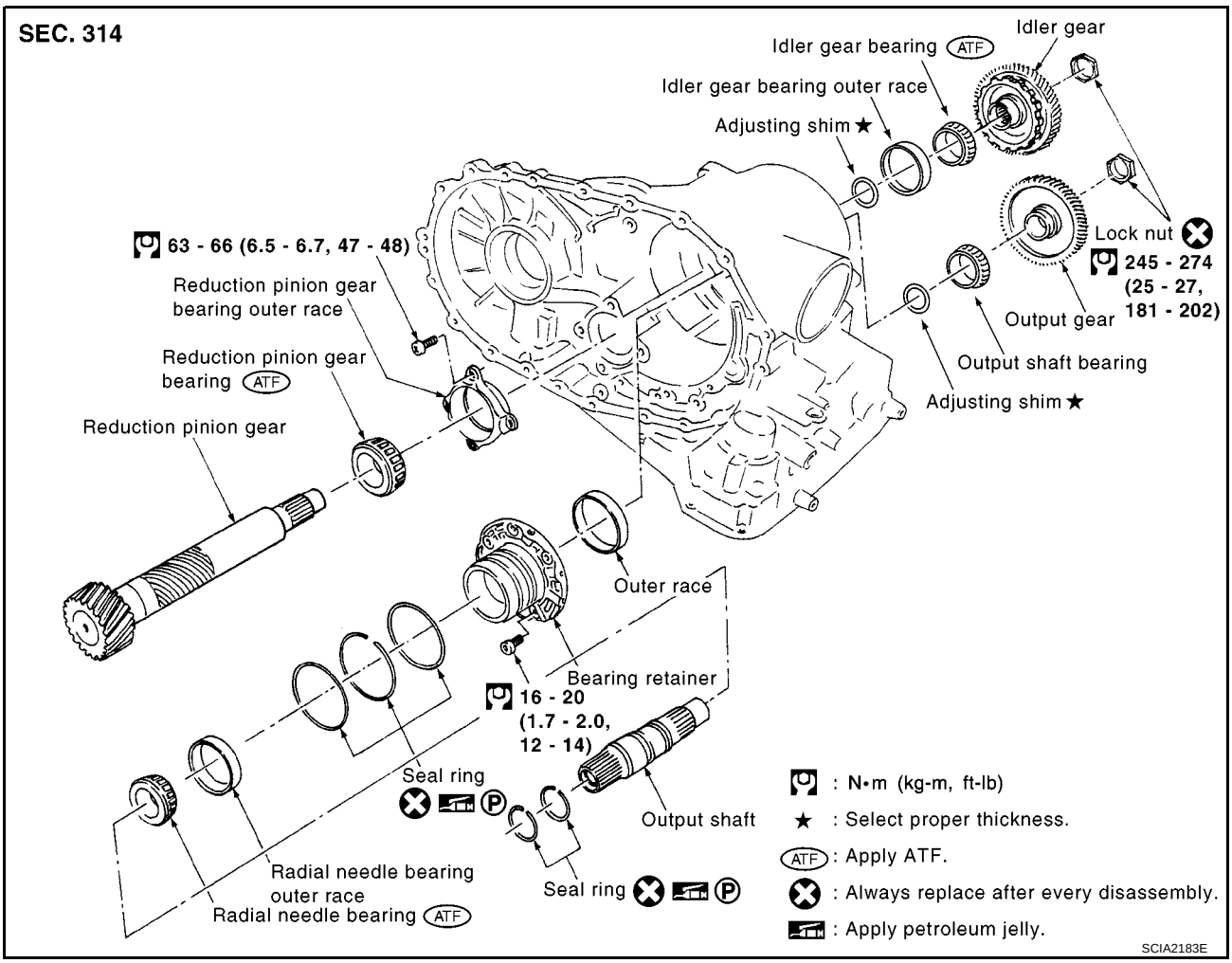
8. Install snap ring to groove of rear internal gear.



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

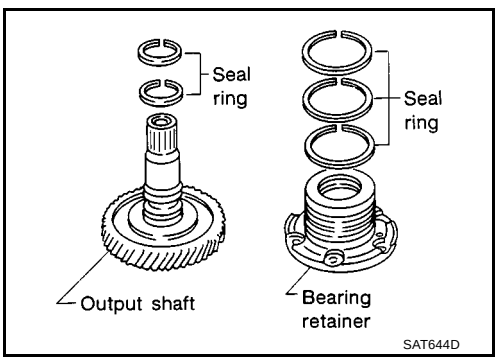
ECS008IG

COMPONENTS

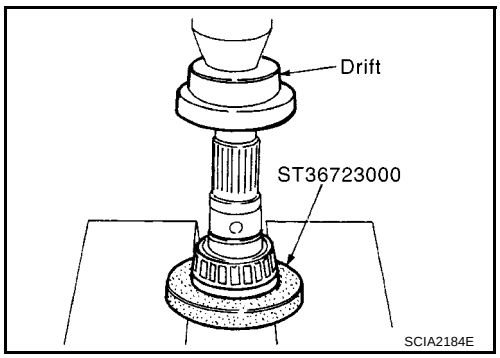


DISASSEMBLY

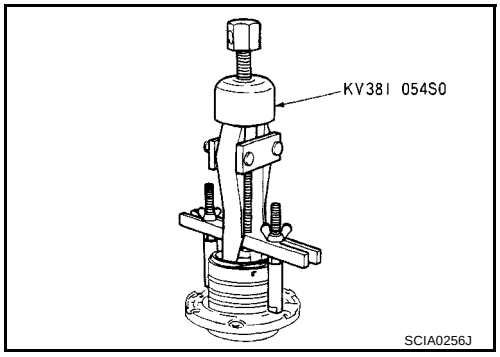
1. Remove seal rings from output shaft and bearing retainer.



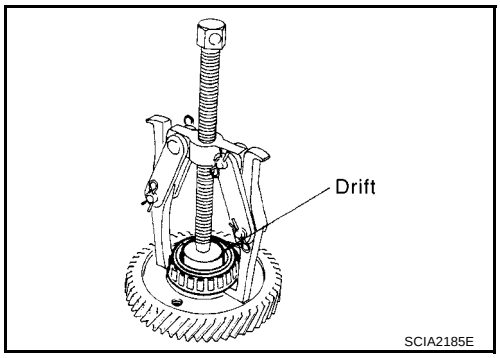
2. Remove output shaft bearing and outer race with the following procedure:
   - Set a drift to output shaft bearing and press out.



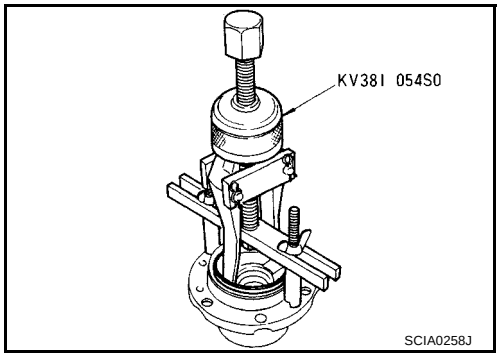
   - Using a puller, remove outer race from bearing retainer.



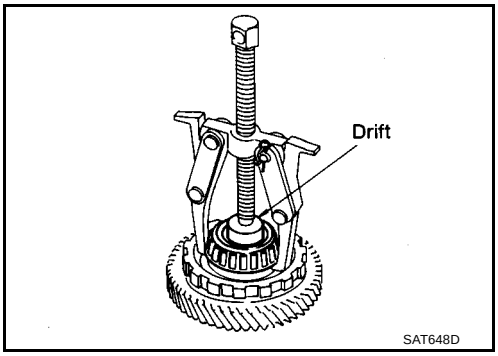
3. Remove output gear bearing and outer race with the following procedure:
   - Set appropriate 33 mm diameter drift and remove bearing using puller.



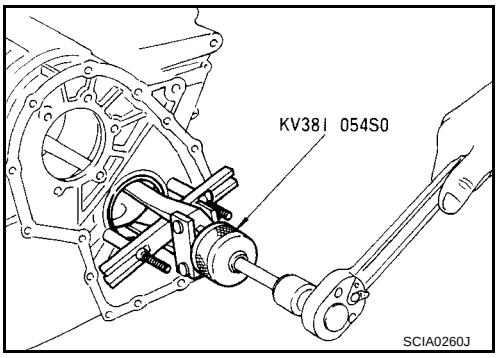
   - Using a puller, remove outer race from bearing retainer.



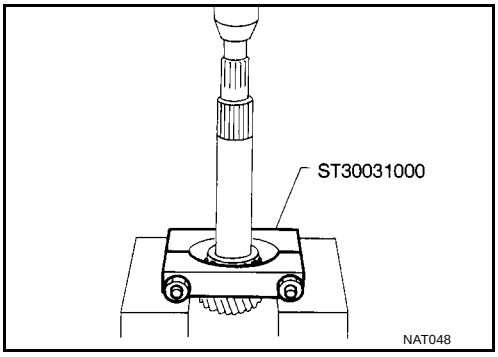
4. Remove idler gear bearing and outer race with the following procedure:
   - Set appropriate 34 mm diameter drift and remove bearing using puller.



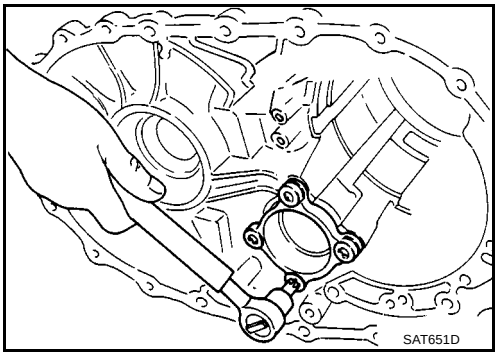
   - Using a puller, remove outer race from transaxle case.



5. Press out reduction pinion gear bearing from reduction pinion gear.



6. Remove reduction pinion gear bearing outer race from transmission case.



INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

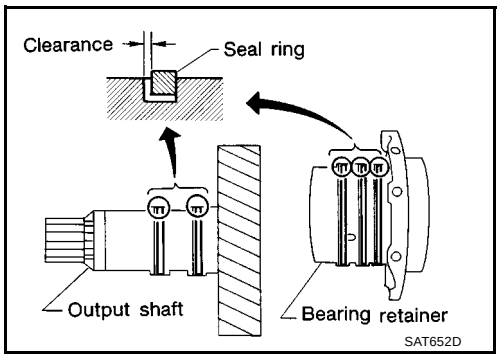
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.

Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**

Seal Ring Clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.



Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Allowable limit:

0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

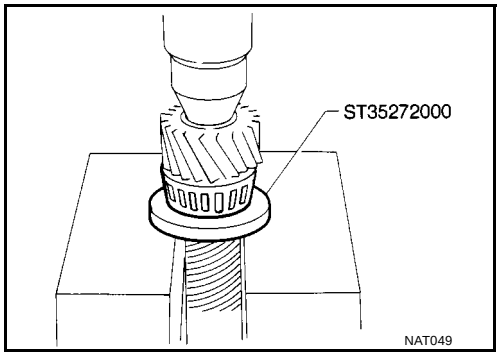
Allowable limit:

0.25 mm (0.0098 in)

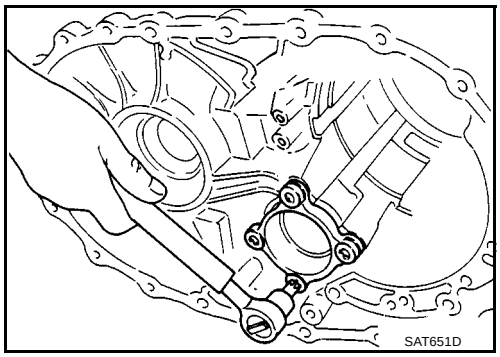
- If not within allowable limit, replace bearing retainer.

ASSEMBLY

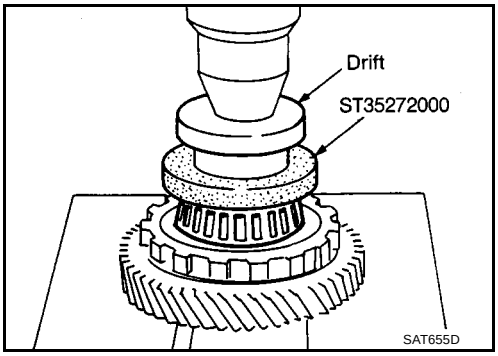
1. Press reduction pinion gear bearing on reduction pinion gear.



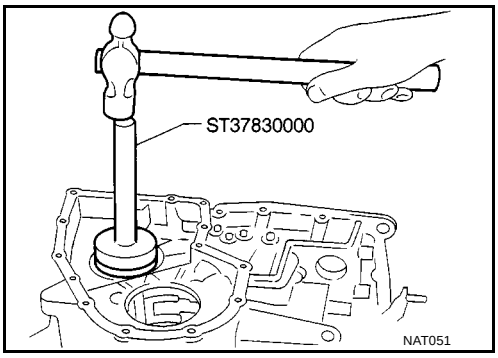
2. Install reduction pinion gear bearing outer race on transmission case.



3. Press idler gear bearing inner race on idler gear.

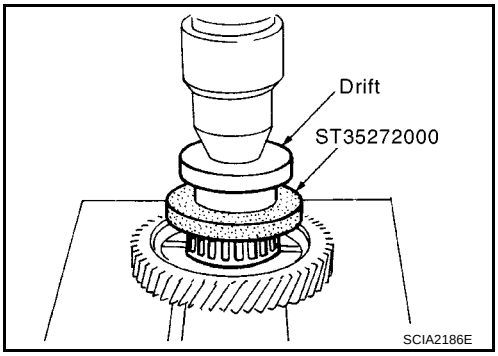


4. Install idler gear bearing outer race on transmission case.

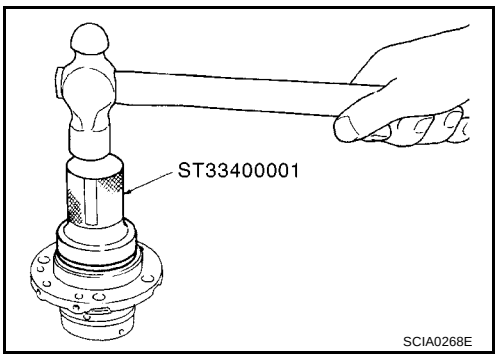


5. Install output gear bearing and outer race with the following procedure:
   - Set a drift to output gear bearing and press out using appropriate drift.

     CAUTION:
     Press a drift onto bearing inner race.

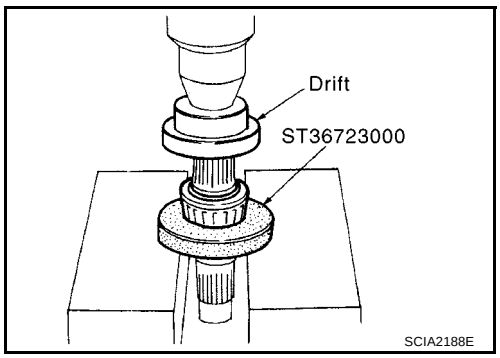


   - Using a drift, press outer race into bearing retainer.

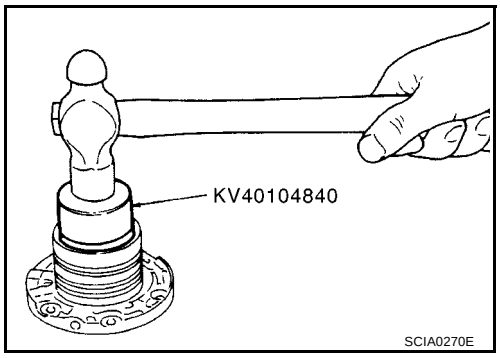


6. Install output shaft bearing and outer race with the following procedure:
   - Set a drift to output shaft bearing and press out.

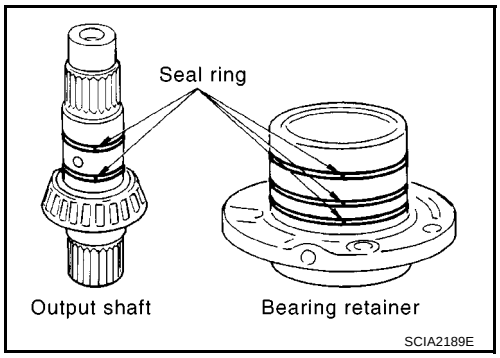
     CAUTION:
     Press a drift onto bearing inner race.



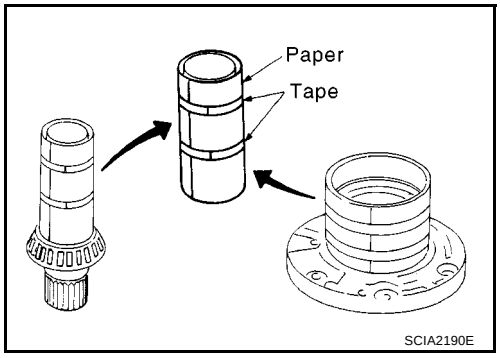
   - Using a drift, install outer race on bearing retainer.



7. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.



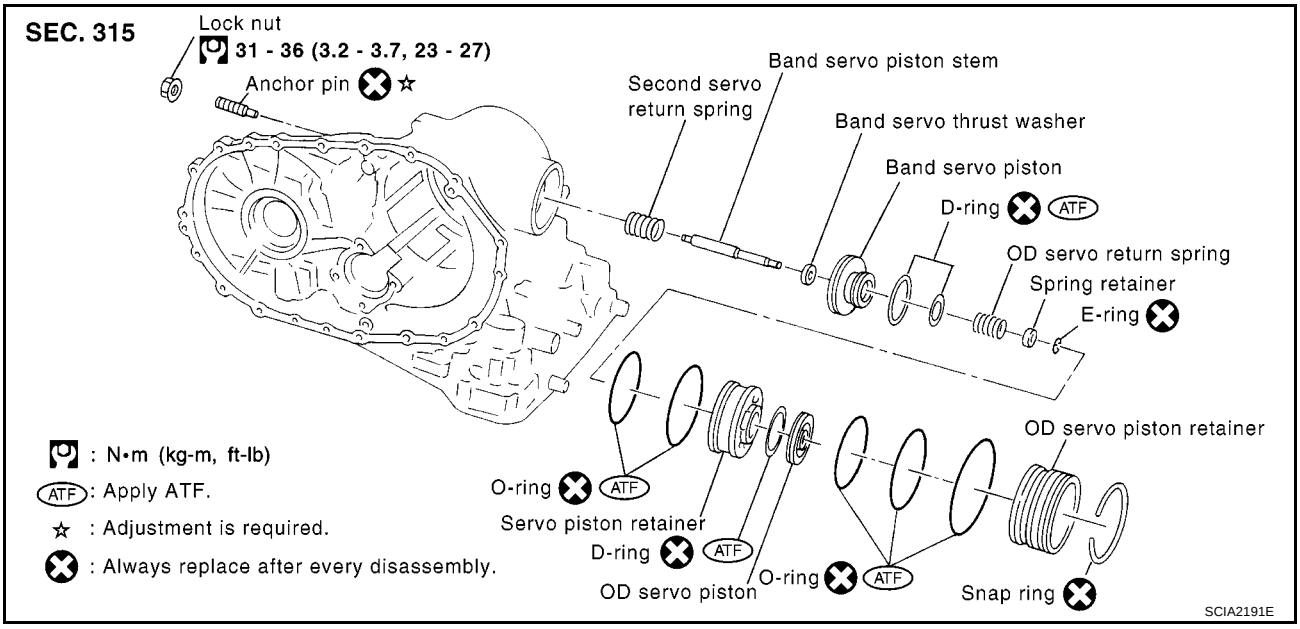
   - **Roll paper around seal rings to prevent seal rings from spreading.**



Band Servo Piston Assembly

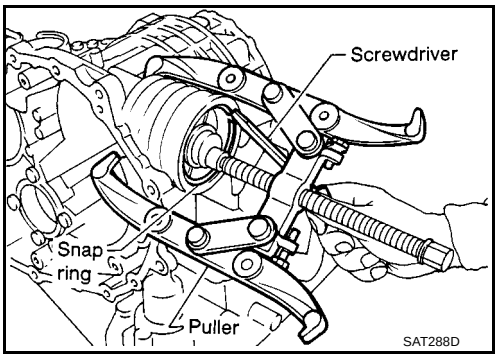
ECS008IH

COMPONENT

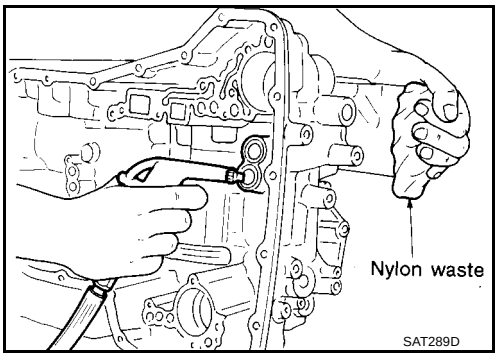


DISASSEMBLY

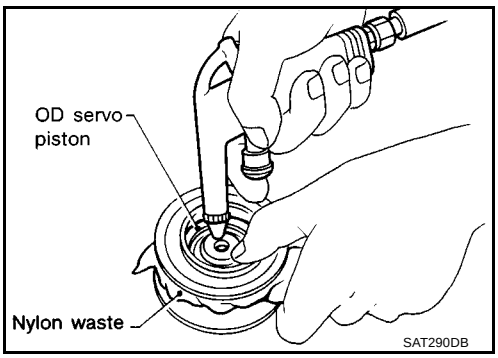
1. Remove band servo piston snap ring.



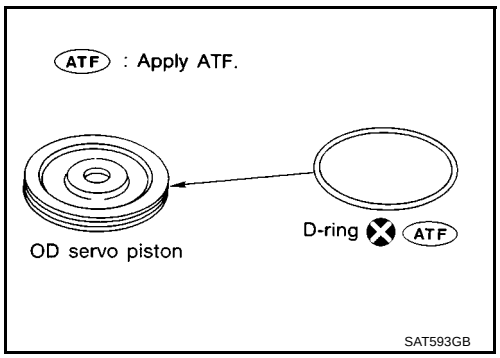
2. Apply compressed air to oil hole in transmission case to remove OD servo piston retainer and band servo piston assembly.
   - **Hold band servo piston assembly with a rag or nylon waste.**



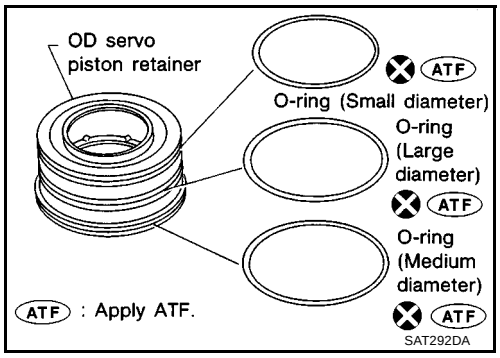
3. Apply compressed air to oil hole in OD servo piston retainer to remove O/D servo piston from retainer.
   - **Hold OD band servo piston while applying compressed air.**



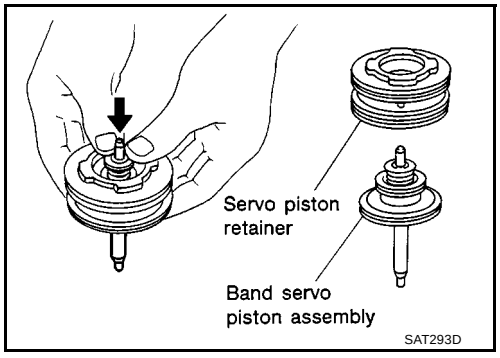
4. Remove D-ring from OD servo piston.



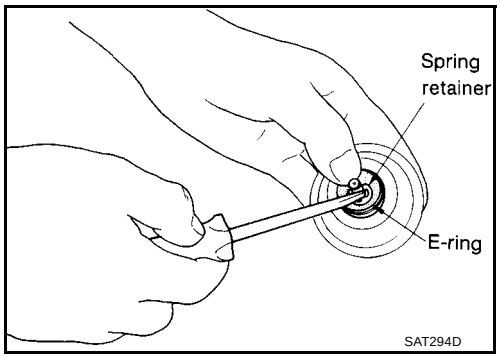
5. Remove O-rings from OD servo piston retainer.



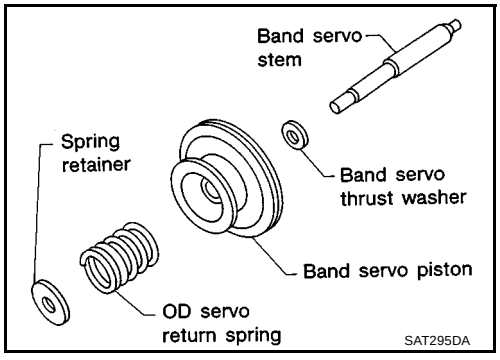
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



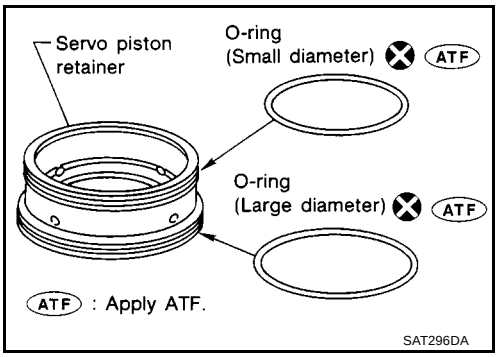
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



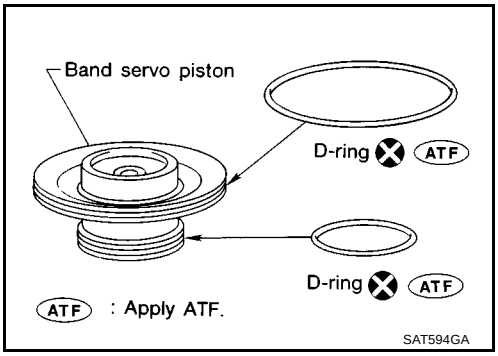
8. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



9. Remove O-rings from servo piston retainer.



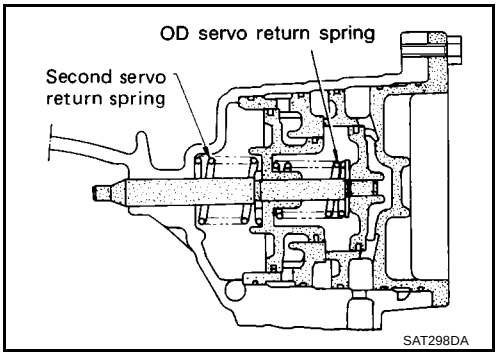
10. Remove D-rings from band servo piston.



INSPECTION

Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

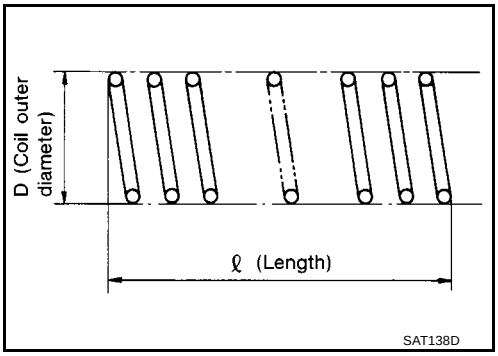


Return Springs

- Check for deformation or damage.
- Measure free length and outer diameter.

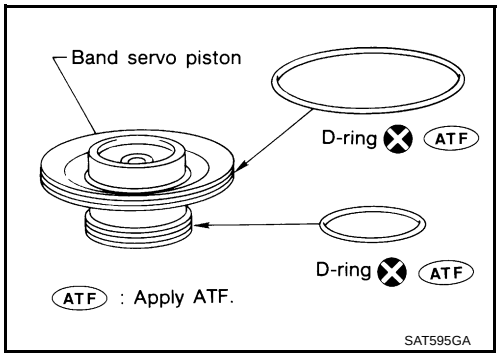
Inspection standard:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"

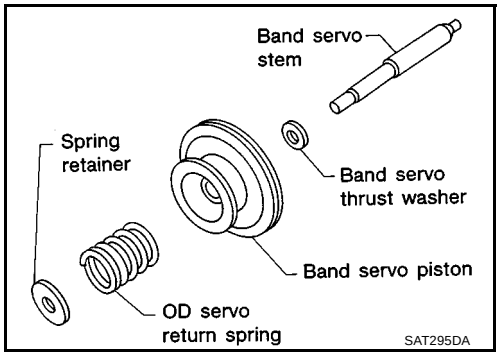


ASSEMBLY

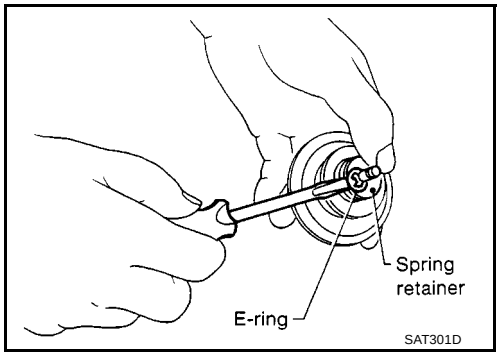
1. Install D-rings to servo piston retainer.
   - **Apply ATF to D-rings.**
   - **Pay attention to position of each D-ring.**



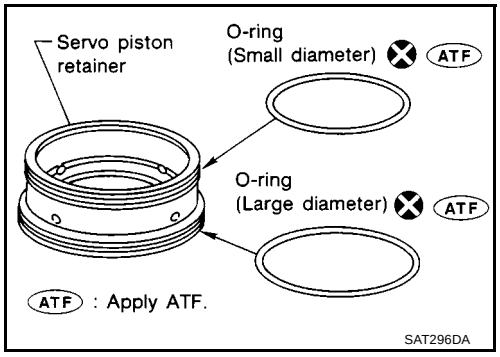
2. Install band servo piston stem, band servo thrust washer, OD servo return spring and spring retainer to band servo piston.



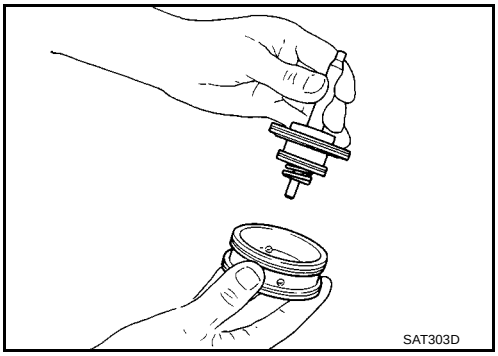
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



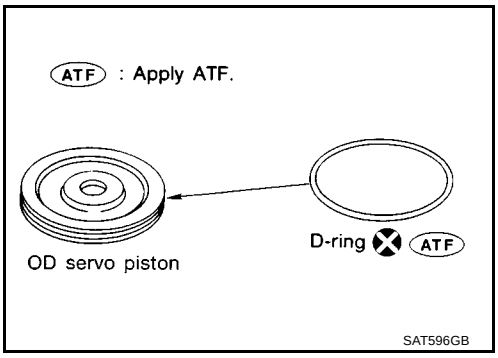
4. Install O-rings to servo piston retainer.
   - **Apply ATF to O-rings.**
   - **Pay attention to position of each O-ring.**



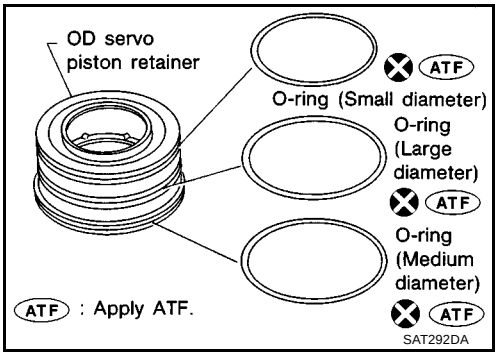
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



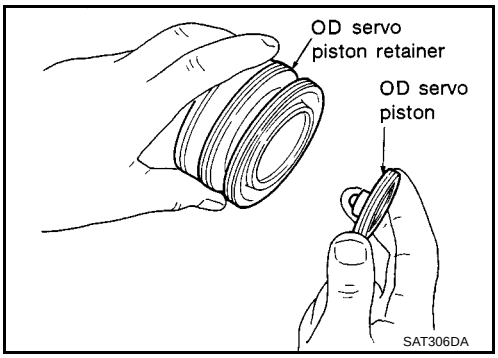
6. Install D-ring to OD servo piston.
   - **Apply ATF to D-ring.**



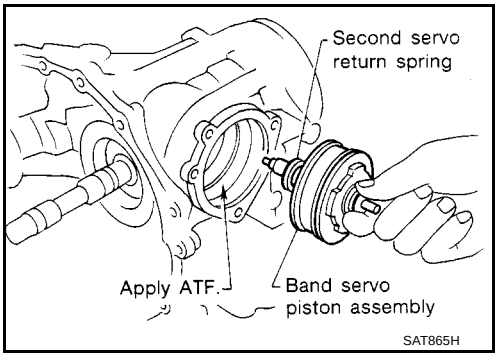
7. Install O-rings to OD servo piston retainer.
   - **Apply ATF to O-rings.**
   - **Pay attention to position of each O-ring.**



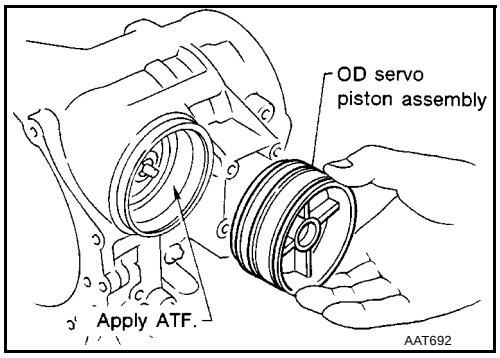
8. Install OD servo piston to OD servo piston retainer.



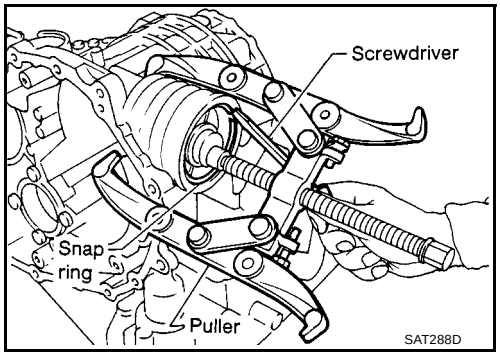
9. Install band servo piston assembly and second servo return spring to transmission case.
   - **Apply ATF to O-ring of band servo piston and transmission case.**



10. Install OD servo piston assembly to transmission case.
    - **Apply ATF to O-ring of band servo piston and transmission case.**



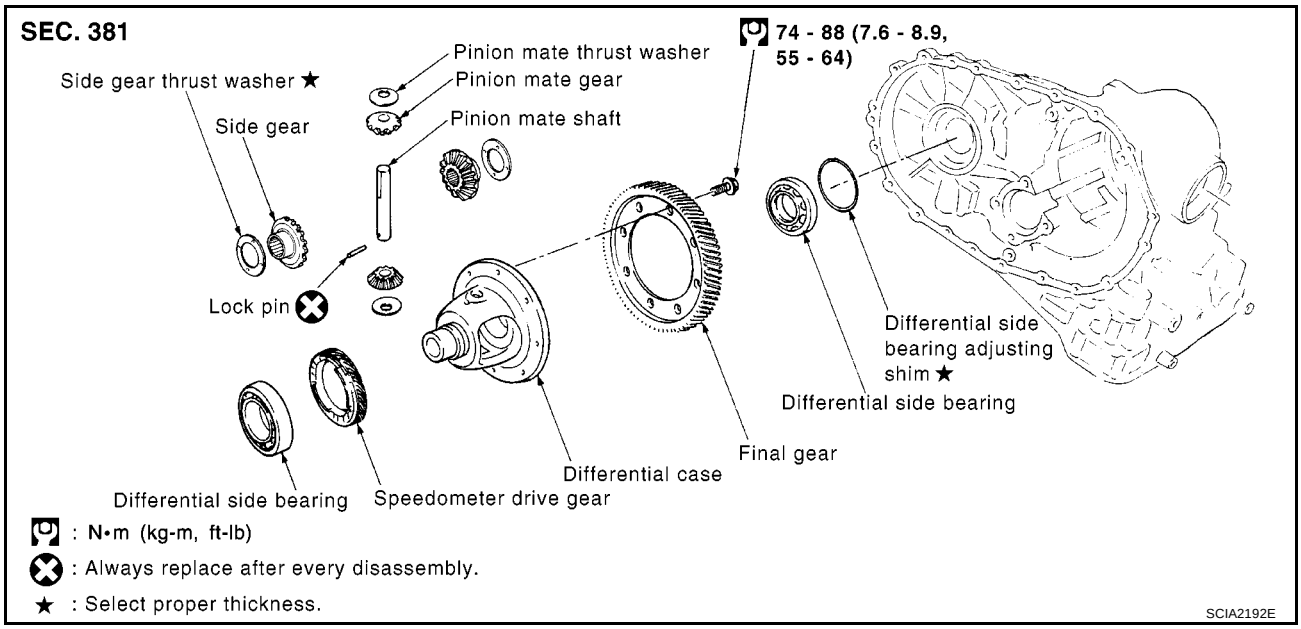
11. Install band servo piston snap ring to transmission case.



Final Drive

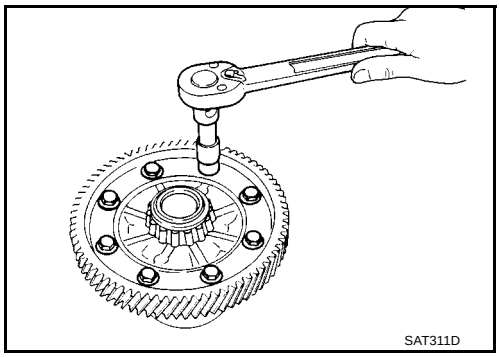
ECS008II

COMPONENTS

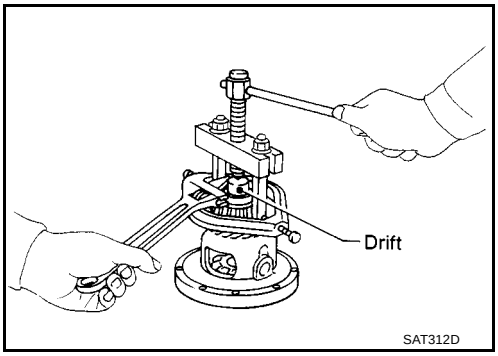


DISASSEMBLY

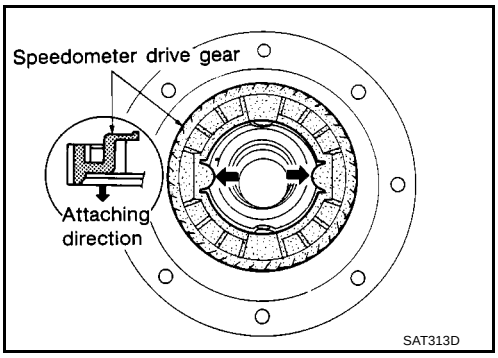
1. Remove final gear.



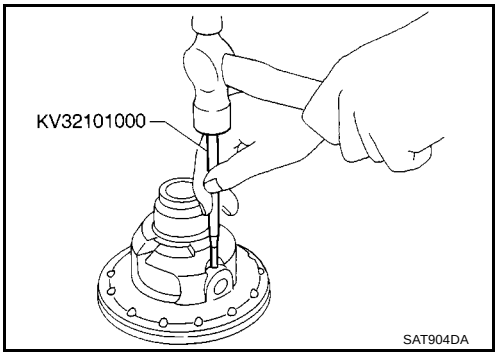
2. Press out differential side bearings.
   - **Be careful not to mix up the right and left bearings.**



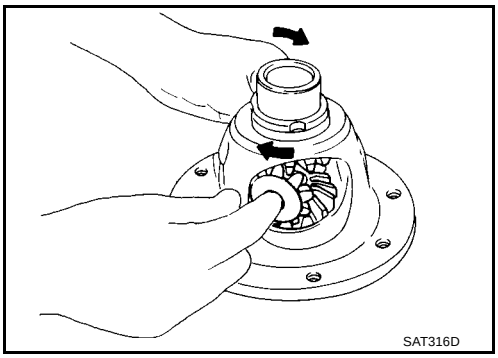
3. Remove speedometer drive gear.



4. Drive out pinion mate shaft lock pin.



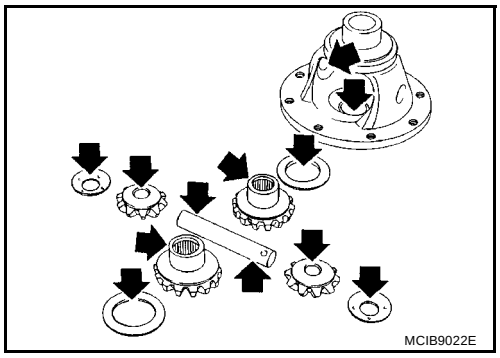
5. Draw out pinion mate shaft lock pin.
6. Remove pinion mate gears and from differential case.



INSPECTION

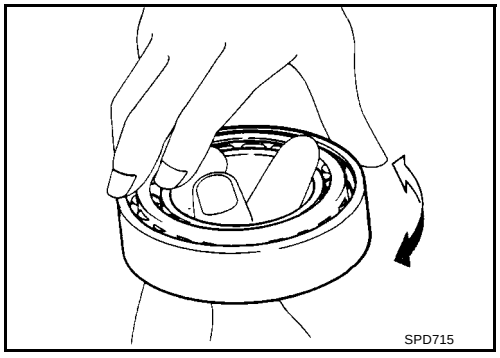
Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



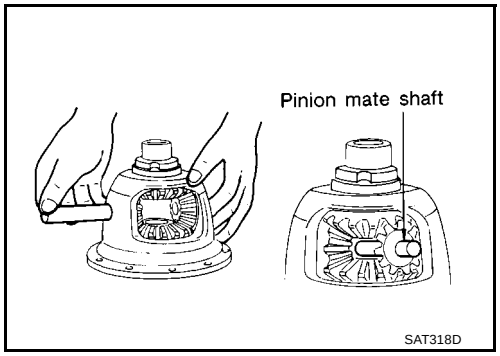
Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



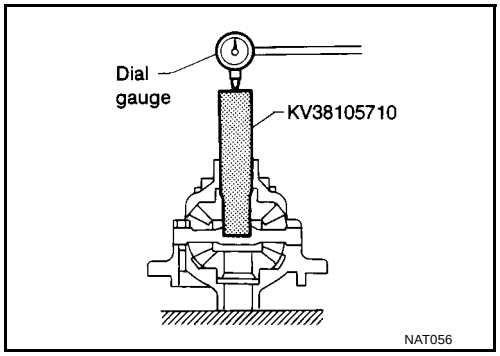
ASSEMBLY

1. Install side gear and thrust washers in differential case.
2. Install pinion mate gears and thrust washers in differential case while rotating them.
   - **When inserting, be careful not to damage pinion mate gear washers.**
   - **Apply ATF to any parts.**



3. Measure clearance between side gear and differential case with washers using the following procedure:

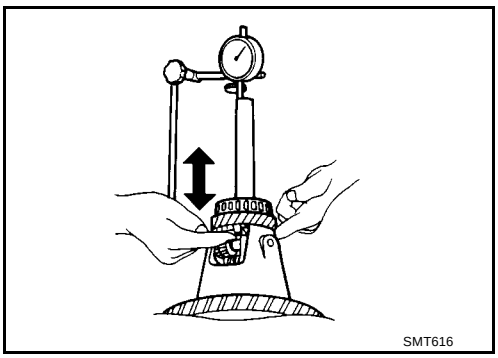
a. Set Tool and dial indicator on side gear.



b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer:

0.1 - 0.2 mm (0.004 - 0.008 in)

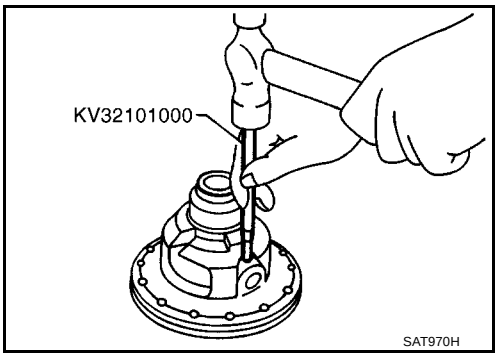


c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

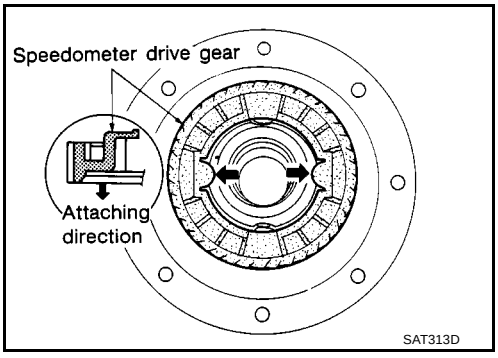
Differential side gear thrust washers:

Refer to **AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"** **.**

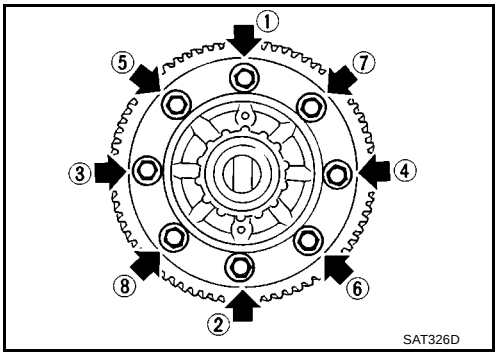
4. Install lock pin.
   - **Make sure that lock pin is flush with case.**



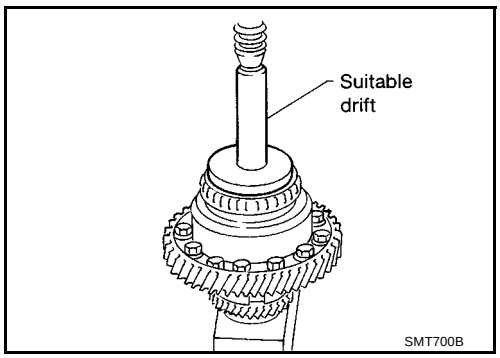
5. Install speedometer drive gear on differential case.
   - **Align the projection of speedometer drive gear with the groove of differential case.**



6. Install final gear and tighten fixing bolts in a numerical order.



7. Press on differential side bearings.



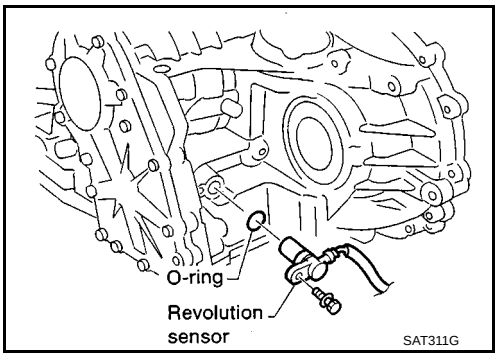
ASSEMBLY

PFP:00000

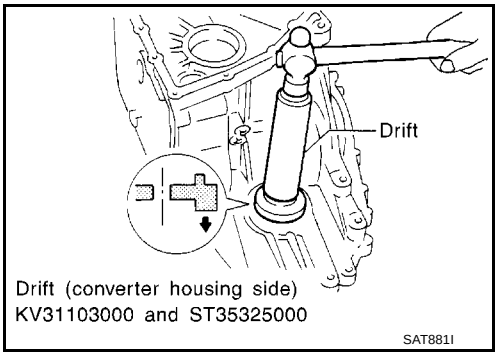
Assembly (1)

ECS008IJ

1. Install revolution sensor from transmission case.
Always use new sealing parts.

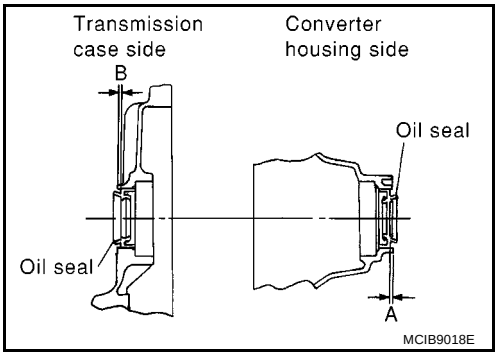


2. Install differential side oil seals on transmission case and converter housing, so that “A” and “B” are with in specification.

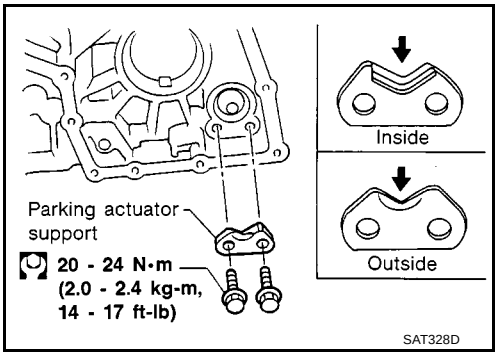


Unit: mm (in)

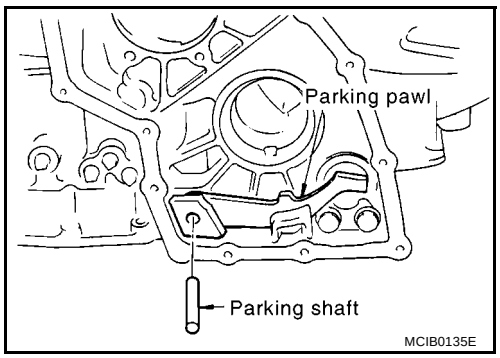
A	B
5.5 - 6.5 (0.217 - 0.256)	–0.5 to 0.5 (–0.020 to 0.020)



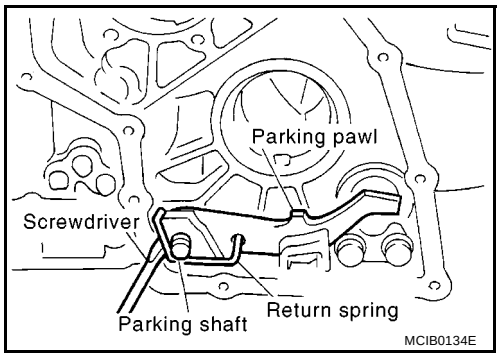
3. Install parking actuator support to transmission case.
- **Pay attention to direction of parking actuator support.**



4. Install parking pawl on transmission case and fix it with parking shaft.



5. Install return spring.



Adjustment (1)

ECS008IK

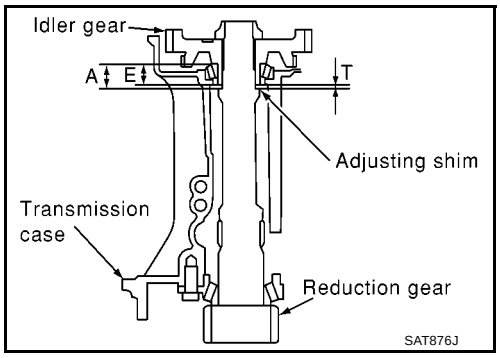
REDUCTION PINION GEAR BEARING PRELOAD

- Be sure to remove final drive assembly before doing this procedure.
- Using caliper and straightedge, calculate a dimension “T” (adjuster shim thickness) in the right figure by the following formula and adjust the inspection standard for pre load (rotating slide torque) as shown below.

T = A – E

Inspection standard for preload:

0.11 - 0.69 N-m (0.02 - 0.07 kg-m, 1 - 6 in-lb)



1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.

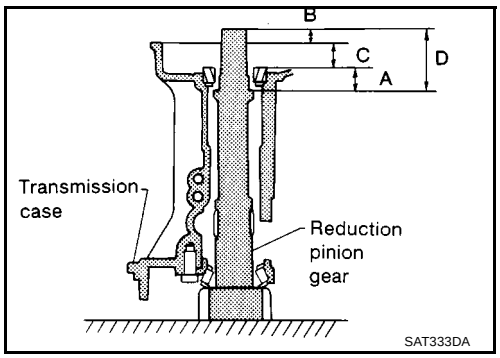
a. Place reduction pinion gear on transmission case as shown.

b. Place idler gear bearing on transmission case.

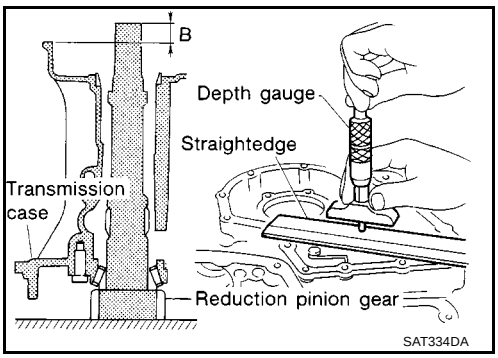
c. Measure dimensions “B” “C” and “D” and calculate dimension “A”.

A = D – (B + C)

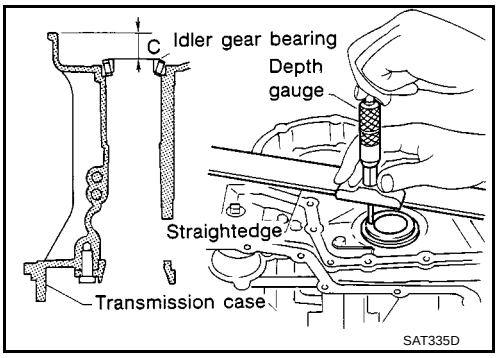
“A”: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



- Measure dimension “B” between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension “B” in at least two places.**

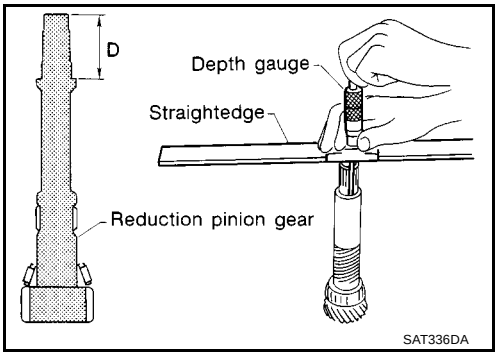


- Measure dimension “C” between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension “C” in at least two places.**



- Measure dimension “D” between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure dimension “D” in at least two places.**
- Calculate dimension “A”.

A = D – (B + C)



d. Measure dimension “E” between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
   - **Measure dimension “E” in at least two places.**

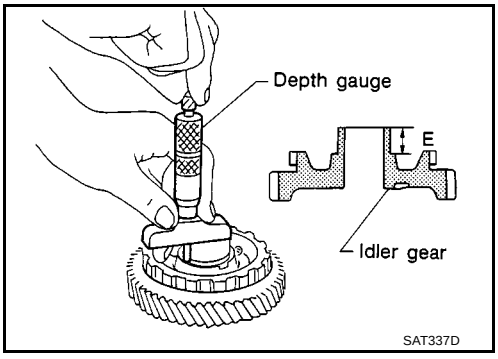
e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A – E – 0.05 mm (0.0020 in)*

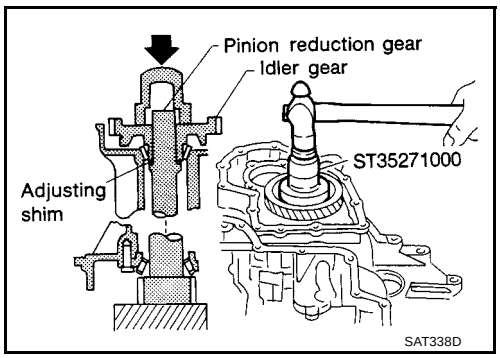
(*... Bearing preload)

Reduction pinion gear bearing adjusting shim:

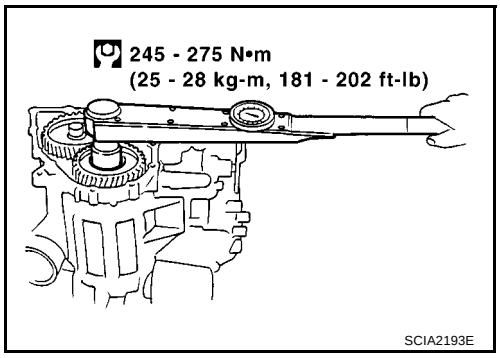
Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



3. Install reduction gear and reduction pinion gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.
   - **Press idler gear so-that idler gear can be locked by parking pawl.**



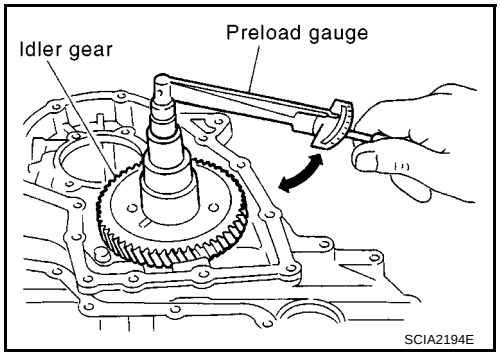
6. Tighten idler gear lock nut to the specified torque.
   - **Lock idler gear with parking pawl when tightening lock nut.**



7. Measure turning torque of reduction pinion gear.
   - **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

   Turning torque of reduction pinion gear:

   0.11 - 0.69 N-m (0.02 - 0.07 kg-m, 1 - 6 in-lb)

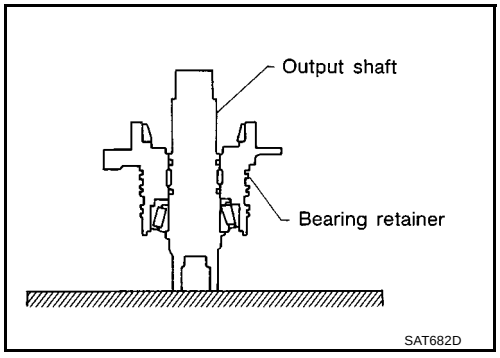


OUTPUT SHAFT END PLAY

1. Select proper thickness of output shaft bearing adjusting spacer using the following procedures.

a. Remove paper rolled around output shaft.

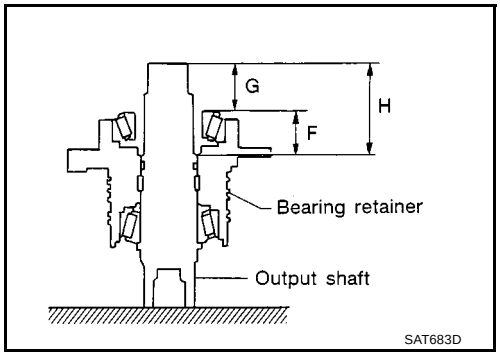
b. Place bearing retainer on output shaft.



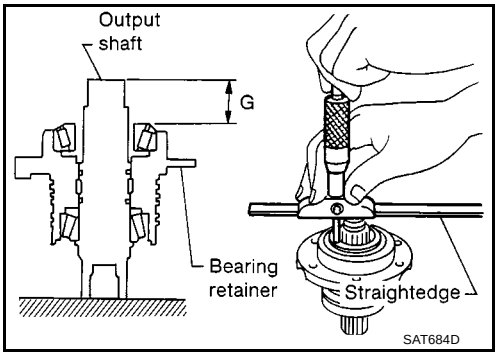
c. Place output gear bearing inner race on bearing retainer.

d. Measure dimensions “G” and “H” and calculate dimension “F”.
   “F”: Distance between the surface of output gear bearing inner race and adjusting shim mating surface of output shaft.

   F = H – G

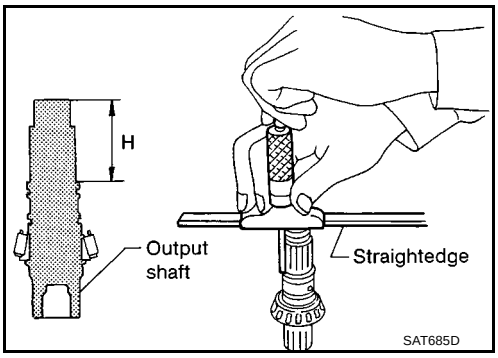


- Measure dimension “G” between end of output shaft and surface of output gear bearing inner race.
- **Measure dimension “G” in at least two places.**

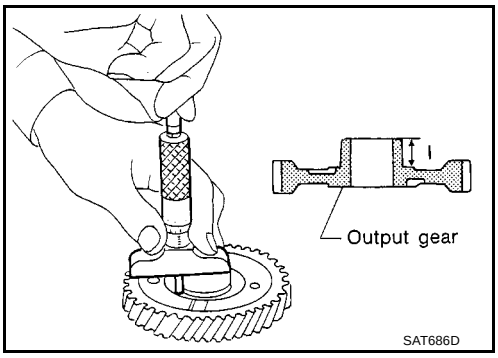


- Measure dimension “H” between end of output shaft and adjusting spacer mating surface of output shaft.
- **Measure dimension “H” in at least two places.**
- Calculate dimension “F”.

F = H – G



e. Measure dimension “I” between end of output gear (adjusting spacer mating surface) and bearing inner race fitting surface.
- **Measure dimension “I” in at least two places.**



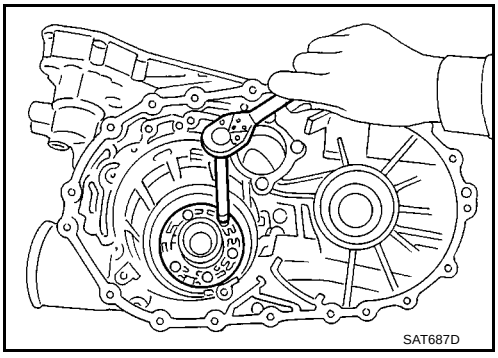
f. Calculate dimension “T_2”.
“T_2”: Distance between adjusting spacer mating surface of output gear and output shaft

T_2 = F – I

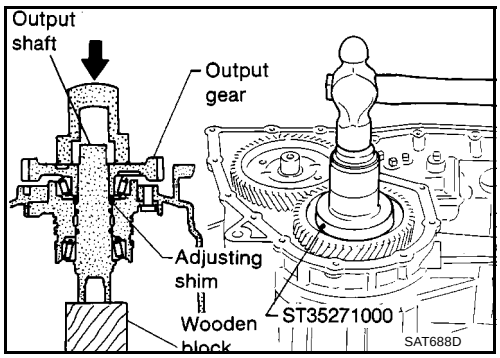
g. Select proper thickness of output shaft bearing adjusting spacer using SDS table as a guide.

Output shaft bearing adjusting spacer:
Refer to AT-534

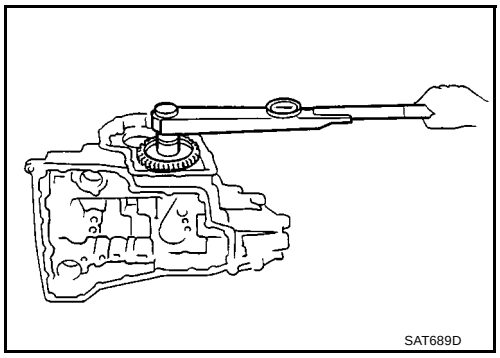
2. Install bearing retainer for output shaft.



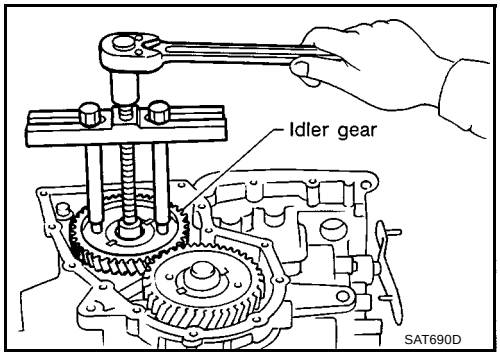
3. Place output shaft on bearing retainer.
4. Place output shaft bearing adjusting spacer selected in step1-g on output shaft.
5. Press output gear bearing inner race on output gear.
6. Press output gear on output shaft.



7. Tighten output gear lock nut to specified torque.



8. Remove idler gear to measure output shaft bearing preload.

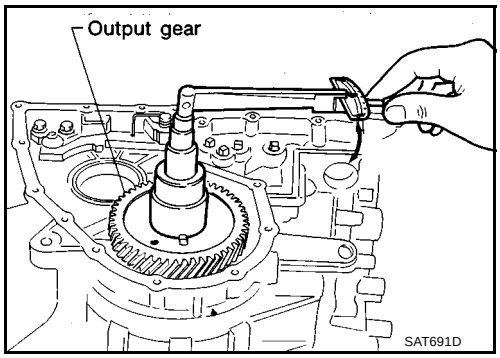


9. Measure output shaft bearing preload.
   - When measuring bearing preload, turn output shaft in both directions several times seat bearing rollers correctly.

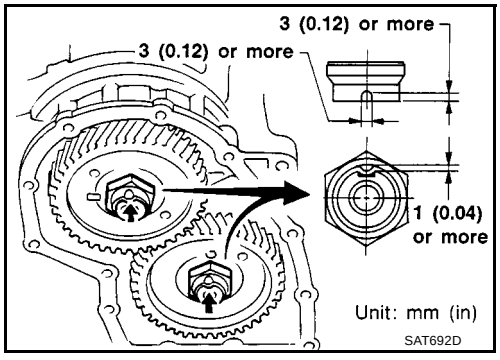
     Output shaft bearing preload:

     0.25 - 0.88 N-m (0.03 - 0.08 kg-m, 3 - 7 in-lb)

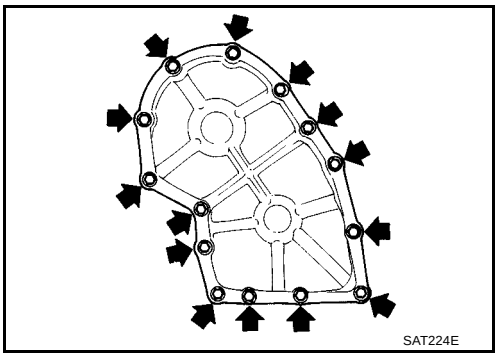
   - If not within specified range, readjust bearing preload.



10. Install idler gear and tighten lock nut to specified torque
11. After properly adjusting bearing preload, clinch idler gear and output gear lock nuts as shown.



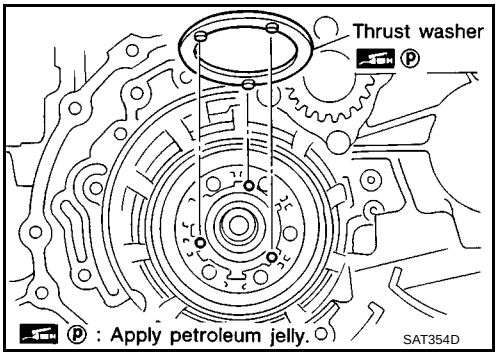
12. Install new gasket and side cover on transmission case.
    - **Always replace side cover bolts when removed.**


SAT224E

Assembly (2)

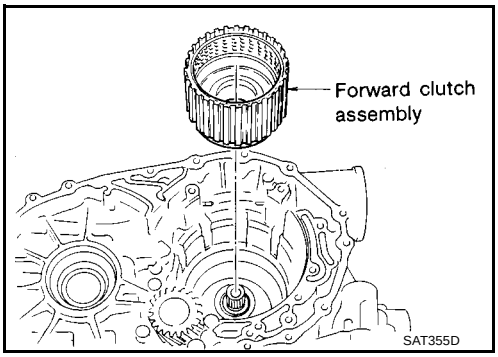
ECS008IL

1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
    - **Apply petroleum jelly to thrust washer.**



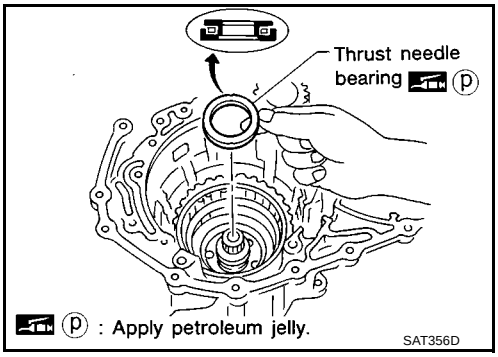
SAT354D

3. Install forward clutch assembly.
    - **Align teeth of low & reverse brake drive plates before installing.**
    - **Make sure that bearing retainer seal rings are not spread.**



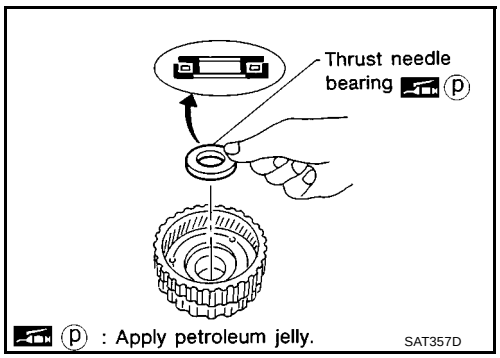
SAT355D

4. Install thrust needle bearing on bearing retainer.
    - **Apply petroleum jelly to thrust bearing.**
    - **Pay attention to direction of thrust needle bearing.**

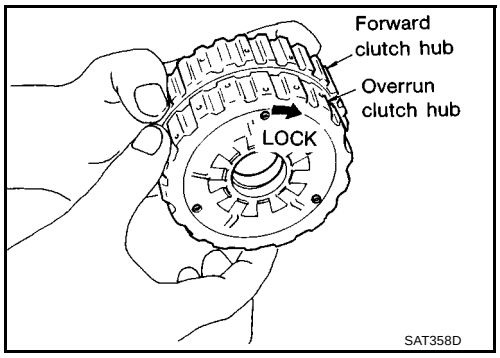


SAT356D

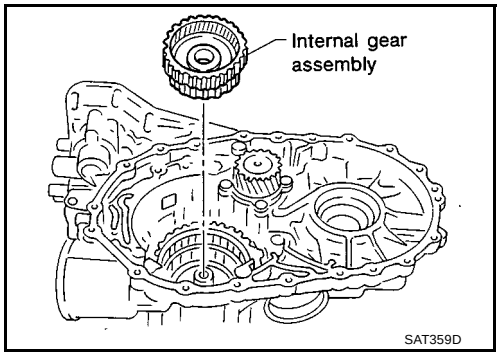
5. Install thrust needle bearing on rear internal gear.
   - **Apply petroleum jelly to thrust needle bearing.**
   - **Pay attention to direction of thrust needle bearing.**



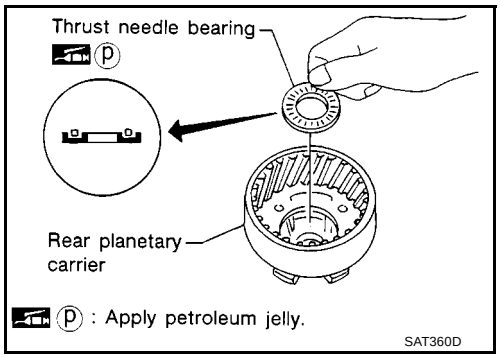
6. Hold forward clutch hub and turn overrun clutch hub.
   Check overrun clutch hub for directions of lock and unlock.
   - If not as shown in illustration, check installed direction of forward one-way clutch.



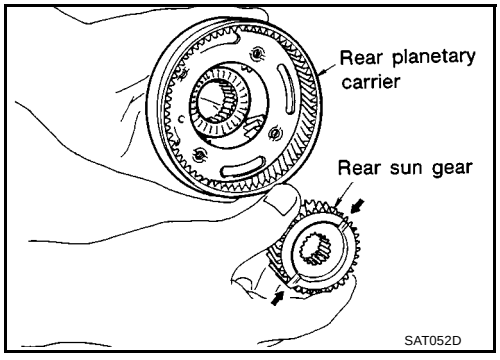
7. Install rear internal gear assembly.
   - **Align teeth of forward clutch and overrun clutch drive plate.**



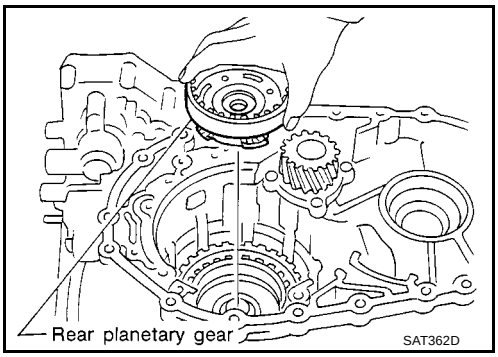
8. Install needle bearing on rear planetary carrier.
   - **Apply petroleum jelly to needle bearing.**
   - **Pay attention to direction of needle bearing.**



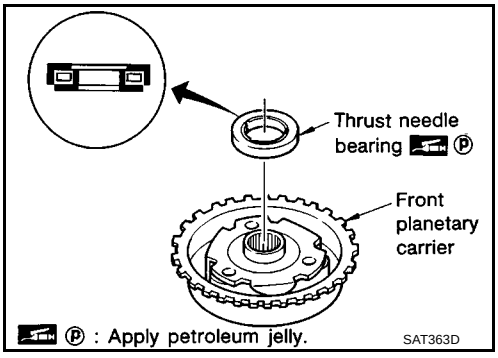
9. Install rear sun gear on rear planetary carrier.
   - **Pay attention to direction of rear sun gear.**



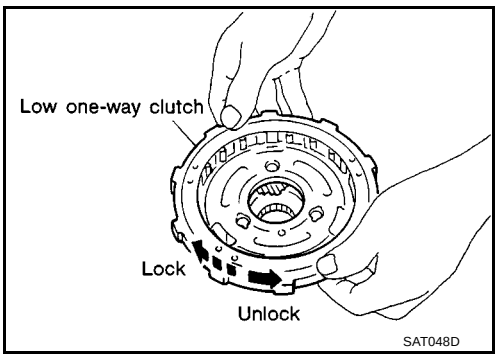
10. Install rear planetary carrier on transmission case.



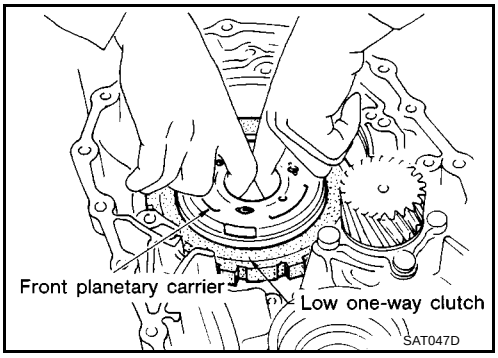
11. Install thrust needle bearing on front planetary carrier.
    - **Apply petroleum jelly to thrust needle bearing.**
    - **Pay attention to direction of thrust needle bearing.**



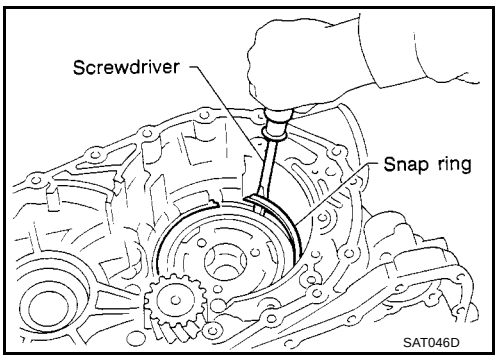
12. Install low one-way clutch to front planetary carrier by turning it in the direction of the arrow as shown.
13. While holding front planetary carrier, turn low one-way clutch. Check low one-way clutch for correct directions of lock and unlock.



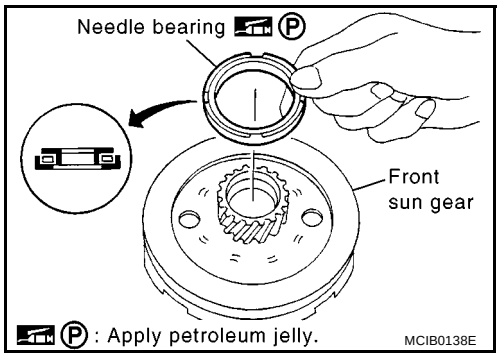
14. Install front planetary carrier assembly on transmission case.



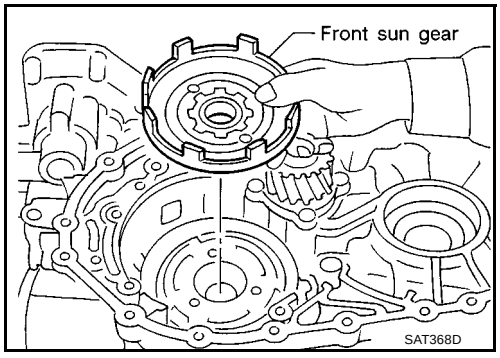
15. Install snap ring with screwdriver.
    - **Forward clutch and bearings must be correctly installed for snap ring to fit groove of transmission case.**



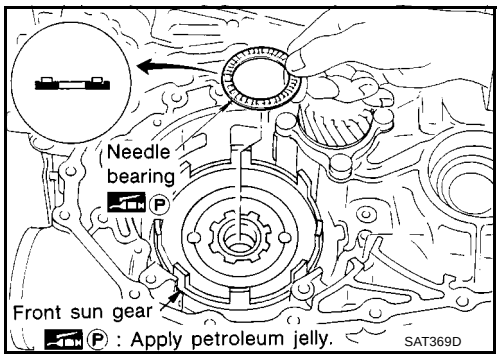
16. Install needle bearing on front sun gear.
    - **Apply petroleum jelly to needle bearing.**
    - **Pay attention to direction of needle bearing.**



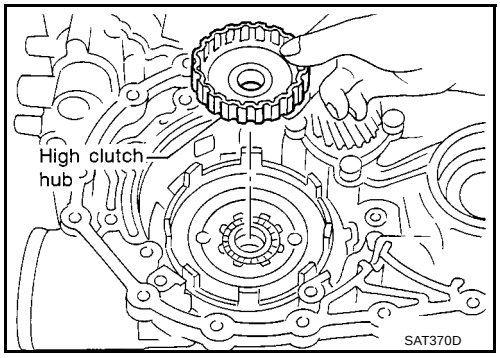
17. Install front sun gear on front planetary carrier.



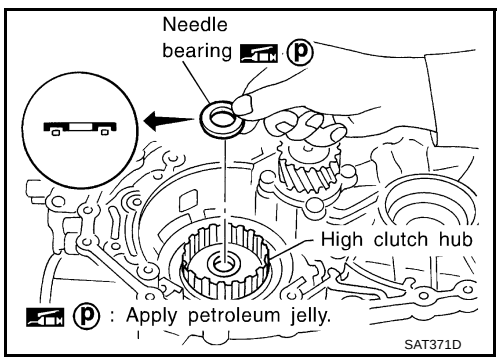
18. Install needle bearing on front sun gear.
    - **Apply petroleum jelly to needle bearing.**
    - **Pay attention to direction of needle bearing.**



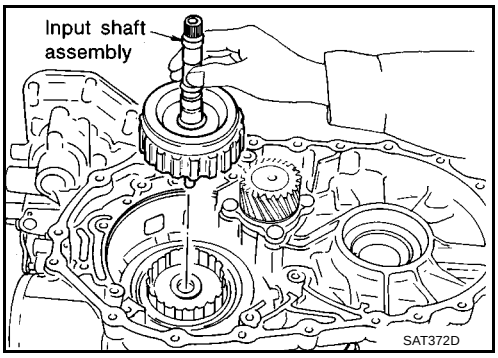
19. Install high clutch hub on front sun gear.



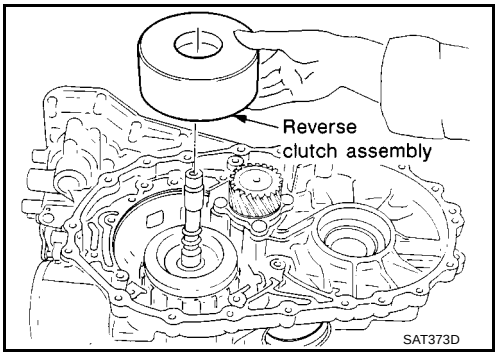
20. Install needle bearing on high clutch hub.
    - **Apply petroleum jelly to needle bearing.**
    - **Pay attention to direction of needle bearing.**



21. Remove paper rolled around input shaft.
22. Install input shaft assembly.



23. Install reverse clutch assembly.
    - **Align teeth of high clutch drive plates before installing.**



Adjustment (2)

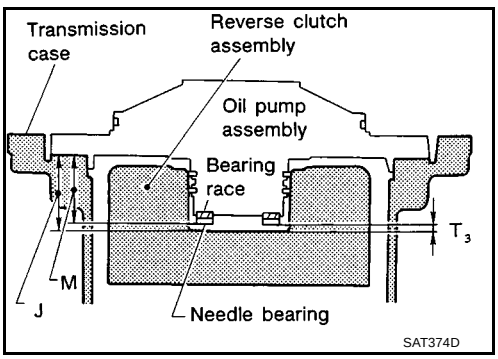
ECS008IM

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

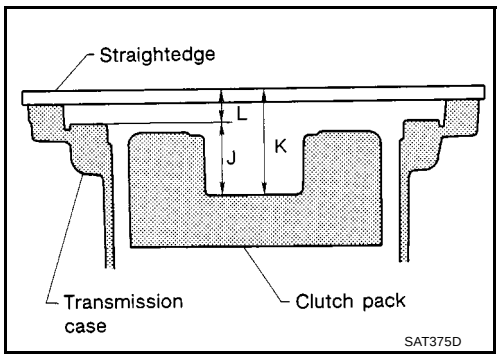
Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

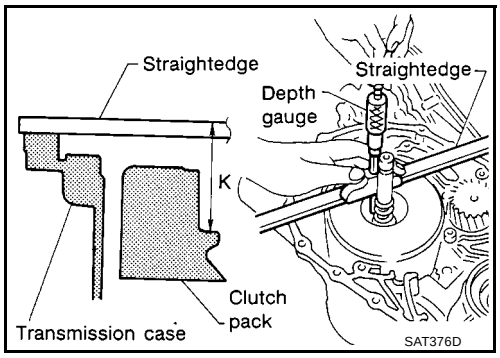
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions “K” and “L” and then calculate dimension “J”.



a. Measure dimension “K”.

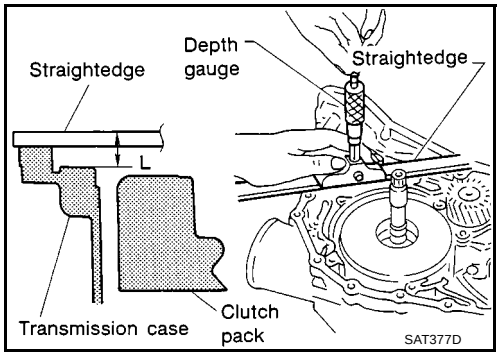


b. Measure dimension “L”.

c. Calculate dimension “J”.

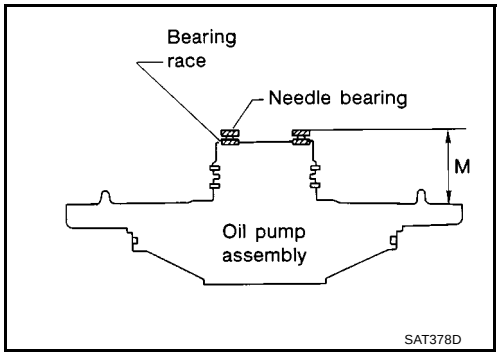
“J”: Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch drum.

J = K – L



2. Measure dimension “M”.

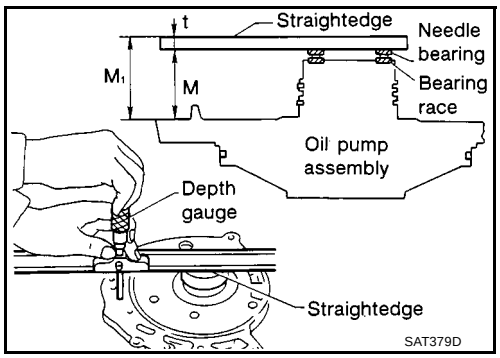
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension “M”.

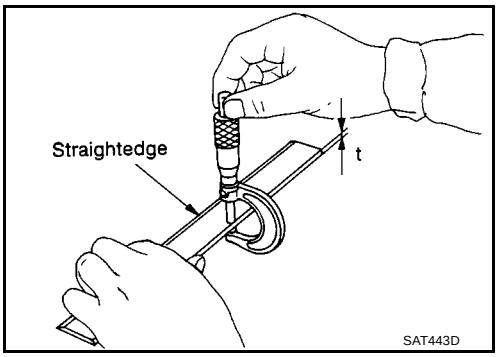
“M”: Distance between transmission case fitting surface of oil pump cover and needle bearing on oil pump cover.

“M_1 ”: Indication of gauge.



c. Measure thickness of straightedge “t”.

$M = M_1 - t$



3. Adjust total end play “T_3 ”.

$T_3 = J - M$

Total end play “T_3 ”:

0.25 - 0.55 mm (0.0098 - 0.0217 in)

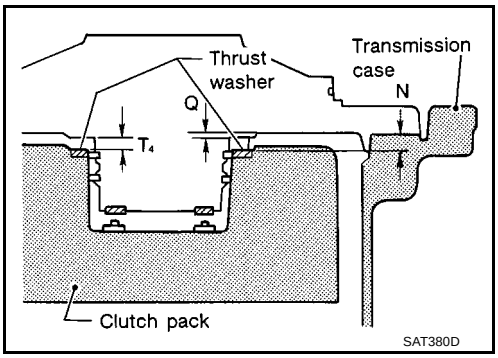
- Select proper thickness of bearing race so that total end play is within specifications.

Bearing races: **Refer to** AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"

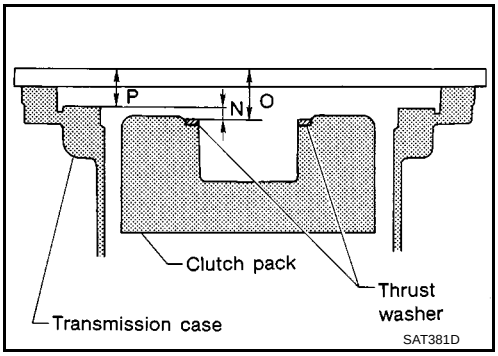
.

REVERSE CLUTCH END PLAY

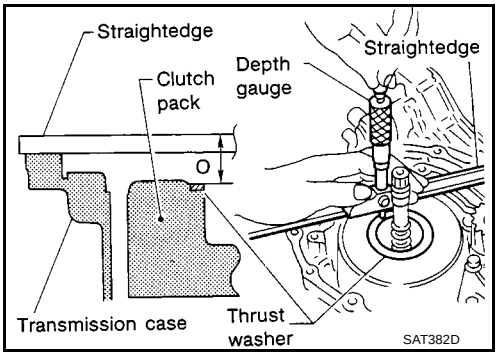
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions “O” and “P” and then calculate dimension “N”.



a. Place thrust washer on reverse clutch drum.
b. Measure dimension “O”.

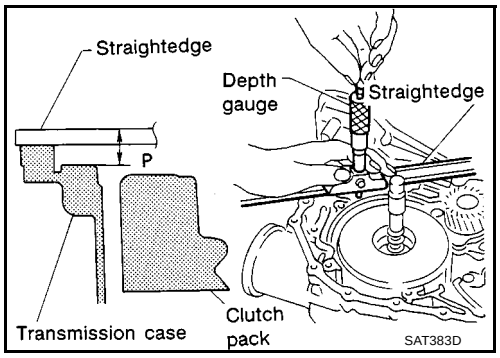


c. Measure dimension “P”.

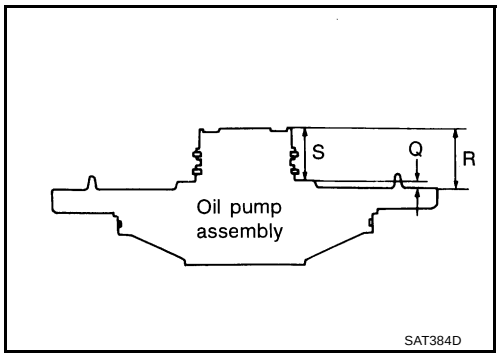
d. Calculate dimension “N”.

“N”: Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum.

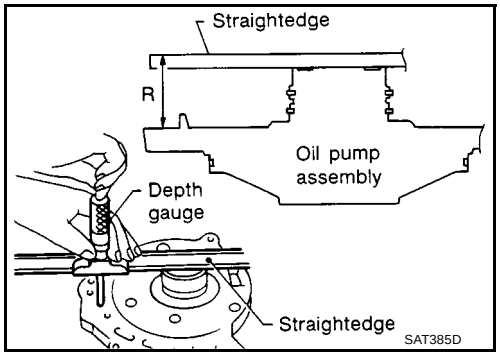
N = O – P



2. Measure dimensions “R” and “S” and then calculate dimension “Q”.



a. Measure dimension “R”.

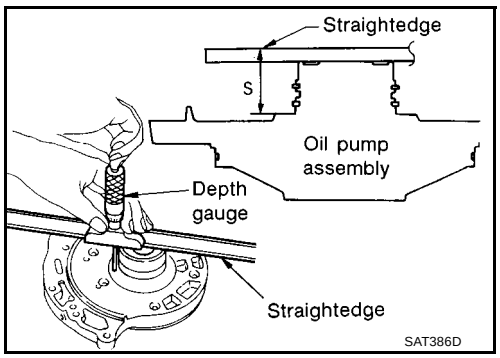


b. Measure dimension “S”.

c. Calculate dimension “Q”.

“Q”: Distance between transmission case fitting surface and thrust washer mating surface.

Q = R – S



3. Adjust reverse clutch end play “T_4 ”.

T_4 = N – Q

Reverse clutch end play:

0.65 - 1.00 mm (0.0256 - 0.0394 in)

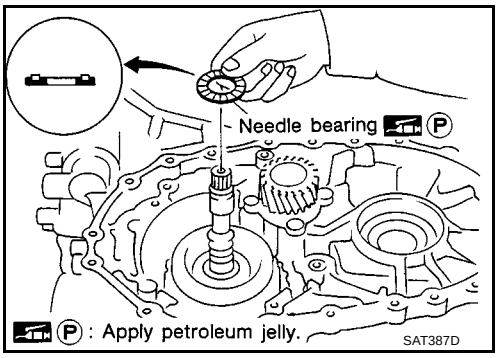
- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

Thrust washer: Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

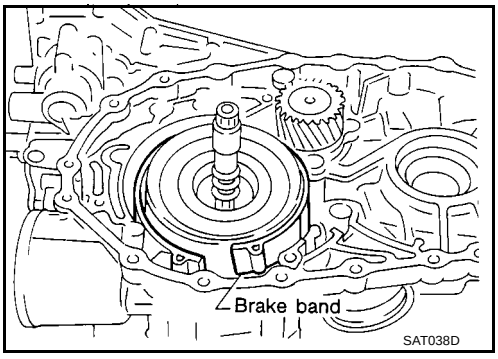
Assembly (3)

ECS008IN

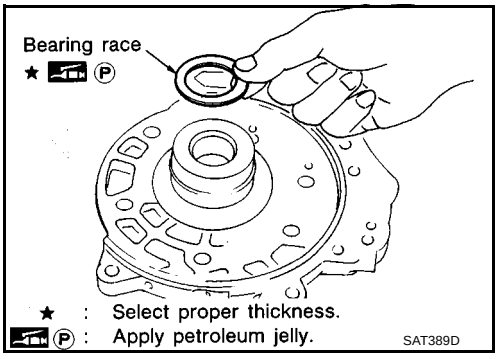
1. Remove reverse clutch assembly and install needle bearing on high clutch assembly.
   - **Pay attention to direction of needle bearing.**
2. Install reverse clutch assembly



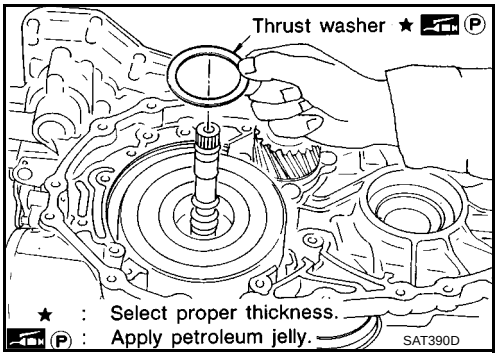
3. Install anchor end pin and lock nut on transmission case.
4. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



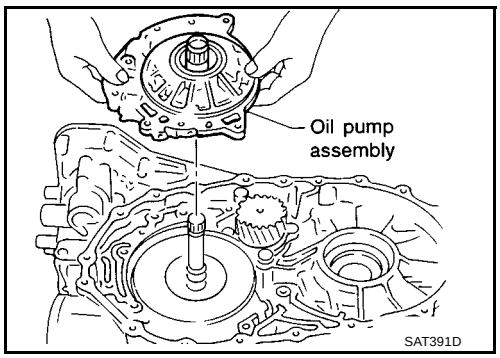
5. Place bearing race selected in total end play adjustment step on oil pump cover.
   - **Apply petroleum jelly to bearing race.**



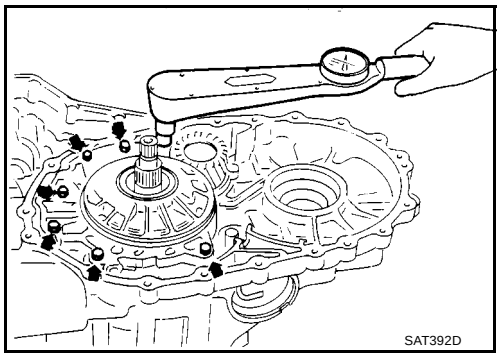
6. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
   - **Apply petroleum jelly to thrust washer.**



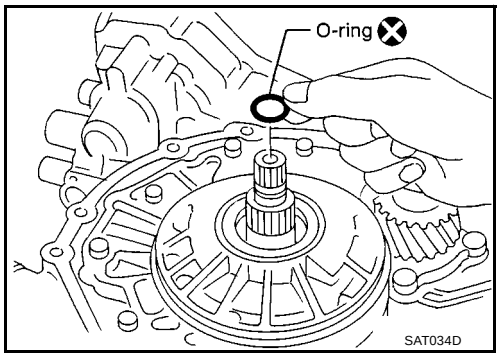
7. Install oil pump assembly on transmission case.



8. Tighten oil pump fixing bolts to the specified torque.



9. Install O-ring to input shaft.
   - **Apply ATF to O-ring.**

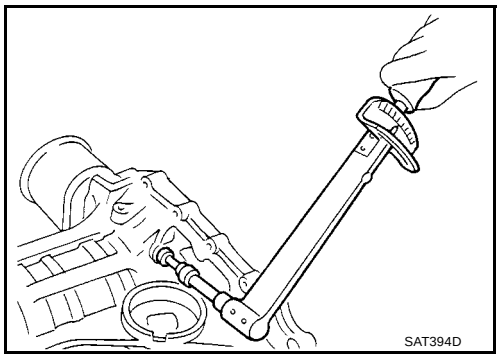


10. Adjust brake band.

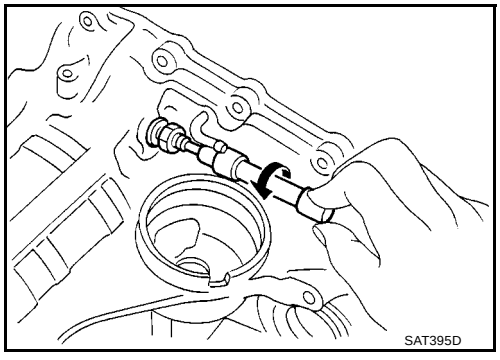
a. Tighten anchor end pin to the specified torque.

Anchor end pin:

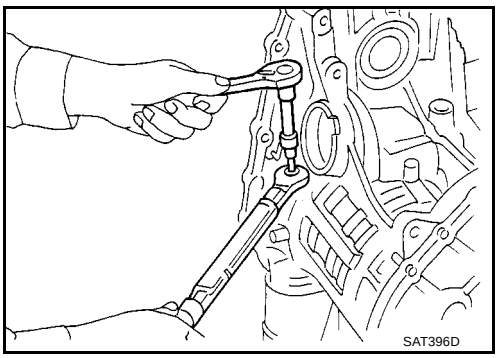
Refer to **AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"** .



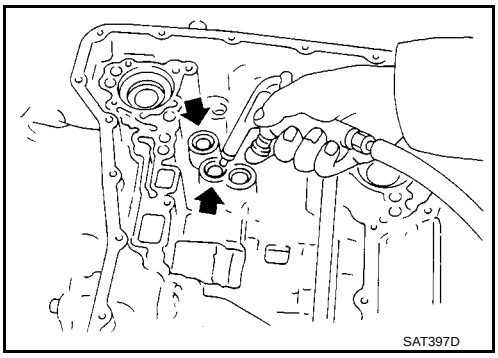
b. Back off anchor end pin two and a half turns.



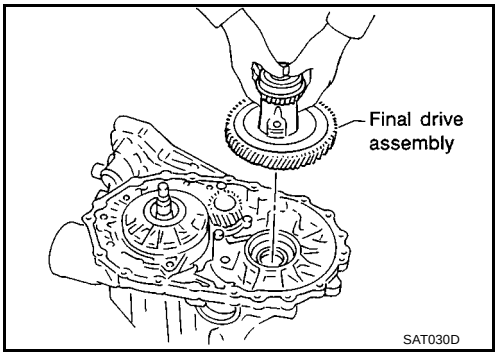
c. While holding anchor end pin, tighten lock nut.



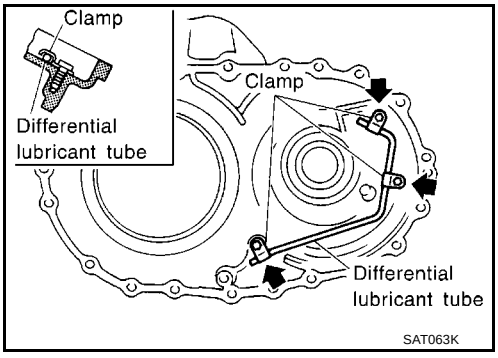
11. Apply compressed air to oil holes of transmission case and check operation of brake band.



12. Install final drive assembly on transmission case.

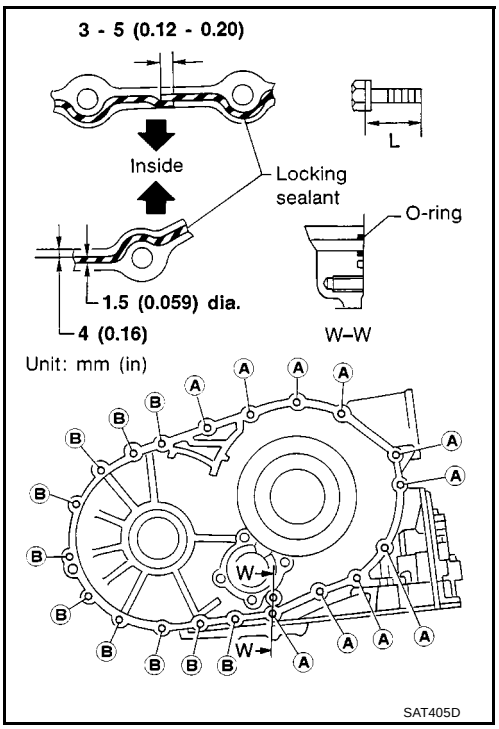


13. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-433, "OVERHAUL" .



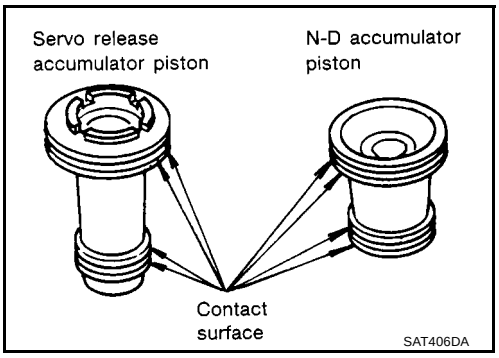
14. Install O-ring on differential oil port of transmission case.
15. Install converter housing on transmission case.
    - **Apply locking sealant to mating surface of converter housing.**

Bolt	Length mm (in)
A	30 (1.18)
B	40 (1.57)



16. Install accumulator piston.

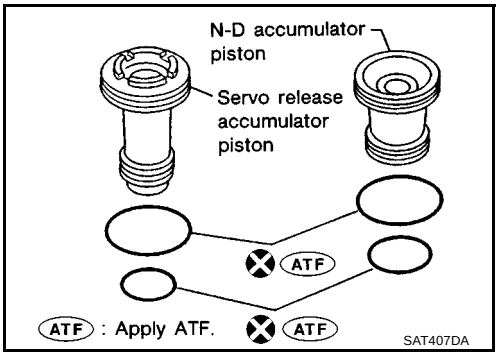
a. Check contact surface of accumulator piston for damage.



b. Install O-rings on accumulator piston.
    - **Apply ATF to O-rings.**

Accumulator piston O-rings:

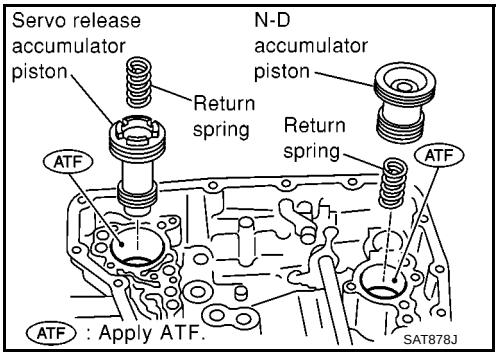
Refer to **AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"** .



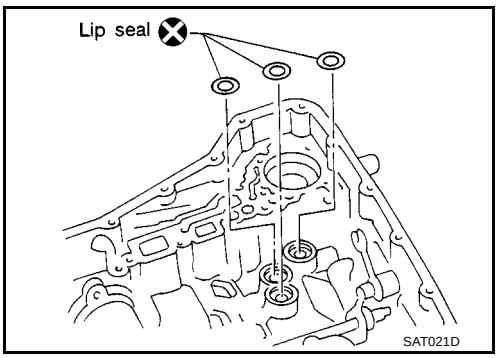
c. Install accumulator pistons and return springs on transmission case.
    - **Apply ATF to inner surface of transmission case.**

Return springs:

Refer to **AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)"** .



17. Install lip seals for band servo oil holes on transmission case.
    - **Apply petroleum jelly to lip seals.**

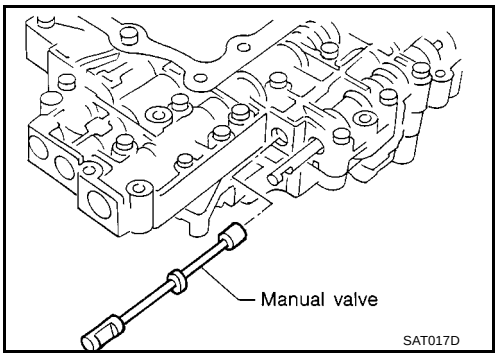


18. Install control valve assembly.

a. Insert manual valve into control valve assembly.
   - **Apply ATF to manual valve.**

b. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.

c. Install stopper ring to terminal body.

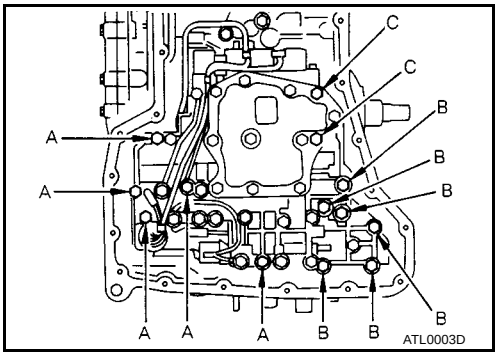


d. Tighten bolts **A** , **B** and **C** .

: 6.9 - 8.8N·m (0.71 - 0.89 kg-m, 61 - 77 in-lb)

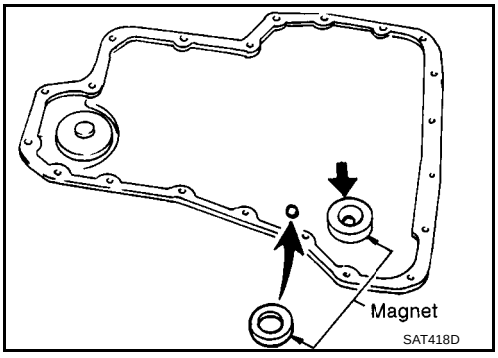
Bolt length, number and location:

Bolt	A	B	C
Bolt length "ℓ"	40 mm (1.57 in)	33 mm (1.30 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



19. Install oil pan.

a. Attach a magnet to oil pan.

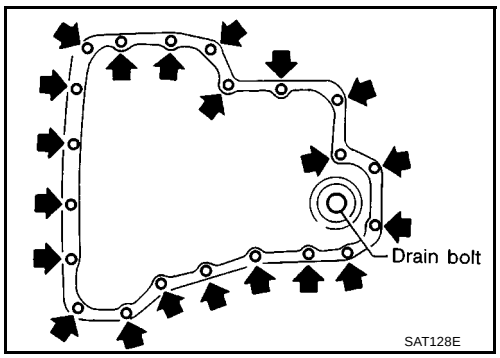


b. Install new oil pan gasket on transmission case.

c. Install oil pan on transmission case.

- **Always replace oil pan bolts as they are self-sealing bolts.**
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

d. Tighten drain plug to specified torque.

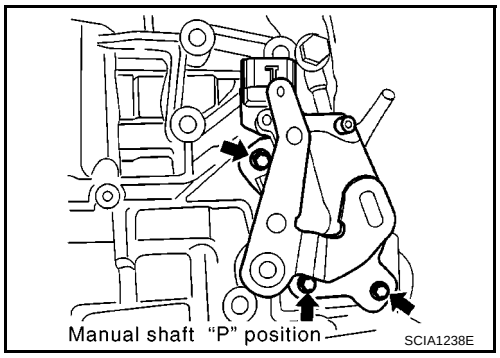


20. Install park/neutral position (PNP) switch.

a. Set manual shaft in P position.

b. Temporarily install park/neutral position (PNP) switch on manual shaft.

c. Move selector lever to N position.



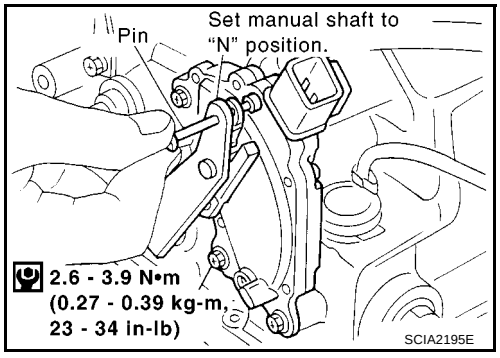
d. Use a 4 mm (0.16 in) pin for this adjustment.

i. Insert the pin straight into the manual shaft adjustment hole.

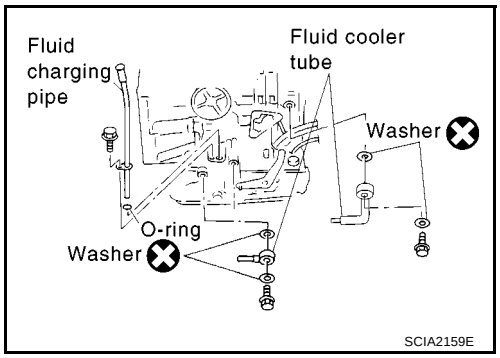
ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.

e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to AT-433, "OVERHAUL" .

f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.



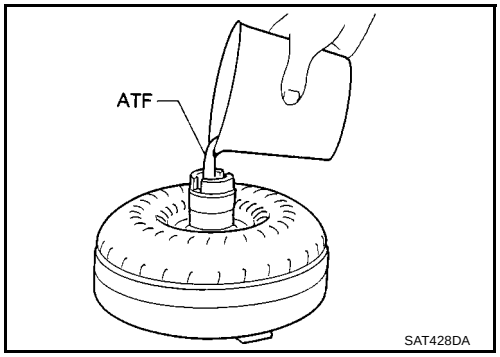
21. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-433, "OVERHAUL" .



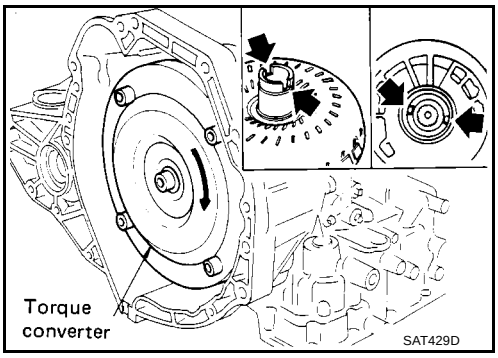
22. Install torque converter.

a. Pour ATF into torque converter.

- **Approximately 1 liter (1-3/4 Imp pt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**



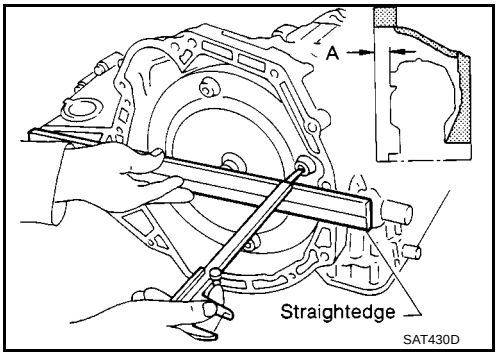
b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance “A” to check that torque converter is in proper position.

Distance A:

Refer to AT-534, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS008IO

Engine		CR12DE	CR14DE
Automatic transaxle model		RE4F03B	
Automatic transaxle assembly	Model code number	3AX80	3AX81
Transaxle gear ratio	1st	2.861	
	2nd	1.562	
	3rd	1.000	
	4th	0.697	
	Reverse	2.310	
	Final drive	4.072	
Recommended fluid		Genuine Nissan Automatic Transmission Fluid or equivalent*	
Fluid capacity		7.7 ℓ (6-3/4 Imp qt)	

*: Refer to MA-18, "Fluids and Lubricants" .

Shift Schedule

ECS008IP

VEHICLE SPEED WHEN SHIFTING GEARS

Engine		CR12DE						
Model code number		3AX80						
Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	48 - 56 (30 - 35)	92 - 100 (57 - 62)	146 - 154 (91 - 96)	142 - 150 (88 - 93)	82 - 90 (51 - 56)	41 - 49 (25 - 30)	48 - 56 (30 - 35)
Half throttle	Comfort	31 - 39 (19 - 24)	58 - 66 (36 - 41)	116 - 124 (72 - 77)	71 - 79 (44 - 49)	34 - 42 (21 - 26)	5 - 13 (3 - 8)	48 - 56 (30 - 35)

Engine		CR14DE						
Model code number		3AX81						
Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	48 - 56 (30 - 35)	92 - 100 (57 - 62)	146 - 154 (91 - 96)	142 - 150 (88 - 93)	82 - 90 (51 - 56)	41 - 49 (25 - 30)	48 - 56 (30 - 35)
Half throttle	Comfort	37 - 45 (23 - 28)	67 - 75 (42 - 47)	119 - 127 (74 - 79)	69 - 77 (42 - 48)	39 - 47 (21 - 26)	5 - 13 (3 - 8)	48 - 56 (30 - 35)

VEHICLE SPEED WHEN PERFORMING LOCK-UP

Engine			CR12DE	
Model code number			3AX80	
Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up ON	Lock-up OFF
2/8	ON (D_4)	Comfort	69 - 77 (43 - 48)	63 - 71 (39 - 44)
	OFF (D_3)		96 - 104 (60 - 65)	93 - 101 (58 - 63)

Engine			CR14DE	
Model code number			3AX81	
Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up ON	Lock-up OFF
2/8	ON (D_4)	Comfort	77 - 85 (48 - 53)	53 - 61 (33 - 38)
	OFF (D_3)		96 - 104 (60 - 65)	93 - 101 (58 - 63)

Stall Revolution

ECS008IQ

Engine	Model code number	Stall revolution rpm
CR12DE	3AX80	2,100 - 2,550
CR14DE	3AX81	2,300 - 2,800

Line Pressure

ECS008IR

Engine speed rpm	Engine	Model code number	Line pressure kPa (bar, kg/cm^2 , psi)	
			R position	D, 2, 1 position
Idle	CR12DE	3AX80	778 (7.8, 7.9, 113)	500 (5.0, 5.1, 73)
	CR14DE	3AX81		
Stall	CR12DE	3AX80	1677 (16.8, 17.1, 243)	1078 (10.8, 11.0, 156)
	CR14DE	3AX81	1813 (18.1, 18.5, 263)	1165 (11.7, 11.9, 169)

Control Valves

ECS008IS

CONTROL VALVE AND PLUG RETURN SPRINGS

Unit: mm (in)

	No.	Parts	Part No.*	Free length	Outer diameter
Upper body Refer to “Control Valve Upper Body”, AT-466 .	35	3-2 timing valve spring	31736-01X00	23.29 (0.9169)	6.65 (0.2618)
	19	Cooler check valve spring	31742-3AX05	28.04 (1.1039)	7.15 (0.2815)
	23	Pilot valve spring	31742-3AX03	38.98 (1.5346)	8.9 (0.350)
	15	1-2 accumulator valve spring	31742-3AX08	55.26 (2.1756)	19.6(0.772)
	28	1-2 accumulator piston spring	31742-3AX00	20.5 (0.807)	6.95 (0.2736)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	2	Overrun clutch reducing valve spring	31742-80X06	37.5 (1.476)	7.0 (0.276)
	7	Torque converter relief valve spring	31742-3AX04	33.3 (1.3110)	9.0 (0.354)
	10	Lock up control valve spring	31742-3AX02	53.01 (2.0870)	6.5 (0.256)
Lower body Refer to “Control Valve Lower Body”, AT-470 .	34	Shuttle valve spring	31762-41X04	51.0 (2.0079)	5.65 (0.2224)
	18	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	23	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	27	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	2	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	11	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	7	Pressure modifier piston spring	31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Line pressure relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)
	—	T/C pressure hold valve spring	31742-3AX11	9.0 (0.354)	7.3 (0.287)

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes

ECS008IT

REVERSE CLUTCH

Model code number		3AX80, 3AX81	
Number of drive plates		2	
Number of driven plates		2	
Drive plate thickness mm (in)	Standard	2.0 (0.079)	
	Allowable limit	1.8 (0.071)	
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
	Allowable limit	1.2 (0.047)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		4.4 (0.173)	31537-31X00
		4.6 (0.181)	31537-31X01
		4.8 (0.189)	31537-31X02
		5.0 (0.197)	31537-31X03
		5.2 (0.205)	31537-31X04

*: Always check with the Parts Department for the latest parts information.

HIGH CLUTCH

Model code number		3AX80		3AX81	
Number of drive plates		2			
Number of driven plates		6			
Drive plate thickness mm (in)	Standard	2.0 (0.079)		1.6 (0.063)	
	Allowable limit	1.8 (0.071)		1.4 (0.055)	
Clearance mm (in)	Standard	1.4 - 1.8 (0.055 - 0.071)			
	Allowable limit	2.4 (0.094)			
Thickness of retaining plates		Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
		3.6 (0.142)	31537-32X12	4.4 (0.173)	31537-32X03
		3.8 (0.150)	31537-32X00	4.6 (0.181)	31537-32X04
		4.0 (0.157)	31537-32X01	4.8 (0.189)	31537-32X05
		4.2 (0.165)	31537-32X02	5.0 (0.197)	31537-32X06
		4.4 (0.173)	31537-32X03	5.2 (0.205)	31537-32X07
		4.6 (0.181)	31537-32X04	5.4 (0.213)	31537-32X08
		4.8 (0.189)	31537-32X05	5.6 (0.220)	31537-32X09
				5.8 (0.228)	31537-32X10

*: Always check with the Parts Department for the latest parts information.

FORWARD CLUTCH

Model code number		3AX80	3AX81	
Number of drive plates		4	5	
Number of driven plates		6	5	
Drive plate thickness mm (in)	Standard	1.8 (0.071)		
	Allowable limit	1.6 (0.063)		
Clearance mm (in)	Standard	0.45 - 0.85 (0.018 - 0.033)		
	Allowable limit	1.85 (0.073)		
Thickness of retaining plates		Thickness mm (in)	Part number*	
		3.6 (0.142)	31537-31X60	
		3.8 (0.150)	31537-31X61	
		4.0 (0.157)	31537-31X62	
		4.2 (0.165)	31537-31X63	
		4.4 (0.173)	31537-31X64	
		4.6 (0.181)	31537-31X65	

*: Always check with the Parts Department for the latest parts information.

OVERRUN CLUTCH

Model code number		3AX80		3AX81	
Number of drive plates		2		3	
Number of driven plates		5		4	
Drive plate thickness mm (in)	Standard	1.6 (0.063)			
	Allowable limit	1.4 (0.055)			
Clearance mm (in)	Standard	1.0 - 1.4 (0.039 - 0.055)			
	Allowable limit	2.0 (0.079)			
Thickness of retaining plates		Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
		3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150) 4.0 (0.157)	31567-31X77 31567-31X78 31567-31X79 31567-31X80 31567-31X81	3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173)	31567-31X79 31567-31X80 31567-31X81 31567-31X82 31567-31X83

*: Always check with the Parts Department for the latest parts information.

LOW & REVERSE BRAKE

Model code number		3AX80	3AX81	
Number of drive plates		3	4	
Number of driven plates		5	4	
Drive plate thickness mm (in)	Standard	2.0 (0.079)		
	Allowable limit	1.8 (0.071)		
Clearance mm (in)	Standard	1.4 - 1.8 (0.055 - 0.071)		
	Allowable limit	2.8 (0.110)		
Thickness of retaining plates		Thickness mm (in)	Part number*	
		3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181)	31667-31X16 31667-31X17 31667-31X18 31667-31X19 31667-31X20 31667-31X21	

*: Always check with the Parts Department for the latest parts information.

BRAKE BAND

Anchor end pin tightening torque	3.9 - 5.9 N-m (0.4 - 0.6 kg-m, 35 - 52 in-lb)
Number of returning revolutions for anchor end pin	2.5±0.125
Lock nut tightening torque	32 - 36 N-m (3.3 - 3.6 kg-m, 24 - 26 ft-lb)

Clutch and Brake Return Springs

ECS008IU

Unit: mm (in)

Parts		Free length	Outer diameter	Part number*
Forward clutch (Overrun clutch)	Outer (16 pcs)	26.6 (1.047)	10.6 (0.417)	31505-31X02
	Inner (16 pcs)	26.3 (1.035)	7.7 (0.303)	31505-31X03
Reverse clutch (16 pcs)		18.6 (0.732)	8.0 (0.315)	31505-31X00
High clutch (12 pcs)		19.7 (0.776)	11.1 (0.437)	31505-31X01
Low reverse brake (20 pcs)		25.1 (0.988)	7.6 (0.299)	31505-31X04

*: Always check with the Parts Department for the latest parts information.

Oil Pump

ECS008IV

Oil pump side clearance mm (in)		0.02 - 0.04 (0.0008 - 0.0016)
Thickness of inner gears and outer gears		Inner gear
		Thickness mm (in) / Part number*
		9.99 - 10.00 (0.3933 - 0.3937) / 31346-31X00 9.98 - 9.99 (0.3929 - 0.3933) / 31346-31X01 9.97 - 9.98 (0.3925 - 0.3929) / 31346-31X02
		Outer gear
		Thickness mm (in) / Part number*
		9.99 - 10.00 (0.3933 - 0.3937) / 31347-31X00 9.98 - 9.99 (0.3929 - 0.3933) / 31347-31X01 9.97 - 9.98 (0.3925 - 0.3929) / 31347-31X02
Clearance between oil pump housing and outer gear mm (in)	Standard	0.08 - 0.15 (0.0031 - 0.0059)
	Allowable limit	0.15 (0.0059)
Oil pump cover seal ring clearance mm (in)	Standard	0.15 - 0.35 (0.0059 - 0.0138)
	Allowable limit	0.35 (0.0138)

*: Always check with the Parts Department for the latest parts information.

Input Shaft

ECS008IW

Unit: mm (in)

Input shaft seal ring clearance	Standard	0.1 - 0.25 (0.004 - 0.0098)
	Allowable limit	0.25 (0.0098)

Planetary carrier

ECS008IX

Unit: mm (in)

Clearance between planetary carrier and pinion washer	Standard	0.15 - 0.70 (0.0059 - 0.0276)
	Allowable limit	0.80 (0.0315)

Final Drive

ECS008IY

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

Thickness mm (in)	Part number*
0.75 - 0.80 (0.0295 - 0.0315)	38454-31X00
0.80 - 0.85 (0.0315 - 0.0335)	38454-31X01
0.85 - 0.90 (0.0335 - 0.0354)	38454-31X02
0.90 - 0.95 (0.0354 - 0.0374)	38454-31X03
0.95 - 1.00 (0.0374 - 0.0394)	38454-31X04

*: Always check with the Parts Department for the latest parts information.

BEARING PRELOAD

Differential side bearing preload “T”	0.04 - 0.09 mm (0.0016 - 0.0035 in)

TURNING TORQUE

Turning torque of final drive assembly	0.49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)

DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.48 (0.0189)	38454-M8001
0.56 (0.0220)	38454-M8003
0.64 (0.0252)	38454-M8005
0.72 (0.0283)	38454-M8007
0.80 (0.0315)	38454-M8009
0.88 (0.0346)	38454-M8011
0.96 (0.0378)	38454-M8013
1.04 (0.0409)	38454-M8015

*: Always check with the Parts Department for the latest parts information.

TABLE FOR SELECTING DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

Unit: mm (in)

Dial indicator deflection	Suitable shim(s)
0.31 - 0.35 (0.0122 - 0.0138)	0.40 (0.0157)
0.35 - 0.39 (0.0138 - 0.0154)	0.44 (0.0173)
0.39 - 0.43 (0.0154 - 0.0169)	0.48 (0.0189)
0.43 - 0.47 (0.0169 - 0.0185)	0.52 (0.0205)
0.47 - 0.51 (0.0185 - 0.0201)	0.56 (0.0220)
0.51 - 0.55 (0.0201 - 0.0217)	0.60 (0.0236)
0.55 - 0.59 (0.0217 - 0.0232)	0.64 (0.0252)
0.59 - 0.63 (0.0232 - 0.0248)	0.68 (0.0268)
0.63 - 0.67 (0.0248 - 0.0264)	0.72 (0.0283)
0.67 - 0.71 (0.0264 - 0.0280)	0.76 (0.0299)
0.71 - 0.75 (0.0280 - 0.0295)	0.80 (0.0315)
0.75 - 0.79 (0.0295 - 0.0311)	0.84 (0.0331)
0.79 - 0.83 (0.0311 - 0.0327)	0.88 (0.0346)
0.83 - 0.87 (0.0327 - 0.0343)	0.92 (0.0362)
0.87 - 0.91 (0.0343 - 0.0358)	0.48 (0.0189) + 0.48 (0.0189)
0.91 - 0.95 (0.0358 - 0.0374)	0.48 (0.0189) + 0.52 (0.0205)
0.95 - 0.99 (0.0374 - 0.0390)	0.52 (0.0205) + 0.52 (0.0205)
0.99 - 1.03 (0.0390 - 0.0406)	0.52 (0.0205) + 0.56 (0.0220)
1.03 - 1.07 (0.0406 - 0.0421)	0.56 (0.0220) + 0.56 (0.0220)
1.07 - 1.11 (0.0421 - 0.0437)	0.56 (0.0220) + 0.60 (0.0236)
1.11 - 1.15 (0.0437 - 0.0453)	0.60 (0.0236) + 0.60 (0.0236)
1.15 - 1.19 (0.0453 - 0.0469)	0.60 (0.0236) + 0.64 (0.0252)
1.19 - 1.23 (0.0469 - 0.0484)	0.64 (0.0252) + 0.64 (0.0252)
1.23 - 1.27 (0.0484 - 0.0500)	0.64 (0.0252) + 0.68 (0.0268)
1.27 - 1.31 (0.0500 - 0.0516)	0.68 (0.0268) + 0.68 (0.0268)
1.31 - 1.35 (0.0516 - 0.0531)	0.68 (0.0268) + 0.72 (0.0283)
1.35 - 1.39 (0.0531 - 0.0547)	1.44 (0.0567)
1.39 - 1.43 (0.0547 - 0.0563)	0.72 (0.0283) + 0.76 (0.0299)
1.43 - 1.47 (0.0563 - 0.0579)	0.76 (0.0299) + 0.76 (0.0299)
1.47 - 1.51 (0.0579 - 0.0594)	0.76 (0.0299) + 0.80 (0.0315)
1.51 - 1.55 (0.0594 - 0.0610)	0.80 (0.0315) + 0.80 (0.0315)
1.55 - 1.59 (0.0610 - 0.0626)	0.80 (0.0315) + 0.84 (0.0331)
1.59 - 1.63 (0.0626 - 0.0642)	0.84 (0.0331) + 0.84 (0.0331)
1.63 - 1.67 (0.0642 - 0.0657)	0.84 (0.0331) + 0.88 (0.0346)
1.67 - 1.71 (0.0657 - 0.0673)	0.88 (0.0346) + 0.88 (0.0346)
1.71 - 1.75 (0.0673 - 0.0689)	0.88 (0.0346) + 0.92 (0.0362)
1.75 - 1.79 (0.0689 - 0.0705)	0.92 (0.0362) + 0.92 (0.0362)
1.79 - 1.83 (0.0705 - 0.0720)	0.92 (0.0362) + 0.96 (0.0378)
1.83 - 1.87 (0.0720 - 0.0736)	0.96 (0.0378) + 0.96 (0.0378)
1.87 - 1.91 (0.0736 - 0.0752)	0.52 (0.0205) + 1.44 (0.0567)
1.91 - 1.95 (0.0752 - 0.0768)	0.56 (0.0220) + 1.44 (0.0567)

Reduction Pinion Gear

ECS008IZ

BEARING PRELOAD

Reduction pinion gear bearing preload	0.05 mm (0.0020 in)

TURNING TORQUE

Turning torque of reduction pinion gear	0.1 - 0.69 N-m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

Thickness mm (in)	Part number*
1.74 (0.0685)	31438-31X16
1.78 (0.0701)	31438-31X17
1.82 (0.0717)	31438-31X18
1.86 (0.0732)	31438-31X19
1.90 (0.0748)	31438-31X20
1.92 (0.0756)	31439-31X60
1.94 (0.0764)	31438-31X21
1.96 (0.0772)	31439-31X61
1.98 (0.0780)	31438-31X22
2.00 (0.0787)	31439-31X62
2.02 (0.0795)	31438-31X23
2.04 (0.0803)	31439-31X63
2.06 (0.0811)	31438-31X24
2.08 (0.0819)	31439-31X64
2.10 (0.0827)	31438-31X60
2.12 (0.0835)	31439-31X65
2.14 (0.0843)	31438-31X61
2.16 (0.0850)	31439-31X66
2.18 (0.0858)	31438-31X62
2.20 (0.0866)	31439-31X67
2.22 (0.0874)	31438-31X63
2.24 (0.0882)	31439-31X68
2.26 (0.0890)	31438-31X64
2.28 (0.0898)	31439-31X69
2.30 (0.0906)	31438-31X65
2.34 (0.0921)	31438-31X66
2.38 (0.0937)	31438-31X67
2.42 (0.0953)	31438-31X68
2.46 (0.0969)	31438-31X69
2.50 (0.0984)	31438-31X70
2.54 (0.1000)	31438-31X71
2.58 (0.1016)	31438-31X72
2.62 (0.1031)	31438-31X73
2.66 (0.1047)	31438-31X74

*: Always check with the Parts Department for the latest parts information.

TABLE FOR SELECTING REDUCTION PINION GEAR BEARING ADJUSTING SHIM

Unit: mm (in)

Dimension “T”	Suitable shim(s)
1.77 - 1.81 (0.0697 - 0.0713)	1.74 (0.0685)
1.81 - 1.85 (0.0713 - 0.0728)	1.78 (0.0701)
1.85 - 1.89 (0.0728 - 0.0744)	1.82 (0.0717)
1.89 - 1.93 (0.0744 - 0.0760)	1.86 (0.0732)
1.93 - 1.96 (0.0760 - 0.0772)	1.90 (0.0748)
1.96 - 1.98 (0.0772 - 0.0780)	1.92 (0.0756)
1.98 - 2.00 (0.0780 - 0.0787)	1.94 (0.0764)
2.00 - 2.02 (0.0787 - 0.0795)	1.96 (0.0772)
2.02 - 2.04 (0.0795 - 0.0803)	1.98 (0.0780)
2.04 - 2.06 (0.0803 - 0.0811)	2.00 (0.0787)
2.06 - 2.08 (0.0811 - 0.0819)	2.02 (0.0795)
2.08 - 2.10 (0.0819 - 0.0827)	2.04 (0.0803)
2.10 - 2.12 (0.0827 - 0.0835)	2.06 (0.0811)
2.12 - 2.14 (0.0835 - 0.0843)	2.08 (0.0819)
2.14 - 2.16 (0.0843 - 0.0850)	2.10 (0.0827)
2.16 - 2.18 (0.0850 - 0.0858)	2.12 (0.0835)
2.18 - 2.20 (0.0858 - 0.0866)	2.14 (0.0843)
2.20 - 2.22 (0.0866 - 0.0874)	2.16 (0.0850)
2.22 - 2.24 (0.0874 - 0.0888)	2.18 (0.0858)
2.24 - 2.26 (0.0882 - 0.0890)	2.20 (0.0866)
2.26 - 2.28 (0.0890 - 0.0898)	2.22 (0.0874)
2.28 - 2.30 (0.0898 - 0.0906)	2.24 (0.0882)
2.30 - 2.32 (0.0906 - 0.0913)	2.26 (0.0890)
2.32 - 2.34 (0.0913 - 0.0921)	2.28 (0.0898)
2.34 - 2.37 (0.0921 - 0.0933)	2.30 (0.0906)
2.37 - 2.41 (0.0933 - 0.0949)	2.34 (0.0921)
2.41 - 2.45 (0.0949 - 0.0965)	2.38 (0.0937)
2.45 - 2.49 (0.0965 - 0.0980)	2.42 (0.0953)
2.49 - 2.53 (0.0980 - 0.0996)	2.46 (0.0969)
2.53 - 2.57 (0.0996 - 0.1012)	2.50 (0.0984)
2.57 - 2.61 (0.1012 - 0.1028)	2.54 (0.1000)
2.61 - 2.65 (0.1028 - 0.1043)	2.58 (0.1016)
2.65 - 2.69 (0.1043 - 0.1059)	2.62 (0.1031)
2.69 - 2.73 (0.1059 - 0.1075)	2.66 (0.1047)

Output Shaft

ECS008J0

SEAL RING CLEARANCE

Unit: mm (in)

Output shaft seal ring clearance	Standard	0.10 - 0.35 (0.0039 - 0.0138)
	Allowable limit	0.35 (0.0138)

END PLAY

Output shaft end play	0 - 0.5 mm (0 - 0.020 in)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
29.5 (1.161)	26.2 (1.031)	1.95 (0.077)	31525 31X04

*: Always check with the Parts Department for the latest parts information.

OUTPUT SHAFT END PLAY ADJUSTING SHIMS

Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
6.26 (0.2465)	31437 31X16	6.80 (0.2677)	31437 31X82
6.30 (0.2480)	31437 31X17	6.82 (0.2685)	31437 31X65
6.34 (0.2496)	31437 31X18	6.84 (0.2693)	31437 31X83
6.38 (0.2512)	31437 31X19	6.86 (0.2701)	31437 31X66
6.42 (0.2528)	31437 31X20	6.88 (0.2709)	31437 31X84
6.46 (0.2543)	31437 31X21	6.90 (0.2717)	31437 31X67
6.50 (0.2559)	31437 31X22	6.92 (0.2724)	31437 31X46
6.54 (0.2575)	31437 31X23	6.94 (0.2732)	31437 31X68
6.58 (0.2591)	31437 31X24	6.96 (0.2740)	31437 31X47
6.62 (0.2606)	31437 31X60	6.98 (0.2748)	31437 31X69
6.64 (0.2614)	31437 31X78	7.00 (0.2756)	31437 31X48
6.66 (0.2622)	31437 31X61	7.02 (0.2764)	31437 31X70
6.68 (0.2630)	31437 31X79	7.06 (0.2780)	31437 31X71
6.70 (0.2638)	31437 31X62	7.10 (0.2795)	31437 31X72
6.72 (0.2646)	31437 31X80	7.14 (0.2811)	31437 31X73
6.74 (0.2654)	31437 31X63	7.18 (0.2827)	31437 31X74
6.76 (0.2661)	31437 31X81	7.20 (0.2835)	31437 31X75
6.78 (0.2669)	31437 31X64		

*: Always check with the Parts Department for the latest parts information.

Bearing Retainer

ECS008J1

SEAL RING CLEARANCE

Unit: mm (in)

Bearing retainer seal ring clearance	Standard	0.10 - 0.27 (0.0039 - 0.0106)
	Allowable limit	0.27 (0.0106)

Total End Play

ECS008J2

Total end play “T_3 ”	0.25 - 0.55 mm (0.0098 - 0.0217 in)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)	Part number*
0.6 (0.024)	31435-31X01
0.8 (0.031)	31435-31X02
1.0 (0.039)	31435-31X03
1.2 (0.047)	31435-31X04
1.4 (0.055)	31435-31X05
1.6 (0.063)	31435-31X06
1.8 (0.071)	31435-31X07
2.0 (0.079)	31435-31X08

*: Always check with the Parts Department for the latest parts information.

Reverse Clutch End Play

ECS008J3

Reverse clutch end play “T4”	0.65 - 1.00 mm (0.0256 - 0.0394 in)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH END PLAY

Thickness mm (in)	Part number*
0.65 (0.0256)	31508-31X10
0.80 (0.0315)	31508-31X11
0.95 (0.0374)	31508-31X12
1.10 (0.0433)	31508-31X13
1.25 (0.0492)	31508-31X14
1.40 (0.0551)	31508-31X15

*: Always check with the Parts Department for the latest parts information.

Accumulator

ECS008J4

O-RING

Unit: mm (in)

Accumulator	Diameter (Small)	Part number*	Diameter (Large)	Part number*
Servo release accumulator	26.9 (1.059)	31526-41X03	44.2 (1.740)	31526-41X02
N-D accumulator	34.6 (1.362)	31526-31X08	39.4 (1.551)	31672-21X00

*: Always check with the Parts Department for the latest parts information.

RETURN SPRING

Unit: mm (in)

Accumulator	Free length	Outer diameter	Part number*
Servo release accumulator spring	52.5 (2.067)	20.4 (0.8.3)	31605-80X03
N-D accumulator spring	46.5 (1.831)	28.0 (1.102)	31605-85X02

*: Always check with the Parts Department for the latest parts information.

Band Servo

ECS008J5

RETURN SPRING

Unit: mm (in)

Return spring	Free length	Outer diameter	Part number*
2nd servo return spring	32.5 (1.280)	25.9 (1.020)	31605-31X20
OD servo return spring	38.52 (1.5165)	22.0 (0.866)	31605-31X21

*: Always check with the Parts Department for the latest parts information.

Removal and Installation

ECS008J6

Unit: mm (in)

Distance between end of converter housing and torque converter	21.1 (0.831) or more

Shift Solenoid Valves

ECS008J7

Gear	Solenoid A	Solenoid B
1st	ON	ON
2nd	OFF	ON
3rd	OFF	OFF
4th	ON	OFF

Solenoid Valves

ECS008J8

Solenoid valve	Resistance (Approx.)	Terminal number
Shift solenoid A	20 - 30Ω	2
Shift solenoid B	5 - 20Ω	1
Ovr. clutch sol.	20 - 30Ω	3
Line pres. sol.	2.5 - 5Ω	4
T/conv. clutch sol.	5 - 20Ω	5

A/T Fluid Temperature Sensor

ECS008J9

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

Revolution Sensor

ECS008JA

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	150 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

Dropping Resistor

ECS008JB

Resistance	12Ω

SECTION ATC
AUTOMATIC AIR CONDITIONER

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for Working with HFC-134a (R-134a) 3
General Refrigerant Precautions 3
Lubricant Precautions 4
Precautions for Refrigerant Connection 4
FEATURES OF NEW TYPE REFRIGERANT CONNECTION 4
O-RING AND REFRIGERANT CONNECTION 5
Precautions for Servicing Compressor 6
Precautions for Service Equipment 6
RECOVERY/RECYCLING EQUIPMENT 6
ELECTRONIC LEAK DETECTOR 6
VACUUM PUMP 7
MANIFOLD GAUGE SET 7
SERVICE HOSES 7
SERVICE COUPLERS 8
REFRIGERANT WEIGHT SCALE 8
CALIBRATING ACR4 WEIGHT SCALE 8
CHARGING CYLINDER 9
Precautions for Leak Detection Dye 9
IDENTIFICATION 9
IDENTIFICATION LABEL FOR VEHICLE 9
Wiring Diagram and Trouble Diagnosis 9
PREPARATION 10
HFC-134a (R-134a) Service Tools and Equipment 10
REFRIGERATION SYSTEM 13
Refrigerant Cycle 13
REFRIGERANT FLOW 13
Refrigerant System Protection 13
REFRIGERANT PRESSURE SENSOR 13
LUBRICANT 14
Adjustment of Compressor Lubricant Amount 14
LUBRICANT 14
PROCEDURES FOR LUBRICANT RETURN OPERATION 14
LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR 15
LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR 15
AUTO AIR CONDITIONER SYSTEM 16
Description 16
TROUBLE DIAGNOSIS 17
CONSULT-II Functions 17
CONSULT-II BASIC OPERATION 17
DATA MONITOR 18
Diagnosis Procedure 19
DIAGNOSIS CHART BY SYMPTOM 19
Component Parts Location 21
CR ENGINE MODELS 21
K9K ENGINE MODELS 22
Circuit Diagram 23
Wiring Diagram —A/C— CR Engine Models 24
Wiring Diagram —A/C— K9K Engine Models 28
A/C Auto Amp. Input/Output Signal Standard 32
Self-Diagnosis Function 33
DESCRIPTION 33
OPERATION PROCEDURE 34
Difference Between Set Temperature and Control Temperature 38
DESCRIPTION 38
HOW TO SET 38
Function Inspection 38
Air Conditioning System 40
Ambient Sensor System 40
In-Vehicle Sensor System 42
Sunload Sensor System 43
Intake Sensor System 44
Coolant Temperature Signal System 46
Blower Motor System 47
Intake Door Motor System 51
Mode Door Motor System 51
Air Mix Door Motor System 53
Magnetic Clutch System 54
Check Fan ON Signal 57
Insufficient Cooling 58
CHECK FUNCTION (FOR CR ENGINE) 58

DIAGNOSIS BY PRESSURE GAUGE 60
DIAGNOSIS OF COMPRESSOR 61
Detecting Leaks With Fluorescent Indicator 62
METHOD FOR DETECTING REFRIGERANT LEAKAGE. 62
CONTROL UNIT 63
Removal and Installation 63
REMOVAL 63
INSTALLATION 63
Disassembly and Assembly 63
AMBIENT SENSOR 65
Removal and Installation 65
IN-VEHICLE SENSOR 66
Removal and Installation 66
SUNLOAD SENSOR 67
Removal and Installation 67
INTAKE SENSOR 68
Removal 68
Installation 68
A/C UNIT ASSEMBLY 69
Removal and Installation 69
REMOVAL 69
INSTALLATION 70
Disassembly and Assembly 71
HEATER CORE 73
Removal and Installation 73
REMOVAL 73
INSTALLATION 73
BLOWER MOTOR 74
Removal and Installation 74
REMOVAL 74
INSTALLATION 74
AIR CONDITIONER FILTER 75
Removal, Replacement and Installation 75
REMOVAL 75
REPLACEMENT 75
INSTALLATION 75
INTAKE DOOR MOTOR 76
Removal and Installation 76
MODE DOOR MOTOR 77
Removal and Installation 77
AIR MIX DOOR MOTOR 78
Removal and Installation 78
FAN CONTROL AMPLIFIER 79
Removal and Installation 79
DUCTS AND GRILLES 80
Removal and Installation 80
COMPONENT PARTS LOCATION 80
CENTRAL VENTILATOR GRILLE 80
SIDE VENTILATOR GRILLE 80
DEFROSTER NOZZLE AND DUCT 81
SIDE VENTILATOR DUCT 82
FOOT DUCT 83
REFRIGERANT LINES 84
Component Parts Location 84
CR ENGINE MODELS 84
K9K ENGINE MODELS 85
Removal and Installation for Compressor 85
REMOVAL 85
INSTALLATION 86
Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models) 86
REMOVAL 86
INSTALLATION 87
Removal and Installation for High-Pressure Flexible Hose (CR Engine Models) 87
REMOVAL 87
INSTALLATION 88
Removal and Installation for High-Pressure Pipe (CR Engine Models) 88
REMOVAL 88
INSTALLATION 88
Removal and Installation for Pipe and Hose (K9K Engine Models) 89
COMPONENTS 89
REMOVAL 89
INSTALLATION 90
Removal and Installation for Refrigerant Pressure Sensor 90
REMOVAL AND INSTALLATION 90
Removal and Installation for Condenser (CR Engine Models) 90
REMOVAL 90
INSTALLATION 91
Removal and Installation for Condenser (K9K Engine Models) 91
REMOVAL 91
INSTALLATION 91
Removal and Installation for Liquid Tank (CR Engien Models) 92
REMOVAL 92
INSTALLATION 92
Removal and Installation for Liquid Tank (K9K Engine Models) 92
REMOVAL 92
INSTALLATION 93
Removal and Installation for Evaporator 93
REMOVAL 93
INSTALLATION 93
Removal and Installation for Expansion Valve 94
REMOVAL 94
INSTALLATION 94

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EJS004HI

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions for Working with HFC-134a (R-134a)

EJS004HJ

WARNING:

- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J2210 HFC-134a (R-134a) recycling equipment, or J2209 HFC-134a (R-134a) recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
- **Do not allow lubricant (Nissan A/C System Oil Type S or R) to come in contact with styrofoam parts. Damage may result.**

General Refrigerant Precautions

EJS004HK

WARNING:

- **Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (125°F).**
- **Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Do not intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a)**

have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

Lubricant Precautions

EJS004HL

- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J2210 HFC-134a (R-134a) recycling equipment, or J2209 HFC-134a (R-134a) recovery equipment. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Do not allow lubricant (Nissan A/C System Oil Type R) to come in contact with styrofoam parts. Damage may result.

Precautions for Refrigerant Connection

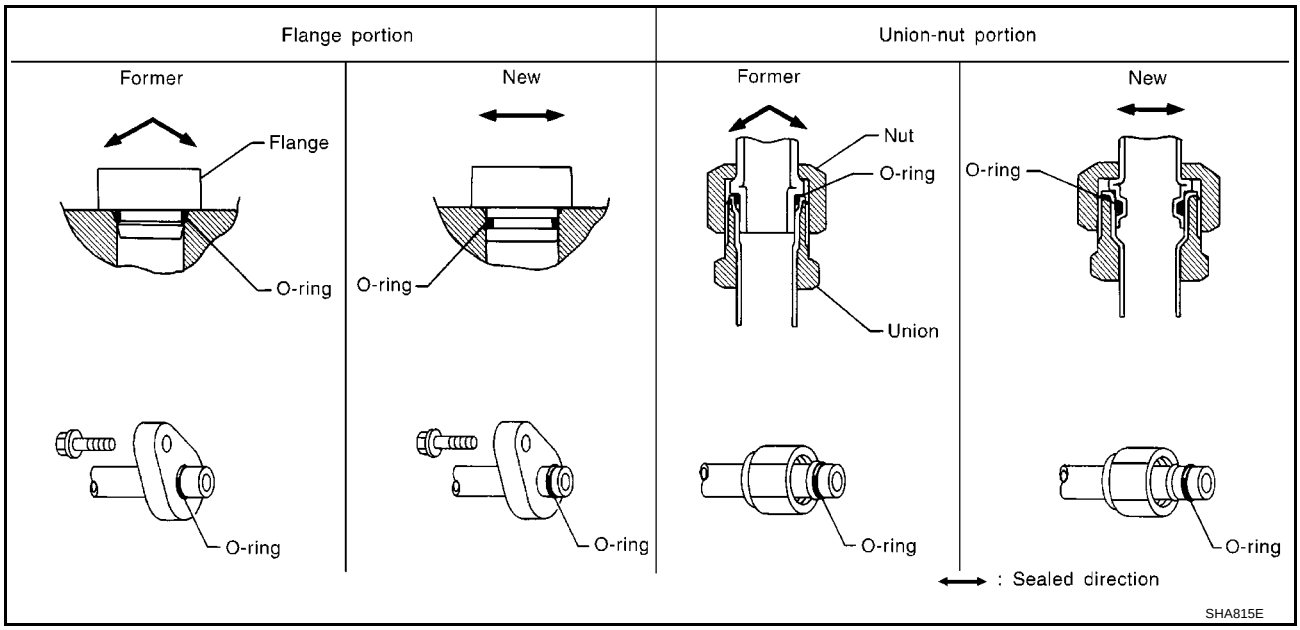
EJS004HM

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit
- Refrigerant pressure sensor to liquid tank

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.



O-RING AND REFRIGERANT CONNECTION

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Part Numbers and Specifications (CR Engine Models)

Connection type	Location		Part No.	Nominal size
Axle seal-type	Air conditioner unit	Inlet	92471N8210	8 dia.
		Outlet	92743N8210	16 dia.
	Condenser	Inlet	92472N8210	12 dia.
		Outlet	92471N8210	8 dia.
	Compressor	Inlet	92474N8210	19 dia.
		Outlet	92472N8210	12 dia.
	Liquid tank	Inlet	92471N8210	8 dia.
		Outlet		
Conventional	Refrigerant pressure sensor		J247689956	10 dia.
	Expansion valve	Inlet	92477AX000	12 dia.
		Outlet	92477AX005	16 dia.

O-Ring Part Numbers and Specifications (K9K Engine Models)

Connection type	Piping connection point		Part number	Qty.	Remarks
New	Low-pressure flexible hose to heater & cooling unit		77030 65314	2	Renault part
	High-pressure pipe to heater & cooling unit		77030 65318	2	Renault part
	Condenser to high-pressure flexible hose		77030 65316	2	Renault part
	Condenser to high-pressure pipe		77030 65318	2	Renault part
	Compressor to low-pressure flexible hose		77030 65315	2	Renault part
	Compressor to high-pressure flexible hose		77030 65316	2	Renault part
	Liquid tank to condenser pipe		—	—	—
Former	Refrigerant pressure sensor		—	—	—
	Expansion valve to evaporator	Inlet	—	—	—
		Outlet	—	—	—

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

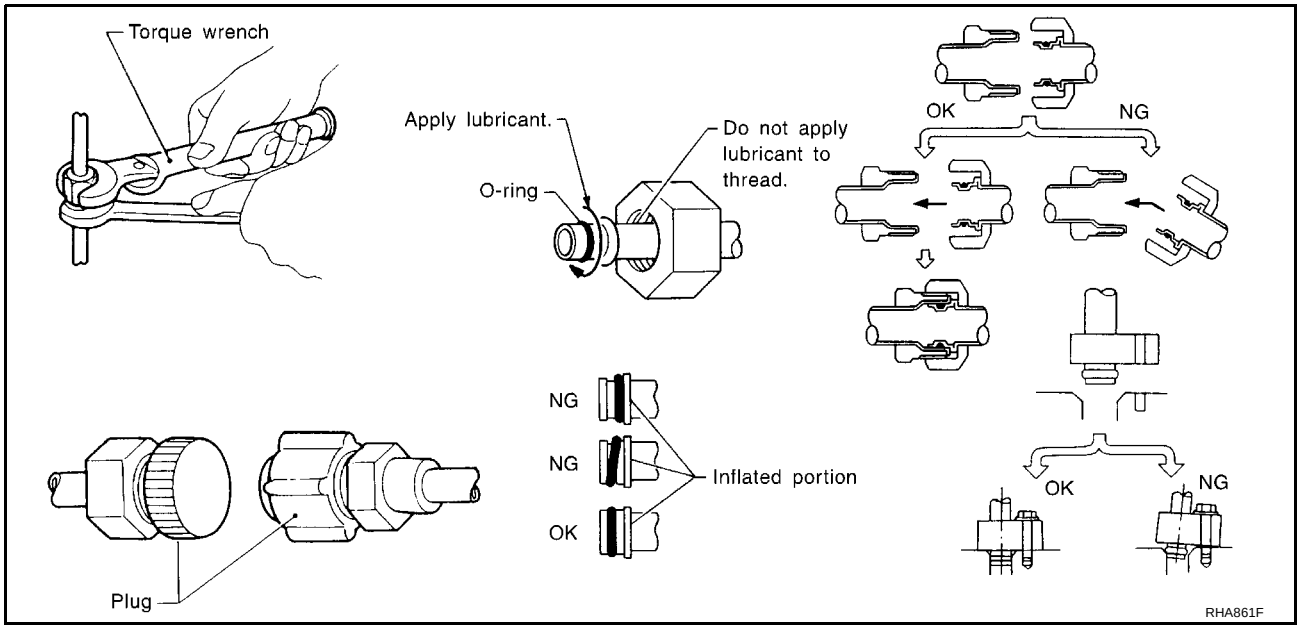
When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same position as it is when mounted on the car. Malfunction to do so will cause lubricant to enter the low pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**

- When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.

	KC59G Compressor
Lubricant name:	Nissan A/C System Oil Type R
Part number:	KLH00-PAGR0

- O-ring must be closely attached to dented portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.
- After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.



Precautions for Servicing Compressor

EJS004HN

- Plug all openings to prevent moisture and foreign matter from entering.
- When the compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to ATC-14, "Adjustment of Compressor Lubricant Amount" .
- Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.
- After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

Precautions for Service Equipment

EJS004HO

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturers instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

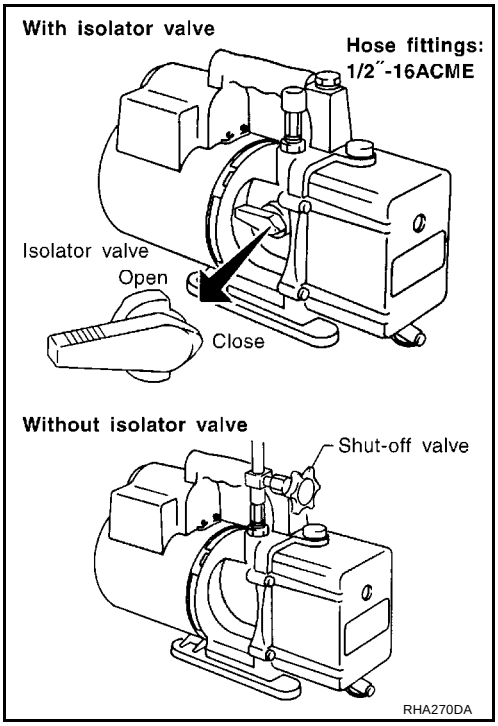
Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

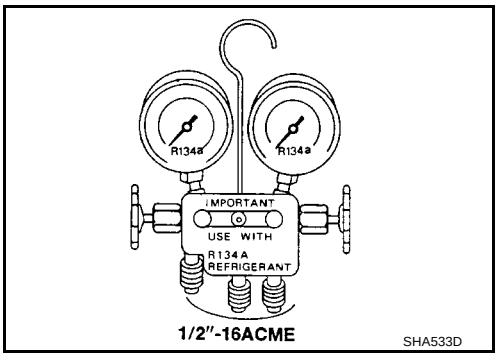
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



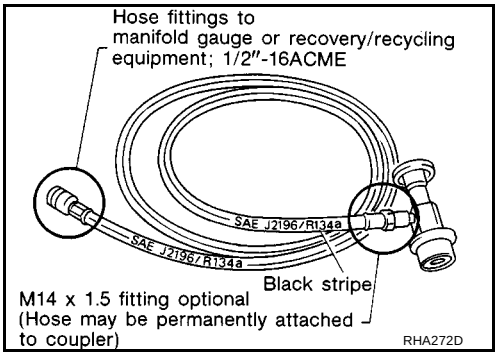
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a (R-134a) or 134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

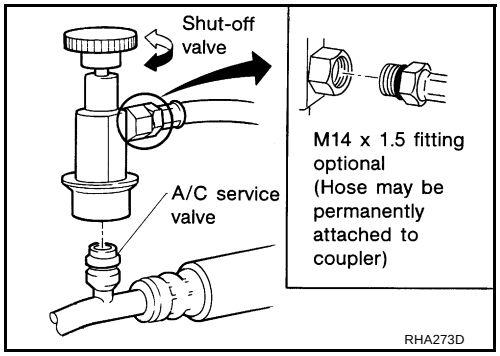
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

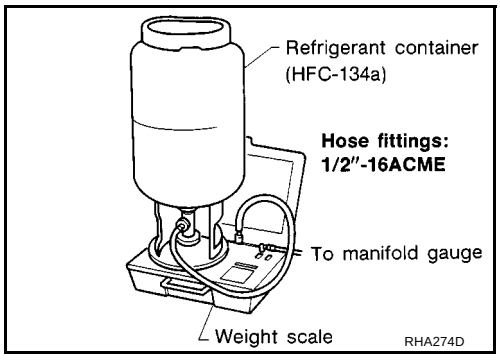
Never attempt to connect HFC-134a (R-134a) service couplers to an CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CALIBRATING ACR4 WEIGHT SCALE

Calibrate the scale every three months.
To calibrate the weight scale on the ACR4:

1. Press **Shift/Reset** and **Enter** at the same time.
2. Press **8787** . "**A1** " will be displayed.
3. Remove all weight from the scale.
4. Press **0** , then press **Enter** . "**0.00** " will be displayed and change to "**A2** ".
5. Place a known weight (dumbbell or similar weight), between 4.5 and 8.6 kg (10 and 19 lb) on the center of the weight scale.
6. Enter the known weight using four digits. (Example 10 lb = 10.00, 10.5 lb = 10.50)
7. Press **Enter** — the display returns to the vacuum mode.
8. Press **Shift/Reset** and **Enter** at the same time.
9. Press **6** — the known weight on the scale is displayed.
10. Remove the known weight from the scale. "**0.00** " will be displayed.
11. Press **Shift/Reset** to return the ACR4 to the program mode.

CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

Precautions for Leak Detection Dye

EJS004HP

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to (J-41995) pin-point refrigerant leaks.
- For your safety and your Customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector (J-41995).
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.
- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce / 7.4 CC) per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detector dye in HFC-134a (R-134a) A/C systems or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor malfunction occurs.

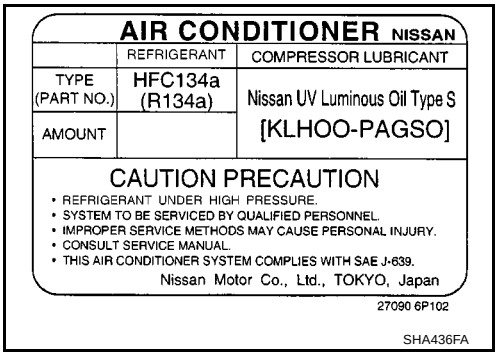
IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have this identification label on the front side of hood.



Wiring Diagram and Trouble Diagnosis

EJS004HQ

When you read wiring diagrams, refer to the followings:

- GI-14, "How to Read Wiring Diagrams" in GI section.
- PG-4, "POWER SUPPLY ROUTING" in PG section.

When you perform trouble diagnosis, refer to the followings:

- GI-10, "How to Follow Trouble Diagnoses" in GI section.
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section.

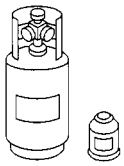
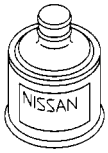
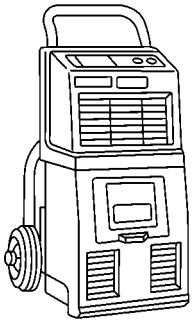
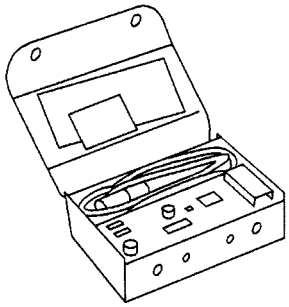
PREPARATION

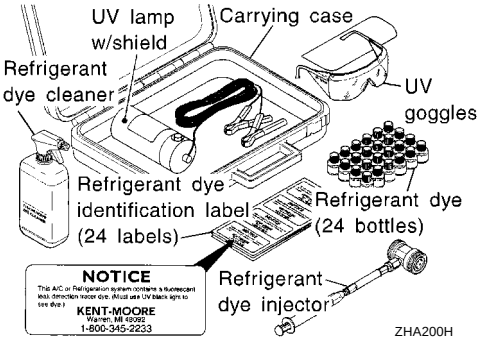
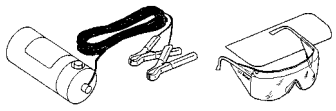
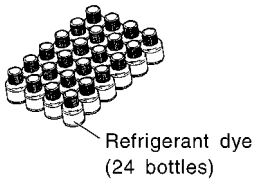
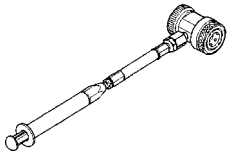
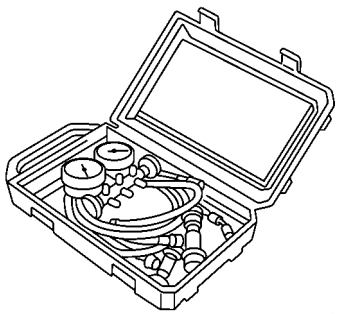
PFP:00002

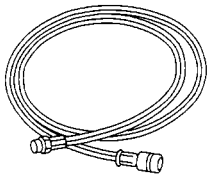
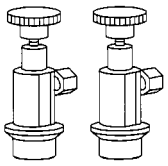
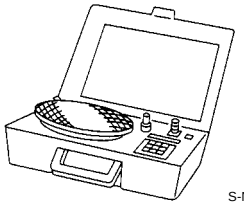
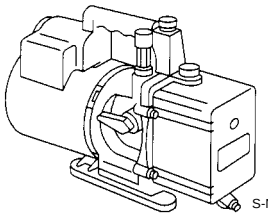
HFC-134a (R-134a) Service Tools and Equipment

EJS004HR

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name	Description	
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2″ -16 ACME
KLH00-PAGR0 Nissan A/C System Oil Type R	 S-NT197	Type: Poly alkaline glycol oil (PAG), type R Application: HFC-134a (R-134a) vane rotary compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant Recovery and Recycling and Recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: ● DC 12V (Power socket)

Tool number Tool name	Description	
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system. Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills.
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: ● The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size ● 1/2″ -16 ACME

Tool number Tool name	Description	
Service hoses ● High side hose ● Low side hose ● Utility hose	 S-NT201	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2″ -16 ACME
Service couplers ● High side coupler ● Low side coupler	 S-NT202	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size ● 1/2″ -16 ACME
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: ● Air displacement:4 CFM ● Micron rating:20 microns ● Oil capacity:482 g (17 oz.) Fitting size: Thread size ● 1/2″ -16 ACME

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle

EJS004HS

REFRIGERANT FLOW

Refrigerant basically circulates through compressor, condenser, liquid tank and evaporator and returns to compressor. Vaporization of refrigerant is controlled by expansion valve.

Refrigerant System Protection

EJS004HT

REFRIGERANT PRESSURE SENSOR

- Refrigerant system is protected from significant high-pressure or low-pressure by refrigerant pressure sensor attached to condenser.
- If unexpected pressures are detected in the cooler system (approx. 2.74 MPa (approx. 27.9 kg/cm^2) or more or 0.14 MPa (approx. 1.4 kg/cm^2) or less), the compressor is stopped by the refrigerant pressure sensor.
  Note: Values in the ( ) indicate gauge pressure.

LUBRICANT

PFP:KLG00

Adjustment of Compressor Lubricant Amount

EJS004HU

Compressor lubricant circulates through the system with refrigerant. When air conditioner system component is replaced or after the large refrigerant leak, lubricant needs to be added to compressor. Also it is important to maintain lubricant level properly. If lubricant level is not proper, following might happen.

- Insufficient lubricant: Compressor adherence
- Lubricant overfill: Insufficient cooling (insufficient heat exchange)

LUBRICANT

Lubricant name : Nissan A/C System Oil Type R
Part number : KLH00-PAGR0

PROCEDURES FOR LUBRICANT RETURN OPERATION

Follow the steps bellow to adjust the lubricant level.

1. CHECK A/C SYSTEM

1. Make sure A/C system operates normally.
2. Make sure a large amount of refrigerant or lubricant does not leak.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. LUBRICANT RETURN OPERATION

1. Start the engine. Put it in the following state.
- Engine speed: Idling - 1,200 rpm
- A/C or AUTO switch: ON
- Fan speed: HI
- Air inlet: Recirculation
- Set temperature: FULL HOT
2. Keep running for approximately 10 minutes.
3. Stop the engine.

CAUTION:
When a large leak of refrigerant or lubricant is found, do not perform lubricant return operation.

>> GO TO 3.

3. CHECK COMPRESSOR

Is compressor replaced?

YES >> GO TO ATC-15, "LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR" .
NO >> GO TO 4.

4. CHECK OTHER COMPONENTS

Is any other component to be replaced? (evaporator, condenser, liquid tank, large leak of refrigerant or lubricant)

YES >> GO TO ATC-15, "LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR" .
NO >> GO TO ATC-58, "Insufficient Cooling" .

LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR

Add compressor lubricant from the high-pressure port of the compressor according to the table below. α indicates lubricant amount that spouts with refrigerant when refrigerant is discharged.

Components to be replaced	Lubricant amount to be added
Evaporator	35+α cm^3
Condenser	15+α cm^3
Liquid tank	5+α cm^3

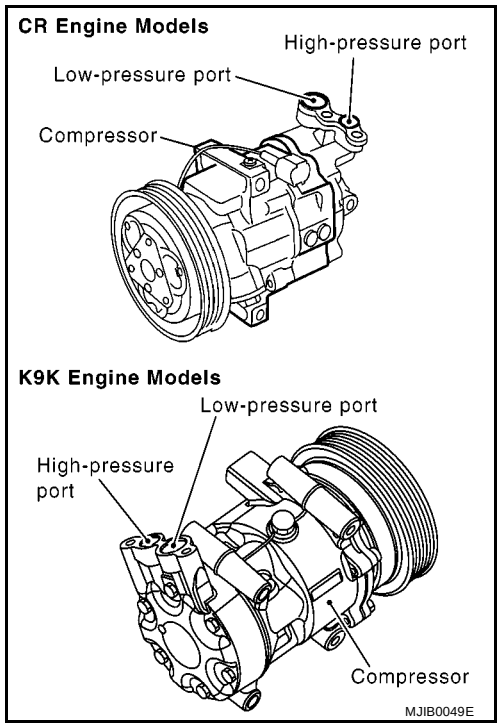
CAUTION:

When replacing 2 or more parts, do not sum up α.

Ex. Lublicant amount to be added to evaporator and liquid tank (cm^3) = 35 + 5 + α

LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR

1. Drain the compressor lubricant from the removed compressor's high and low-pressure ports and measure the amount of lubricant.
2. Drain the compressor lubricant from a new compressor according to the formula below. α indicates lubricant amount that spouts with refrigerant when refrigerant is discharged.
   Lubricant amount drained from new compressor (cm^3)
   = Lubricant amount contained in the new compressor (80) - Lubricant amount discharged from the removed compressor - Lubricant amount that adheres to inside of compressor (20) - α
   = 60 - Lubricant amount discharged from the removed compressor - α
3. When adding lubricant, add the appropriate amount of compressor lubricant from the compressor's high-pressure port.



AUTO AIR CONDITIONER SYSTEM

PFP:27500

Description

EJS004HV

- The auto air conditioner detects the vehicle cabin temperature, outside air temperature, intake air temperature, and amount of malfunction sunlight using an interior air sensor, ambient air sensor, intake temperature sensor, and sunload sensor. A comparison of the detected values and temperature set by the temperature setting switch is made by the A/C auto amp (internal controller) and then the blown air temperature, vent blown air volume, vents, and air intake are adjusted to maintain the temperature set for the cabin.

TROUBLE DIAGNOSIS

PFP:00004

CONSULT-II Functions

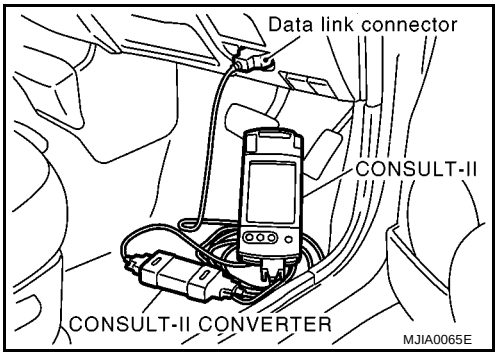
EJS004HW

The CONSULT-II has display functions for work support, self-diagnosis, data monitor, and active tests for each part by combining data reception and command transmission via communication lines from the BCM.

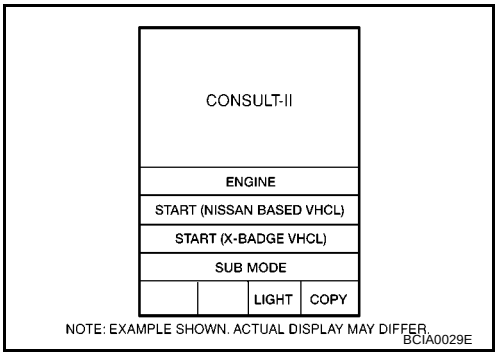
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Air conditioner system	Data monitor	Displays BCM input data in real time.

CONSULT-II BASIC OPERATION

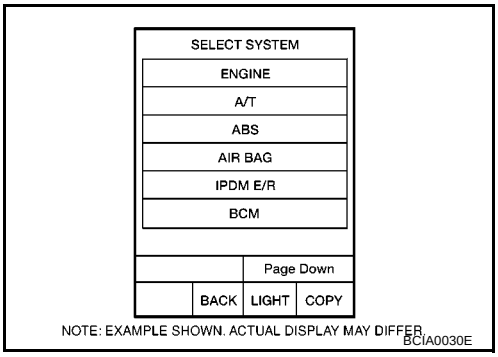
1. Turn ignition switch OFF.
2. Connect the CONSULT-II to data link connector via the CONSULT-II CONVERTER.
   For details, refer to the supplied CONSULT-II Operation Manual (Supplement-III) and CONSULT-II CONVERTER Operation Manual.
   CAUTION:
   If the CONSULT-II is connected without the CONSULT-II, CONVERTER, malfunction may be detected by self-diagnosis in control modules that use CAN communication.
3. Turn ignition switch ON.



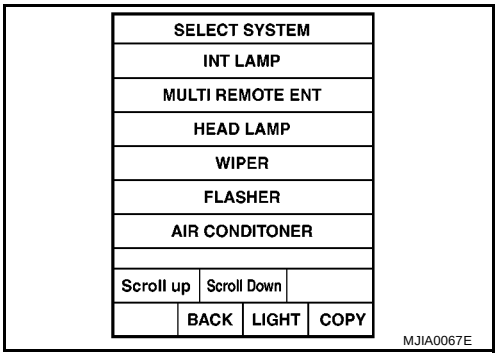
4. Touch “START (NISSAN BASED VHCL)”.



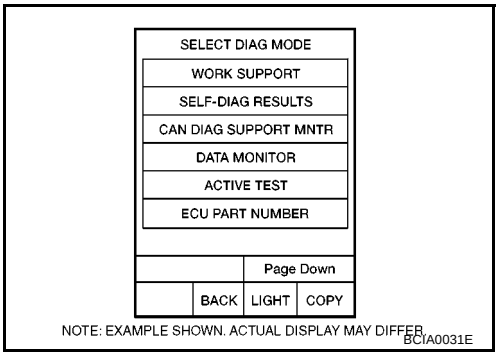
5. Touch “BCM” on the “SELECT SYSTEM” screen.
   - If “BCM” is not displayed, print the “SELECT SYSTEM” screen, and then refer to LAN-4, "PRECAUTIONS" .



6. Touch “AIR CONDITIONER” on the “SELECT TEST ITEM” screen”.



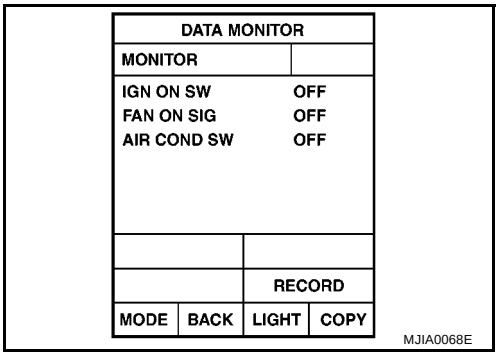
7. Touch “DATA MONITOR” on the “SELET DIAG MODE” screen. For details, refer to separate volume “CONSULT-II Operation Manual”.



DATA MONITOR

Operation Procedure

1. Touch “AIR CONDITIONER” on the “SELECT TEST ITEM” screen”.
2. Touch “DATA MONITOR” on the “SELET DIAG MODE” screen. For details, refer to separate volume “CONSULT-II Operation Manual”.
3. Touch “ALL SIGNALS” on the “DATA MONITOR” screen.
4. Touch “START”.
5. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.



Monitored Item

Monitor item [UNIT]		Contents
FAN ON SIG	[ON/OFF]	Displays status “Blower fan on (ON)/blower fan off (OFF)” as judged by the BCM from the input from the A/C auto amp.
AIR COND SW	[ON/OFF]	Displays status “Compressor on (ON)/compressor off (OFF)” as judged by the BCM from the input from the A/C auto amp.
IGN ON SW	[ON/OFF]	Displays the “ON/OFF, ACC (OFF)” status determined from the ignition switch signal.

Diagnosis Procedure

EJS004HX

DIAGNOSIS CHART BY SYMPTOM

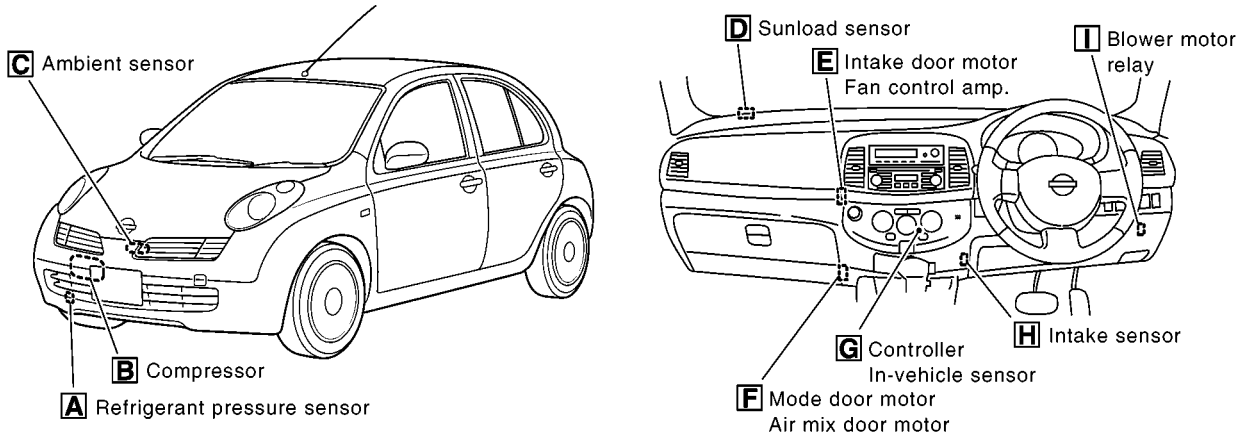
Symptom		Operation inspection	Suspect systems	Possible causes
No air comes out. Airflow volume does not change.		Check blower motor operation.	Blower motor circuit	Refer to ATC-47, "Blower Motor System" and ATC-46, "Coolant Temperature Signal System" .
		The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction
Inaccurate temperature control	Common items (Check these items for any of the three malfunctions listed below.)	Check installation condition of air mix door motor.	Air mix door circuit	● Improper installation of air mix door rod or air mix door lever. ● Malfunction of air mix door system (damage, locking, etc.)
		Set temperature to 18°C and 32°C. Make sure air mix door operates for its full stroke.	Air mix door motor circuit	Refer to ATC-53, "Air Mix Door Motor System" .
		Malfunction indicated in Self-Diagnosis Step 2.	Sensor circuit	● Sensor Malfunction; Refer to ATC-44, "Intake Sensor System" , ATC-43, "Sunload Sensor System" , ATC-42, "In-Vehicle Sensor System" , ATC-40, "Ambient Sensor System" . ● Sensor harness malfunction
		After normal indication in Self-Diagnosis Step 3, reset the actuator to zero position.	Air mix door circuit	Misreading of the door position of the A/C auto amp. ATC-33, "Self-Diagnosis Function"
		Malfunction indicated in Self-Diagnosis Step 3.	Air mix door motor circuit	Refer to ATC-53, "Air Mix Door Motor System" .
	No cold air comes out. (Normal airflow amount)	With A/C switch ON, check operation of magnetic clutch.	Magnetic clutch circuit	Refer to ATC-54, "Magnetic Clutch System" , ATC-57, "Check Fan ON Signal" .
		● Check refrigerant level. ● Performance check	Air conditioner system	Refer to ATC-58, "Insufficient Cooling" in “Cooling Malfunction”.
		The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction
	No warm air comes out. (Airflow volume is normal.)	After warming up engine, heater core inlet and outlet sides of the heater hose do not become warm.	Coolant circuit	● Poor engine coolant ● Blockage of heater hose or heater core
		The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction
	Large difference between set temperature and interior air temperature	Blower motor speed does not change when switching fan switch.	Blower motor circuit	Refer to ATC-47, "Blower Motor System" .
		The inlet of the interior sensor does not draw in smoke when the fan switch is set to speed 4.	Aspirator circuit	● Aspirator malfunction ● Aspirator duct is loose or crushed.
		Check the difference between set temperature and control temperature.	—	Improperly set temperature difference ATC-38, "Difference Between Set Temperature and Control Temperature"
		The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction

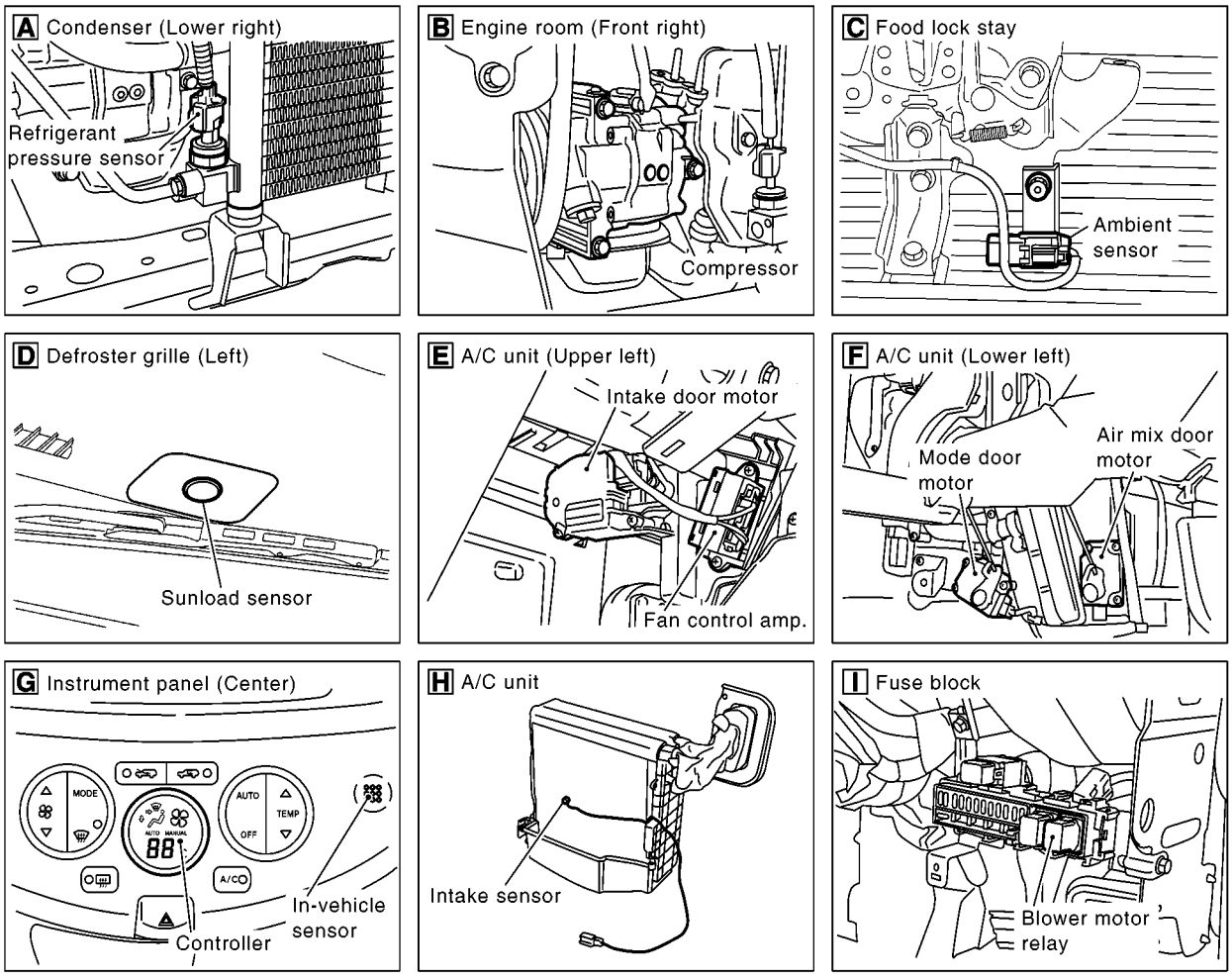
Symptom	Operation inspection	Suspect systems	Possible causes
Unable to switch air outlets to others.	Mode door operation check (manual operation)	Mode door circuit	● Improper installation of mode door rod, mode door link and mode door lever ● Mode door system malfunction (damage, locking, etc.)
	After normal indication in Self-Diagnosis Step 3, reset the actuator to zero position.	Mode door circuit	Misreading of the door position of the A/C auto amp. ATC-33, "Self-Diagnosis Function"
	Malfunction indicated in Self-Diagnosis Step 3.	Mode door motor circuit	Refer to ATC-51, "Mode Door Motor System" .
	The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction
Unable to switch intake inlets to others.	Intake door operation check (manual operation)	Intake door circuit	● Improper installation of intake door lever ● Intake door system malfunction (damage, locking, etc.)
	Malfunction indicated in Self-Diagnosis Step 3.	Intake door motor circuit	Refer to ATC-51, "Intake Door Motor System" .
	The circuit above is normal.	A/C auto amp. circuit	A/C auto amp. malfunction

Component Parts Location

EJS004HY

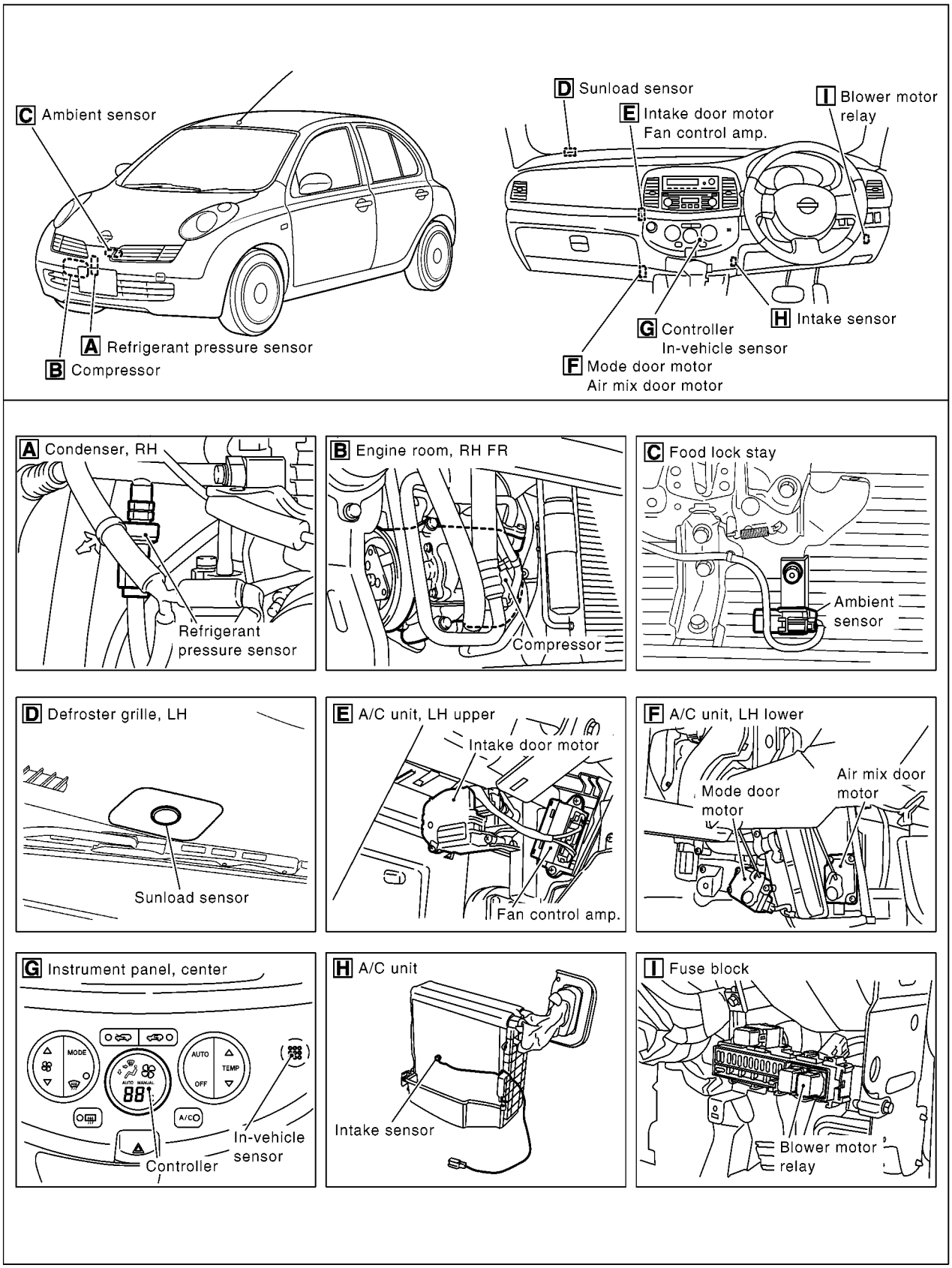
CR ENGINE MODELS





MJIA0069E

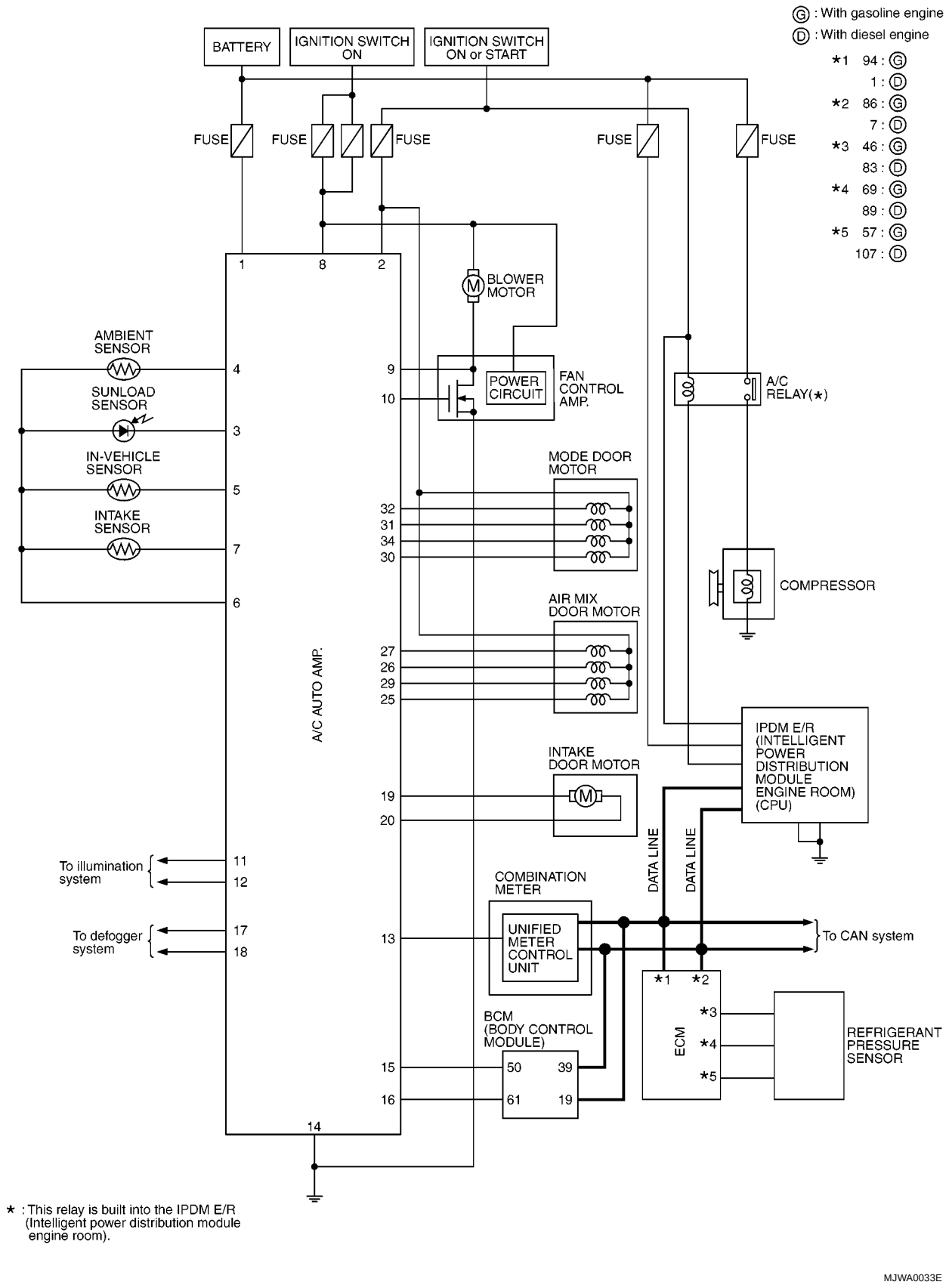
K9K ENGINE MODELS



MJIA0217E

Circuit Diagram

EJS004HZ

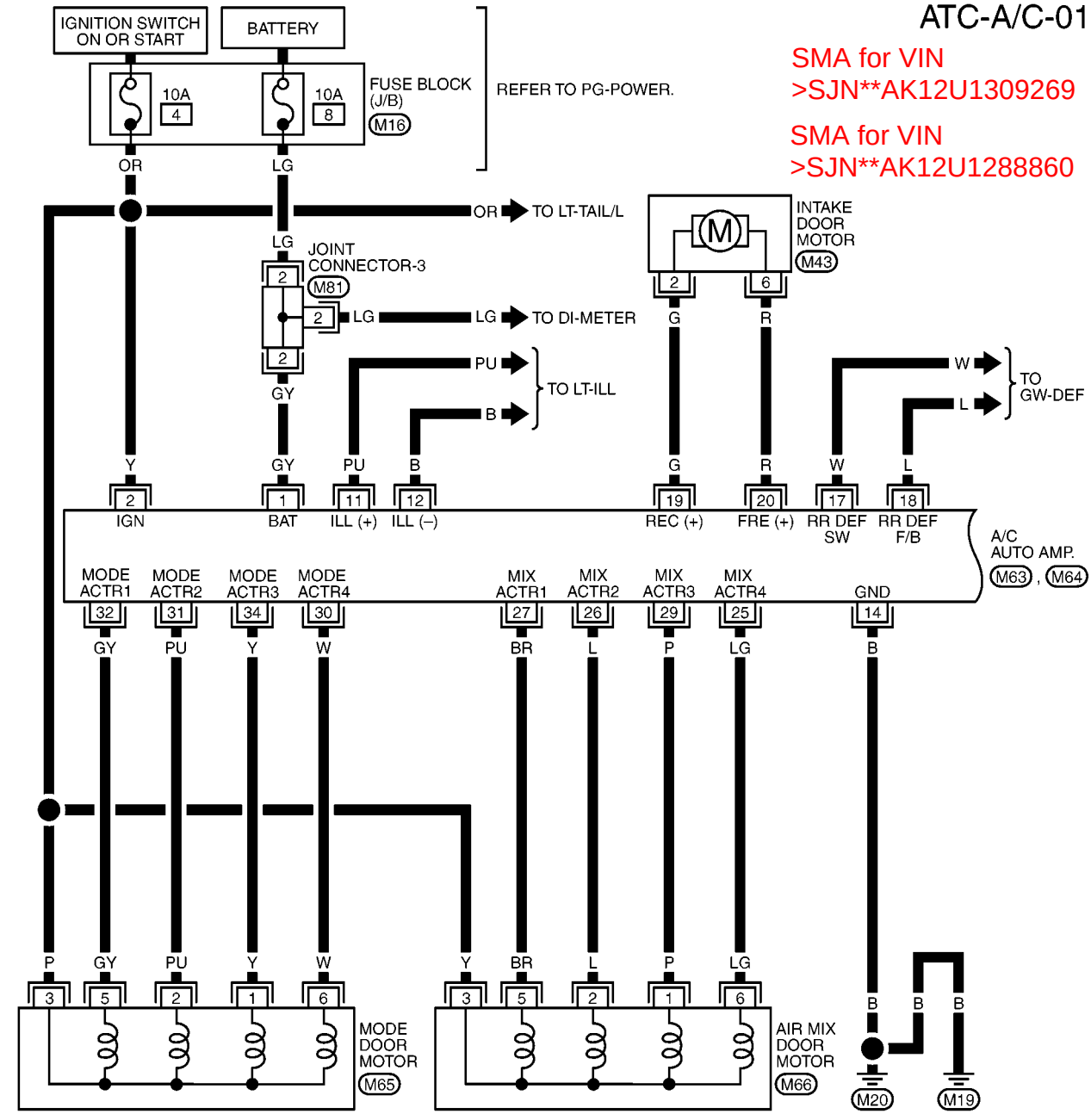


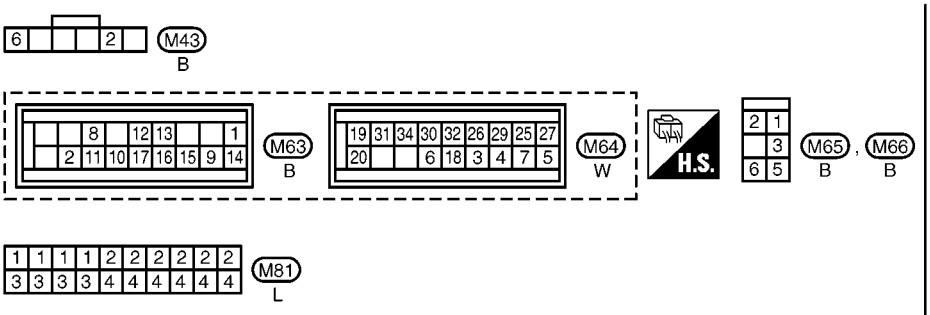
* : This relay is built into the IPDM E/R (Intelligent power distribution module engine room).

MJWA0033E

Wiring Diagram —A/C— CR Engine Models

EJS004I0

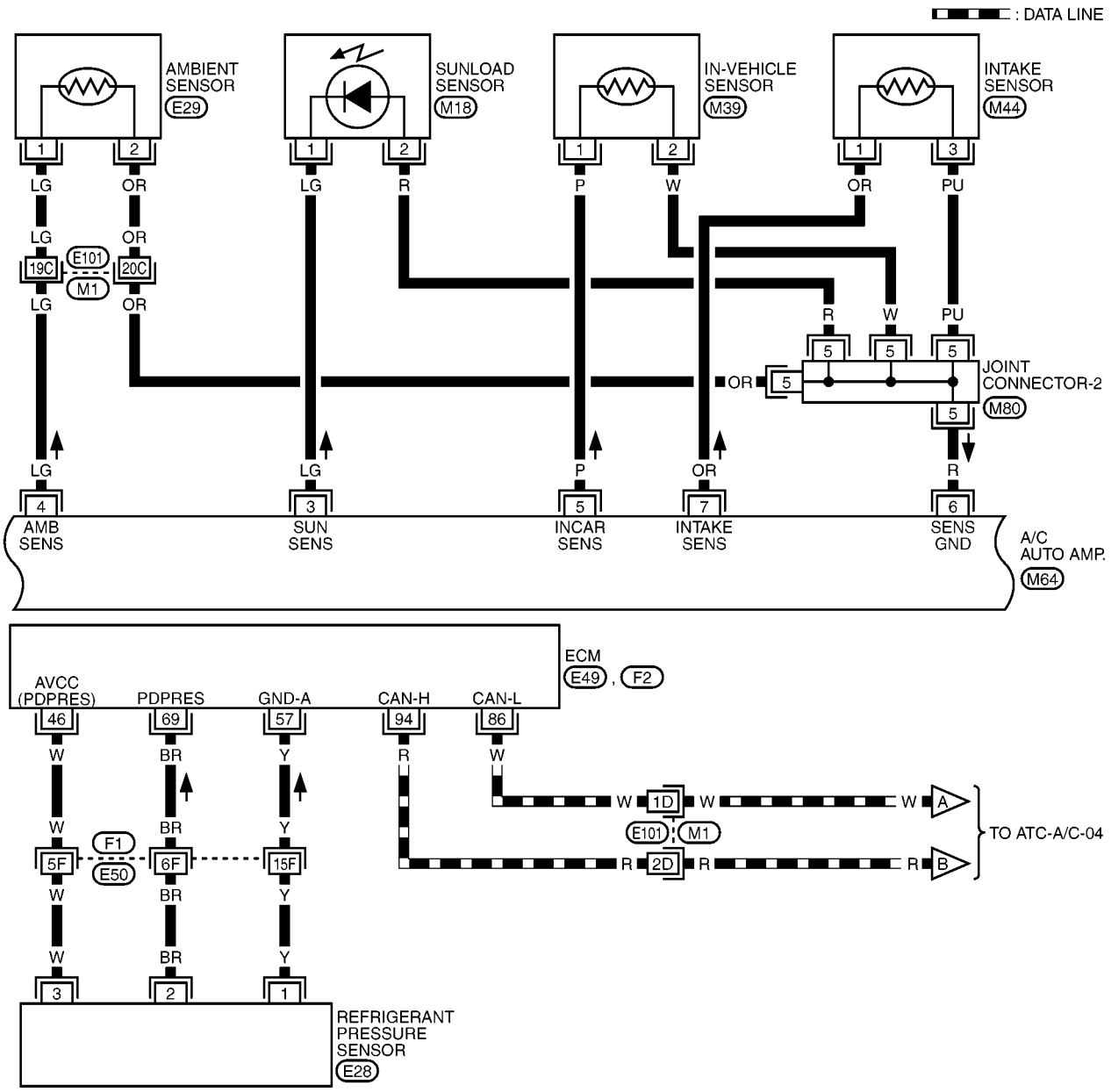


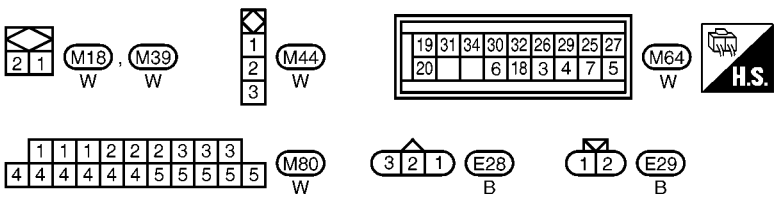


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MJWA0061E

ATC-A/C-02

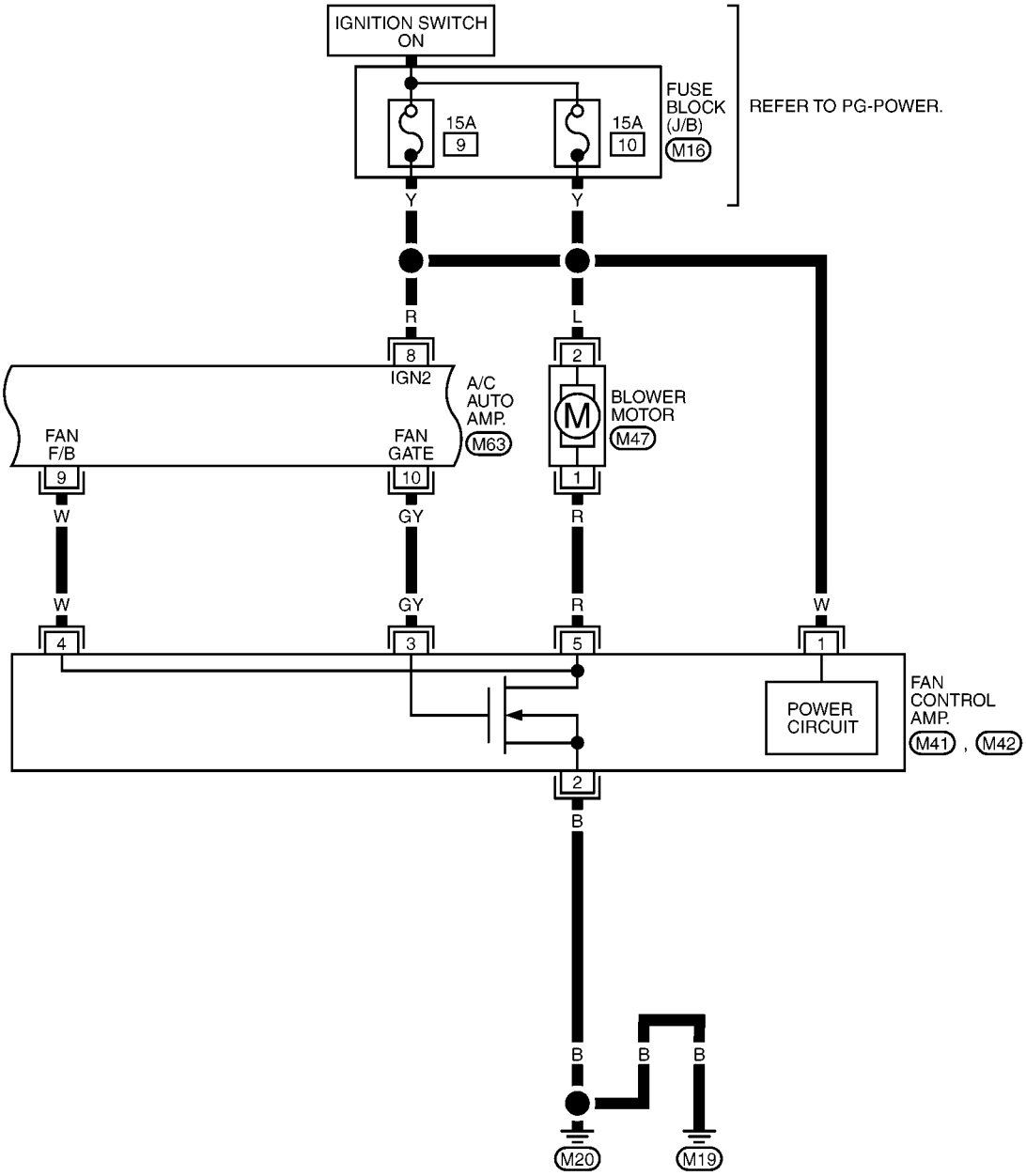


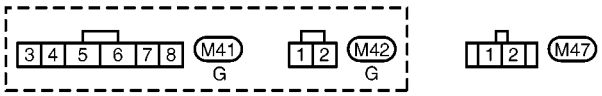


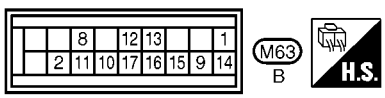
REFER TO THE FOLLOWING.
M1, F1 -SUPER MULTIPLE JUNCTION (SMJ)
E49, F2 -ELECTRICAL UNITS

MJWA0062E

ATC-A/C-03

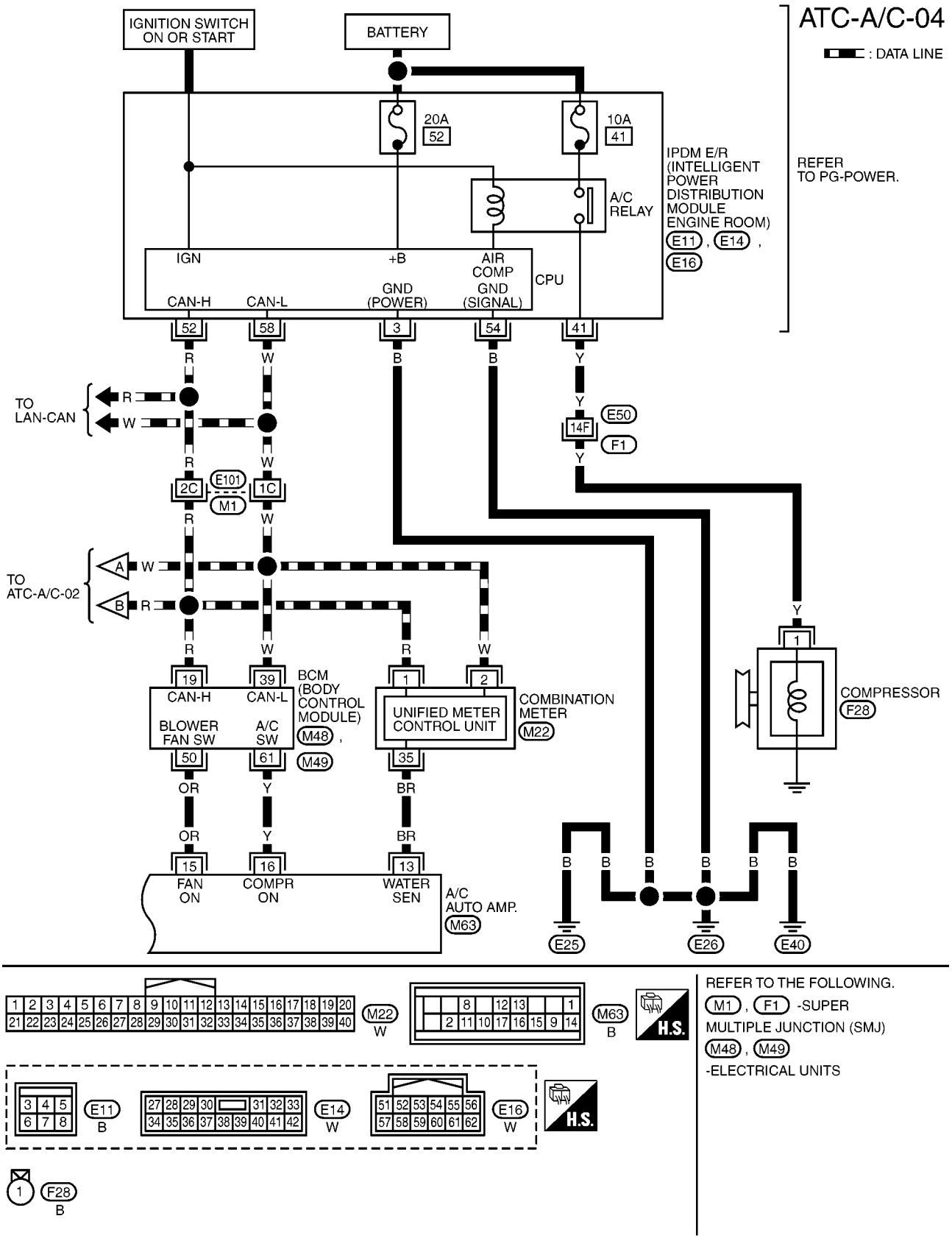






REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MJWA0063E


ATC-A/C-04
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
20A 52
10A 41
A/C RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11, E14, E16
REFER TO PG-POWER.
IGN
+B
AIR COMP
CPU
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
52
58
3
54
41
R
W
B
B
Y
TO LAN-CAN
R
W
Y
14F
E50
F1
Y
R
W
2C
E101
M1
1C
R
W
TO ATC-A/C-02
A
W
B
R
R
W
R
W
19
39
1
2
CAN-H
CAN-L
BLOWER FAN SW
A/C SW
BCM (BODY CONTROL MODULE) M48, M49
UNIFIED METER CONTROL UNIT
COMBINATION METER M22
50
61
35
OR
Y
BR
OR
Y
BR
15
16
13
FAN ON
COMPR ON
WATER SEN
A/C AUTO AMP. M63
B B B B B B
E25
E26
E40
Y
1
COMPRESSOR F28
M22 W
M63 B
H.S.
E11 B
E14 W
E16 W
H.S.
1 F28 B
REFER TO THE FOLLOWING.
M1, F1 -SUPER MULTIPLE JUNCTION (SMJ)
M48, M49
-ELECTRICAL UNITS

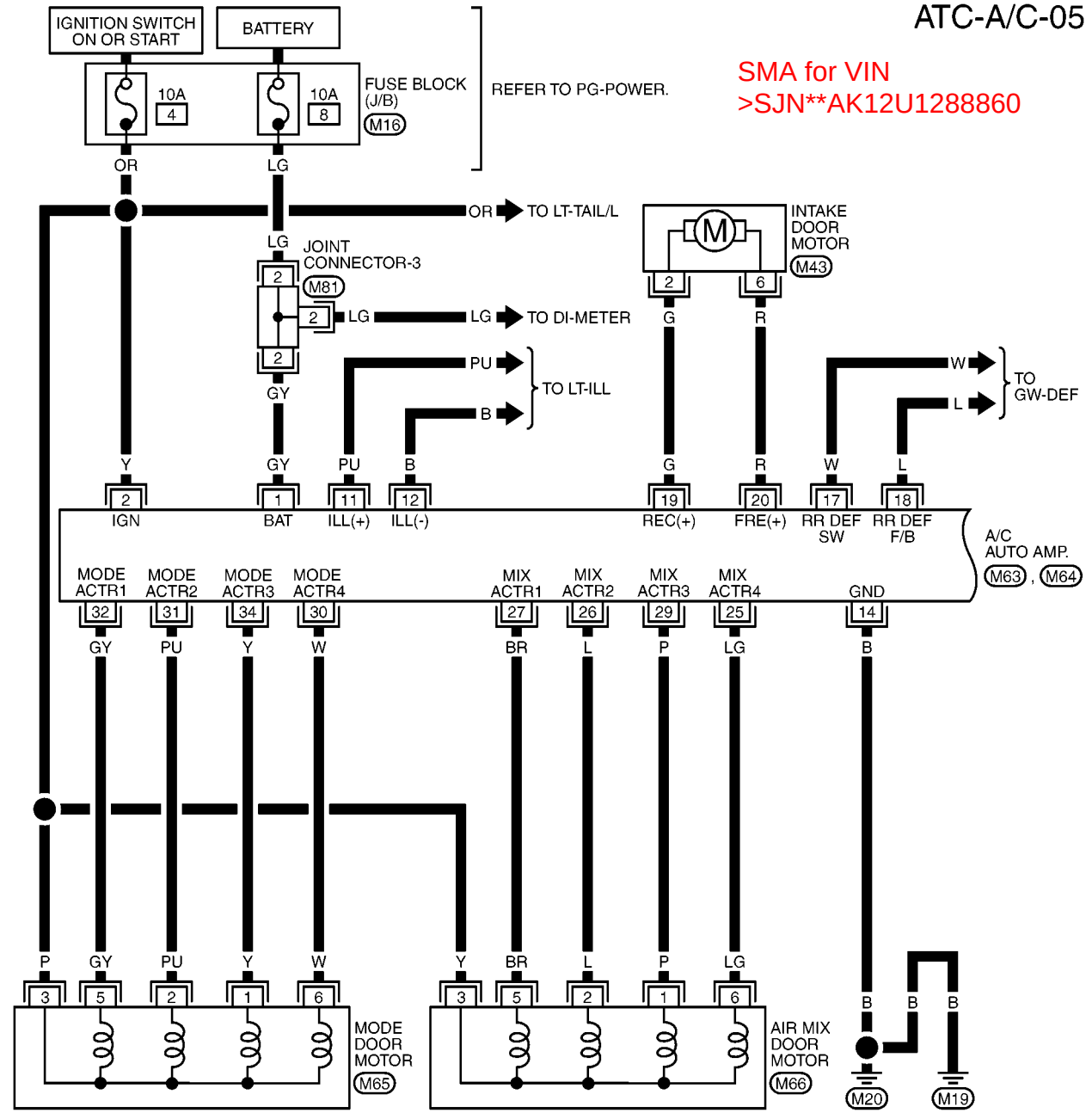
MJWA0064E

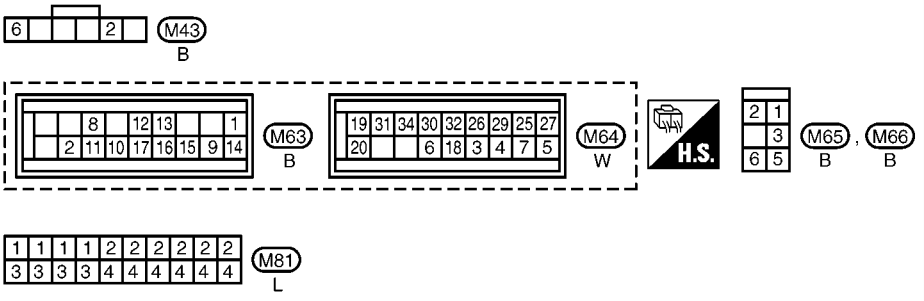
Wiring Diagram —A/C— K9K Engine Models

EJS0057O

ATC-A/C-05

SMA for VIN >SJN**AK12U1288860

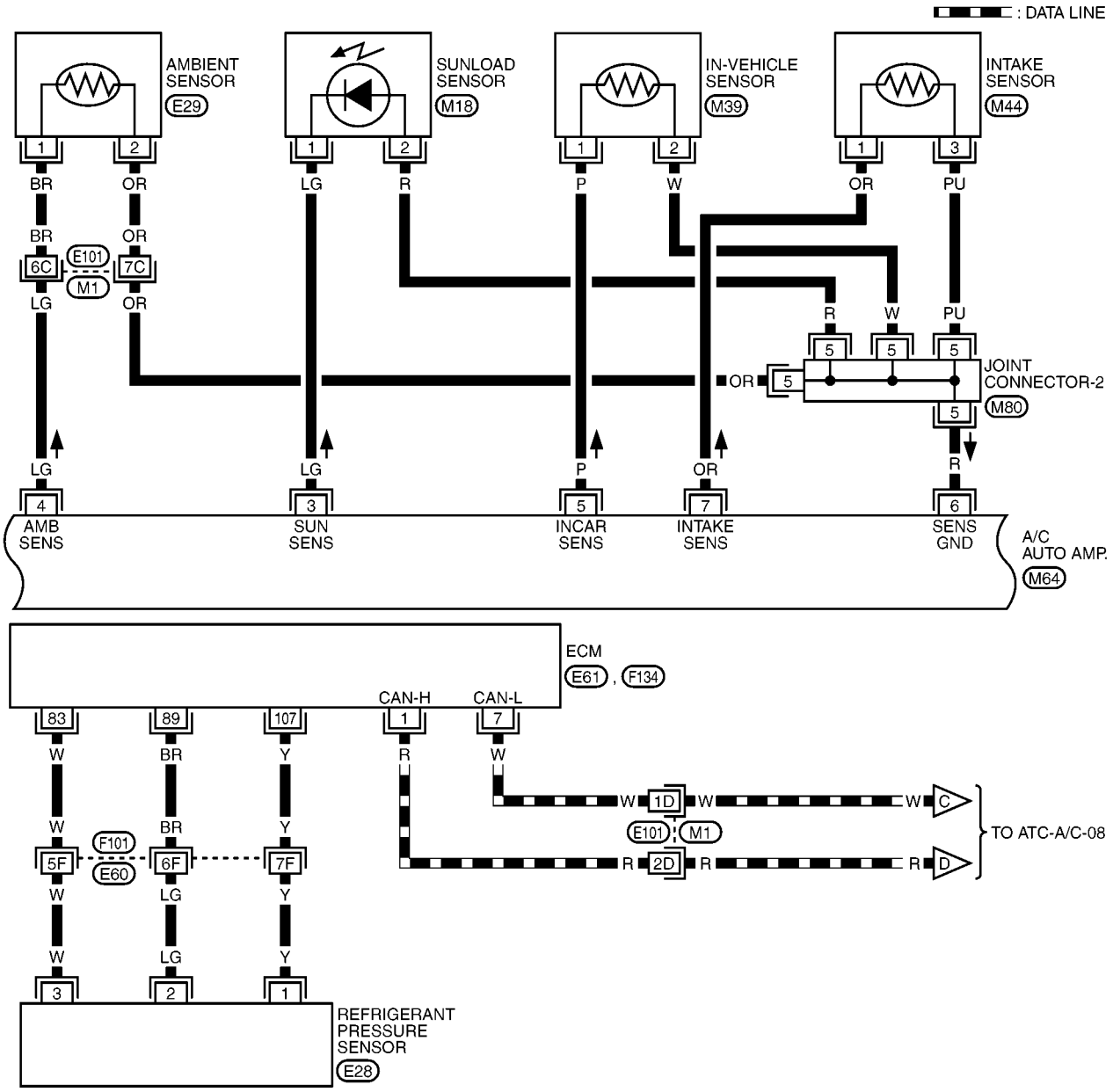


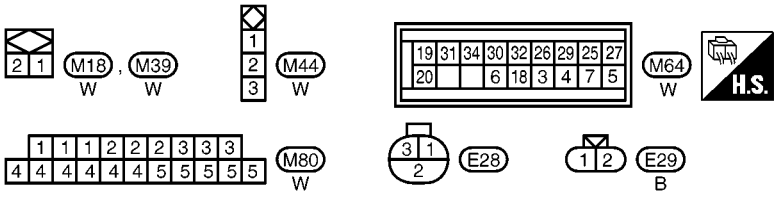


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MJWA0036E

ATC-A/C-06

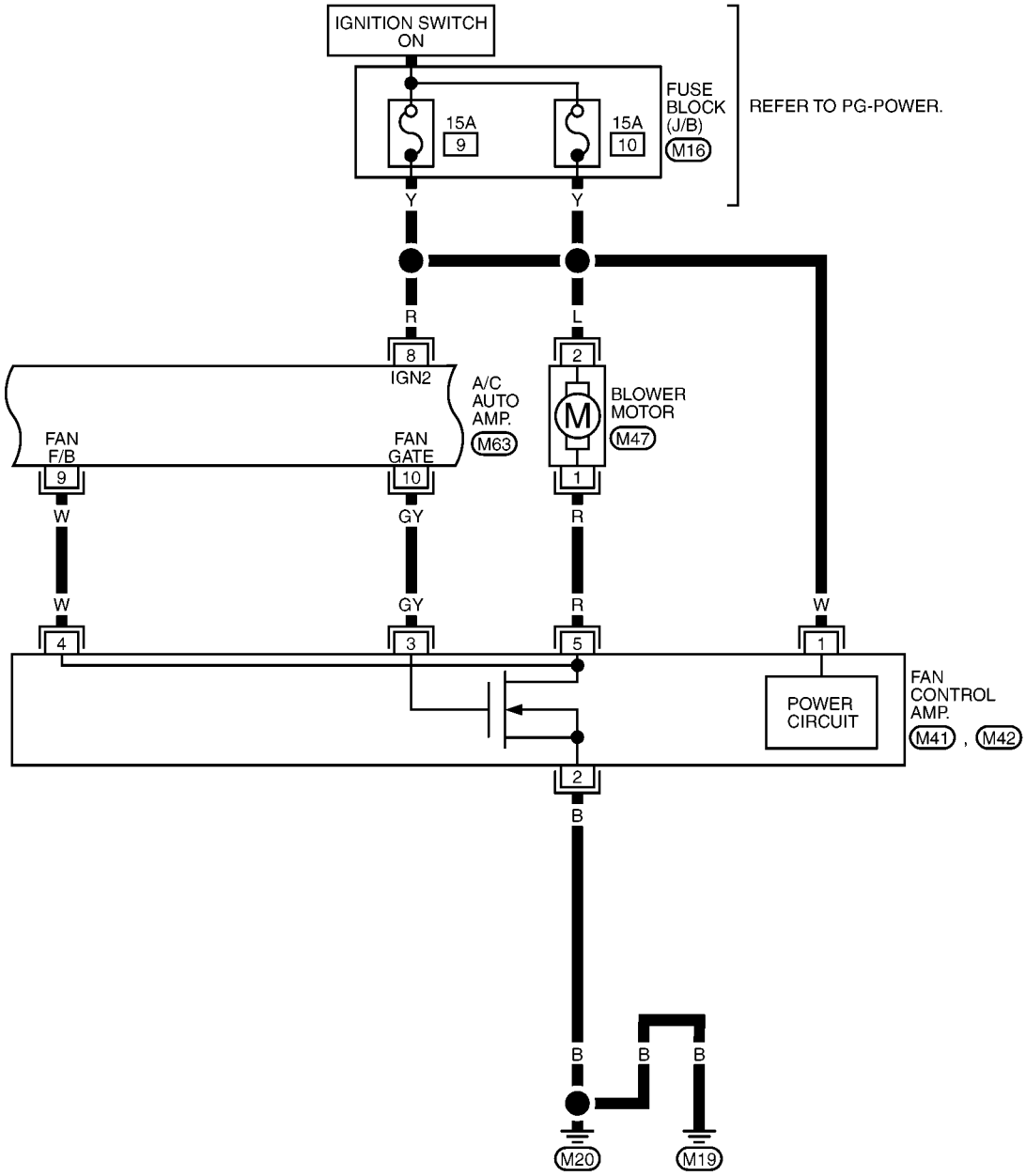


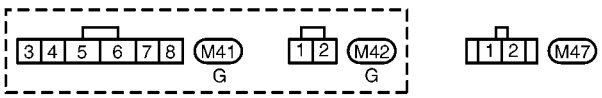


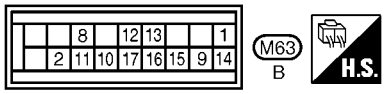
REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)
E61 , F134 -ELECTRICAL UNITS

MJWA0037E

ATC-A/C-07

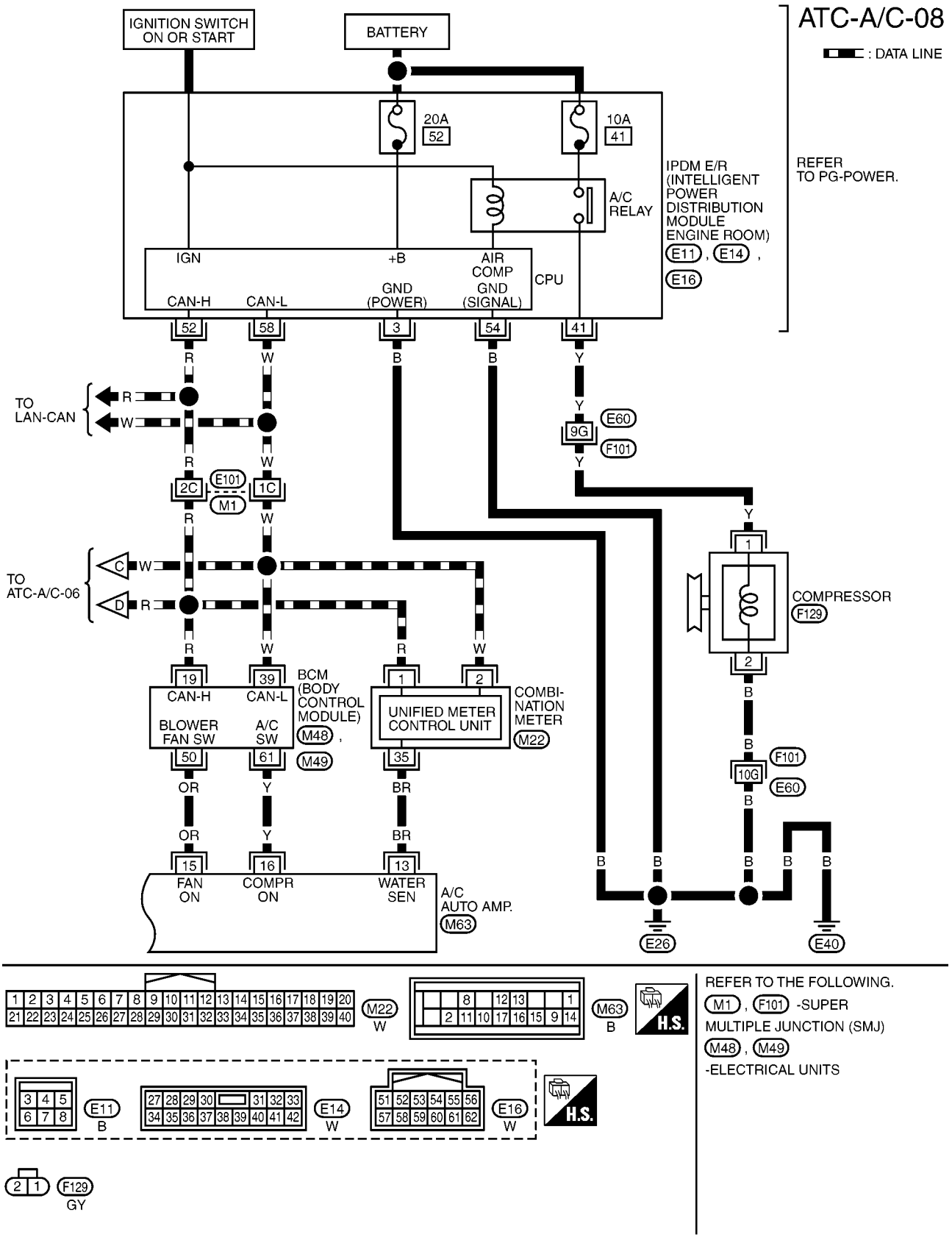






REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

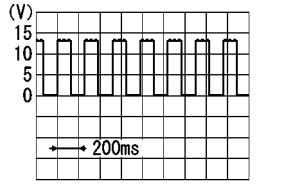
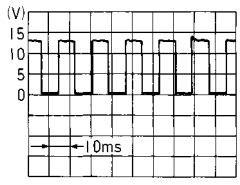
MJWA0038E

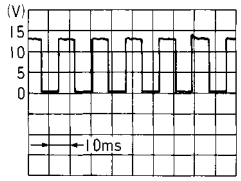

ATC-A/C-08
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
20A 52
10A 41
A/C RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11, E14, E16
REFER TO PG-POWER.
IGN
+B
AIR COMP GND (SIGNAL)
CPU
CAN-H
CAN-L
GND (POWER)
52
58
3
54
41
TO LAN-CAN
E60
9G
F101
E101
2C
M1
1C
TO ATC-A/C-06
COMPRESSOR F129
19
39
1
2
CAN-H
CAN-L
BLOWER FAN SW
A/C SW
BCM (BODY CONTROL MODULE) M48, M49
UNIFIED METER CONTROL UNIT
COMBI-NATION METER M22
50
61
35
10G
15
16
13
FAN ON
COMPR ON
WATER SEN
A/C AUTO AMP. M63
E26
E40
M22 W
M63 B
H.S.
E11 B
E14 W
E16 W
F129 GY
REFER TO THE FOLLOWING.
M1, F101 -SUPER MULTIPLE JUNCTION (SMJ)
M48, M49
-ELECTRICAL UNITS

MJWA0039E

A/C Auto Amp. Input/Output Signal Standard

EJS004I1

Terminal No.	Signal Designation	Measuring condition		Standard
		Ignition switch	Operation (status)	
1	Battery power supply	OFF	—	Approx. 12V
2	Ignition power supply	ON	—	Approx. 12V
3	Sunload sensor signal	—	—	Note 4
4	Ambient sensor signal	—	—	Note 3
5	In-vehicle sensor signal	—	—	Note 1:
6	Sensor ground	ON	—	Approx. 0V
7	Intake sensor signal	—	—	Note 2:
8	Ignition power supply	ON	—	Approx. 12V
9	Blower fan feedback signal	ON	Fan speed: Manual speed 1	Approx. 8V
10	Fan ON signal	ON	Blower fan: ON	Approx. 12V
			Blower fan: OFF	Approx. 1V
11	Illumination power supply	ON	Lighting switch: 1st	Approx. 12V
12	Illumination ground	ON	—	Approx. 0V
13	Engine coolant temperature signal	ON	At idle (after warming up, approx. 80°C) **CAUTION:** **The waveforms vary depending on the coolant temperature.**	 SKIA2224J
14	Ground	ON	—	Approx. 0V
15	Ignition feedback (blower motor) signal	ON	—	Approx. 12V
16	Compressor ON signal	ON	Compressor ON	Approx. 1V
			Compressor OFF	Approx. 5V
17	Rear window defogger switch signal	ON	Rear window defogger: ON	Approx. 1V
			Rear window defogger: OFF	Approx. 12V
18	Rear window defogger feedback signal	ON	Rear window defogger: ON	Approx. 12V
			Rear window defogger: OFF	Approx. 0V
19	Intake door motor drive signal	ON	REC→FRE	Approx. 12V
			FRE→REC	Approx. 0V
20	Intake door motor drive signal	ON	REC or FRE switch: REC→FRE	Approx. 0V
			REC or FRE switch: FRE→REC	Approx. 12V
25 26 27 29	Air mix door motor drive signal	ON	Immediately after temperature adjustment switch operation	 HAK0627D

Terminal No.	Signal Designation	Measuring condition		Standard
		Ignition switch	Operation (status)	
30 31 32 34	Mode door motor drive signal	ON	Immediately after mode switch operation	 HAK0627D

Note 1: Refer to ATC-42, "In-Vehicle Sensor System" .
Note 2: Refer to ATC-44, "Intake Sensor System" .
Note 3: Refer to ATC-40, "Ambient Sensor System" .
Note 4: Refer to ATC-43, "Sunload Sensor System" .

Self-Diagnosis Function

EJS004I2

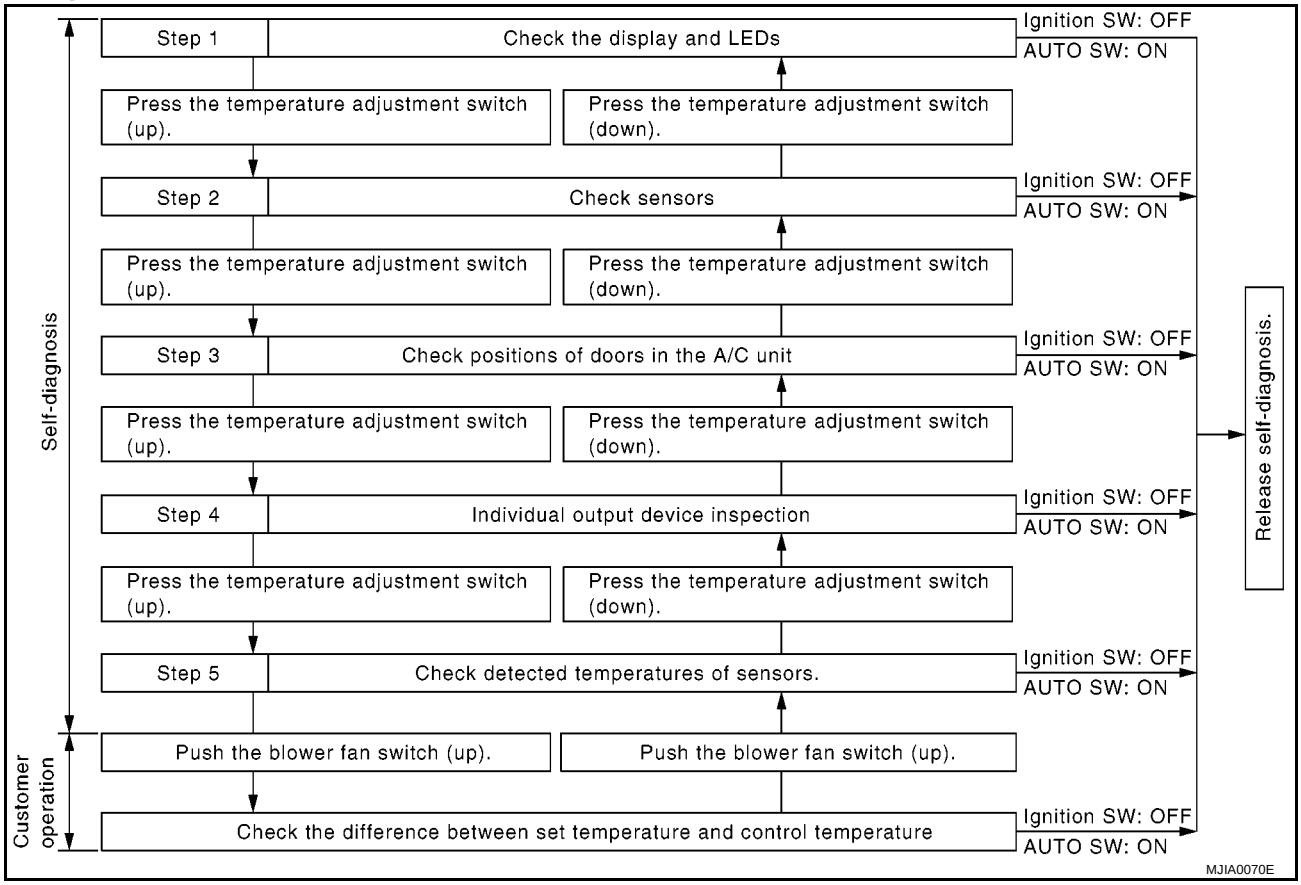
DESCRIPTION

- The self-diagnosis system consists of steps 1 to 5, and diagnosis sensor operations by checking for failures of each sensor and outputting control signals predetermined for each output device.

	Step 1	Step 2	Step 3	Step 4	Step 5
Description	Check the display and LEDs	Check sensors	Check positions of doors in the A/C unit	Individual output device inspection	● Check detected temperatures of sensors
Part to be diagnosed	● Display ● LED	● Ambient sensor ● In-vehicle sensor ● Intake sensor ● Sunload sensor	● Mode door motor ● Air mix door motor	● Mode door motor ● Intake door motor ● Air mix door motor ● Blower motor ● Compressor ● Fan ON signal	● The following sensor – Ambient sensor – In-vehicle sensor – Intake sensor

OPERATION PROCEDURE

Description



Switching to Self-Diagnosis Mode

- Turn ignition switch OFF, then turn it to start engine. Within 10 seconds after starting the engine, press and hold the OFF switch for at least 5 seconds. Self-diagnosis (step1) should start.

  CAUTION:

  Diagnosis should be carried out with the engine running. If the battery voltage drops below 12V during step 3 trouble diagnosis, the actuator speeds become slower and NO results may be returned even for normal operation.

Finishing Self-Diagnosis Mode

- Turn ignition switch OFF or press AUTO switch.

Shifting the Steps

- Use the temperature adjustment switch to switch between steps 1 through 5.

Procedure

1. START SELF-DIAGNOSIS

1. Turn ignition switch from OFF position to engine start. Within 10 seconds of engine start, press and hold OFF switch for approximately 5 seconds or longer.

Is self-diagnosis mode activated?

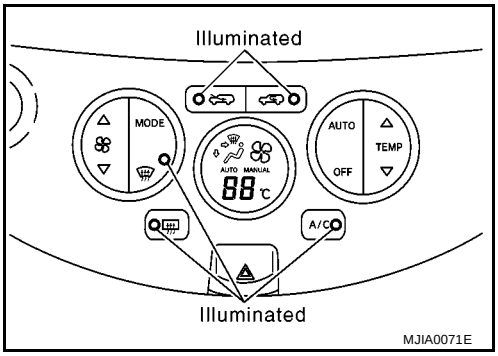
YES >> GO TO 2.
NO >> Replace A/C auto amp.

2. STEP 1 - CHECK DISPLAY AND LEDS

Check LEDs of all controller switches. Check all liquid crystal display segments.
Normal: All segments and LEDs are illuminated.
Error: LEDs and sections of malfunctioning locations are not illuminated.

Are LEDs and display normal?

YES >> GO TO 3.
NO >> Replace A/C auto amp.

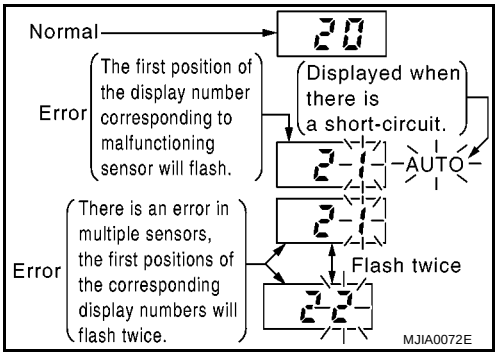


3. STEP 2 - CHECK ALL SENSORS

1. Press temperature adjustment switch (Up:▲) to change to step 2.
2. A “2” is displayed, followed by display of check results.
   Normal: “20” is displayed.
   Error: The first position of the display number corresponding to malfunctioning sensor will flash. “AUTO” is shown on the display when there is a short-circuit.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. CHECK SENSOR MALFUNCTION

When an error occurs, the first position of the display number corresponding to this sensor will flash. If it is determined at this time that there is a short in the sensor circuit, “AUTO” will flash. Further, if there is an error in multiple sensors, the first positions of the corresponding display numbers will flash twice.

Displayed No.	Corresponding sensor	Error return condition		Reference page
		OPEN	SHORT	
21	Ambient sensor	Approx. -42°C or less	Approx. 100°C or more	ATC-40, "Ambient Sensor System"
22	In-vehicle sensor	Approx. -42°C or less	Approx. 100°C or more	ATC-42, "In-Vehicle Sensor System"
24	Intake sensor	Approx. -42°C or less	Approx. 100°C or more	ATC-44, "Intake Sensor System"
25	Sunload sensor	33 W/m^2 (28.4 Kcal/m^2 ·h) or less	1677 W/m^2 (1422 Kcal/m^2 ·h) or more	ATC-43, "Sunload Sensor System"

Example: If there is an open circuit in the ambient sensor, the A/C auto amp. registers extreme cold (-42°C or less) and adjusts the temperature control warmer.

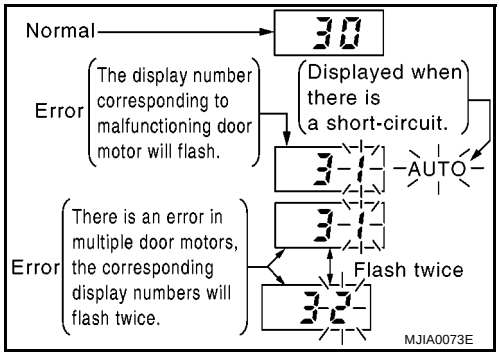
CAUTION:
Sunload sensor may register malfunction when indoors, at dusk, or at other times when light is insufficient.

OK or NG

OK >> End of self-diagnosis
NG >> Malfunction in corresponding sensor system

5. STEP 3 - CHECK AIR MIX DOOR AND MODE DOOR MOTOR

1. Press temperature adjustment switch (Up: ▲) to change to step 3.
2. A “3” is displayed, followed by a display of check results.
   Send output signals to the air mix door motor and mode door motor and inspect both motors.
   Normal: “30” is displayed.
   Error: The indicator lamp for the door position where the error occurred flashes. At this time, if it is judged that there is a short in the door motor circuit, “AUTO” will be displayed. If there is an error in multiple door motors, the corresponding display numbers will flash in ascending order.



door motors corresponding to the DTC

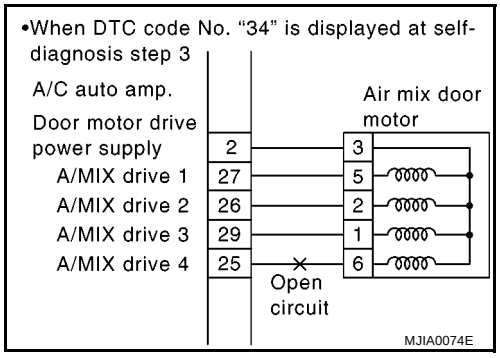
Displayed No.	31, 32, 33, 34	35, 36, 37, 38
Corresponding door motor	Air mix door	Mode door

DTC for an inoperative harness

Corresponding door motor	Air mix door motor				Mode door motor			
Corresponding terminal (Door motor side)	5	2	1	6	5	2	1	6
Corresponding terminal (A/C auto amp. side)	27	26	29	25	32	31	34	30
Displayed number for short circuit	AUTO31	AUTO32	AUTO33	AUTO34	AUTO35	AUTO36	AUTO37	AUTO38
Displayed number for open circuit	31	32	33	34	35	36	37	38

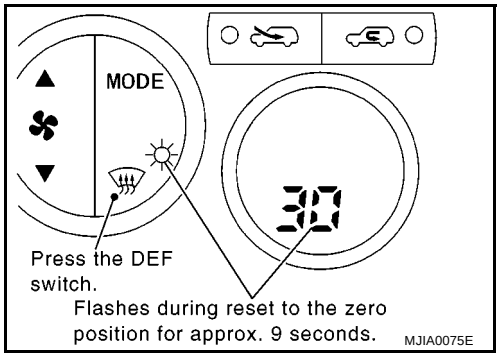
NOTE:

- If all four terminals of each door motor show a DTC for an open circuit, there is probably a disconnected connector or an open circuit in the door motor drive power supply harness.
- If a short circuit occurs in the harness between terminals for each door motor and drive signal, although it cannot be detected by self-diagnosis, the door motor will vibrate when it operates.



Door Motor Zero Position Reset

- Pressing the DEF switch during step 3 will send a reset signal to air mix door and mode door motor to reset them to the zero position.
  During reset: The 30 and DEF switch indicator lamps will flash. (For approx. 9 seconds)



OK or NG

OK >> GO TO 6.
NG >> Refer to ATC-51, "Mode Door Motor System" or ATC-53, "Air Mix Door Motor System" .

6. STEP 4 - CHECK EACH OUTPUT DEVICE

1. Press temperature adjustment switch (Up: ▲) to change to step 4.
2. Each time the DEF switch is pressed, the display will change to 41→42 → 43 → 44 → 45→ 46 → 41.
3. Follow table below and check outlet, inlet, airflow temperature, blower motor applied voltage, magnetic clutch operation, and air mix ratio. Each operating condition should be checked visually, by listening for noise, by touching air outlets with your hand, and so on.

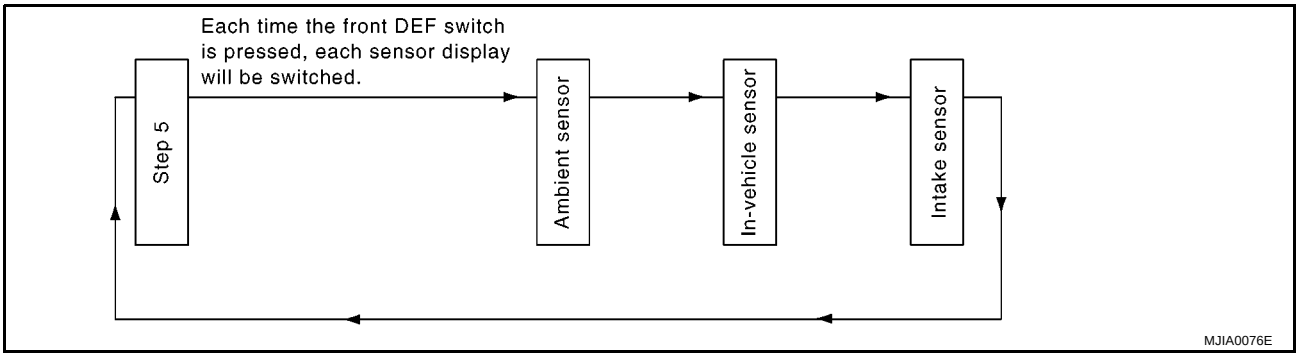
Displayed No.	41	42	43	44	45	46
Mode door	VENT	B/L	B/L	FOOT	D/F	DEF
Intake door	Recirculation	Recirculation	Fresh air	Fresh air	Fresh air	Fresh air
Air mix door position	Full Cold	Full Cold	Halfway (50%)	Halfway (50%)	FULL HOT	FULL HOT
Blower motor Applied voltage	5V	10.5V	8.5V	8.5V	8.5V	Battery voltage
Magnetic clutch	ON	ON	ON	OFF	OFF	ON
Fan ON signal	12V	12V	12V	1V	1V	12V

OK or NG

OK >> GO TO 7.
NG >>
- Outlet does not change: Refer to ATC-51, "Mode Door Motor System" .
- Inlet does not change: Refer to ATC-44, "Intake Sensor System" .
- Airflow temperature does not change: Refer to ATC-53, "Air Mix Door Motor System" .
- Blower motor malfunction: Refer to ATC-47, "Blower Motor System" .
- Magnetic clutch does not engage or operate: Refer to ATC-54, "Magnetic Clutch System" .

7. STEP 5 - DISPLAY OF TEMPERATURE DETECTED AT EACH SENSOR

1. Press temperature adjustment switch (Up: ▲) to change to step 5.
2. Pressing DEF switch once cycles from 5→detected temperature at ambient sensor → detected temperature at in-vehicle sensor → detected temperature at intake sensor →5.



OK or NG

OK >> End of self-diagnosis
NG >>
- Ambient sensor malfunction: Refer to ATC-40, "Ambient Sensor System" .
- Inside air temperature malfunction: Refer to ATC-42, "In-Vehicle Sensor System" .
- Intake sensor malfunction: Refer to ATC-44, "Intake Sensor System" .

Difference Between Set Temperature and Control Temperature

EJS004I3

DESCRIPTION

- If the temperature felt by the customer is different than the airflow temperature controlled by the set temperature, A/C auto amp. control temperature can be adjusted to compensate for the set temperature (displayed temperature).

HOW TO SET

1. Change to self-diagnosis mode. Refer to ATC-34, "Switching to Self-Diagnosis Mode" .
2. In self-diagnosis step 5, press the fan switch (Up: ▲).
3. A “0” is shown in the display.
4. Pressing the temperature adjustment switch increases or decreases the display temperature throughout a range of +3°C through -3°C (in increments of 1°C).At this time, if the setting difference is negative, ″AUTO″ is displayed.

NOTE:
When the set temperature (display temperature) is set to 25°C and -3°C, the temperature controlled by A/C auto amp. is 25°C - 3°C = 22°C and the temperature becomes lower than set temperature.

CAUTION:
When the battery is disconnected or the battery voltage becomes 9V or less, the difference between the set temperature (display) and control temperature is cancelled.

Function Inspection

EJS004I4

1. CHECK FAN SPEED

Operate fan switch to make sure fan speed changes. Confirm operation for all fan speeds.

OK or NG

OK >> Switch fan speed to “4” and GO TO 2.
NG >> Blower motor system malfunction: Refer to ATC-47, "Blower Motor System" .

2. CHECK AIR OUTLET

1. Operate mode switch and DEF switch.
2. Confirm air outlets change according to each indicated air outlet.

OK or NG

OK >> GO TO 3.
NG >> Mode door system malfunction: Refer to ATC-51, "Mode Door Motor System" .

3. CHECK AIR INLET

1. Press REC switch to change recirculation.
2. Listen to intake sound and confirm air inlets change.
3. Press FRE switch to change to fresh air intake.
4. Listen to intake sound and confirm air inlets change.

OK or NG

OK >> GO TO 4.
NG >> Intake door system malfunction: Refer to ATC-51, "Intake Door Motor System" .

4. CHECK WITH TEMPERATURE SETTING LOWERED

1. Turn compressor ON.
2. Press temperature adjustment switch (Down: ▼) and lower temperature setting to 18°C.
3. Confirm cool air blows from outlets.

OK or NG

OK >> GO TO 5.
NG >> Air mix door system malfunction: Refer to ATC-53, "Air Mix Door Motor System" .

5. CHECK WITH TEMPERATURE SETTING RAISED

1. Warm up the engine.
2. Press temperature adjustment switch (Up: ▲) and raise temperature setting to 32°C.
3. Confirm warm air blows from outlets.

OK or NG

OK >> GO TO 6.
NG >> Air mix door system malfunction: Refer to ATC-53, "Air Mix Door Motor System" .

6. CHECK AUTO MODE

1. Press AUTO switch and confirm that ″AUTO″ is displayed.
2. Make sure display and indicator lamp turns on by pressing A/C switch. Listen to make sure compressor is operating. (Temperature of air blowing from outlets and fan speed vary depending on ambient temperature.)

OK or NG

OK >> GO TO 7.
NG >> Refer to ATC-19, "DIAGNOSIS CHART BY SYMPTOM" .

7. CHECK A/C SWITCH

1. Press A/C switch and make sure compressor turns off.
2. Press A/C switch again and make sure compressor turns on.

OK or NG

OK >> If all function checks are normal (no phenomena reoccurrence), refer to ATC-19, "DIAGNOSIS CHART BY SYMPTOM" .
NG >> Refer to ATC-19, "DIAGNOSIS CHART BY SYMPTOM" .

Air Conditioning System

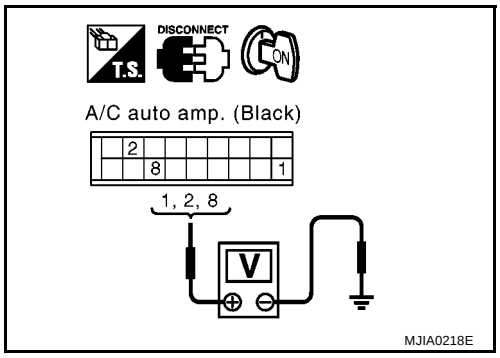
EJS004I5

Symptom: Air conditioner does not operate.

1. CHECK POWER SUPPLY CIRCUIT OF A/C AUTO AMP.

Disconnect the A/C auto amp. connector and check voltage between the ground and terminals 1, 2 and 8.

Connector terminal		Ignition switch	Voltage
A/C auto amp.	Ground		
1		OFF	Battery voltage
2		ON	
8		ON	



OK or NG

OK >> GO TO 2.

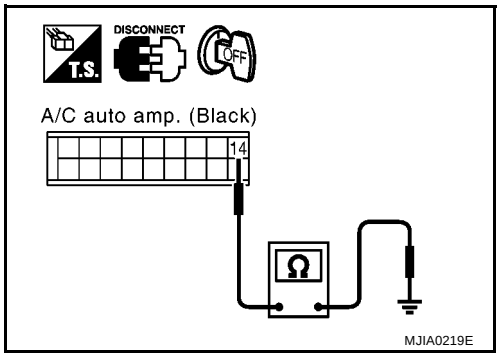
NG >> Check power supply circuit, 10A fuses [Nos. 4 and 8, located in the fuse block (J/B)] and 15A fuses [Nos. 9 and 10, located in the fuse block (J/B)]. Refer to PG-4, "POWER SUPPLY ROUTING" .

- If fuse is OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

2. CHECK GROUND CIRCUIT OF A/C AUTO AMP.

Check continuity between A/C auto amp. terminal 14 and ground.

Connector terminal		Continuity
A/C auto amp.	Ground	Yes
14		



Does continuity exist?

YES >> Replace A/C auto amp.

NO >> Repair harness or connector.

Ambient Sensor System

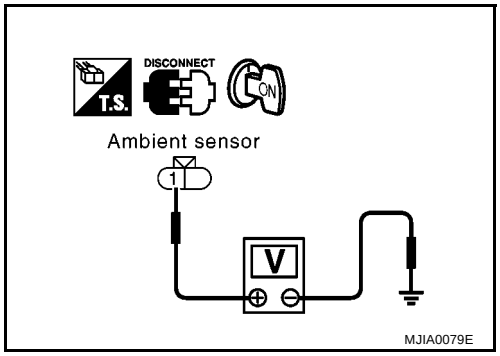
EJS004I6

SMA for VIN >SJN**AK12U1288860

1. CHECK POWER SUPPLY CIRCUIT

Disconnect ambient sensor connector, turn ignition switch ON, and check voltage between the terminal 1 and ground.

Connector terminal		Voltage
Ambient sensor	Ground	Approx. 5V
1		



OK or NG

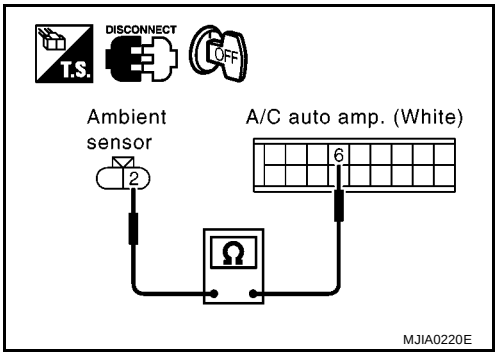
OK >> GO TO 2.

NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between ambient sensor terminal 2 and A/C auto amp. terminal 6.

Connector terminal		Continuity
Ambient sensor	A/C auto amp.	Yes
2	6	



Does continuity exist?

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

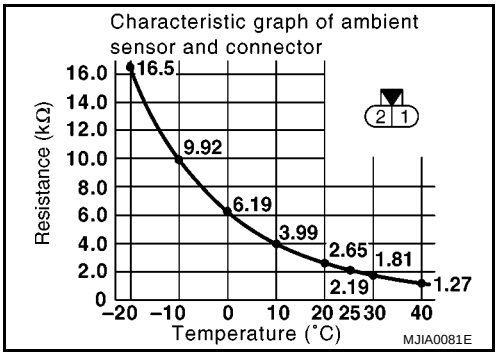
3. CHECK AMBIENT SENSOR

Check resistance between terminals 1 and 2 on ambient sensor.

OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> 1. Replace ambient sensor.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .



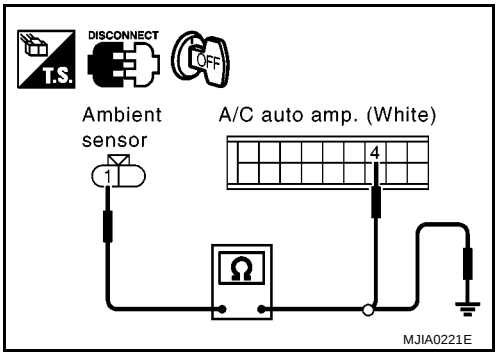
4. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between ambient sensor terminal 1 and A/C auto amp. terminal 4.

Connector terminal		Continuity
Ambient sensor	A/C auto amp.	Yes
1	4	

3. Check continuity between ambient sensor terminal 1 and ground.

Connector terminal		Continuity
Ambient sensor	Ground	None
1		



OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> Repair harness or connector.

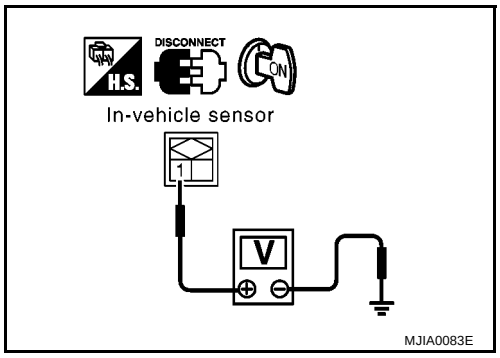
In-Vehicle Sensor System

EJS004I7

1. CHECK POWER SUPPLY CIRCUIT

Disconnect in-vehicle sensor connector, turn ignition switch ON, and check voltage between terminal 1 and ground.

Connector terminal		Voltage
In-vehicle sensor	Ground	Approx. 5V
1		



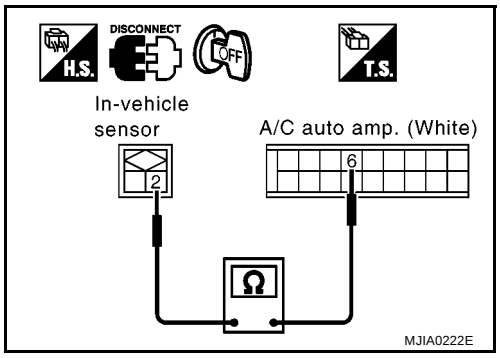
OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between in-vehicle sensor terminal 2 and A/C auto amp. terminal 6.

Connector terminal		Continuity
In-vehicle sensor	A/C auto amp.	Yes
2	6	



Does continuity exist?

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

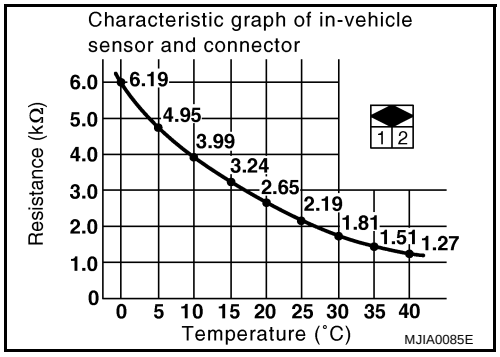
3. CHECK IN-VEHICLE SENSOR

Check the resistance between in-vehicle sensor terminals 1 and 2.

OK or NG

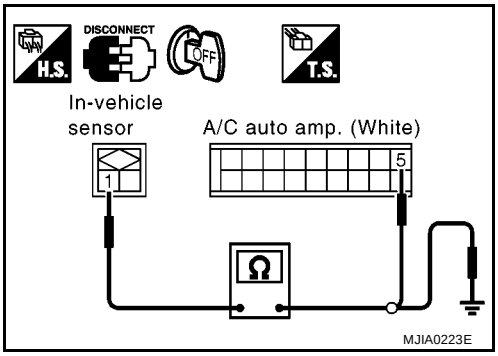
OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> 1. Replace in-vehicle sensor.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .



4. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between in-vehicle sensor terminal 1 and A/C auto amp. terminal 5.



Connector terminal		Continuity
In-vehicle sensor	A/C auto amp.	Yes
1	5	

3. Check continuity between in-vehicle sensor terminal 1 and ground.

Connector terminal		Continuity
In-vehicle sensor	Ground	None
1		

OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

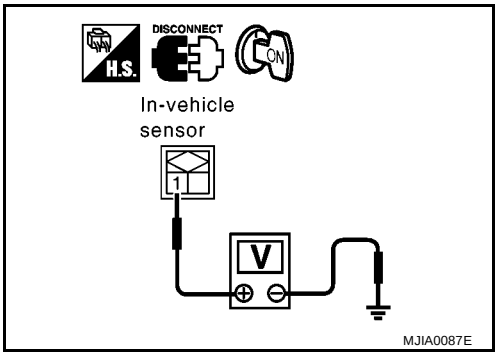
NG >> Repair harness or connector.

Sunload Sensor System

EJS004I8

1. CHECK POWER SUPPLY CIRCUIT

Disconnect sunload sensor connector, turn ignition switch ON, and check voltage between terminal 1 and ground.



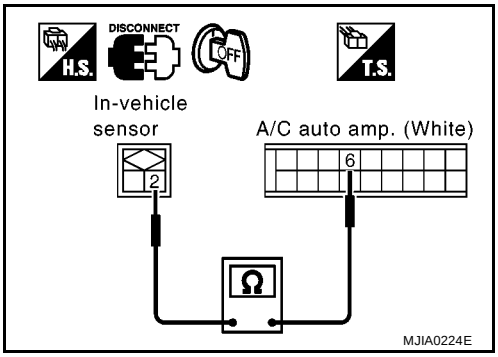
Connector terminal		Voltage
Sunload sensor	Ground	Approx. 5V
1		

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between sunload sensor terminal 2 and A/C auto amp. terminal 6.



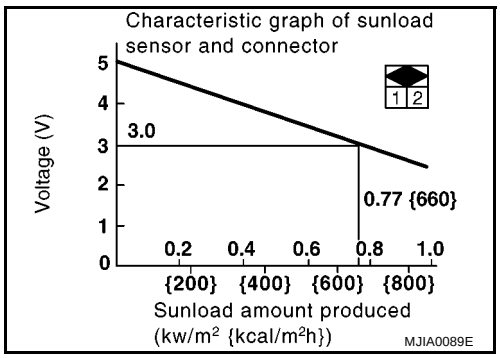
Connector terminal		Continuity
Sunload sensor	A/C auto amp.	Yes
2	6	

Does continuity exist?

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

3. CHECK SUNLOAD SENSOR

1. Connect the sunload sensor and A/C auto amp. connectors.
2. Check voltage between sunload sensor terminal 1 and ground.



NOTE:

- When checking indoors, use a lamp of approximately 60W. Move the lamp towards and away from the sensor to check.
- Sunload amount produced by direct sunshine in fair weather is equivalent to approximately 0.77 W/m^2 (660 kcal/m^2 ·h).

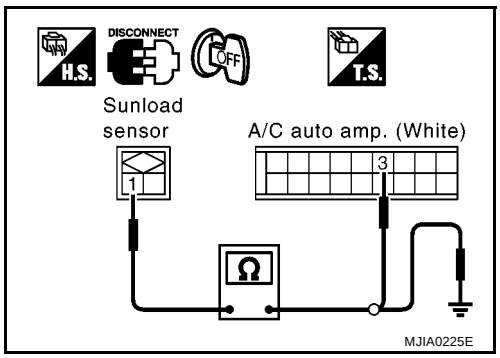
OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> 1. Replace sunload sensor.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

4. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between sunload sensor terminal 1 and A/C auto amp. terminal 3.



Connector terminal		Continuity
Sunload sensor	A/C auto amp.	Yes
1	3	

3. Check continuity between sunload sensor terminal 1 and ground.

Connector terminal		Continuity
Sunload sensor	Ground	None
1		

OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

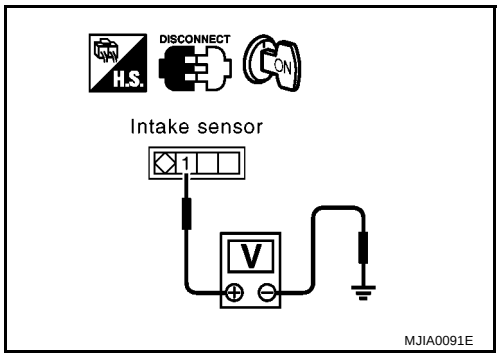
NG >> Repair harness or connector.

Intake Sensor System

EJS004I9

1. CHECK POWER SUPPLY CIRCUIT

Disconnect intake sensor connector, turn ignition switch ON, and check voltage between terminal 1 and ground.



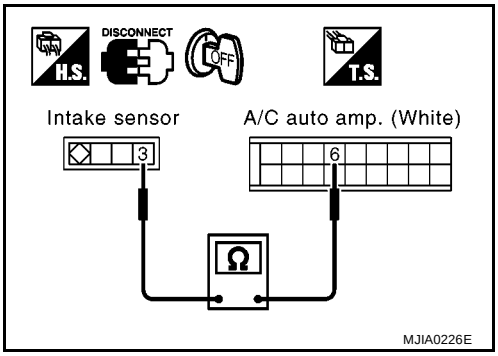
Connector terminal		Voltage
Intake sensor	Ground	Approx. 5V
1		

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between intake sensor terminal 3 and A/C auto amp. terminal 6.



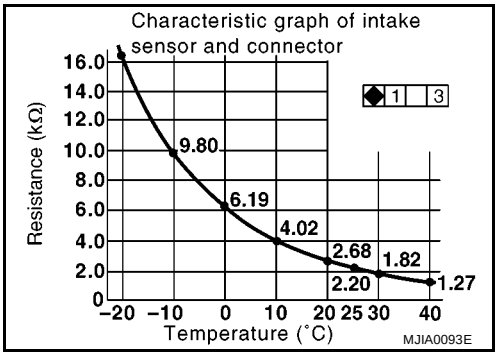
Connector terminal		Continuity
Intake sensor	A/C auto amp.	Yes
3	6	

Does continuity exist?

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

3. CHECK INTAKE SENSOR

Disconnect intake sensor connector and check the resistance between terminals 1 to 3.



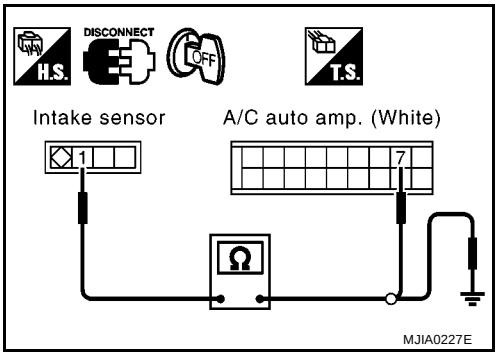
OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> 1. Replace the intake sensor.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

4. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between intake sensor terminal 1 and A/C auto amp. terminal 7.



Connector terminal		Continuity
Intake sensor	A/C auto amp.	Yes
1	7	

3. Check continuity between intake sensor terminal 1 and ground.

Connector terminal		Continuity
Intake sensor	Ground	None
1		

OK or NG

OK >> 1. Replace A/C auto amp.
2. Perform self-diagnosis step 2. Make sure result is normal. Refer to ATC-33, "Self-Diagnosis Function" .

NG >> Repair harness or connector.

Coolant Temperature Signal System

EJS004IA

Phenomenon: The low coolant temperature startup airflow volume control does not cancel or the lower coolant temperature startup airflow volume is not controlled.

Inspection Procedure

1. CHECK FUNCTION OF COMBINATION METER

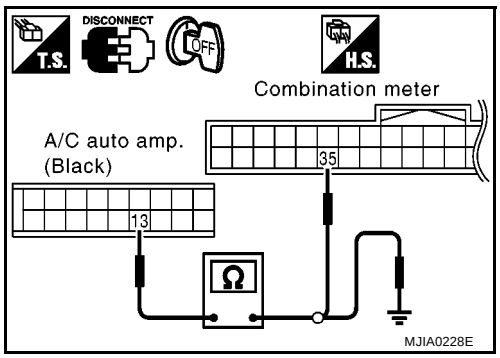
Does the engine coolant temperature gauge operate normally?

OK or NG

OK >> GO TO 2.
NG >> GO TO DI-33, "Inspection/Water Temperature Warning/indicator Lamp" .

2. CHECK HARNESS

1. Disconnect the A/C auto amp. connector and the combination meter connector.
2. Check continuity between A/C auto amp. terminal 13 and combination meter terminal 35.



Connector terminal		Continuity
A/C auto amp.	Combination meter	
13	35	Yes

3. Check continuity between A/C auto amp. terminal 13 and ground.

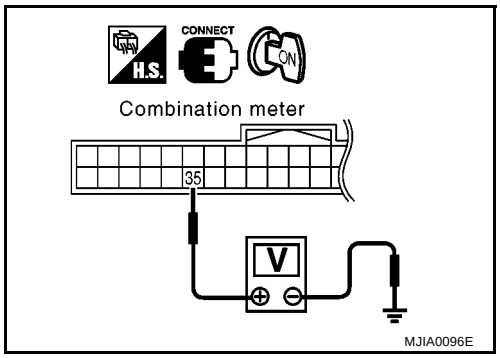
Connector terminal		Continuity
A/C auto amp.	Ground	None
13		

OK or NG

OK >> GO TO 3.
NG >> Repair the harness and connector.

3. CHECK 1: ENGINE COOLANT SIGNAL

1. Connect the A/C auto amp. connector and the combination meter connector.
2. Turn ignition switch ON, and check voltage between combination meter terminal 35 and ground.



Connector terminal		Standard voltage
Combination meter	Ground	Approx. 12V
35		

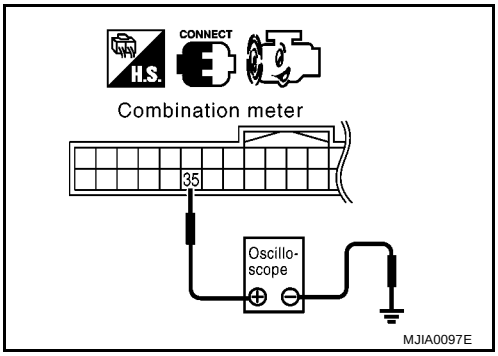
OK or NG

OK >> GO TO 4.
NG >> Replace A/C auto amp.

4. CHECK 2: ENGINE COOLANT TEMPERATURE

After the engine warms up, check voltage waveform between combination meter terminal 35 and ground.

Between terminal 35 and ground	**: Refer to ATC-32, "A/C Auto Amp. Input/Output Signal Standard" .**



OK or NG

OK >> Replace A/C auto amp.
NG >> Replace the combination meter.

Blower Motor System

EJS004IB

SMA for VIN >SJN**AK12U1288860

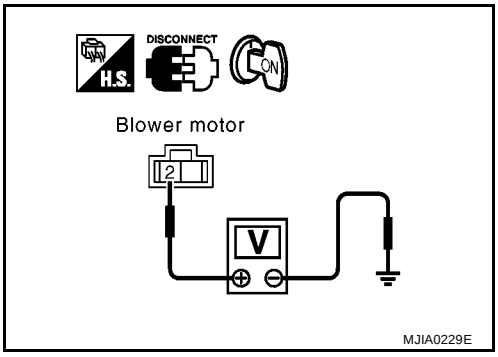
SMA for VIN >SJN**AK12U1309269

Symptom: Operation malfunction of blower motor

1. CHECK POWER SUPPLY CIRCUIT (BLOWER MOTOR)

Turn ignition switch ON, and check voltage between blower motor terminal 2 and ground.

Connector terminal		Voltage
Blower motor	Ground	Battery voltage
2		



OK or NG

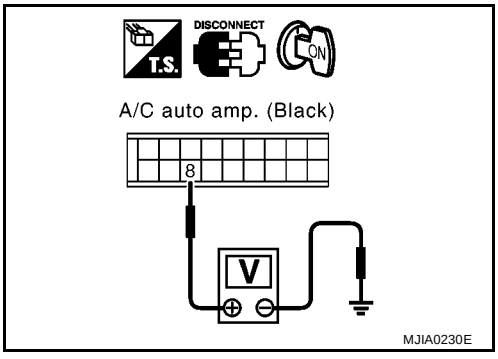
OK >> GO TO 2.
NG >> Check power supply circuit and 15A fuses [Nos. 9 and 10, located in the fuse block (J/B)]. Refer to PG-4, "POWER SUPPLY ROUTING" .

- If OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

2. CHECK POWER SUPPLY CIRCUIT (A/C AUTO AMP.)

1. Disconnect A/C auto amp. connector.
2. Turn ignition switch ON, and check voltage between A/C auto amp. terminal 8 and ground.

Connector terminal		Voltage
A/C auto amp.	Ground	Battery voltage
8		

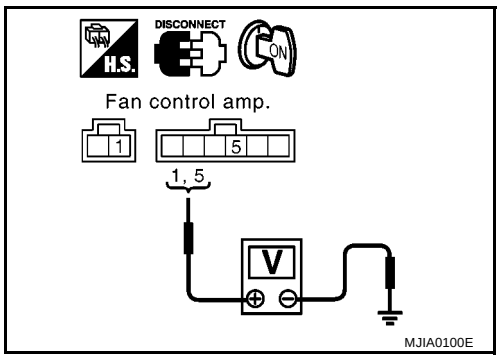


OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK POWER SUPPLY CIRCUIT (FAN CONTROL AMP.)

1. Disconnect the fan control amp. connector.
2. Turn ignition switch ON, and check voltage between fan control amp. terminal 1, 5 and ground.



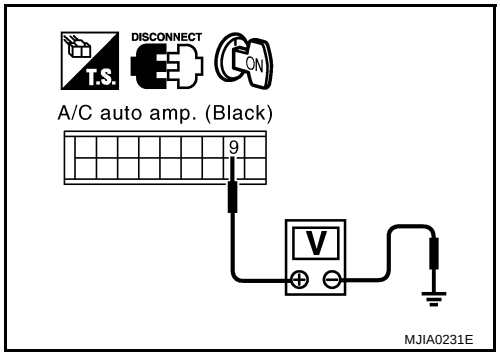
Connector terminal		Voltage
Fan control amp.	Ground	
1		Battery voltage
5		

OK or NG

OK >> GO TO 4.
NG >>
- Between terminal 1 and ground: Repair the harness or connector.
- Between terminal 5 and ground: GO TO 7.

4. CHECK BLOWER MOTOR FEEDBACK SIGNAL

Turn ignition switch ON, and check voltage between A/C auto amp. terminal 9 and ground.



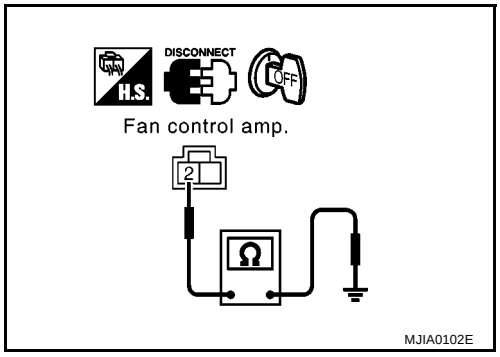
Connector terminal		Voltage
A/C auto amp.	Ground	Approx. 12V
9		

OK or NG

OK >> GO TO 5.
NG >> GO TO 9.

5. CHECK GROUND CIRCUIT

Check continuity between fan control amp. terminal 2 and ground.



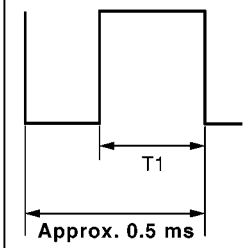
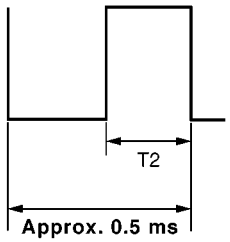
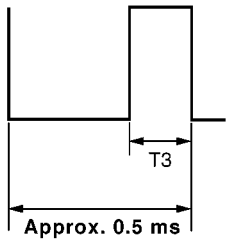
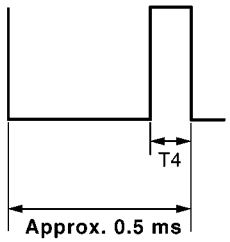
Connector terminal		Continuity
Fan control amp.	Ground	Yes
2		

Does continuity exist?

YES >> GO TO 6.
NO >> Repair harness or connector.

6. CHECK 1: FAN CONTROL AMP. CONTROL SIGNAL

Check waveform between fan control amp. terminal 3 and ground.

Fan speed	First	Second	Third	Fourth
Terminal 3 (Oscilloscope)				
	T1: Approx. 0.37 ms Duty ratio: Approx. 27%	T2: Approx. 0.29 ms Duty ratio: Approx. 42%	T3: Approx. 0.19 ms Duty ratio: Approx. 62%	T4: Approx. 0.04 ms Duty ratio: Approx. 92%

NOTE: Duty ratio = $\frac{\text{Approx. 0.5 ms} - Tx}{\text{Approx. 0.5 ms}} \times 100\ (\%)$

MJIA0103E

OK or NG

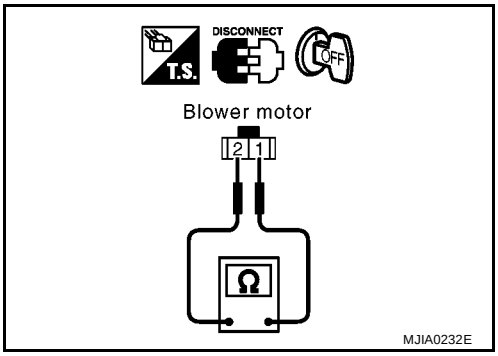
OK >> Replace the fan control amp.

NG >>
- Fan speed is stuck at speed 4: GO TO 11.
- Fan speed is stuck at speed 1: GO TO 12.

7. CHECK BLOWER MOTOR

1. Remove the blower motor.
2. Check continuity between blower motor terminal 1 and terminal 2.

Connector terminal		Continuity
Blower motor		Yes
1	2	



MJIA0232E

Does continuity exist?

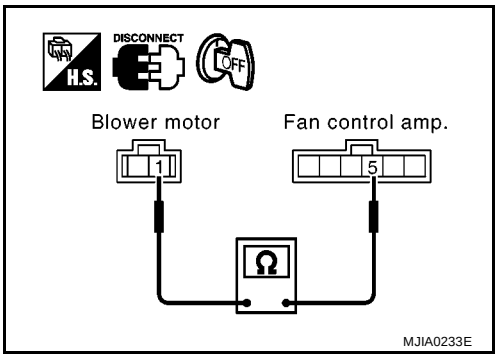
YES >> GO TO 8.

NO >> Replace the blower motor.

8. CHECK CIRCUIT CONTINUITY

1. Disconnect the blower motor and fan control amp. connectors.
2. Check continuity between the blower motor terminal 1 and fan control amp. terminal 5.

Connector terminal		Continuity
Blower motor	Fan control amp.	
1	5	Yes



MJIA0233E

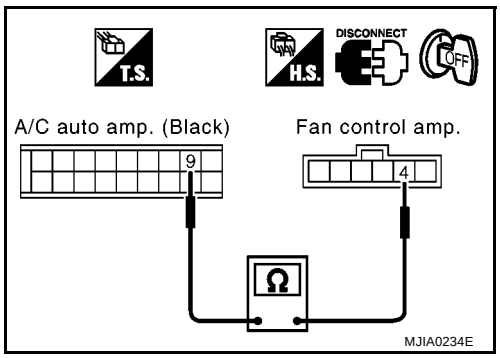
Does continuity exist?

YES >> End of trouble diagnosis

NO >> Repair harness or connector.

9. CHECK CIRCUIT CONTINUITY

1. Disconnect the fan control amp. and A/C auto amp. connectors.
2. Check continuity between fan control amp. terminal 4 and A/C auto amp. terminal 9.



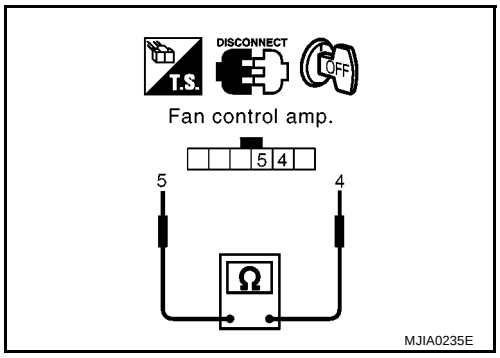
Connector terminal		Continuity
Fan control amp.	A/C auto amp.	
4	9	Yes

Does continuity exist?

YES >> GO TO 10.
NO >> Repair harness or connector.

10. CHECK FAN CONTROL AMP.

Check continuity between fan control amp. terminals 4 and 5.



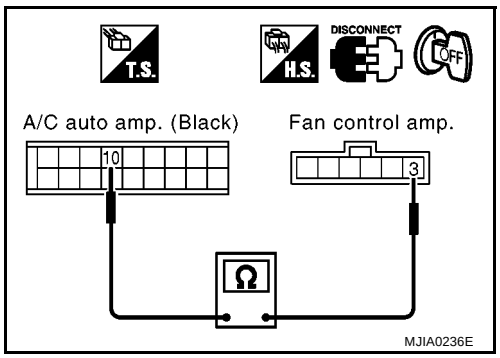
Connector terminal		Continuity
Fan control amp.		
4	5	Yes

Does continuity exist?

YES >> End of trouble diagnosis
NO >> Replace the fan control amp.

11. CHECK CIRCUIT CONTINUITY

1. Disconnect the fan control amp. and A/C auto amp. connectors.
2. Check continuity between fan control amp. terminal 3 and A/C auto amp. terminal 10.



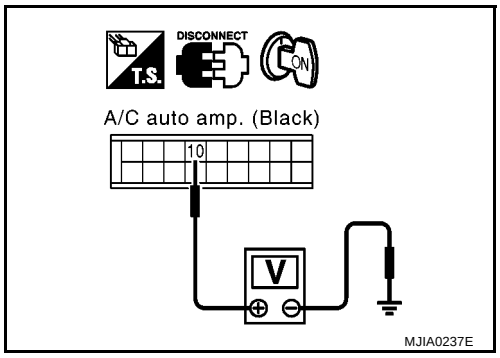
Connector terminal		Continuity
Fan control amp.	A/C auto amp.	
3	10	Yes

Does continuity exist?

YES >> Replace the fan control amp.
NO >> Repair harness or connector.

12. CHECK 2: FAN CONTROL AMP. CONTROL SIGNAL

1. Disconnect the A/C auto amp. connector.
2. Turn ignition switch ON, and check voltage between A/C auto amp. terminal 10 and ground.



Connector terminal		Condition	Voltage
A/C auto amp.	Ground	Fan speed : Speed 1 through Speed 3	Battery voltage
10			

OK or NG

OK >> Replace A/C auto amp.
NG >> Replace the fan control amp.

Intake Door Motor System

EJS004IC

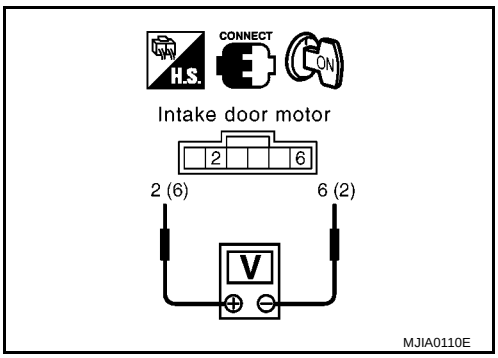
Symptom

- Unable to change the intake door.
- Intake door motor does not operate normally.

1. CHECK INTAKE DOOR MOTOR DRIVE POWER

Turn ignition switch ON, and check voltage between intake door motor terminals 2 and 6.

Connector terminal		Condition	Voltage
Intake door motor			
2(+)	6(-)	FRE→REC	Approx. 12V
6(+)	2(-)	REC→FRE	Approx. 12V



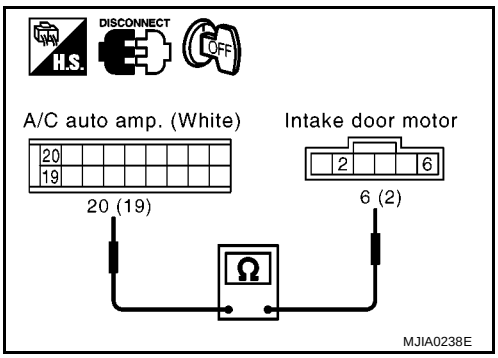
OK or NG

OK >> Replace intake door motor.
NG >> GO TO 2.

2. CHECK CIRCUIT CONTINUITY

Check continuity between A/C auto amp. terminal 19 and 20, and intake door motor terminals 2 and 6.

Connector terminal		Continuity
A/C auto amp.	Intake door motor	
20	6	Yes
19	2	



Does continuity exist?

YES >> Replace A/C auto amp.
NO >> Repair the harness or connector.

Mode Door Motor System

EJS004ID

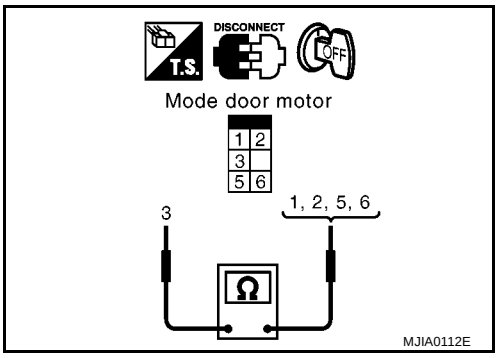
Symptom

- Unable to change air outlets to others.
- Mode door motor does not operate normally.

1. CHECK MODE DOOR MOTOR

1. Disconnect the mode door motor connector.
2. Check continuity between mode door motor terminals 3 and 1, 2, 5, 6.

Connector terminal		Continuity
Mode door motor		
3	1	Yes
	2	
	5	
	6	

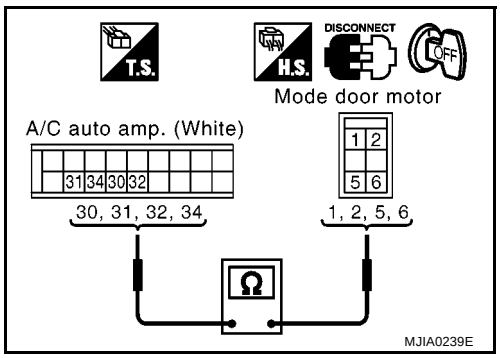


Does continuity exist?

YES >> GO TO 2.
NO >> Replace the mode door motor.

2. CHECK 1: CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity among the A/C auto amp. terminals 30, 31, 32, 34 and the mode door motor terminals 1, 2, 5, and 6.



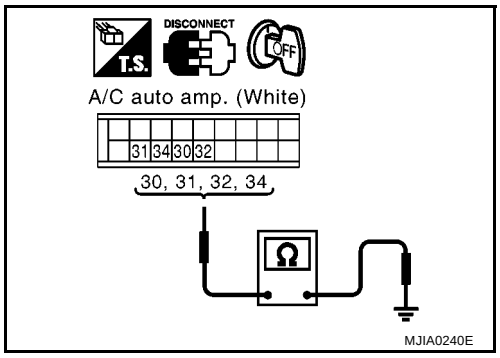
Connector terminal		Continuity
A/C auto amp.	Mode door door	
30	6	Yes
31	2	
32	5	
34	1	

Does continuity exist?

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

3. CHECK 2: CIRCUIT CONTINUITY

Check continuity between the ground and A/C auto amp. terminals 30, 31, 32, and 34.



Connector terminal		Continuity
A/C auto amp.	Ground	None
30		
31		
32		
34		

OK or NG

OK >> Replace A/C auto amp.
NG >> Repair the harness and connector.

Air Mix Door Motor System

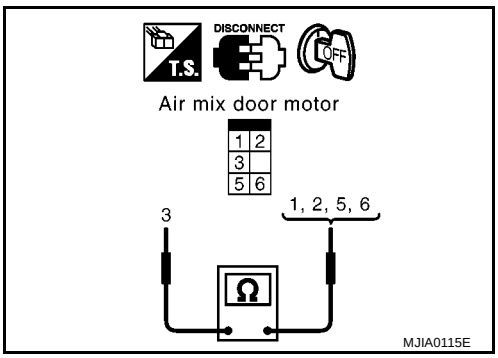
EJS004IE

Symptom:

- Temperature of blowing air does not change.
- Air mix door motor does not operate.

1. CHECK AIR MIX DOOR MOTOR

1. Disconnect the air mix door motor connector.
2. Check continuity between the air mix door motor terminals 3 and 1, 2, 5, 6.



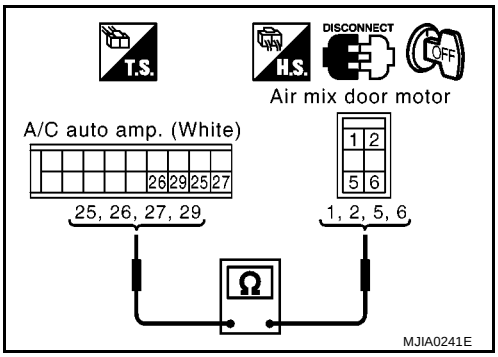
Connector terminal		Continuity
Air mix door motor		
3	1	Yes
	2	
	5	
	6	

Does continuity exist?

YES >> GO TO 2.
NO >> Replace the air mix door motor.

2. CHECK 1: CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.
2. Check continuity between A/C auto amp. terminals 25, 26, 27, 29, and air mix door motor terminals 1, 2, 5, 6.



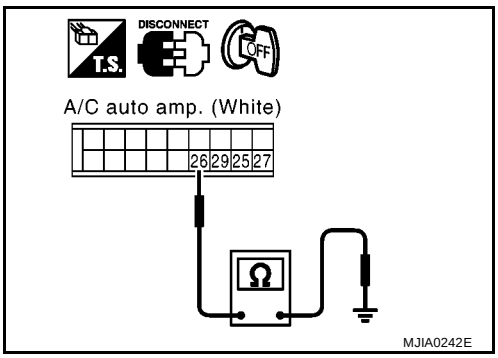
Connector terminal		Continuity
A/C auto amp.	Air mix door motor	
25	6	Yes
26	2	
27	5	
29	1	

Does continuity exist?

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

3. CHECK 2: CIRCUIT CONTINUITY

Check continuity between the ground and A/C auto amp. terminals 25, 26, 27, 29.



Connector terminal		Continuity
A/C auto amp.	Ground	None
25		
26		
27		
29		

OK or NG

OK >> Replace A/C auto amp.
NG >> Repair the harness and connector.

Magnetic Clutch System

EJS004IF

Symptom:

- The magnetic clutch does not operate when the A/C switch is turned to ON when the blower motor is operating.
- The magnetic clutch does not stop. Refer to PG-51, "Diagnosis of IPDM E/R Integrated Relay" .

1. CHECK INTAKE AIR TEMPERATURE SENSOR

Inspect the intake sensor using a self-diagnosis. Refer to ATC-33, "Self-Diagnosis Function" .

OK or NG

OK >> GO TO 2.
NG >> Repair or replace parts according to the inspection results.

2. CHECK WITH AUTO ACTIVE TEST MODE

Perform auto active test to make sure magnetic clutch operates. Refer to PG-42, "Auto Active Test" .

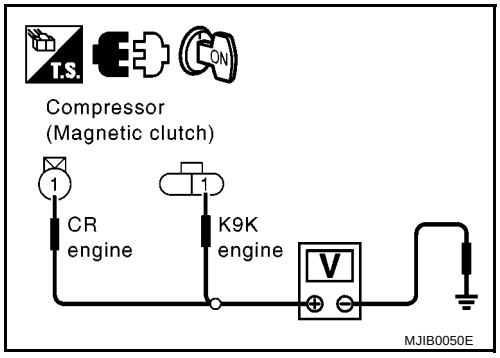
OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK MAGNETIC CLUTCH VOLTAGE

Disconnect compressor connector, turn ignition switch ON, and check voltage between compressor terminal 1 and ground.

Connector terminal		Voltage
Compressor	Ground	Approx. 12V
1		



OK or NG

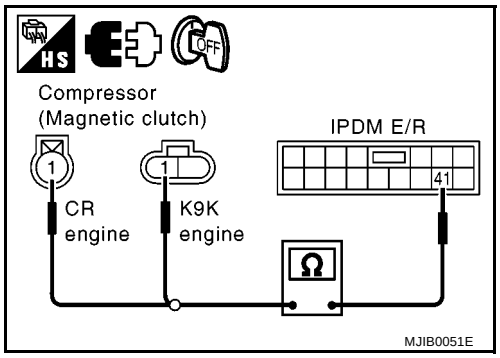
OK >>
- GO TO 5. (CR engine models)
- GO TO 6. (K9K engine models)

NG >> After Inspecting the Fuse (#41), GO TO 4. For Information Regarding the Fuse Block Layout, Refer to PG-4, "POWER SUPPLY ROUTING" .
- If fuse is OK, check for open circuit in harness.
- If a fuse is NG, determine the possible cause, repair circuit and replace blown fuse.

4. CHECK CIRCUIT CONTINUITY

1. Disconnect the IPDM E/R and compressor connectors.
2. Check continuity between IPDM E/R terminal 41 and compressor terminal 1.

Connector terminal		Continuity
IPDM E/R	Compressor	Yes
41	1	



Does continuity exist?

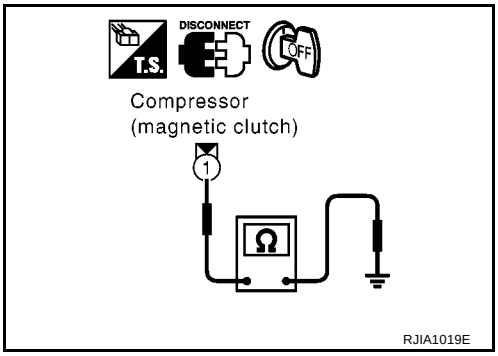
YES >>
- GO TO 5. (CR engine models)
- GO TO 7. (K9K engine models)

NO >> Repair harness or connector.

5. CHECK MAGNETIC CLUTCH

Disconnect compressor connector, and check continuity between terminals 1 and ground.

Connector terminal		Continuity
Compressor	Ground	Yes
1		



Does continuity exist?

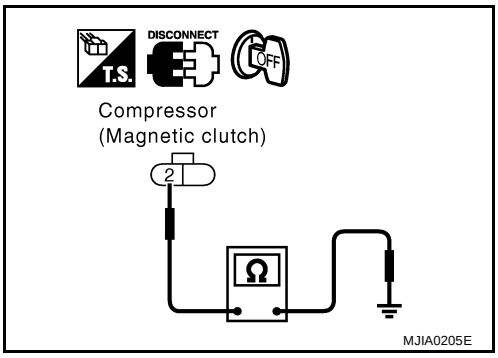
YES >> Apply battery voltage to magnetic clutch directly and check operation sound.
1. If inspection results are NG, replace magnetic clutch.
2. If magnetic clutch is normal, replace IPDM E/R.

NO >> Replace magnetic clutch.

6. CHECK GROUND CIRCUIT

Check continuity between compressor terminal 2 and ground.

Connector terminal		Continuity
Compressor	Ground	Yes
2		



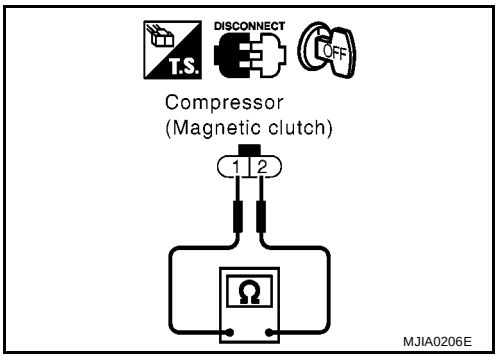
Does continuity exist?

Yes >> GO TO 7.
No >> Repair harness or connector.

7. CHECK MAGNETIC CLUTCH

Disconnect compressor connector, and check continuity between terminals 1 and 2.

Connector terminal		Continuity
Compressor		Yes
1	2	



Does continuity exist?

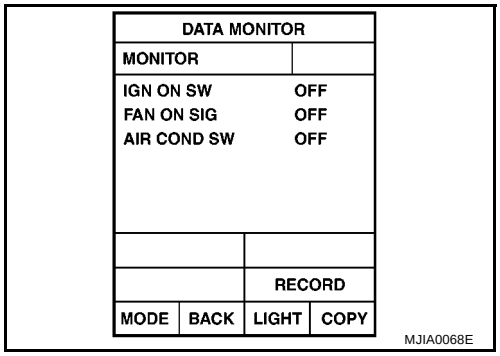
YES >> Apply battery voltage to magnetic clutch directly and check operation sound.
1. If inspection results are NG, replace magnetic clutch.
2. If magnetic clutch is normal, replace IPDM E/R.

NO >> Replace magnetic clutch.

8. CHECK BCM INPUT SIGNAL

With CONSULT-II

- Touch “BCM” → “AIR CONDITIONER” → “DATA MONITOR” → “ALL SIGNALS” and then check ON and OFF operation of compressor. Refer to BCS-22, "CONSULT-II Function (BCM)" .



Without CONSULT-II

- GO TO 10.

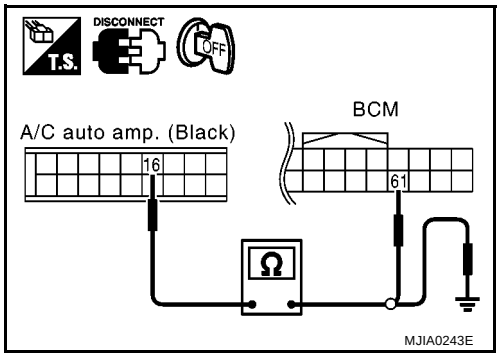
OK or NG

OK >> GO TO 12.
NG >> GO TO 9.

9. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. and BCM connectors.
2. Check continuity between A/C auto amp. terminal 16 and BCM terminal 61, and between A/C auto amp. terminal 16 and ground.

Connector terminal		Continuity
A/C auto amp.	BCM	
16	61	Yes
	Ground	None



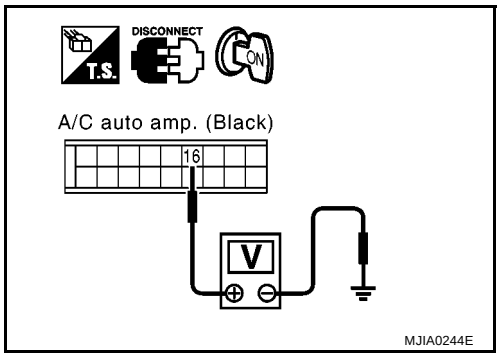
OK or NG

OK >> GO TO 10.
NG >> Repair harness or connector.

10. CHECK COMPRESSOR ON SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON, and check voltage between A/C auto amp. terminal 16 and ground.

Connector terminal		Voltage
A/C auto amp.	Ground	Approx. 5V
16		



OK or NG

OK >> GO TO 12.
NG >> Replace BCM.

11. CHECK REFRIGERANT PRESSURE SENSOR SIGNAL

With CONSULT-II

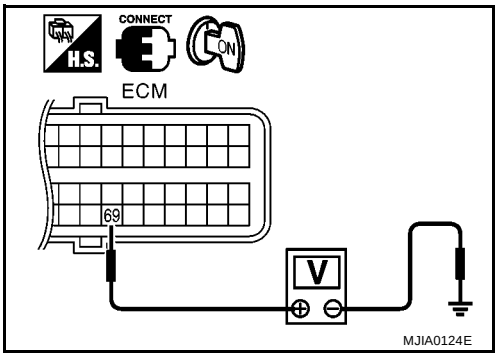
- Check refrigerant pressure sensor (touch “ENGINE” → “DATA MONITOR” → “SELECTION FROM MENU” → “AC PRESS SEN”) input voltage with data monitor.

AC PRESS SEN : Approx. 0.36 - 3.88V

Without CONSULT-II

- Check voltage between ECM terminal 69 and ground.

Connector terminal		Voltage
ECM	Ground	Approx. 0.36 - 3.88V
69		



OK or NG

OK >> GO TO 11.
NG >> GO TO EC-455, "REFRIGERANT PRESSURE SENSOR" (CR engine models) or EC-K9K-236, “Wiring Diagram — Refrigerant Pressure Sensor” (K9K engine models).

12. CHECK CAN COMMUNICATION CIRCUIT

Check the CAN communication between the BCM and ECM, and ECM and IPDM E/R. Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" , PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" .

OK or NG

OK >> Replace ECM.
NG >> Repair or replace parts based on the diagnosis results.

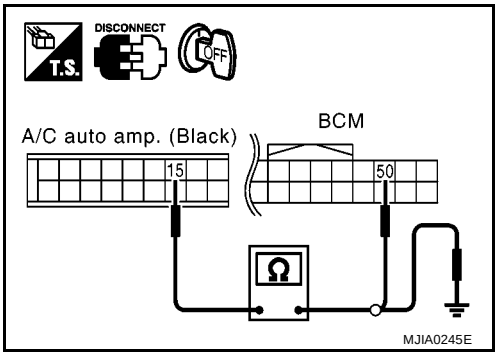
Check Fan ON Signal

EJS004IG

1. CHECK CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. and BCM connectors.
2. Check continuity between A/C auto amp. terminal 15 and BCM terminal 50, and between A/C auto amp. terminal 15 and ground.

Connector terminal		Continuity
A/C auto amp.	BCM	
15	50	Yes
	Ground	None



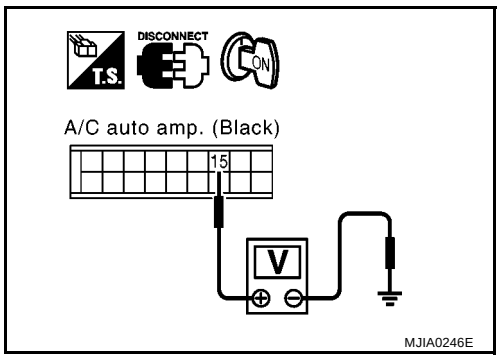
OK or NG

OK >> GO TO 2.
NG >> Repair harness or connector.

2. CHECK FAN ON SIGNAL

1. Disconnect BCM connector.
2. Turn ignition switch ON, and check voltage between A/C auto amp. terminal 15 and ground.

Connector terminal		Voltage
A/C auto amp.	Ground	Approx. 12V
15		



OK or NG

OK >> Replace A/C auto amp.
NG >> Replace BCM.

Insufficient Cooling

EJS004IH

CHECK FUNCTION (FOR CR ENGINE)

Inspection Procedure

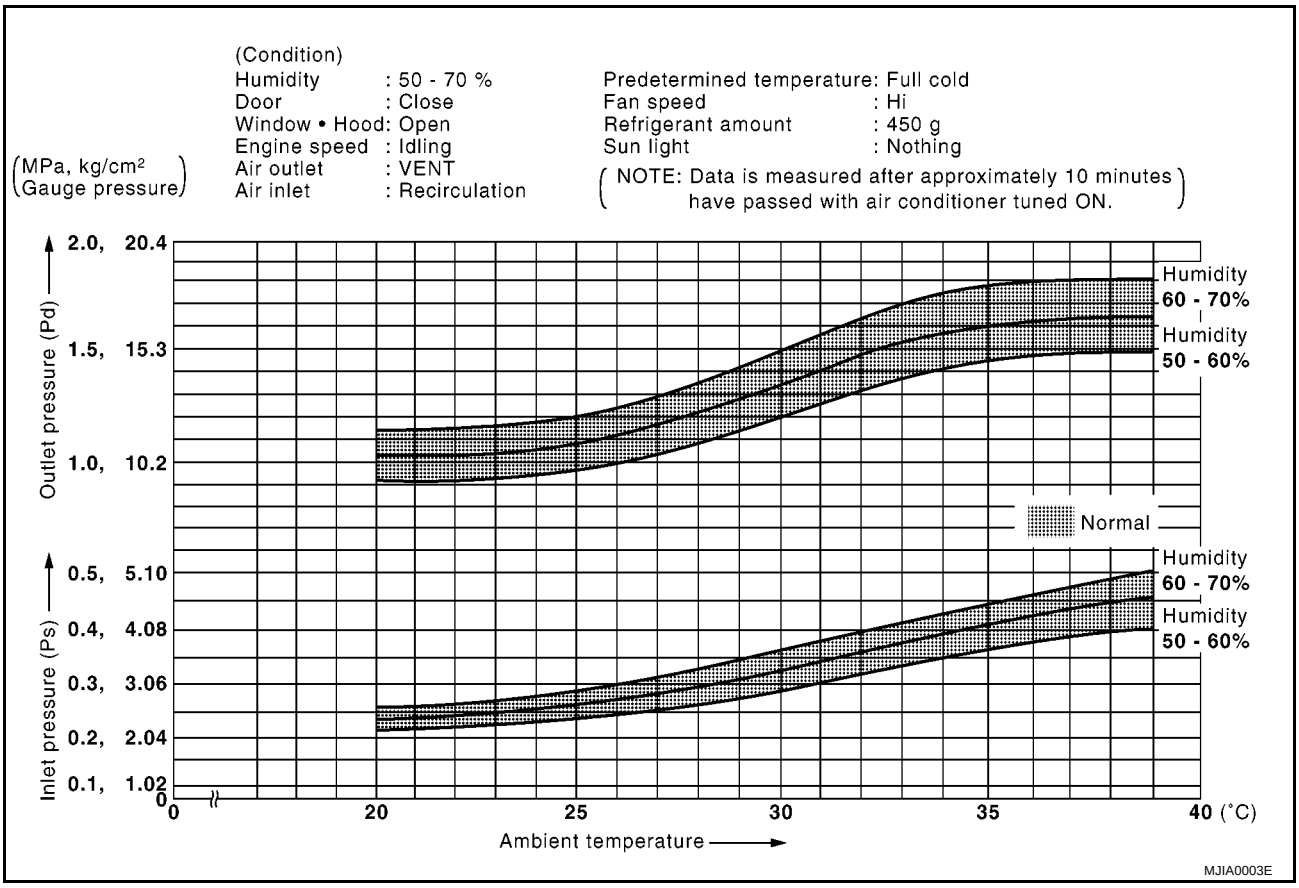
1. Connect manifold gauge to service valve of air conditioner system.
2. Attach a psychrometer to blower unit air inlet (under glove box). Attach a dry-bulb thermometer to right-center of ventilator grille.
3. Start and warm up the engine.
4. After warming-up engine, make sure engine speed is the specified idle speed.
5. Operate compressor. Adjust controller to match conditions below.

Fan speed : HI
Air inlet : Recirculation
Air outlet : Ventilator (VENT)
Predetermined temperature : FULL COLD

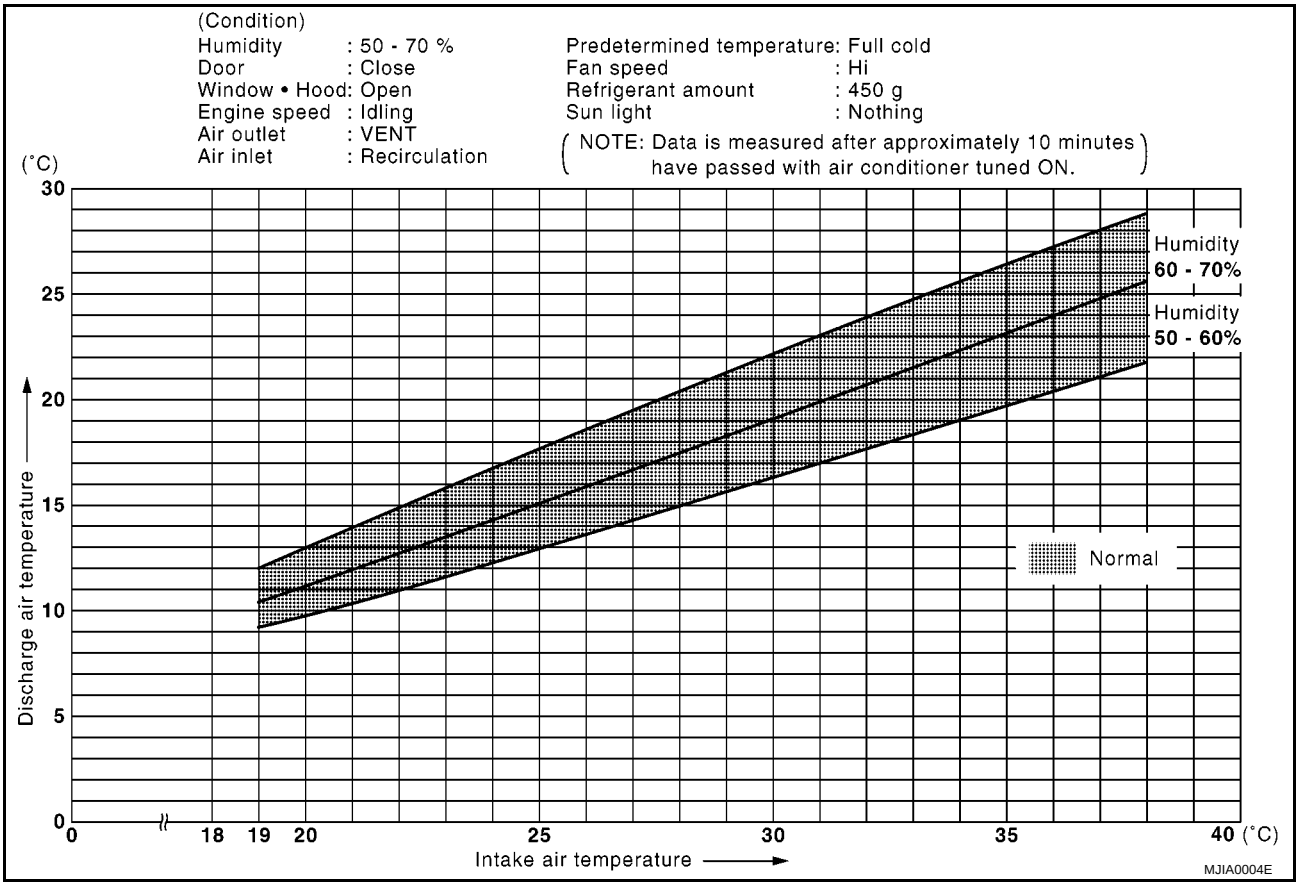
6. Fully open the hood and door windows, and close all the doors.
7. Keep this state until the air conditioner system becomes stable (after approximately 10 minutes).
8. Keep the engine speed at idle.
9. Measure the temperature and humidity at the air inlets, temperature at the air outlets, and the high-pressure and low-pressure of the air conditioner system, and compare them to “Ambient temperature - Pressure characteristic”, “Intake air temperature - Discharge air temperature characteristic” for estimating.

Performance Curve

Ambient temperature - Pressure characteristic



Intake air temperature - Discharge air temperature characteristics



DIAGNOSIS BY PRESSURE GAUGE

Connect a manifold gauge to service valve of air conditioner system, and determine faulty parts and possible causes by pressure in the air conditioning cycle, then troubleshoot.

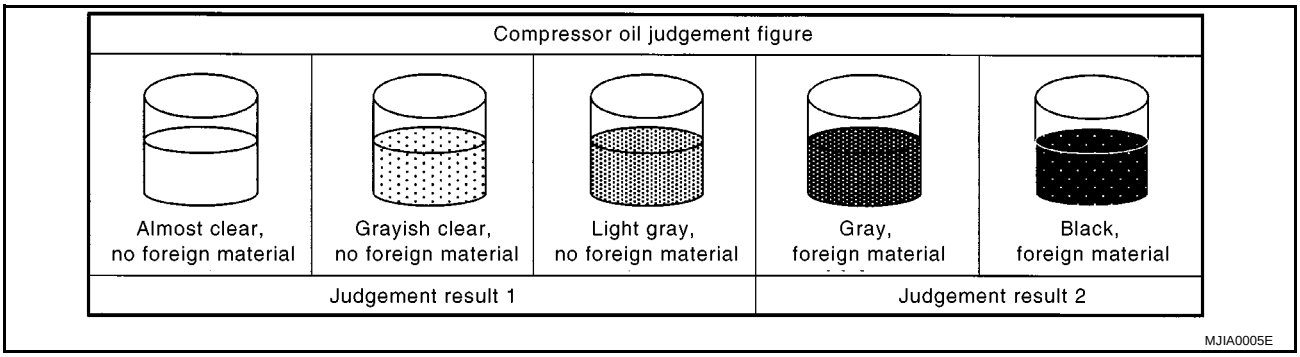
Symptom	Cycle status	Possible causes	Action
High-pressure and low-pressure are both high.	They return to normal when condenser is cooled with water.	Insufficient cooling of condenser ● Operation malfunction of radiator and condenser fan ● Improper installation of air guide ● Clogged condenser or dirty fins	● Repair or replace as necessary ● Clean and repair condenser fins.
		Excessively charged refrigerant	Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.
	When the compressor has been stopped, pressure drops quickly by approximately 2 kg/cm^2 , and then decreases gradually.	Mixed air in the air conditoner system	Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.
	Temperature at low-pressure pipe is lower than that at evaporator outlet, or low-pressure pipe becomes frosted.	Expansion valve opened too far (excessive refrigerant flow).	Replace expansion valve.
High-pressure is extremely high.	Temperature differences occur at points where high-pressure pipe is crushed or clogged.	Crushed points or clogs in high-pressure pipe between compressor and condenser	Repair or replace as necessary
High-pressure and low-pressure are both low (low-pressure occasionally becomes minus).	Evaporator outlet is not cold. Frost forms on evaporator inlet.	Expansion valve is blocked. ● Gas leakage around sensor unit. ● Clogged by foreign material	Remove foreign materials from expansion valve or replace expansion valve.
	Temperature differences occur at the top/bottom outlet and inlet of the liquid tank or the liquid tank becomes frosted.	Liquid tank inner malfunction	Replace liquid tank
	Evaporator becomes frosted.	Evaporator fins are clogged or crushed.	Repair or replace.
		Insufficient airflow	ATC-47, "Blower Motor System"
	Some temperature difference occurs between high-pressure and low-pressure pipes of the compressor.	Insufficient refrigerant amount	● Check for refrigerant leaks. ● Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.
Occasionally high-pressure becomes low, and low-pressure becomes minus.	Sometimes the evaporator outlet side does not become cold. Sometimes frost forms at the evaporator inlet.	Water mixed in cooler system. (Blockage caused by moisture freezing at the expansion valve.)	Discharge refrigerant completely, evacuate again to remove all moisture, and recharge with proper amount of refrigerant. Be certain to replace liquid tank.
High-pressure is low, and low-pressure is high.	The pressure equalizes soon after the compressor is stopped. There is no temperature difference between the compressor high-pressure piping and low-pressure piping.	Compressor malfunction (improper compression) ● Damage or breakage of valve ● Gasket worn or damaged	Replace compressor.

DIAGNOSIS OF COMPRESSOR

If there is a compressor unit malfunction (internal noise, insufficient cooling), follow table below and perform trouble diagnosis.

Symptom	Inspection Method	Checklist	Result	Action
Noise from compressor unit when A/C is ON. (rattling or rolling sound)	Air conditioner system internal pressure	Check with a manifold gauge.	Both high- and low-pressure sides are high. (Refer to Note 2)	Recharge with proper amount of refrigerant.
			High/low-pressures hunt. (Refer to Note 2)	Replace compressor only.
	Check compressor oil condition.	Sample compressor oil and judge.	Refer to the criteria shown in compressor lubricant.	Diagnostic result 1: Replace compressor only. Judgement results 2: Compressor and liquid tank replacement
Insufficient cooling (Refer to Note 1)	Compressor body	Check rotation of compressor. If seized or stuck, sample compressor oil and judge.		
	Air conditioner system internal pressure	Check with a manifold gauge. If the difference between high-pressure and low-pressure is small or if they are almost the same, sample compressor oil and judge.		
Outlet air temperature rises temporarily while driving. (Refer to Note 2)	—	—	—	Replace compressor only.

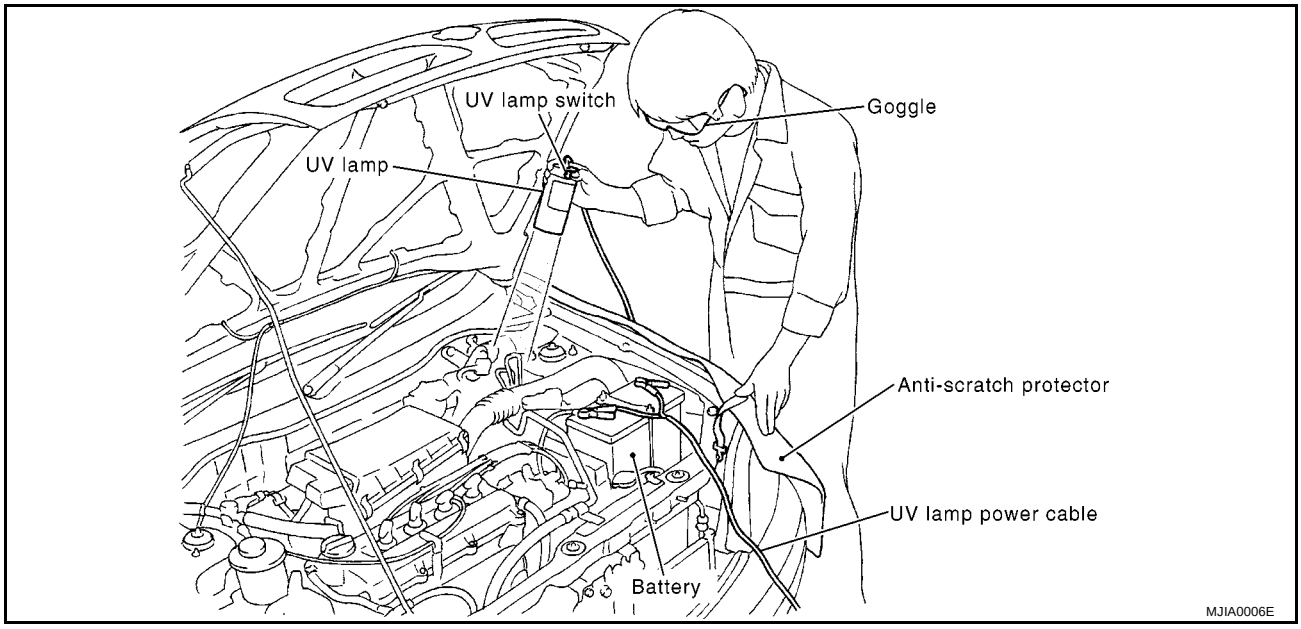
Note 1: First conduct inspection according to trouble diagnosis for each malfunction. Refer to ATC-19, "DIAGNOSIS CHART BY SYMPTOM" .
Note 2: Applicable to variable capacity compressor only.



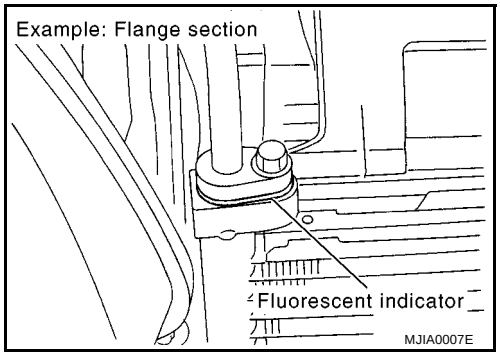
Detecting Leaks With Fluorescent Indicator

EJS004II

METHOD FOR DETECTING REFRIGERANT LEAKAGE.



1. Wear goggles provided with the fluorescent detector.
2. Connect the UV lamp power cable to the negative battery terminal.
3. Press UV lamp switch. Check for air conditioner system leaks. (Light green fluorescent will appear at the leak.)
4. Repair or replace parts with refrigerant leaks and wipe off the fluorescent indicator.



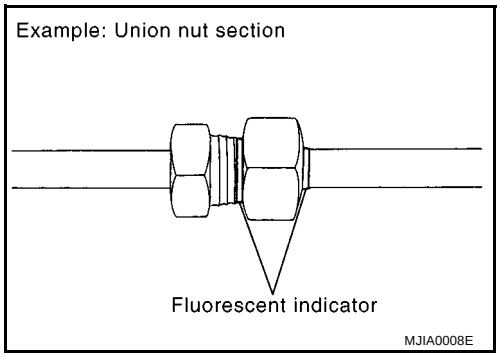
CAUTION:

Completely wipe off all fluorescent indicators. Use a cotton swab or something similar to remove indicator from gaps between parts, screw threads, and similar places.

5. After finishing work, use a UV lamp to make sure no fluorescent indicator remains.

CAUTION:

- **Do not look directly into the UV lamp light source.**
- **For continuous operating time of UV lamp and other details, follow the Operation Manual when performing the operation.**
- **Dust, dirt, and adhesive of packing materials used in condenser, evaporator, and other locations may fluoresce. Be careful to avoid misidentifying leaks.**



Inspection Procedure

- Shine UV lamp on pipe joints from different angles to make sure there are no leaks.
- Use a cotton swab or something similar to wipe water off of drain hoses. By shining UV lamp, a check can also be made to detect leaks from evaporator.
- Use a mirror to check for refrigerant leaks in difficult to see areas.

CONTROL UNIT

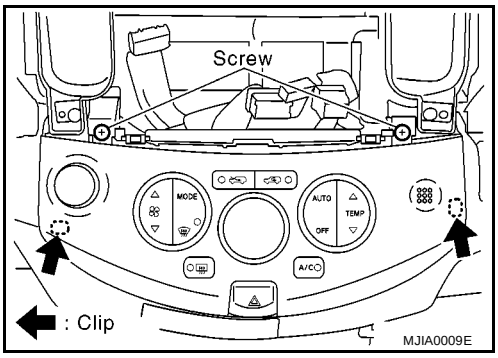
PFP:27500

Removal and Installation

EJS004IJ

REMOVAL

1. Remove cluster lid “C”. Refer to IP-7, "K. Cluster Lid C" .
2. Remove two screws and two clip, then remove controller.

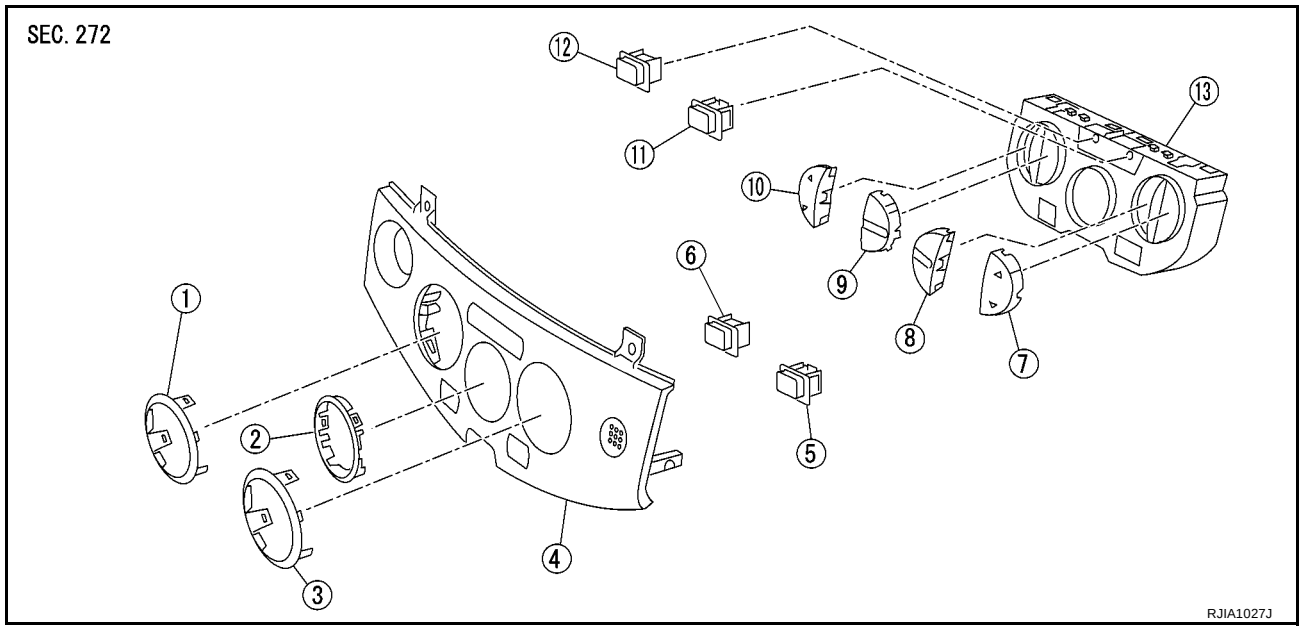


INSTALLATION

Install in the reverse order of removal.

Disassembly and Assembly

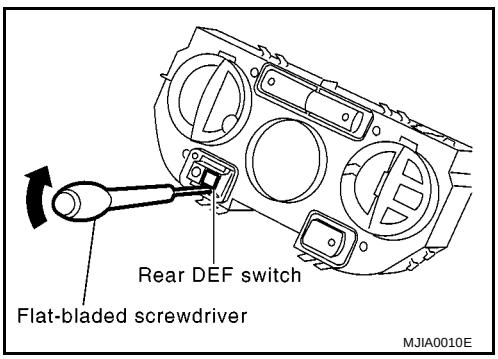
EJS004IK



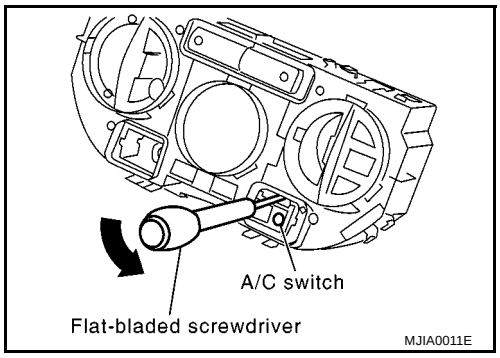
1. MODE ring
2. LCD ring
3. TEMP ring
4. Air conditioner finisher
5. A/C switch
6. Rear DEF switch
7. TEMP switch
8. AUTO switch
9. MODE switch
10. FAN switch
11. REC switch
12. FRE switch
13. Controller assembly

NOTE:

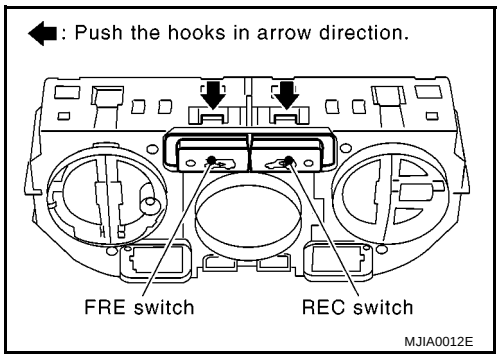
After removing the rear DEF switch, use a flat bladed screwdriver to push the hooks in the arrow direction, and then remove the rear DEF switch.



NOTE:
After removing the A/C switch, use a flat bladed screwdriver to push the hooks in the arrow direction, and then remove the A/C switch.



NOTE:
Use a flat bladed screwdriver to push the hooks in the arrow direction, and then remove the FRE and REC switch.



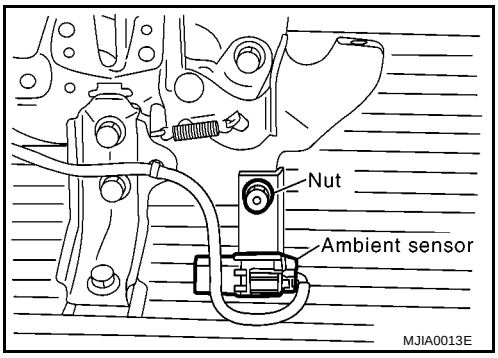
AMBIENT SENSOR

PFP:27722

Removal and Installation

EJS004IL

1. Remove the front grille (LH). Refer to EI-8, "FRONT GRILLE" .
2. Remove the nut and then remove the ambient sensor.



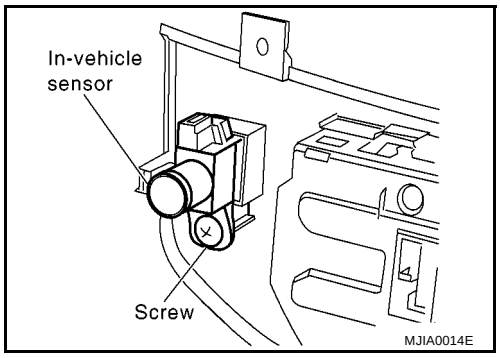
IN-VEHICLE SENSOR

PFP:27720

Removal and Installation

EJS004IM

1. Remove the controller. Refer to ATC-63, "CONTROL UNIT" .
2. Remove the screw and the remove the in-vehicle sensor.



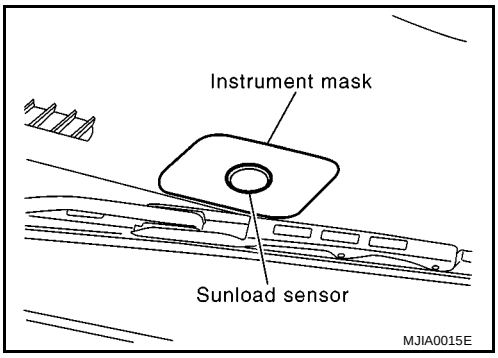
SUNLOAD SENSOR

PFP:27721

Removal and Installation

EJS004IN

1. Remove the instrument mask. Refer to IP-4, "Component Parts Location" .
2. Remove the sunload sensor.



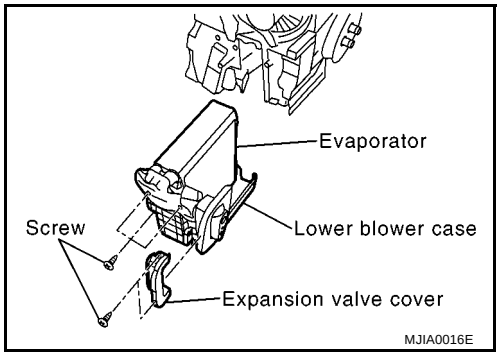
INTAKE SENSOR

PFP:27723

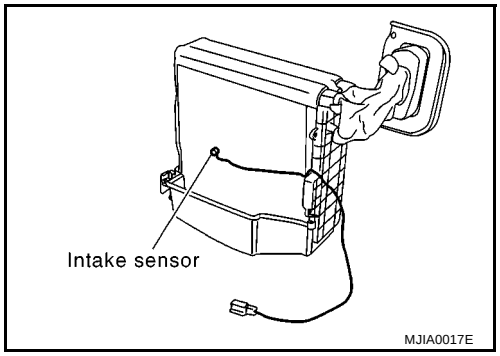
Removal

EJS004IO

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove the A/C unit. Refer to ATC-69, "A/C UNIT ASSEMBLY" .
3. Remove the air conditioner filter, mode door actuator, and foot duct (RH). Refer to ATC-75, "AIR CONDITIONER FILTER" , ATC-77, "MODE DOOR MOTOR" , ATC-83, "FOOT DUCT" .
4. Remove the lower blower case and expansion valve cover.



5. Slide the evaporator and door blower case downward, and remove the intake sensor.



Installation

EJS004IP

CAUTION:

- **Replace the low-pressure and high-pressure flexible hoses and high-pressure pipe O-rings with new ones. Apply compressor lubricant to them during installation.**
- **When replacing the intake air temperature sensor, install the intake sensor thermistor in the same position as the removed intake sensor.**
- **When removing and installing the intake sensor, do not rotate the thermistor insertion part.**
- **After charging with refrigerant, check for refrigerant leaks.**
- **After installing actuator, reset zero position by following Self-Diagnosis Step 3. Refer to ATC-33, "Self-Diagnosis Function" .**

Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.

Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6kg-m, 26 - 52 in-lb)

A/C UNIT ASSEMBLY

PFP:27210

Removal and Installation

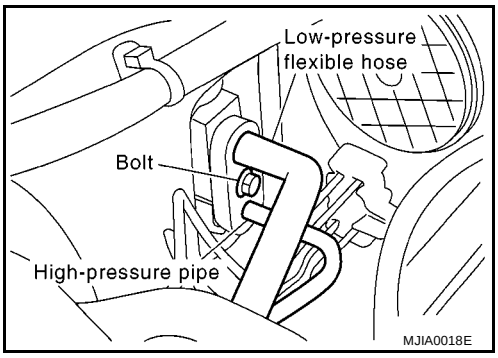
EJS004IQ

REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Drain engine coolant.
3. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.

CAUTION:

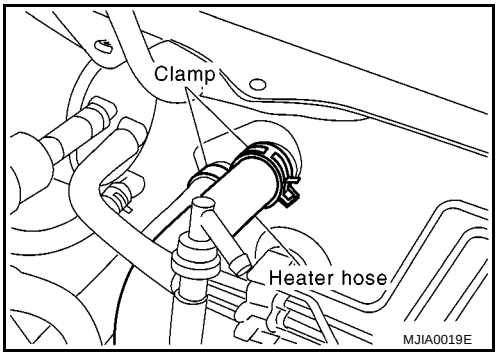
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



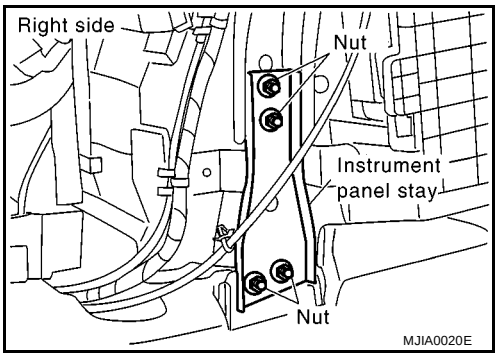
4. Pull out the heater hoses from the heater core.

CAUTION:

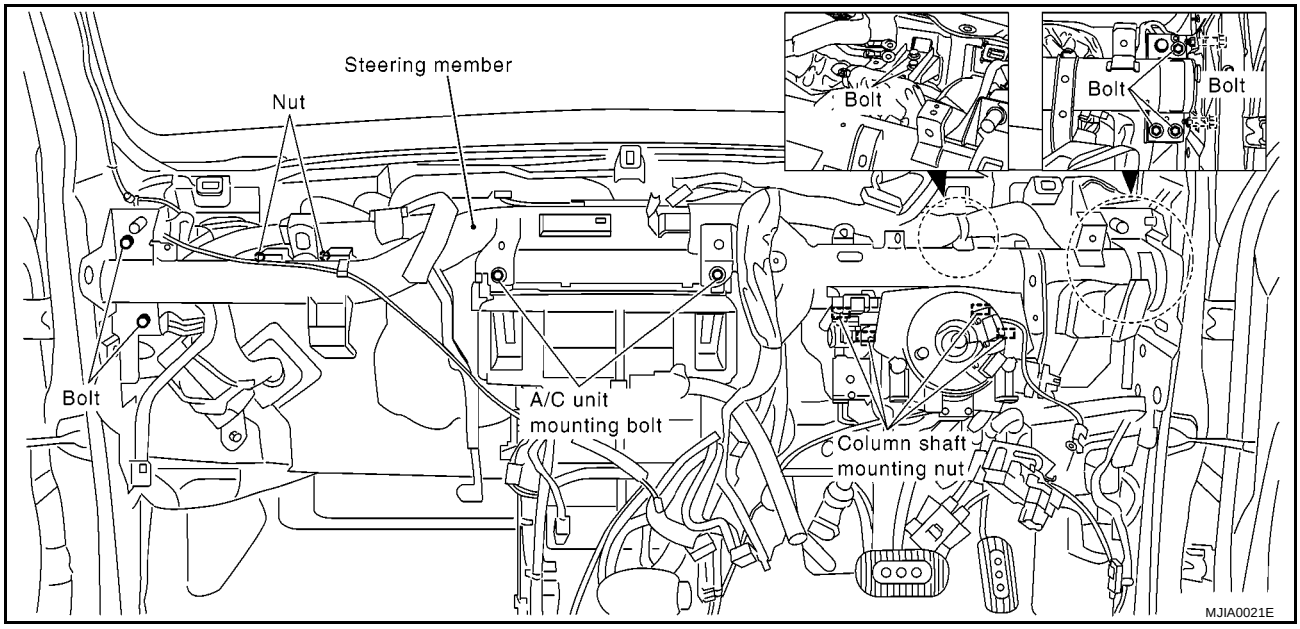
- **Some coolant may spill when heater hoses are disconnected.**
- **Close off the coolant inlet and outlet on the heater core (2 locations) with shop cloths.**



5. Remove instrument panel. Refer to IP-5, "Removal and Installation" .
6. Remove the vehicle harness clips and then remove the instrument panel stay.



NOTE:
This illustration is for RHD model. The layout for LHD model is symmetrically opposite.



7. Remove the ventilator duct mounting screws and clips.
8. Remove the two A/C unit mounting bolts, nine steering member mounting bolts, four column shaft mounting bolts, and the harness clips.
9. Remove the BCM. Refer to BCS-3, "BCM (BODY CONTROL MODULE)" .
10. Remove the steering member, and then remove the A/C unit.

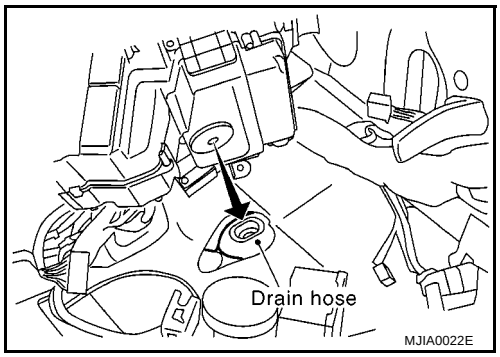
INSTALLATION

CAUTION:

- **Replace all O-rings on the pipes with new ones. Apply a coat of compressor lubricant prior to installation.**
- **After charging with refrigerant, check for refrigerant leaks.**

1. Install the A/C unit.

   CAUTION:
   Confirm that the A/C unit drain and drain hose positions match up.

   A/C unit mounting bolt.
   Tightening torque : 5.98 - 7.65 N·m (0.61 - 0.78 kg-m, 53 - 67 in-lb)

2. Perform removal steps 3 through 10 in reverse order.

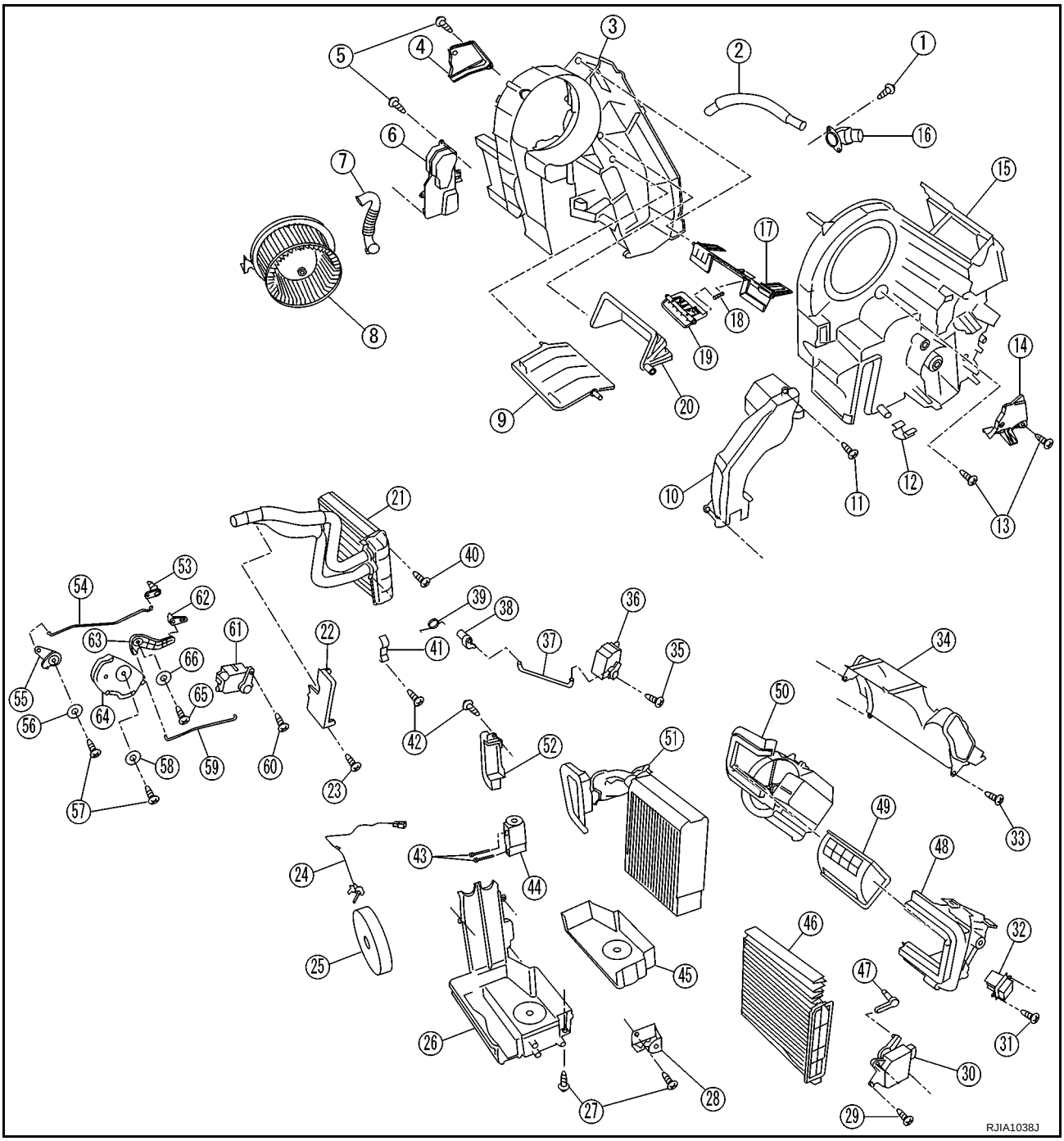
   Steering member mounting nut and bolt
   Tightening torque :11 - 13 N·m (1.1 - 1.4 kg-m, 8.2 - 9.5 ft-lb)

   Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.
   Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6kg-m, 26 - 52 in-lb)

3. Fill engine coolant.
4. Charge refrigerant using refrigerant recovery unit (for HFC134a).

Disassembly and Assembly

EJS004IR



1. Screw
2. Aspirator duct
3. Blower case (RH)
4. Cover (RH)
5. Screw
6. Foot duct (RH)
7. Coolant hose
8. Blower motor
9. Air mix door
10. Foot duct (LH)
11. Screw
12. Clips
13. Screw
14. Cover (LH)
15. Blower case (LH)
16. Aspirator
17. Vent door
18. DEF rod
19. DEF door
20. Foot door
21. Heater core
22. Heater pipe cover
23. Screw
24. Intake sensor
25. Heater pipe packing
26. Lower blower case
27. Screw
28. Bracket
29. Screw
30. Intake door motor
31. Screw
32. Fan control amp.
33. Screw
34. Attachment case
35. Screw
36. Air mix door motor

37. Air mix door rod	38. Air mix door lever	39. Spring
40. Screw	41. Heater pipe clip	42. Screw
43. Bolt	44. Expansion valve	45. Insulator
46. Air conditioner filter	47. Intake link	48. Intake case (LH)
49. Intake door	50. Intake case (RH)	51. Evaporator
52. Expansion valve cover	53. Vent DEF lever	54. Vent DEF rod
55. Vent DEF link	56. Washer	57. Screw
58. Washer	59. Mode door rod	60. Screw
61. Mode door motor	62. Foot lever	63. Foot link
64. Main link	65. Screw	66. Washer

CAUTION:

After installing actuator, reset zero position by following Self-Diagnosis Step 3. Refer to ATC-33, "Self-Diagnosis Function" .

HEATER CORE

PFP:27140

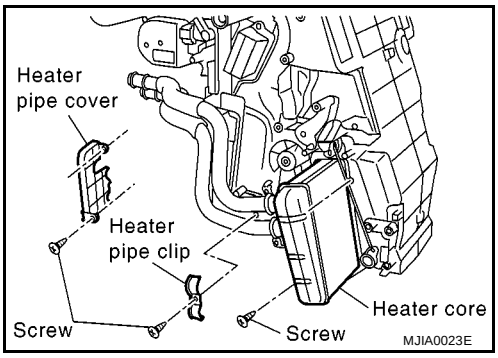
Removal and Installation

EJS004IS

REMOVAL

1. Remove the A/C unit. Refer to ATC-69, "A/C UNIT ASSEMBLY" .
2. Remove the foot duct (LH), two screws, and heater pipe cover.
3. Remove the mode door actuator, main link, and vent DEF link.

   CAUTION:
   After installing actuator, reset zero position by following Self-Diagnosis Step 3. Refer to ATC-33, "Self-Diagnosis Function" .
4. Remove the heater pipe clip, and then pull out heater core from the A/C unit.



INSTALLATION

Install in the reverse order of removal.

BLOWER MOTOR

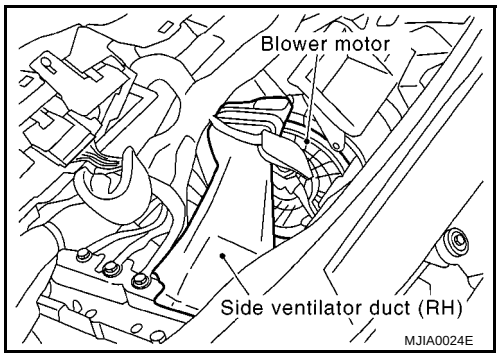
PFP:27226

Removal and Installation

EJS004IT

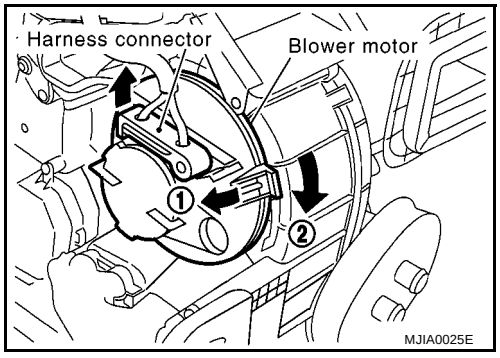
REMOVAL

1. Remove instrument panel. Refer to IP-5, "Removal and Installation" .
2. Remove the side ventilator duct (RH). Refer to ATC-82, "SIDE VENTILATOR DUCT" .



3. Disconnect the harness connector, and remove the blower motor.

CAUTION:
When the blower fan and blower motor are assembled, the balance is adjusted, so do not replace the individual parts.



INSTALLATION

Install in the reverse order of removal.

CAUTION:
Correctly install the blower motor flange holding hooks in the air conditioner unit.

AIR CONDITIONER FILTER

PFP:27277

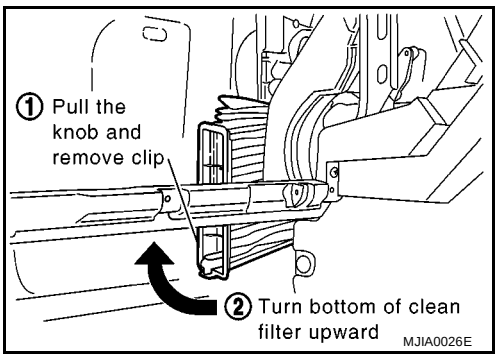
Removal, Replacement and Installation

EJS004IU

REMOVAL

NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Compress the air conditioner filter downward while sliding it to the out side of the vehicle.
3. Turn the bottom of the air conditioner filter upward, and then remove it.

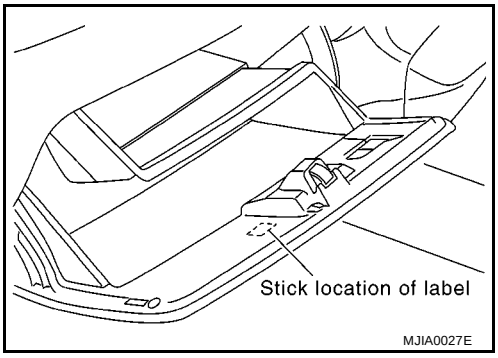


REPLACEMENT

NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

Air conditioner filter Replacement interval : Once a year or every 12,000 km

Fill in the necessary information on the label, and stick it on the inside of the glove box as shown in the figure.



INSTALLATION

Install in the reverse order of removal.

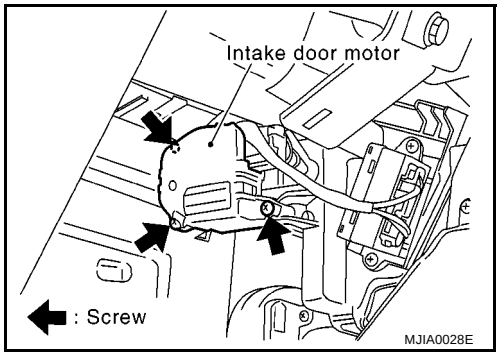
INTAKE DOOR MOTOR

PFP:27730

Removal and Installation

EJS004IV

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the three screws and then remove the intake door motor.



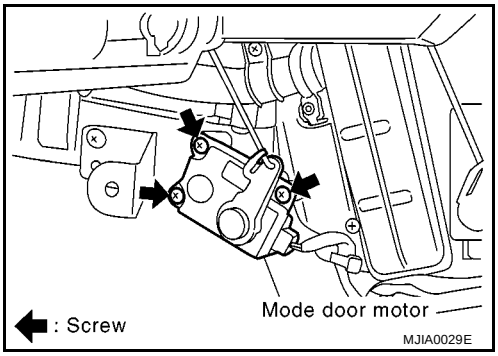
MODE DOOR MOTOR

PFP:27731

Removal and Installation

EJS004IW

1. Remove the instrument panel stay cover. Refer to IP-8, "M. Instrument Panel Stay Cover" .
2. Remove the three screws and then remove the mode door motor.



CAUTION:

After installing actuator, reset zero position by following Self-Diagnosis Step 3. Refer to ATC-33, "Self-Diagnosis Function" .

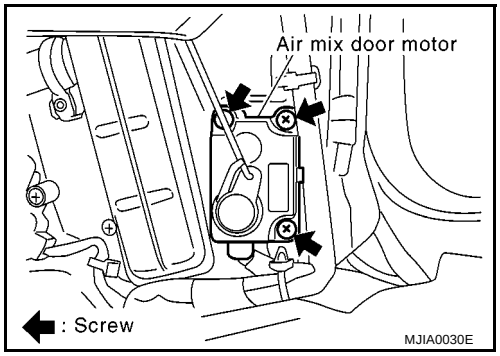
AIR MIX DOOR MOTOR

PFP:27732

Removal and Installation

EJS004IX

1. Remove the instrument panel stay cover. Refer to IP-8, "M. Instrument Panel Stay Cover" .
2. Remove the three screws and then remove the air mix door actuator.



CAUTION:

After installing actuator, reset zero position by following Self-Diagnosis Step 3. Refer to ATC-33, "Self-Diagnosis Function" .

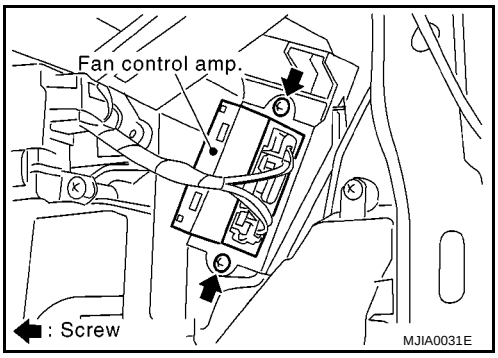
FAN CONTROL AMPLIFIER

PFP:27761

Removal and Installation

EJS004IY

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the two screws and then remove the fan control amp.



DUCTS AND GRILLES

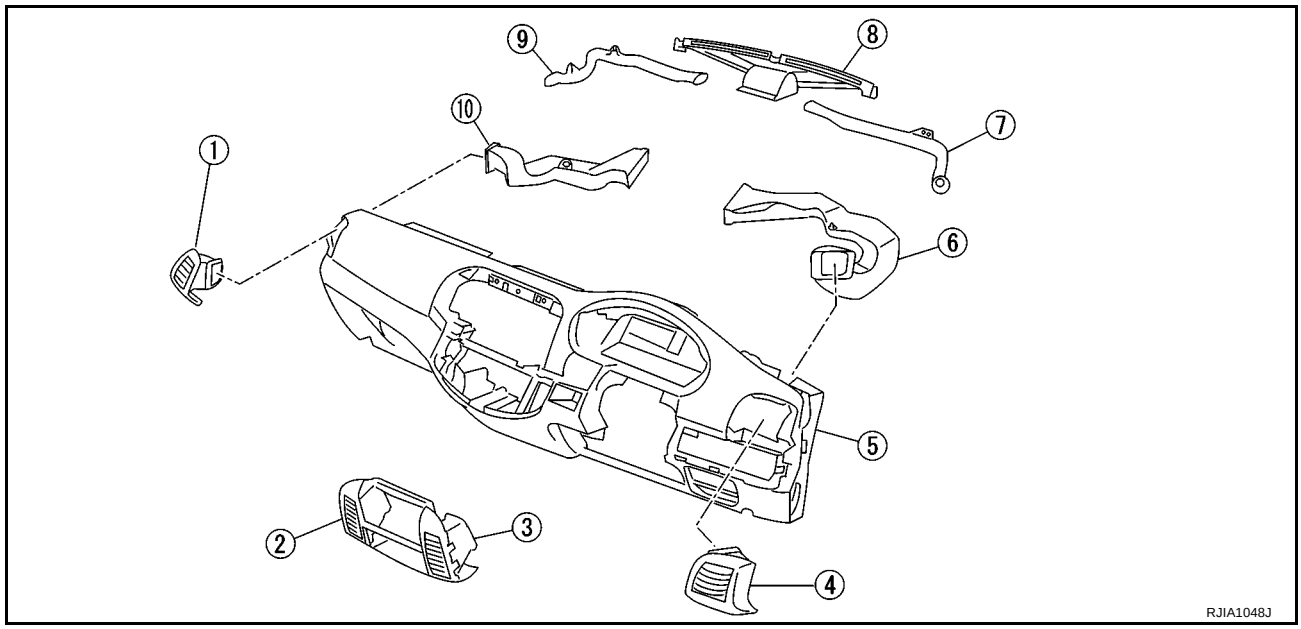
PFP:27860

Removal and Installation

EJS004IZ

COMPONENT PARTS LOCATION

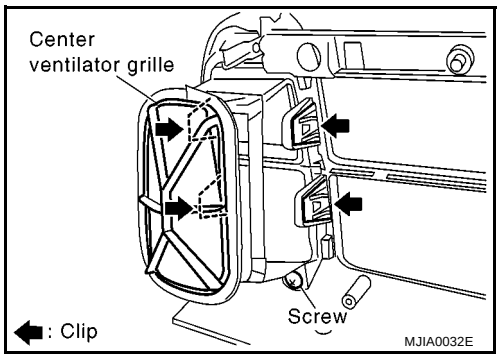
NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.



1. Side ventilator grille (passenger side)
2. Central ventilator grille (passenger side)
3. Central ventilator grille (driver side)
4. Side ventilator grille (driver side)
5. Instrument panel
6. Side ventilator duct (driver side)
7. Side defroster duct (driver side)
8. Defroster nozzle
9. Side defroster duct (passenger side)
10. Side ventilator duct (passenger side)

CENTRAL VENTILATOR GRILLE

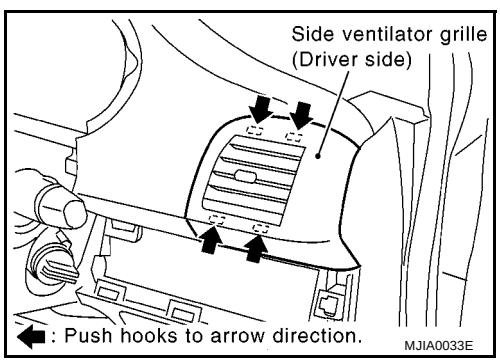
1. Remove cluster lid “C”. Refer to IP-7, "K. Cluster Lid C" .
2. Remove the audio. Refer to AV-3, "AUDIO" , AV-17, "NAVIGATION SYSTEM" .
3. Remove the center ventilator grille.



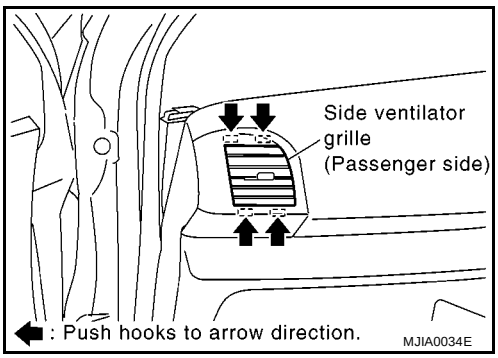
SIDE VENTILATOR GRILLE

NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .
2. Remove the switch panel finisher. Refer to IP-6, "E. Switch Panel Finisher" .
3. Remove the side ventilator grille (driver side) hooks from the back side of the instrument panel, and then remove the side ventilator grille (driver side).
4. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .



5. Remove the side ventilator grille (passenger side) hooks from the back side of the instrument panel, and then remove the side ventilator grille (passenger side).

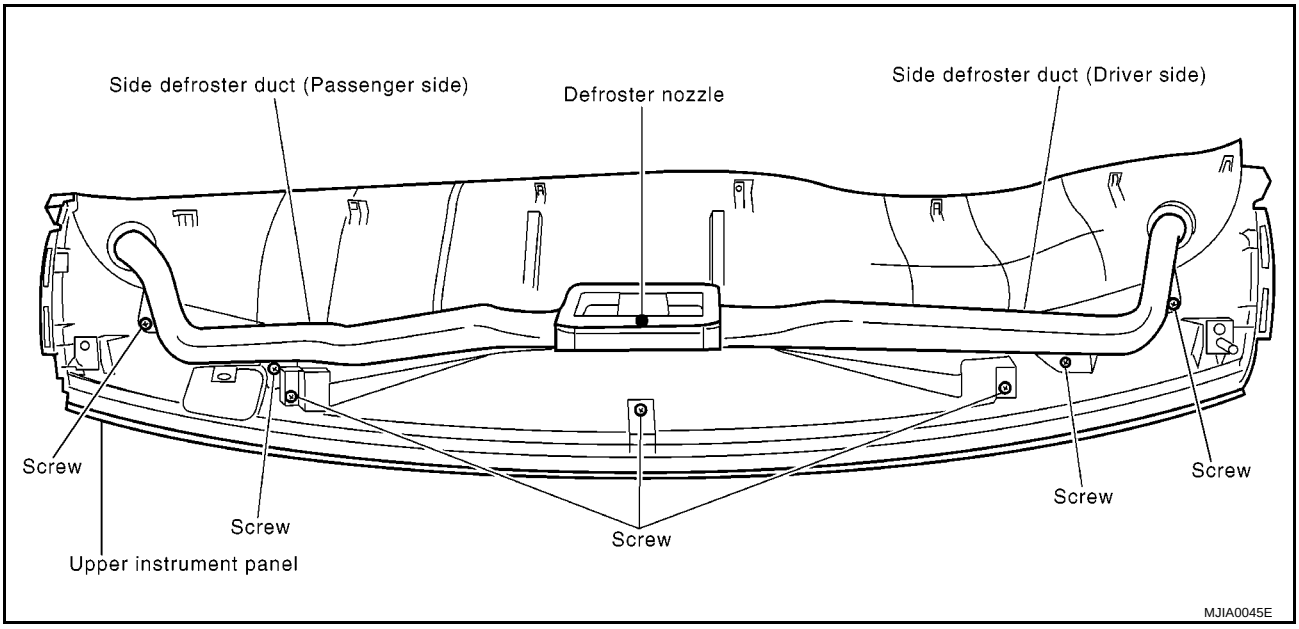


DEFROSTER NOZZLE AND DUCT

NOTE:

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .



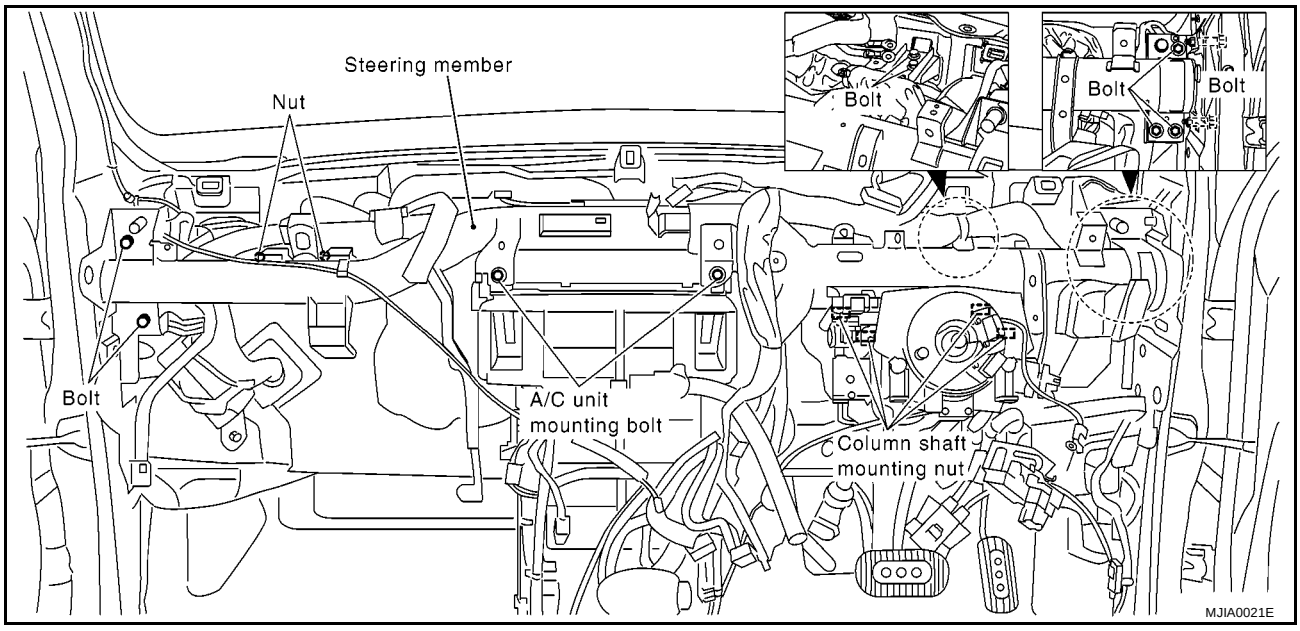
2. Remove the side defroster ducts and defroster nozzles from the upper instrument panel.

SIDE VENTILATOR DUCT

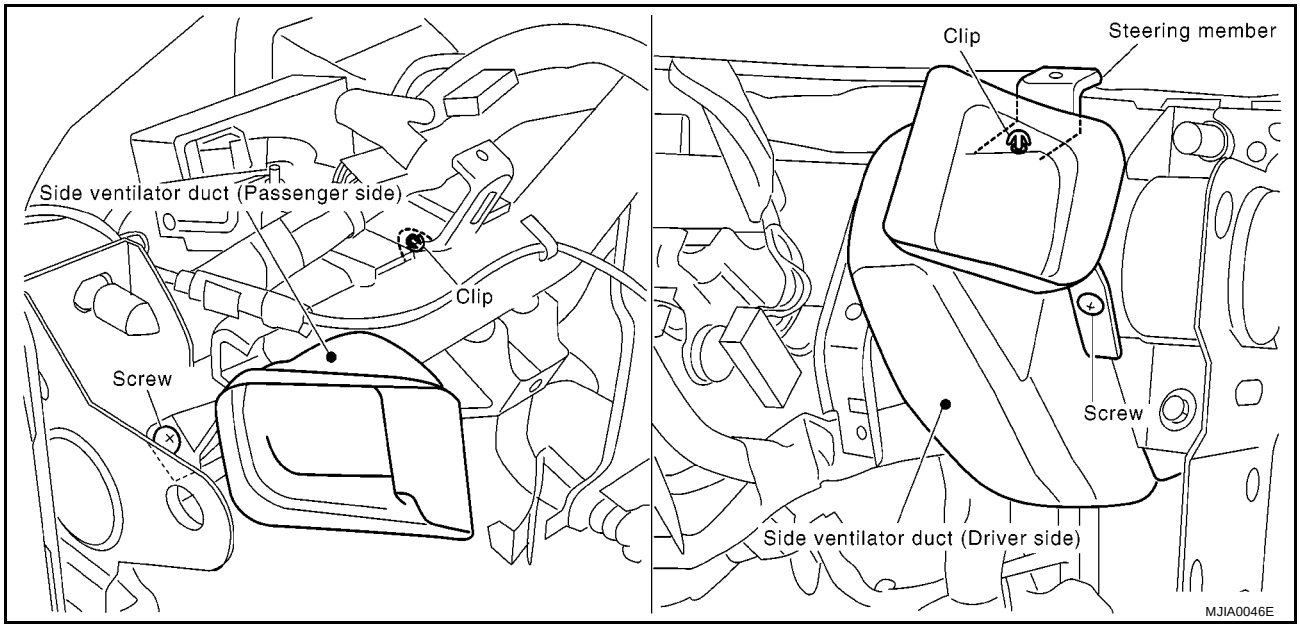
NOTE:

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the side ventilator duct (passenger side).
3. Remove instrument panel. Refer to IP-5, "Removal and Installation" .
4. Remove the BCM. Refer to BCS-3, "BCM (BODY CONTROL MODULE)" .
5. Remove the two A/C unit mounting bolts, nine steering member mounting bolts, four column shaft mounting bolts, and the harness clips.



6. Remove the steering member, and then remove the side ventilator duct (driver side).

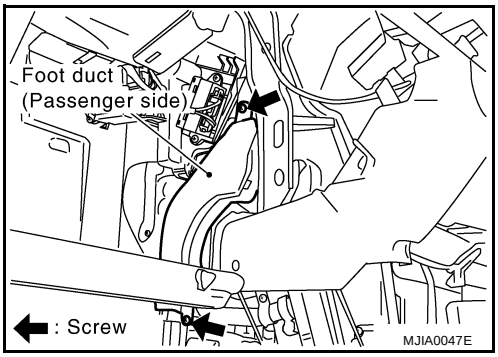


Steering member mounting nut and bolt

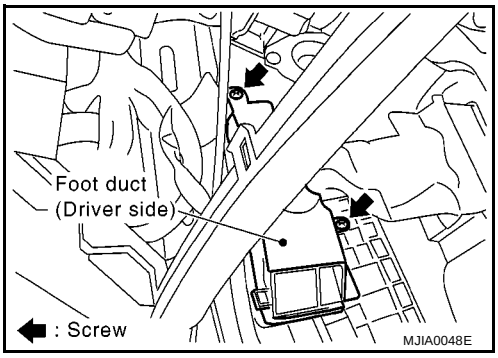
Tightening torque :11 - 13 N·m (1.1 - 1.4 kg-m, 8.2 - 9.5 ft-lb)

FOOT DUCT

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the two screws and then remove the food duct (passenger side).



3. Remove the instrument under tray. Refer to IP-6, "D. Instrument Panel Under Tray" .
4. Remove the two screws and intake sensor connector, and then remove the foot duct (driver side).



REFRIGERANT LINES

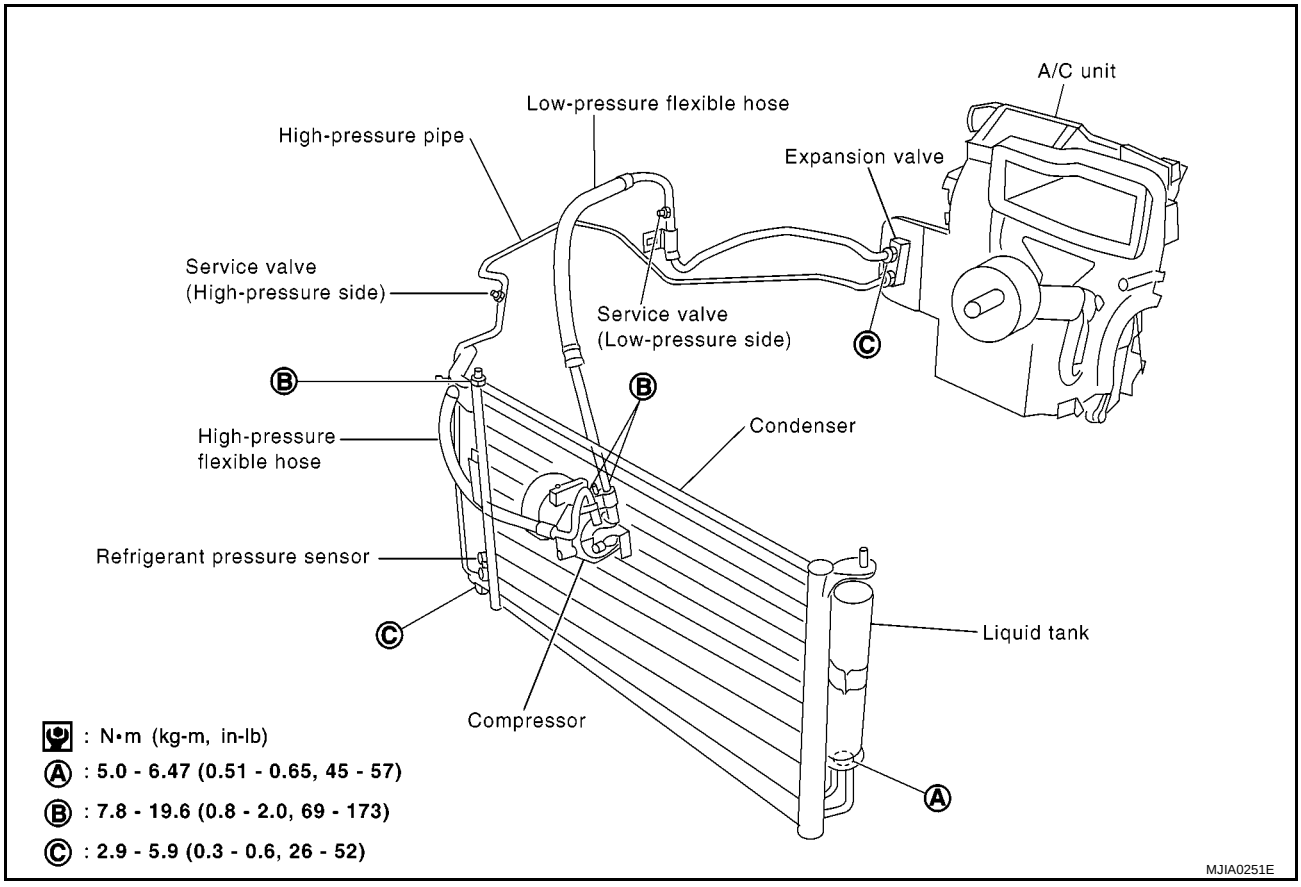
PFP:92600

Component Parts Location

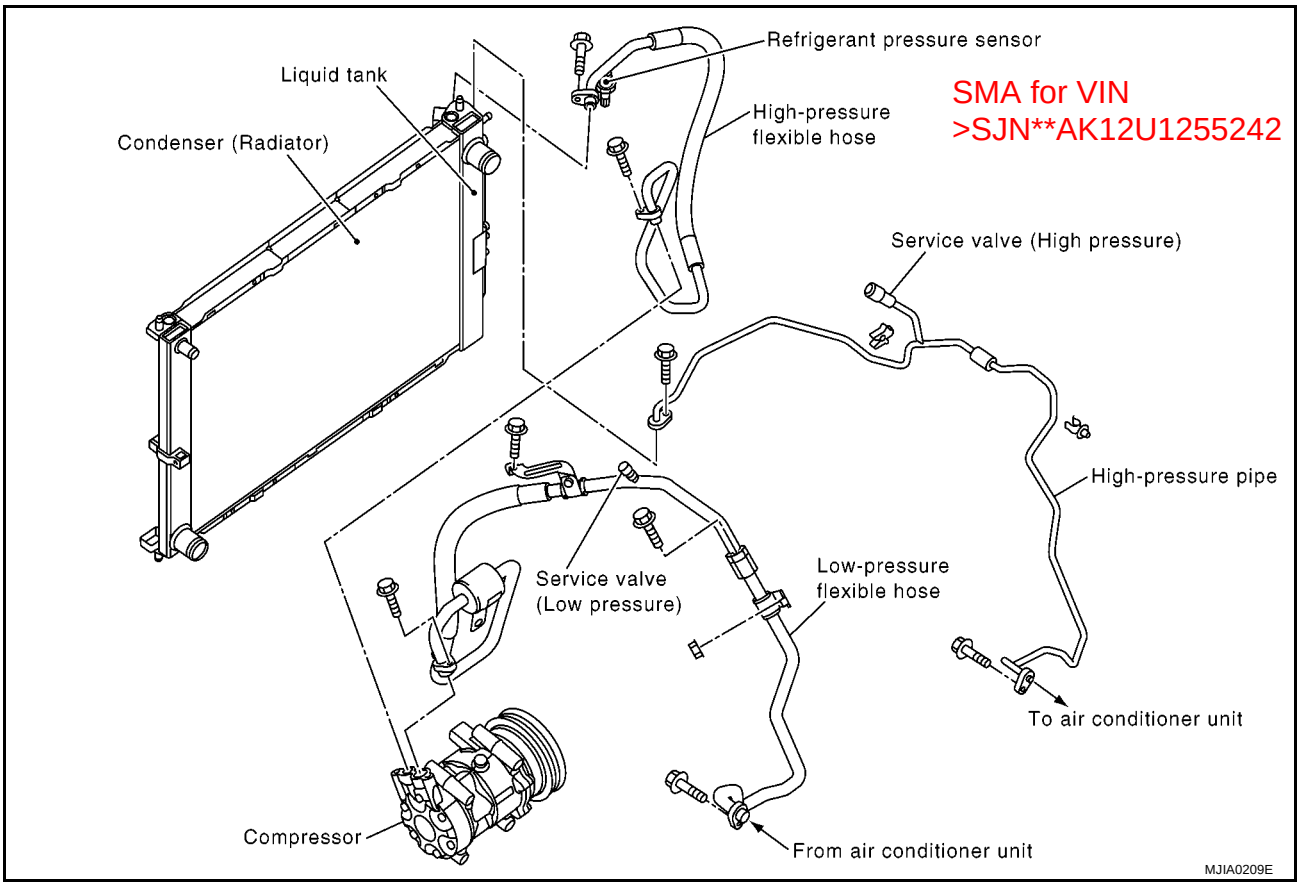
EJS004J0

SMA for VIN >SJN**AK12U1255242

CR ENGINE MODELS



K9K ENGINE MODELS



Removal and Installation for Compressor

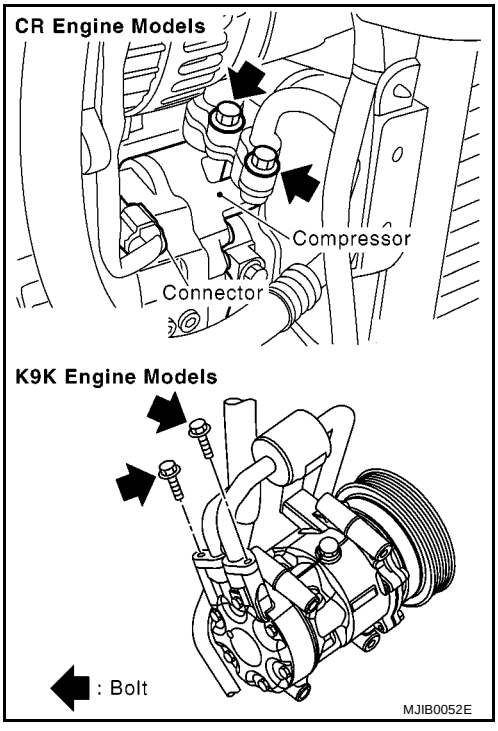
EJS004J1

REMOVAL

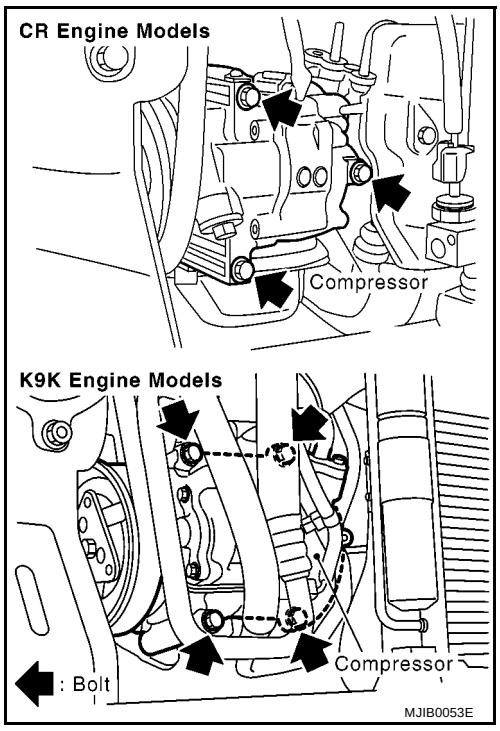
1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Disconnect compressor connector.
4. Remove the high-pressure and low-pressure flexible hose mounting bolts, and then disconnect the high-pressure and low-pressure flexible hose from the compressor.

CAUTION:

- **Cover the compressor high and low-pressure ports with caps to keep the lubricant from spilling.**
- **Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.**



5. Remove the air conditioner compressor belt and alternator belt. Refer to EM-12, "DRIVE BELTS" .
6. Remove compressor mounting bolts.
7. Remove the compressor from under the vehicle.



INSTALLATION

CAUTION:

- **Replace O-rings on high-pressure and low-pressure flexible hoses with new ones. Apply compressor oil when installing new O-rings.**
- **After installing the air conditioner compressor and alternator belt, adjust the belt tension. Refer to EM-12, "DRIVE BELTS" .**
- **When charging refrigerant, check for refrigerant leaks.**

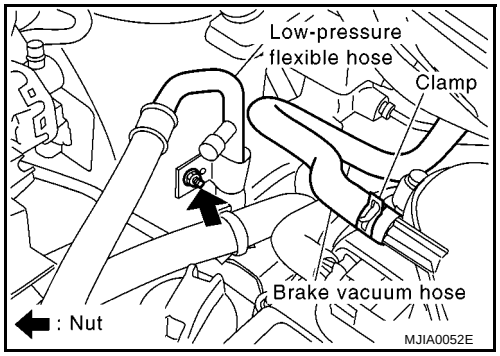
Compressor mounting bolt
Tightening torque : 16.6 - 23.5 N·m (1.7 - 2.3 kg-m, 13 - 17 ft-lb)
High-pressure flexible hose mounting bolt
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 69 - 173 in-lb)
Low-pressure flexible hose mounting bolt
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 69 - 173 in-lb)

Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models)

EJS004J2

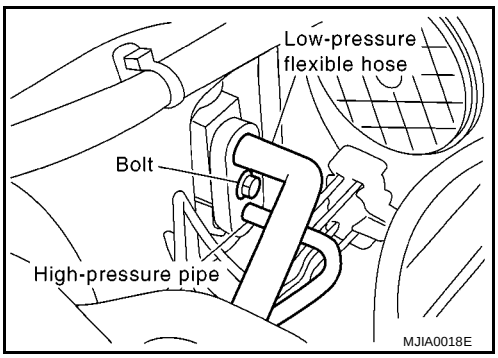
REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove the low-pressure flexible hose bracket mounting nut.
4. Remove the brake vacuum hose from the air cleaner case.



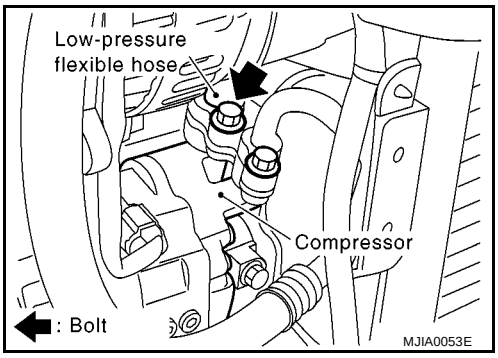
5. Remove the low-pressure flexible hose mounting bolt (air conditioner unit side).

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



6. Remove the low-pressure flexible hose mounting bolt (compressor side) and then remove the low-pressure flexible hose.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



INSTALLATION

CAUTION:

- **Replace the low-pressure flexible hose O-ring with a new one. Apply a coat of compressor lubricant to the O-ring prior to installation.**
- **When charging refrigerant, check for refrigerant leaks.**

Low-pressure flexible hose mounting bolt (compressor side)
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 69 - 173 in-lb)
Low-pressure flexible hose mounting bolt (evaporator side)
Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m, 26 - 52 in-lb)
Low-pressure flexible hose bracket mounting nut
Tightening torque : 3.82 - 4.51 N·m (0.39 - 0.46 kg-m, 34 - 39 in-lb)

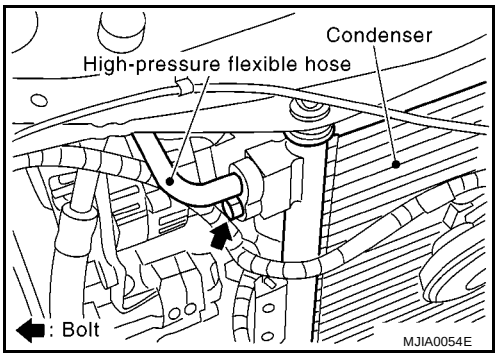
Removal and Installation for High-Pressure Flexible Hose (CR Engine Models)

EJS004J3

REMOVAL

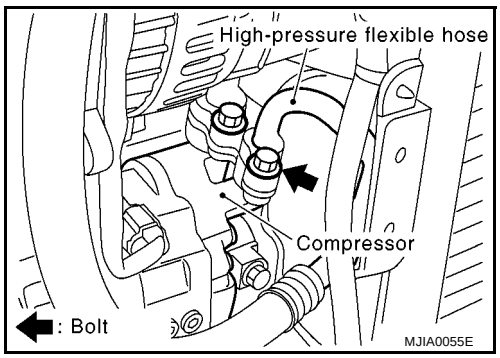
1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove the front grille (RH). Refer to EI-8, "FRONT GRILLE" .
4. Remove the high-pressure flexible hose mounting bolt (condenser side).

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



5. Remove the high-pressure flexible hose mounting bolt (compressor side), and then remove the high-pressure flexible hose.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



INSTALLATION

CAUTION:
- **Replace O-ring on high-pressure flexible hose with a new one. Apply compressor oil when installing new O-rings.**
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure flexible hose mounting bolt

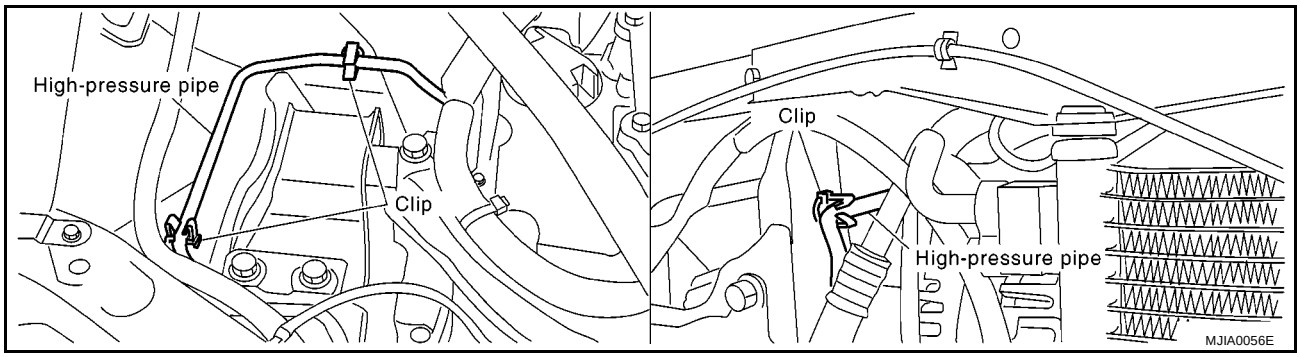
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 69 - 173 in-lb)

Removal and Installation for High-Pressure Pipe (CR Engine Models)

EJS004J4

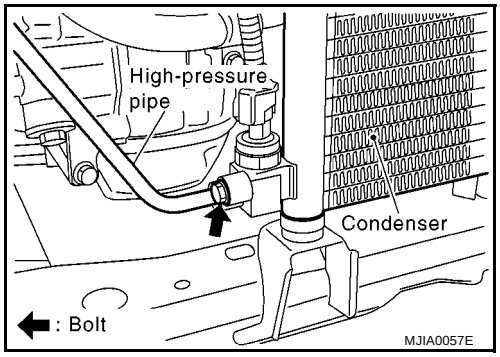
REMOVAL

1. Remove the cowl top and headlamp (RH). Refer to EI-10, "COWL TOP" and halogen headlamp model LT-6, "HEADLAMP -CONVENTIONAL TYPE-" .
2. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
3. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" and BL-12, "RADIATOR CORE SUPPORT" .
4. Remove the low-pressure flexible hose. Refer to ATC-86, "Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models)" .
5. Remove the high-pressure pipe from clips.



6. Remove the high-pressure pipe mounting bolt, and then remove the high-pressure pipe.

CAUTION:
Seal the pipe connection openings with caps, plastic tape, or something similar to prevent them from being exposed to the atmosphere.



INSTALLATION

CAUTION:
- **Replace the O-ring on the high-pressure pipe with new one, and apply compressor lubricant to it before installing.**

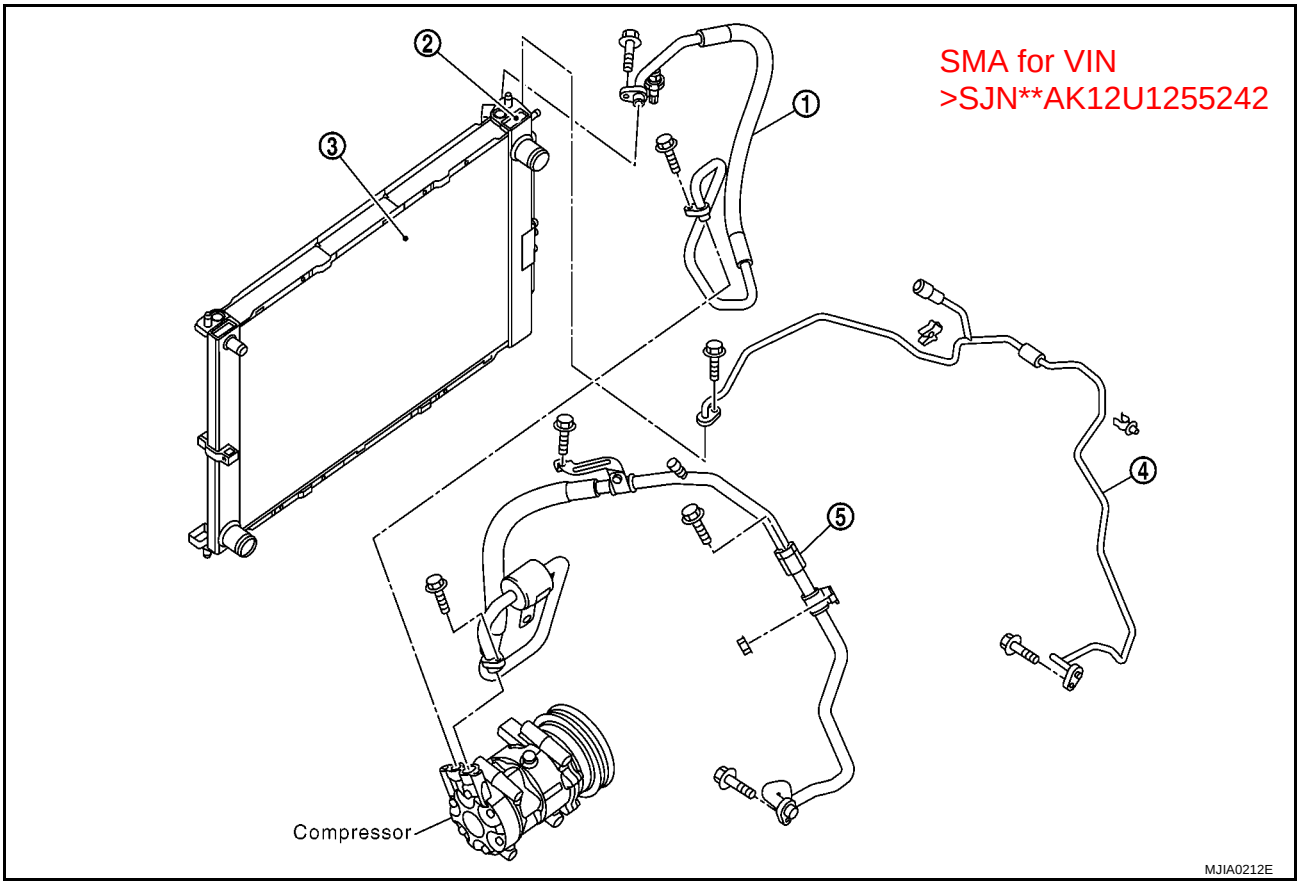
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure pipe mounting bolt
Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m, 26 - 52 in-lb)
Low-pressure flexible hose and high-pressure pipe mounting bolts (evaporator side)
Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m, 26 - 52 in-lb)
Low-pressure flexible hose mounting bolt (compressor side)
Tightening torque : 7.8 - 19.6 N·m (0.8 - 2.0 kg-m, 69 - 173 in-lb)

Removal and Installation for Pipe and Hose (K9K Engine Models)

EJS0057P

COMPONENTS



1. High-pressure flexible hose
2. Liquid tank
3. Condenser and radiator assembly
4. High-pressure pipe
5. Low-pressure flexible hose

SMA for VIN
>SJN**AK12U1255242

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the low-pressure flexible hose bracket mounting bolt and nut.
3. Remove the high-pressure pipe and low-pressure flexible hose mounting bolts (air conditioner unit side).

   CAUTION:
   Seal the connecting points of the pipe and hose with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.
4. Remove the low-pressure flexible hose mounting bolt (compressor side) and then remove the low-pressure flexible hose.

   CAUTION:
   Seal the connecting points of the hose with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.
5. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
6. Remove the high-pressure pipe mounting bolt (liquid tank side) and then remove the high-pressure pipe.

CAUTION:
Seal the connecting points of the pipe with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

7. Remove the high-pressure flexible hose mounting bolts and then remove the high-pressure flexible hose.

CAUTION:
Seal the connecting points of the hoses with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

INSTALLATION SMA for VIN

CAUTION: >SJN**AK12U1255242

- **Replace the O-rings on the high-pressure pipe, low-pressure flexible hose, and high-pressure flexible hose with new ones, and apply compressor lubricant to O-rings before installing.**
- **When charging refrigerant, check for refrigerant leaks.**

Removal and Installation for Refrigerant Pressure Sensor

EJS004J5

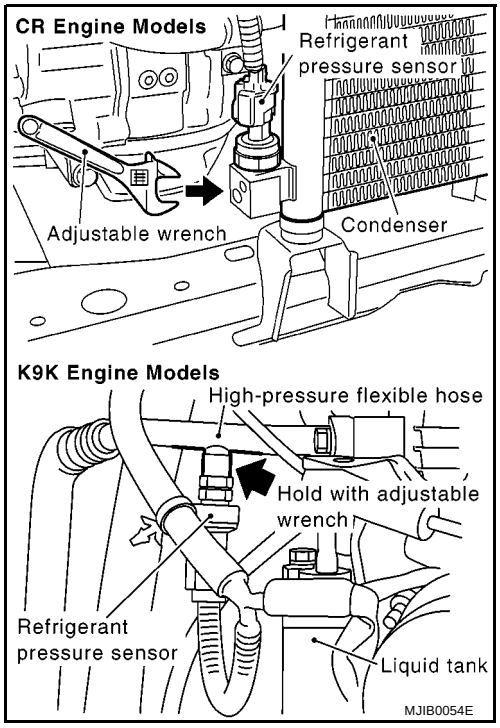
REMOVAL AND INSTALLATION

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" and BL-12, "RADIATOR CORE SUPPORT" .
3. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from the condenser (CR engine models) or the high-pressure flexible hose (K9K engine models).

CAUTION:
- **Be careful when working so as not to damage the condenser core.**
- **When installing refrigerant pressure sensor, apply compressor lubricant to the O-rings.**

Refrigerant pressure sensor

Tightening torque : 9.8 - 11.7 N·m (1.0 - 1.1 kg-m, 87 - 103 in-lb)



Removal and Installation for Condenser (CR Engine Models)

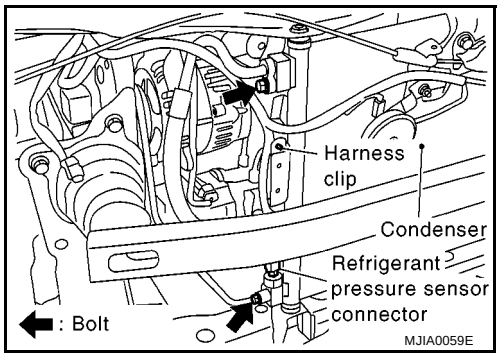
EJS004J6

REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" and BL-12, "RADIATOR CORE SUPPORT" .
3. Disconnect the high-pressure flexible hose and high-pressure pipe from the condenser.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

4. Disconnect the refrigerant pressure sensor connector, and then remove the harness clip.

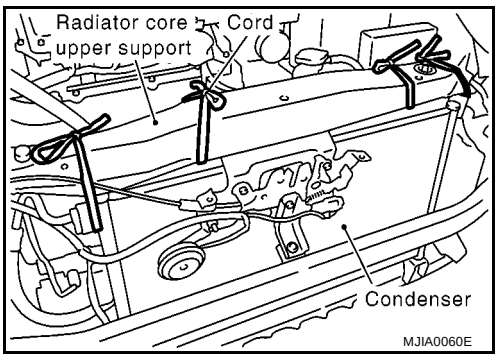


5. Use cord, etc., to hold the condenser and radiator to each radiator core support upper.

   NOTE:
   To prevent the compressor and radiator from being dropped when the radiator core lower support is removed.

6. Remove the mounting bolts, and then remove the radiator core lower support.
7. Remove the condenser from underneath the vehicle.

   CAUTION:
   Do not damage the condenser core.



INSTALLATION

CAUTION:

- **Replace O-rings on the high-pressure pipe and high-pressure flexible hose with new ones. Apply compressor lubricant to O-rings when installing them.**
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure flexible hose bolt

Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 69 - 173 in-lb)

High-pressure pipe mounting bolt

Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m, 26 - 52 in-lb)

Radiator core lower support mounting bolts.

Tightening torque : 43.4 - 58.7 N·m (4.5 - 5.9 kg-m, 32 - 43 ft-lb)

Removal and Installation for Condenser (K9K Engine Models)

EJS0057Q

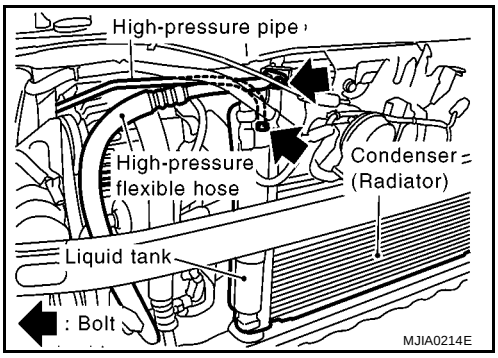
REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
3. Disconnect the high-pressure flexible hose from the condenser. Disconnect the high-pressure pipe from the liquid tank.

   CAUTION:
   Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

4. Remove the radiator assembly. Refer to CO-34, "RADIATOR" .

   CAUTION:
   Do not damage the radiator and condenser core.



INSTALLATION

CAUTION:

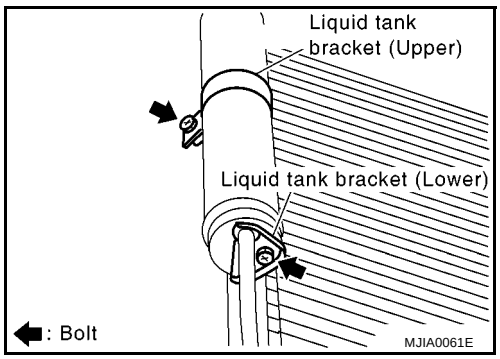
- **Replace O-rings on the high-pressure pipe and high-pressure flexible hose with new ones. Apply compressor lubricant to O-rings when installing them.**
- **When charging refrigerant, check for refrigerant leaks.**

Removal and Installation for Liquid Tank (CR Engien Models)

EJS004J7

REMOVAL

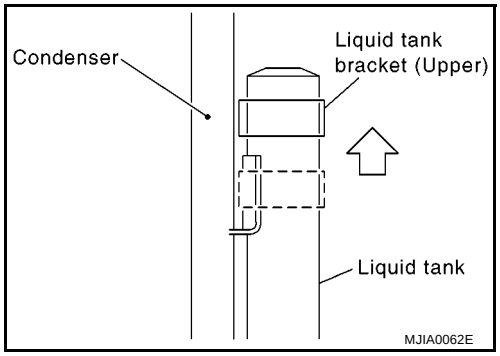
1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove condenser. Refer to ATC-90, "Removal and Installation for Condenser (CR Engine Models)" .
3. Clean around the liquid tank to remove foreign material and corrosion.
4. Remove the liquid tank bracket (upper/lower) mounting bolts.



5. Lift up the liquid tank bracket, and remove it from the condenser protruding area.
6. Lift up the liquid tank and remove it.

CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

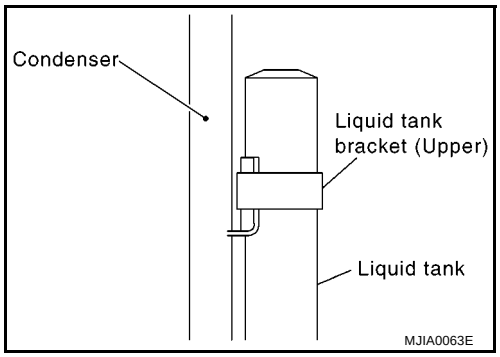


INSTALLATION

Install the liquid tank, and then install liquid tank bracket to the condenser.

CAUTION:

- **Make sure the liquid tank bracket is correctly inserted into the condenser's protruding area (the liquid tank bracket does not move below the center of the liquid tank).**
- **Replace the condenser pipe O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.**



Liquid tank bracket (upper) mounting bolt

Tightening torque : 2.94 - 3.82 N·m (0.29 - 0.38 kg-m, 26 - 33 in-lb)

Liquid tank bracket (lower) mounting bolt

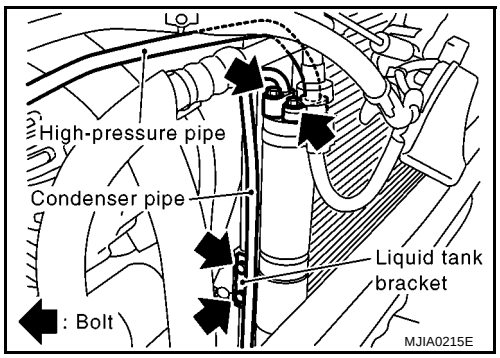
Tightening torque : 5.0 - 6.47 N·m (0.51 - 0.65 kg-m, 45 - 57 in-lb)

Removal and Installation for Liquid Tank (K9K Engine Models)

EJS0057R

REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Clean around the liquid tank to remove foreign material and corrosion.
3. Remove the high-pressure pipe from the liquid tank.
4. Remove the condenser pipe mounting bolt from the liquid tank, and remove pipe from the condenser protruding area.
5. Remove the liquid tank bracket bolts and then remove the liquid tank.



CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

INSTALLATION

Install the liquid tank, and then install liquid tank bracket to the condenser.

CAUTION:
Replace the condenser pipe O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.

Removal and Installation for Evaporator

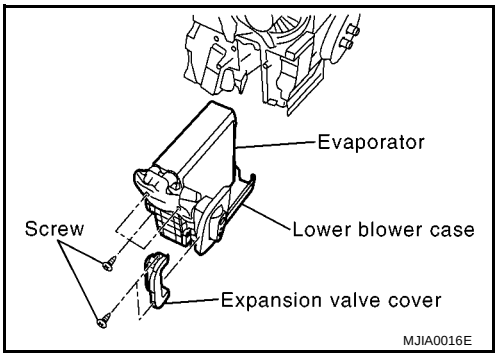
EJS004J8

REMOVAL

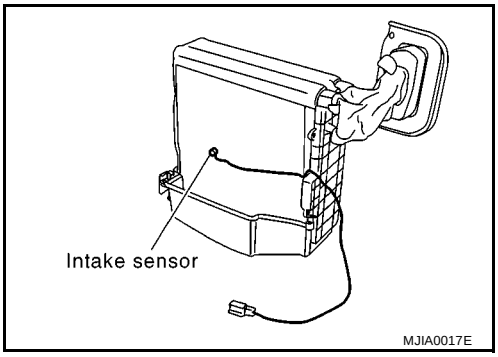
1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Remove the A/C unit. Refer to ATC-69, "A/C UNIT ASSEMBLY" .

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

3. Remove the air conditioner filter, mode door motor, and foot duct (RH). Refer to ATC-75, "AIR CONDITIONER FILTER" , ATC-77, "MODE DOOR MOTOR" and ATC-83, "FOOT DUCT" .
4. Remove the lower blower case and expansion valve cover.



5. Slide the evaporator and lower blower case downward, and remove the intake sensor.
6. Remove the evaporator from the lower blower case.



INSTALLATION

CAUTION:
- **Replace low-pressure flexible hose and high-pressure pipe O-rings with new ones. Apply a coat of compressor lubricant prior to installation.**
- **When installing a new evaporator, install the thermistor of intake air temperature in the same position as the removed intake sensor.**
- **When removing and installing the intake sensor, do not rotate the thermistor insertion part.**

Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.
Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m, 26 - 52 in-lb)

Removal and Installation for Expansion Valve

EJS004J9

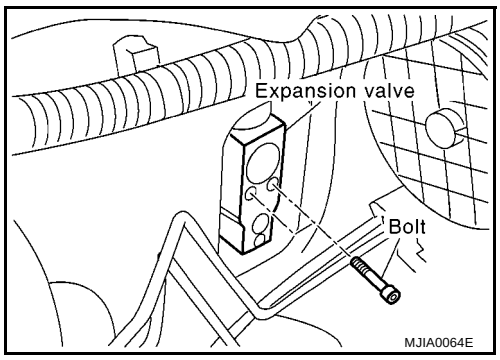
REMOVAL

1. Use refrigerant collecting equipment (for HFC134a) to discharge refrigerant.
2. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.

CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

3. Remove the two bolts from the expansion valve, and then remove the expansion valve.



INSTALLATION

CAUTION:

Replace the removed O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.

Expansion valve mounting bolts

Tightening torque : 2.9 - 5.0 N·m (0.29 - 0.51 kg-m, 26 - 44 in-lb)

Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.

Tightening torque : 2.9 - 5.9 N·m (0.29 - 0.60 kg-m, 26 - 52 in-lb)

SECTION AV

AUDIO, VISUAL & TELEPHONE SYSTEM

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Wiring Diagrams and Trouble Diagnosis 2
AUDIO 3
System Description 3
AUDIO SYSTEM 3
Wiring Diagram —AUDIO— 4
WITHOUT ESP 4
WITH ESP 6
Terminals and Reference Value for Audio Unit 8
Steering Wheel Audio Control Switch Resistance Check 9
Trouble Diagnosis 9
PROBLEM WITH RADIO AND CD 9
FOR RADIO ONLY 10
FOR CD ONLY 10
Noise Inspection 10
TYPE OF NOISE AND POSSIBLE CAUSE 10
Power Supply Circuit Inspection 11
Steering Wheel Audio Control Switch Does Not Operate 11
Removal and Installation of Audio Unit 12
REMOVAL 12
INSTALLATION 12
Removal and Installation of Front Door Speaker 13
REMOVAL 13
INSTALLATION 13
Removal and Installation of Rear Door Speaker (3 door models) 13
REMOVAL 13
INSTALLATION 13
Removal and Installation of Rear Door Speaker (5 door models) 13
REMOVAL 13
INSTALLATION 13
Removal and Installation of Front Pillar Tweeter 14
REMOVAL 14
INSTALLATION 14
AUDIO ANTENNA 15
Location of Antenna 15
Removal and Installation of Roof Antenna 16
REMOVAL 16
INSTALLATION 16
NAVIGATION SYSTEM 17
Schematic 17
Wiring Diagram —NAVI— 18
WITHOUT ESP 18
WITH ESP 21

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS00778

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Wiring Diagrams and Trouble Diagnosis

EKS00779

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When you perform trouble diagnosis, refer to the following:

- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

AUDIO

PFP:28111

System Description

EKS0077A

AUDIO SYSTEM

Refer to Owner's Manual for audio system operating instructions.

Power is supplied at all times

- through 15A fuse (No. 24, located in the fuse and fusible link box)
- to audio unit terminal 34,

With the ignition switch in the ACC or ON position, power is supplied

- through 10A fuse [No. 12, located in the fuse block (J/B)]
- to audio unit terminal 37,

Ground is supplied through the case of the audio unit.

Ground is also supplied

- through body ground M60,
- to audio unit terminal 38.

Audio signals are supplied

- through audio unit terminals 21, 22, 23, 24, 25, 26, 27, 28
- to terminals 1 and 2 of front door speaker LH and RH
- to terminals 1 and 2 of rear door speaker LH and RH
- to terminals 1 and 2 of tweeter LH and RH.

When one of steering wheel audio control switches is pushed to volume down or seek down, resistance in steering switch circuit changes depending on which button is pushed. This will change voltage. Power is supplied

- from audio unit terminal 11
- through combination switch (spiral cable) terminals 33 and 15
- to steering wheel audio control switch.

Ground is supplied

- from steering wheel audio control switch
- through combination switch (spiral cable) terminals 16 and 32
- from audio unit terminal 12.

When one of steering wheel audio control switches is pushed to volume up, seek up, or mode ON, resistance in steering switch circuit changes depending on which button is pushed. This will change voltage. Power is supplied

- from audio unit terminal 10
- through combination switch (spiral cable) terminals 34 and 14
- to steering wheel audio control switch.

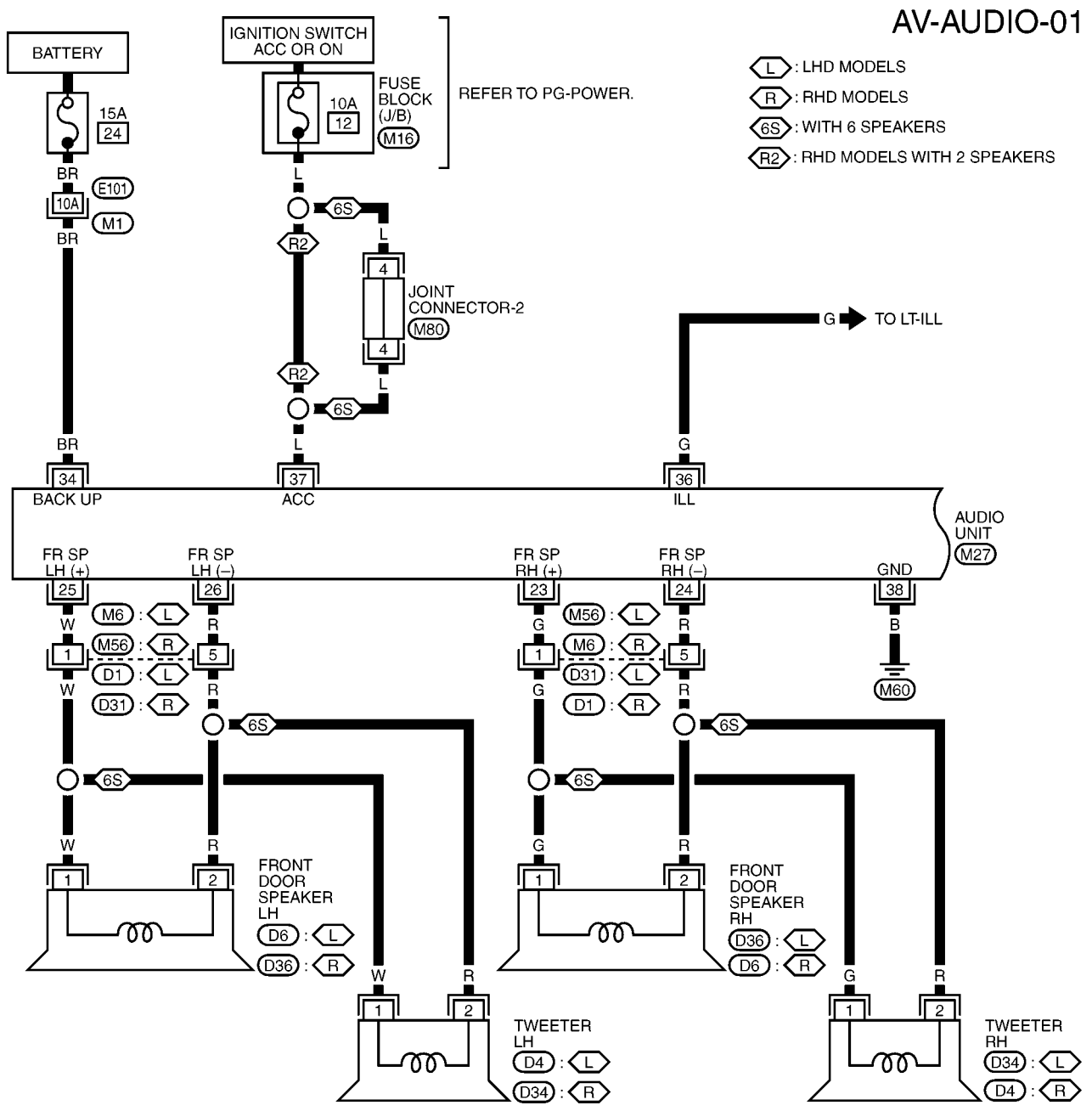
Ground is supplied

- from steering wheel audio control switch
- through combination switch (spiral cable) terminals 16 and 32
- from audio unit terminal 12.

Wiring Diagram —AUDIO—

EKS0077C

WITHOUT ESP

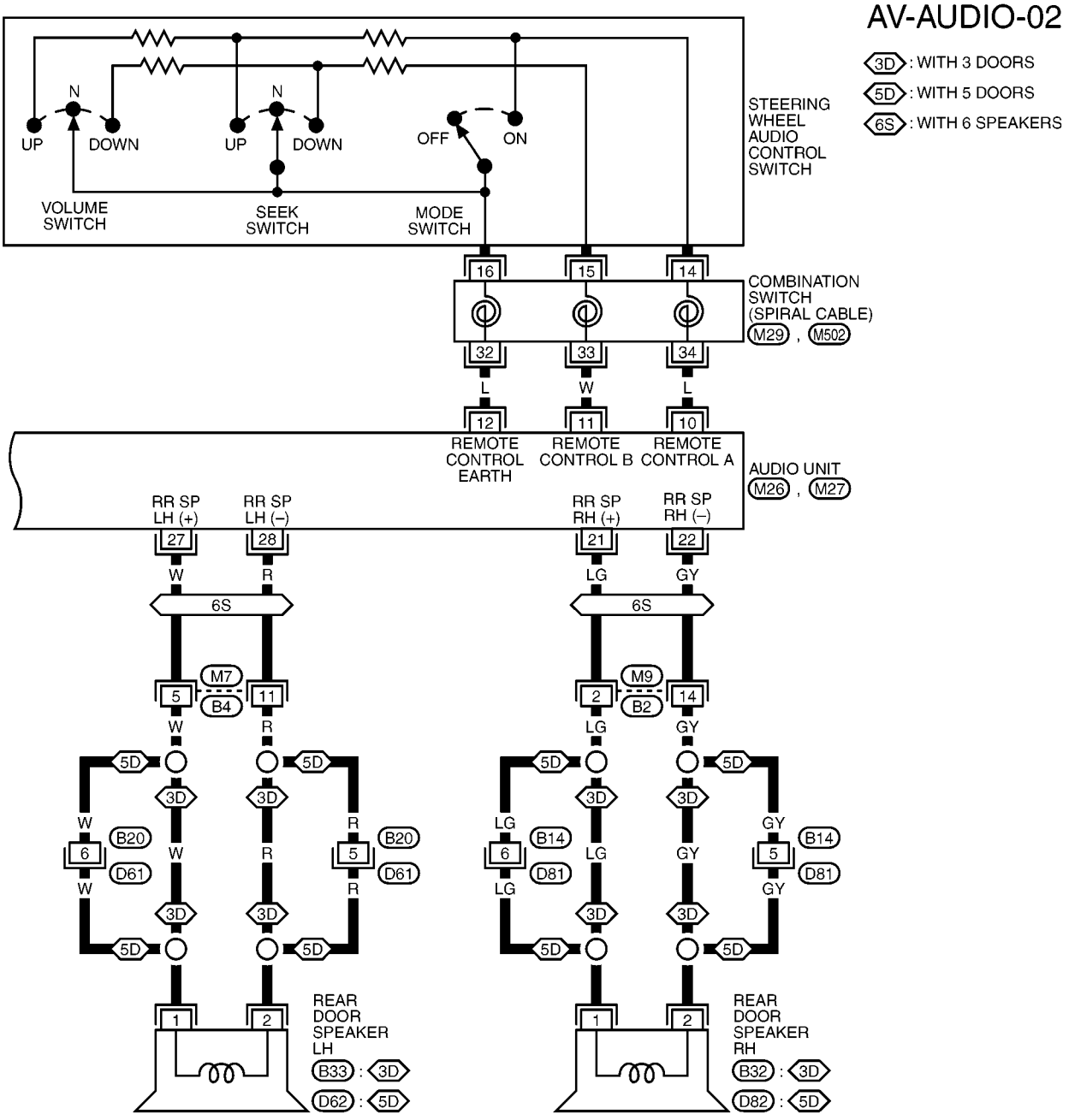


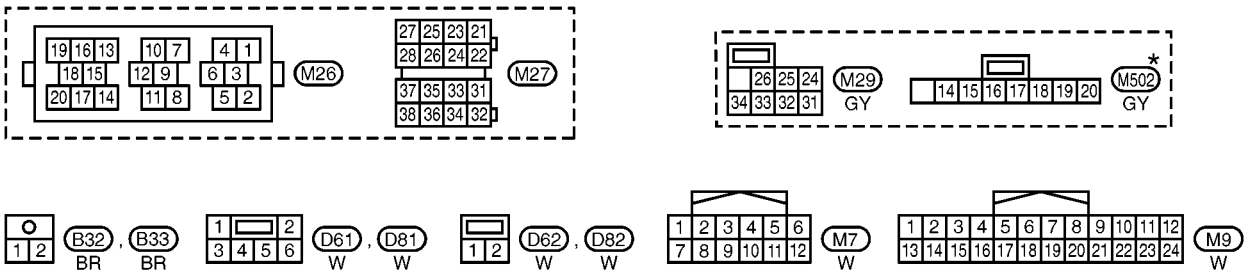
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1818E

AV-AUDIO-02

3D : WITH 3 DOORS
5D : WITH 5 DOORS
6S : WITH 6 SPEAKERS

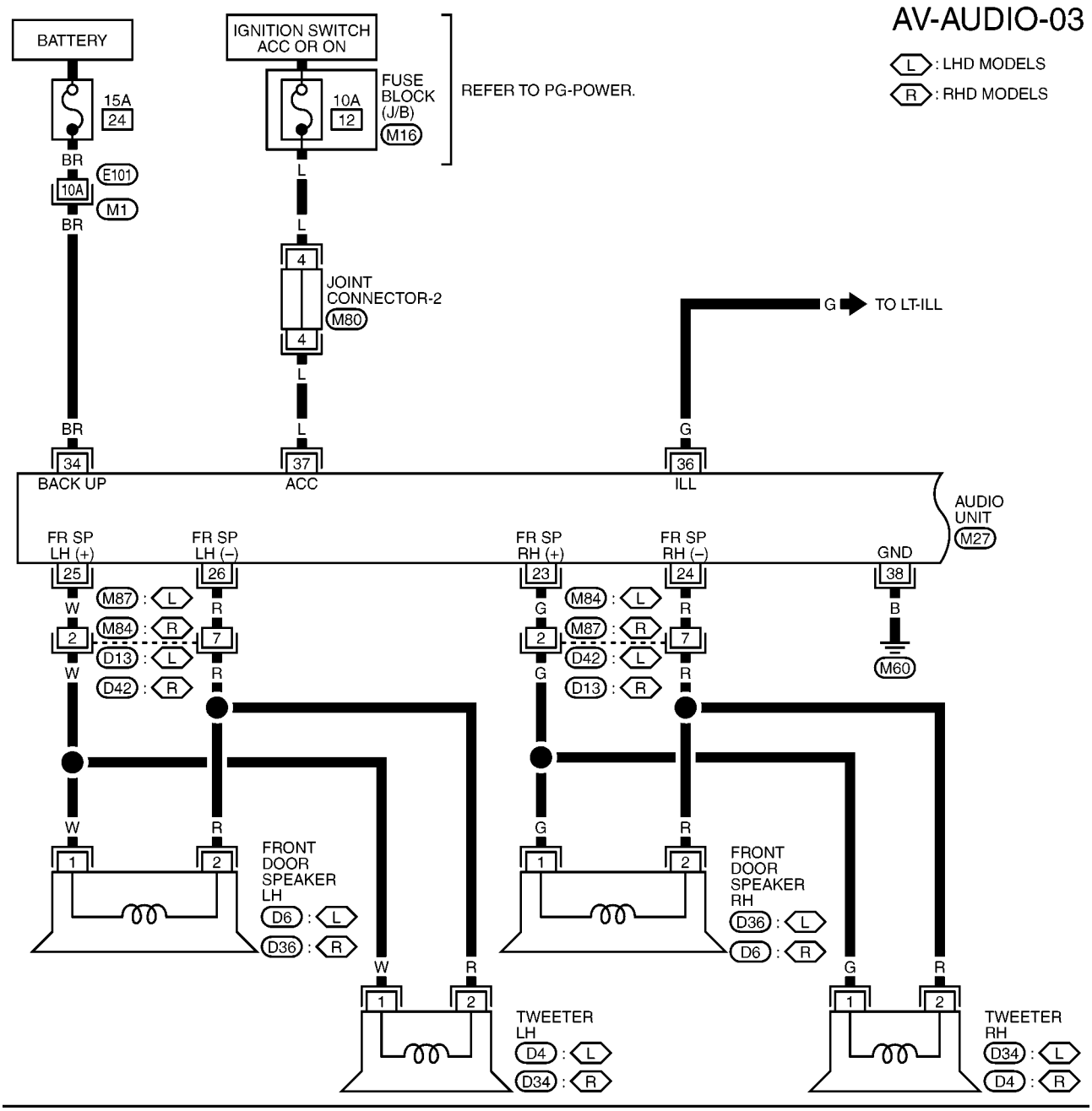




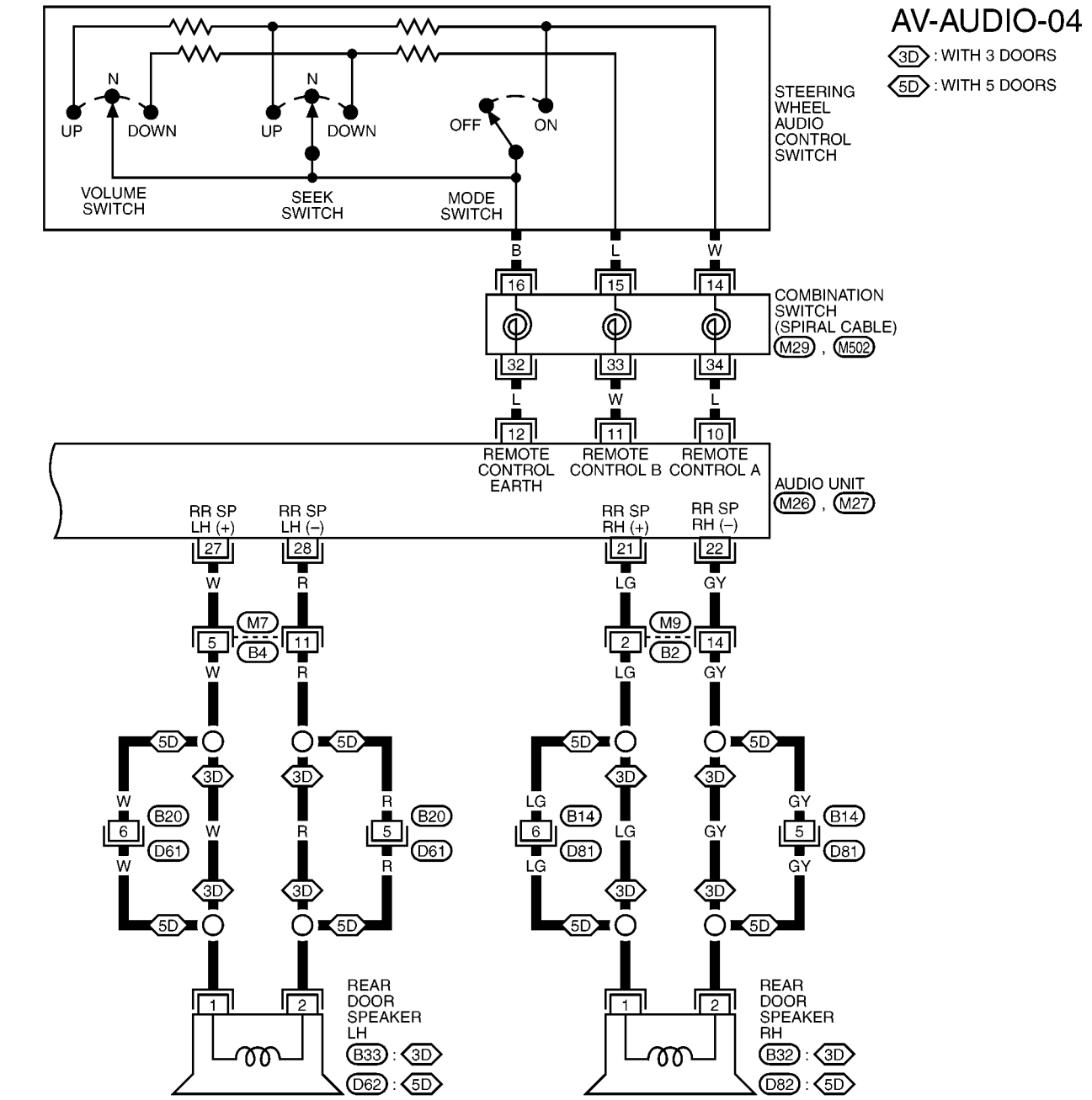
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

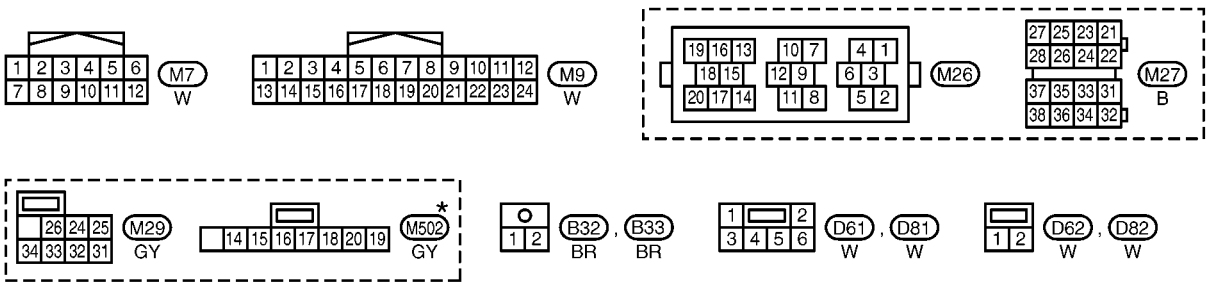
MKWA0838E

WITH ESP



MKWA1819E



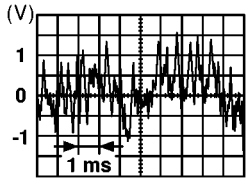
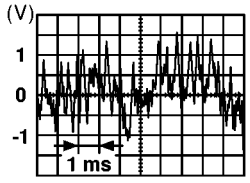
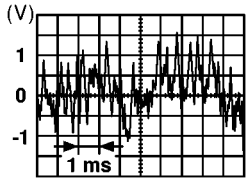
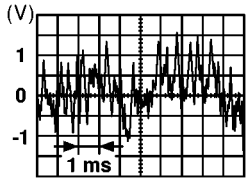


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

MKWA1820E

Terminals and Reference Value for Audio Unit

EKS0077E

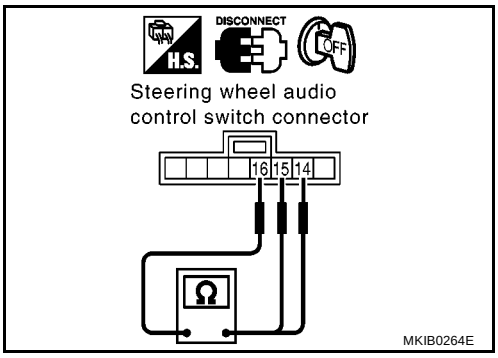
Terminal No. (wire color)		Item	Signal input/ output	Condition		Voltage	Example of symptom
(+)	(–)			Ignition switch	Operation		
10 (L)	Ground	Remote control A	Input	ON	Press MODE switch	Approx. 0V	Steering wheel audio controls do not function.
					Press SEEK UP switch	Approx. 1.68V	
					Press VOL UP switch	Approx. 3.34V	
					Except for above	Approx. 5V	
11 (W)	Ground	Remote control B	Input	ON	Press SEEK DOWN switch	Approx. 1.68V	Steering wheel audio controls do not function.
					Press VOL DOWN switch	Approx. 3.34V	
					Except for above	Approx. 5V	
12 (L)	-	Remote control earth	-	ON	-	Approx. 0V	Steering wheel audio controls do not function.
21 (LG)	22 (GY)	Speaker output (rear RH)	Output	ON	Receive radio broadcast	 SKIA0177E	No sound from rear RH speaker.
23 (G)	24 (R)	Speaker output (front RH)	Output	ON	Receive radio broadcast	 SKIA0177E	No sound from front RH speaker or tweeter RH.
25 (W)	26 (R)	Speaker output (front LH)	Output	ON	Receive radio broadcast	 SKIA0177E	No sound from front LH speaker or tweeter LH.
27 (W)	28 (R)	Speaker output (rear LH)	Output	ON	Receive radio broadcast	 SKIA0177E	No sound from rear LH speaker.

Terminal No. (wire color)		Item	Signal input/ output	Condition		Voltage	Example of symptom
(+)	(–)			Ignition switch	Operation		
34 (BR)	Ground	Battery power	Input	OFF	-	Battery voltage	Audio unit operation is not possible.
36 (G)	Ground	Illumination signal	Input	ON	Lighting switch is ON (position 1).	Battery voltage	Audio unit illumination does not come on when lighting switch is ON (position 1).
					Turn lighting switch OFF.	Approx. 3.0V or less	
37 (L)	Ground	ACC power	Input	ACC	-	Battery voltage	Audio unit operation is not possible.
38 (B)	Ground	Ground	-	ON	-	Approx. 0V	-

Steering Wheel Audio Control Switch Resistance Check

EKS007AT

Terminal		Signal name	Condition	Resistance (Ω)
(+)	(–)			
14	16	Seek up (next)	Depress (station) up switch.	Approx. 165
		Mode	Depress mode switch.	Approx. 0
		Volume (up)	Depress volume up switch.	Approx. 652
15	16	Seek down (previous)	Depress (station) down switch.	Approx. 165
		Volume (down)	Depress volume down switch.	Approx. 652



Trouble Diagnosis

EKS0077J

- The majority of the audio troubles are the result of outside causes (bad CD electromagnetic interference, etc.). Check the inspection items below to diagnose the malfunction.

PROBLEM WITH RADIO AND CD

Symptom	Check items	Possible cause
Inoperative	● Check that the ignition switch is in the ACC position.	● Audio unit ● Audio unit power circuit
No sound	● Check that the volume is not turned down. ● Check that the balance and fader control knobs are centered.	● Audio unit ● Audio unit power circuit ● Speaker ● Sound signal circuit between speaker and Audio unit
Poor sound	● Check that the bass and treble adjustment knobs are centered.	● Audio unit ● Speaker
Noisy	-	● Audio unit ● Each electrical equipment

FOR RADIO ONLY

Symptom	Check items	Possible cause
No sound	● Check that the radio is tuned to a station's frequency.	● Audio unit ● Antenna feeder ● Roof antenna
Noisy	● Check that the radio is tuned to a station's frequency. ● Check that the signal of the received station is not weak. ● Check whether or not the malfunction occurs only in a particular area. (Note)	● Audio unit ● Antenna feeder ● Roof antenna ● Noise prevention parts ● Each electrical equipment ● Wire harness of each piece of electrical equipment
Selected radio stations stored in memory are deleted	-	● Audio unit ● Audio unit power circuit

NOTE:

- This is noise resulting from variations in field strength, such as fading noise and multi-path noise, or external noise from trains and other sources. It is not a malfunction.
  - Fading noise: This noise occurs because of variations in the field strength in a narrow range due to mountains or buildings blocking the signal.
  - Multi-path noise: This noise results from the waves sent directly from the broadcast station arriving at the antenna at a different time from the waves which reflect off of mountains or buildings.

FOR CD ONLY

Symptom	Check items	Possible cause
The CD cannot be played.	● Check that the CD is not upside down. ● Check that there is no dirt, damage, or water on the disc.	● Audio unit
The sound skips, stops suddenly, or is distorted.	● Check that there is no dirt, damage, or water on the disc. ● Check that the trouble is not due to strong vibration.	

Noise Inspection

EKS0077K

The vehicle itself can be a source of noise if noise prevention parts or electrical equipment is malfunction. Check if noise is caused and/or changed by engine rotation, ignition switch turned to each position, and operation of each piece of electrical equipment, and determine the cause.

NOTE:

The source of the noise can be found easily by listening to the noise while removing the fuses of electrical components, one by one.

TYPE OF NOISE AND POSSIBLE CAUSE

Occurrence condition		Possible cause
Occurs only when engine is ON.	A continuous growling noise occurs. The speed of the noise varies with changes in the engine speed.	● Problem with the ignition condenser.
	A whistling noise occurs while the engine speed is high. A booming noise occurs while the engine is running and the lighting switch is ON.	● Problem with the alternator
The occurrence of the noise is linked with the operation of the fuel pump.		● Problem with the fuel pump condenser
Noise only occurs when various electrical components are operating.	A cracking or snapping sound occurs with the operation of various switches.	● Relay malfunction, radio malfunction
	The noise occurs when various motors are operating.	● Problem with the motor case ground ● Problem with the motor

Occurrence condition	Possible cause
The noise occurs constantly, not just under certain conditions.	● Rear defogger coil malfunction ● Open circuit in printed heater ● Poor ground of antenna amplifier or antenna feeder line
A cracking or snapping sound occurs while the vehicle is being driven, especially when it is vibrating excessively.	● Problem with the ground wire of body parts ● Problem with ground due to part installation problem ● Problem with wiring connections or a short circuit

Power Supply Circuit Inspection

EKS0077L

1. CHECK FUSE

- Check that the following fuses of the audio unit are not blown. Refer to PG-106, "FUSE BLOCK - JUNCTION BOX (J/B)" and PG-107, "FUSE AND FUSIBLE LINK BOX" .

Unit	Terminals			Signal name	Fuse No.
	(+)		(-)		
	Connector	Terminal (wire color)			
Audio unit	M27	34 (BR)	Ground	Battery power	24
	M27	37 (L)	Ground	ACC power	12

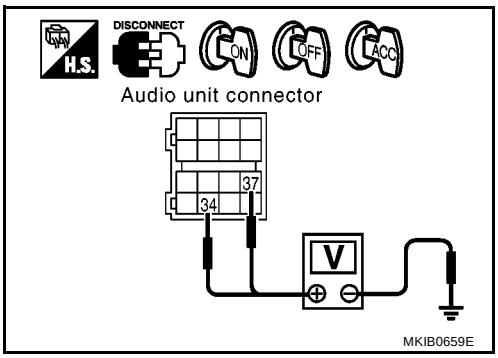
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. POWER SUPPLY CIRCUIT CHECK

Disconnect the connector. Check voltage between the following harness connector terminal (+) and body ground (-).

Unit	Terminal No.			Ignition switch		
	(+)		(-)	OFF	ACC	ON
	Connector	Terminal (wire color)				
Audio unit	M27	34 (BR)	Ground	Battery power	Battery voltage	Battery voltage
	M27	37 (L)	Ground	0V	Battery voltage	Battery voltage



OK or NG

OK >> Inspection end.
NG >> Repair or replace harness.

Steering Wheel Audio Control Switch Does Not Operate

EKS007AU

1. STEERING WHEEL AUDIO CONTROL SWITCH RESISTANCE CHECK

1. Disconnect steering wheel audio control switch connector.
2. Check resistance steering wheel audio control switch. Refer to AV-9, "Steering Wheel Audio Control Switch Resistance Check" .

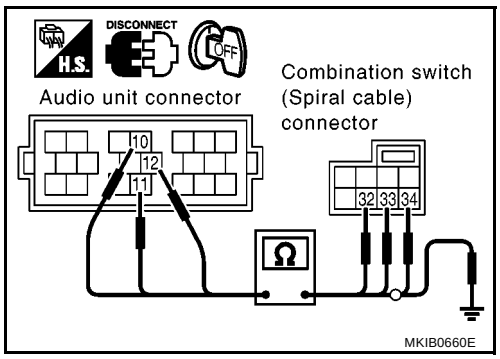
Resistance value is OK?

YES or NO

YES >> GO TO 2.
NO >> Replace steering wheel audio control switch.

2. STEERING WHEEL AUDIO CONTROL SWITCH CIRCUIT CHECK

1. Disconnect audio unit connector.
2. Check continuity between audio unit harness connector M26 and combination switch (spiral cable) harness connector M29.



Terminals				Continuity
Connector	Terminal (wire color)	Connector	Terminal (wire color)	
M26	10 (L)	M29	34 (L)	Yes
	11 (W)		33 (W)	
	12 (L)		32 (L)	

3. Check continuity between audio unit and ground.

Terminals			Continuity
(+)		(-)	
Connector	Terminal (wire color)		
M26	10 (L)	Ground	No
	11 (W)		
	12 (L)		

OK or NG

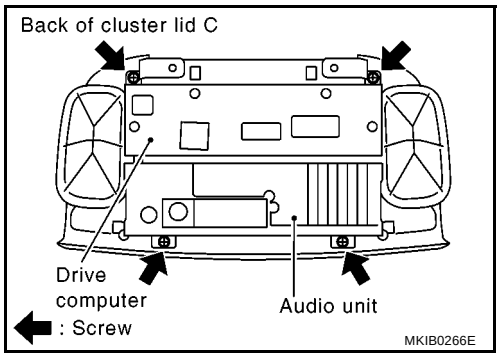
OK >> Check combination switch (spiral cable).
NG >> Replace audio unit.

Removal and Installation of Audio Unit

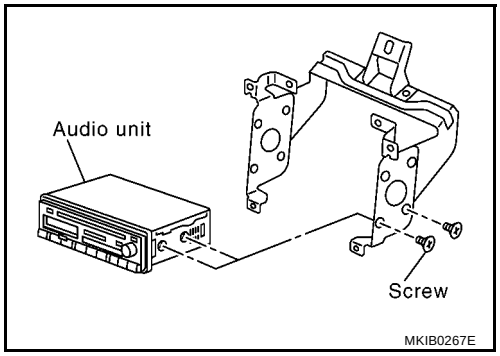
EKS0077N

REMOVAL

1. Remove instrument panel and cluster lid C. Refer to IP-7, "K. Cluster Lid C" .
2. Remove screws and remove audio unit and bracket.



3. Remove screws and remove bracket.



INSTALLATION

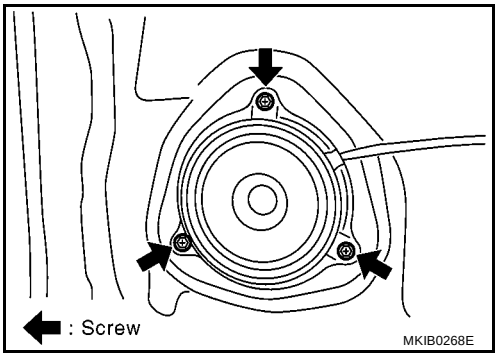
Install in the reverse order of removal.

Removal and Installation of Front Door Speaker

EKS0077O

REMOVAL

1. Remove front door finisher. Refer to EI-16, "DOOR FINISHER" .
2. Remove screws and remove speaker.



INSTALLATION

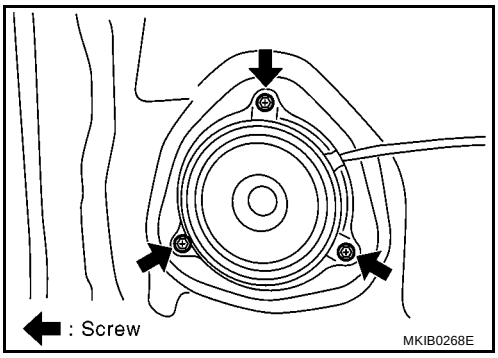
Install in the reverse order of removal.

Removal and Installation of Rear Door Speaker (3 door models)

EKS007PJ

REMOVAL

1. Remove rear door finisher. Refer to EI-16, "DOOR FINISHER" .
2. Remove screws and remove speaker.



INSTALLATION

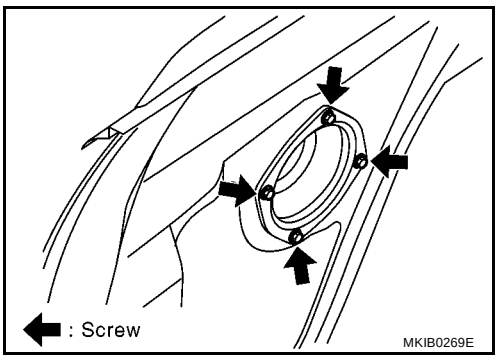
Install in the reverse order of removal.

Removal and Installation of Rear Door Speaker (5 door models)

EKS007PK

REMOVAL

1. Remove rear side finisher. Refer to EI-16, "DOOR FINISHER" .
2. Remove screws and remove speaker.



INSTALLATION

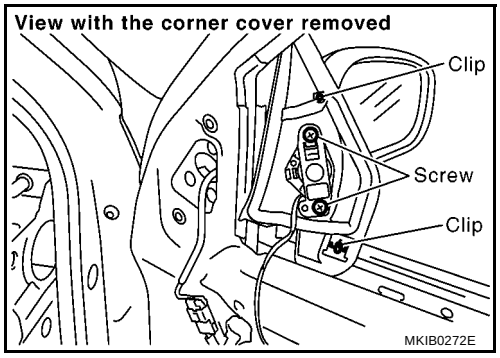
Install in the reverse order of removal.

Removal and Installation of Front Pillar Tweeter

EKS0077P

REMOVAL

1. Remove front door finisher. Refer to EI-19, "BODY SIDE TRIM" .
2. Remove clips and remove corner cover.
3. Remove screws and remove front pillar tweeter.



INSTALLATION

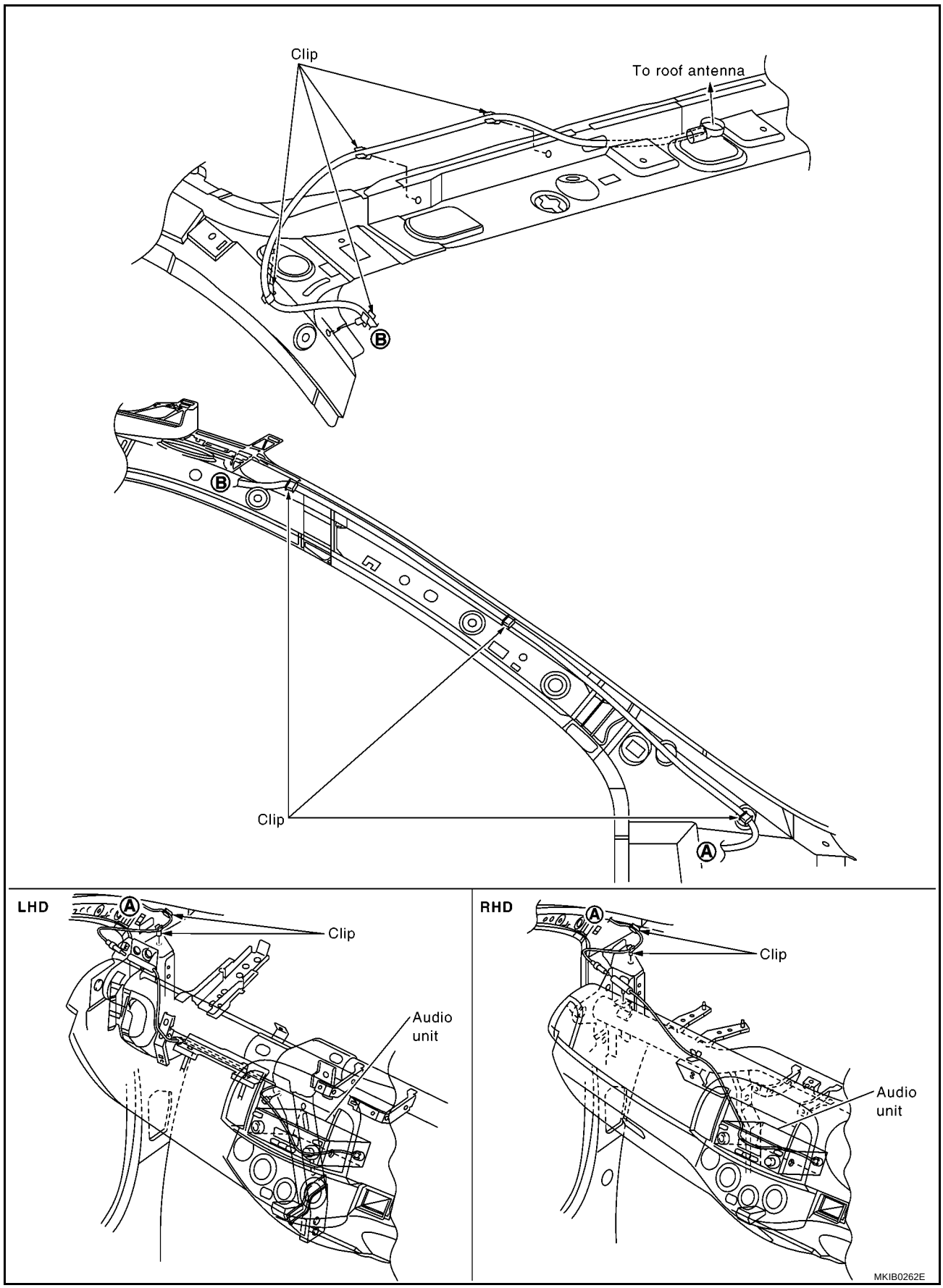
Install in the reverse order of removal.

AUDIO ANTENNA

PFP:28200

Location of Antenna

EKS0077Q

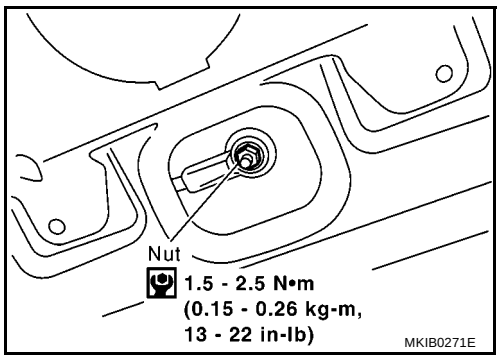


Removal and Installation of Roof Antenna

EKS0077R

REMOVAL

1. Remove headliner. Refer to EI-24, "HEADLINER" .
2. Remove roof antenna mounting nuts, antenna plug. Then remove roof antenna.



INSTALLATION

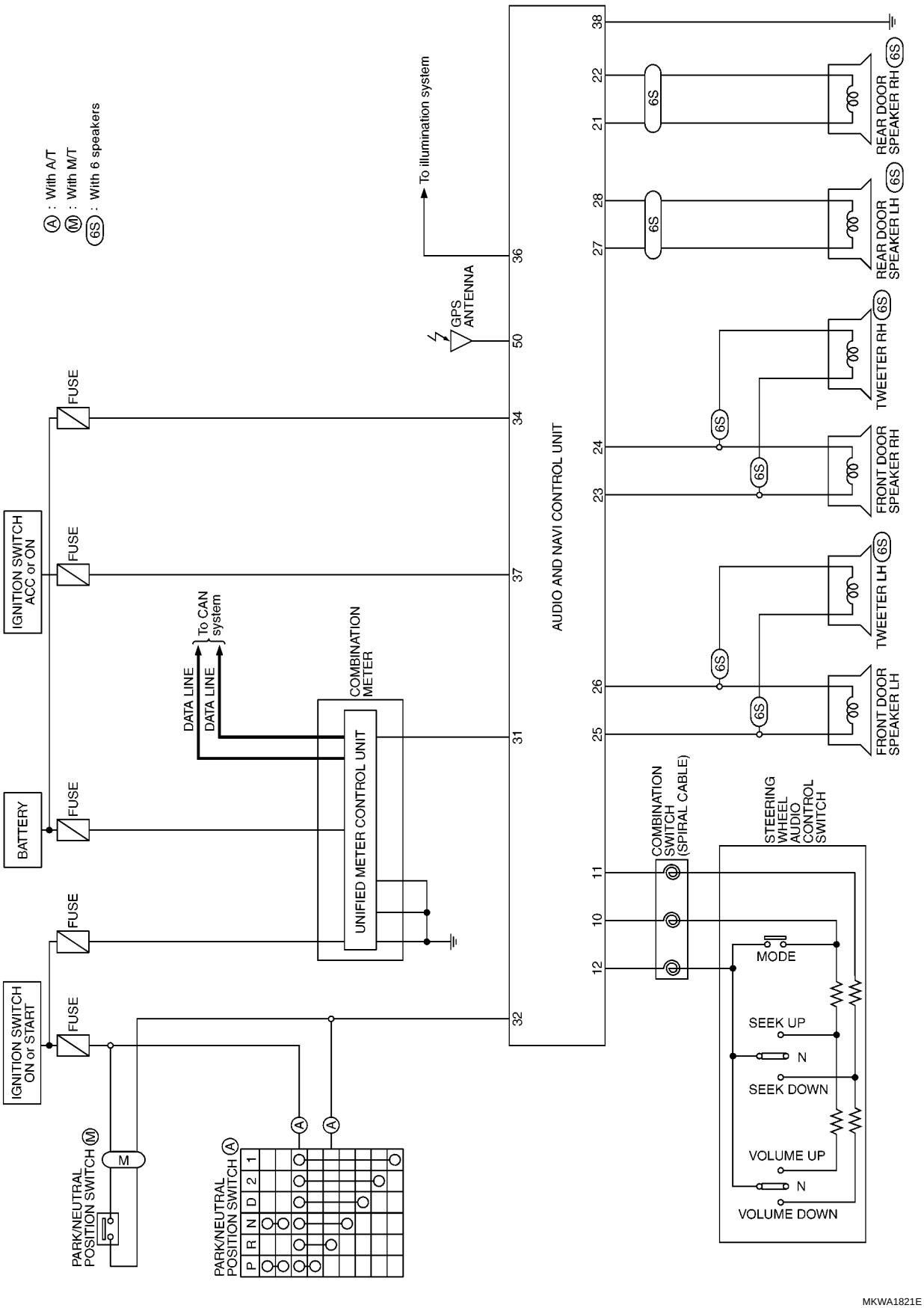
Install in the reverse order of removal.

NAVIGATION SYSTEM

PFP:25915

Schematic

EKS007T8

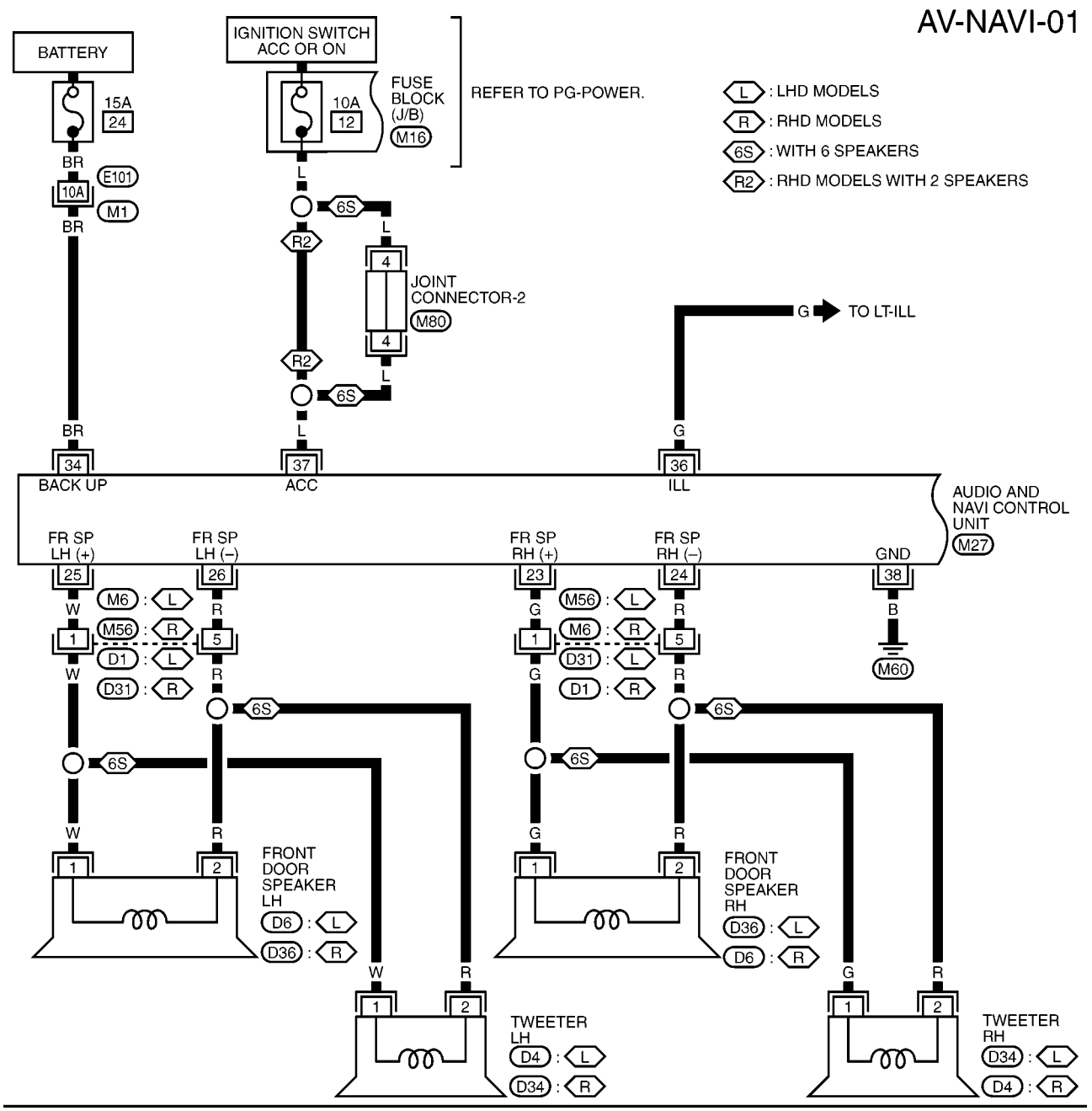


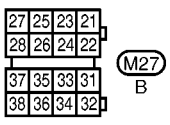
MKWA1821E

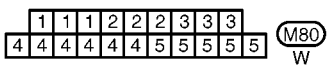
Wiring Diagram —NAVI—

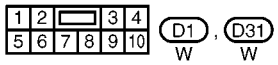
EKS007T9

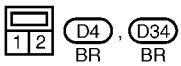
WITHOUT ESP

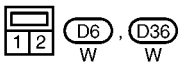






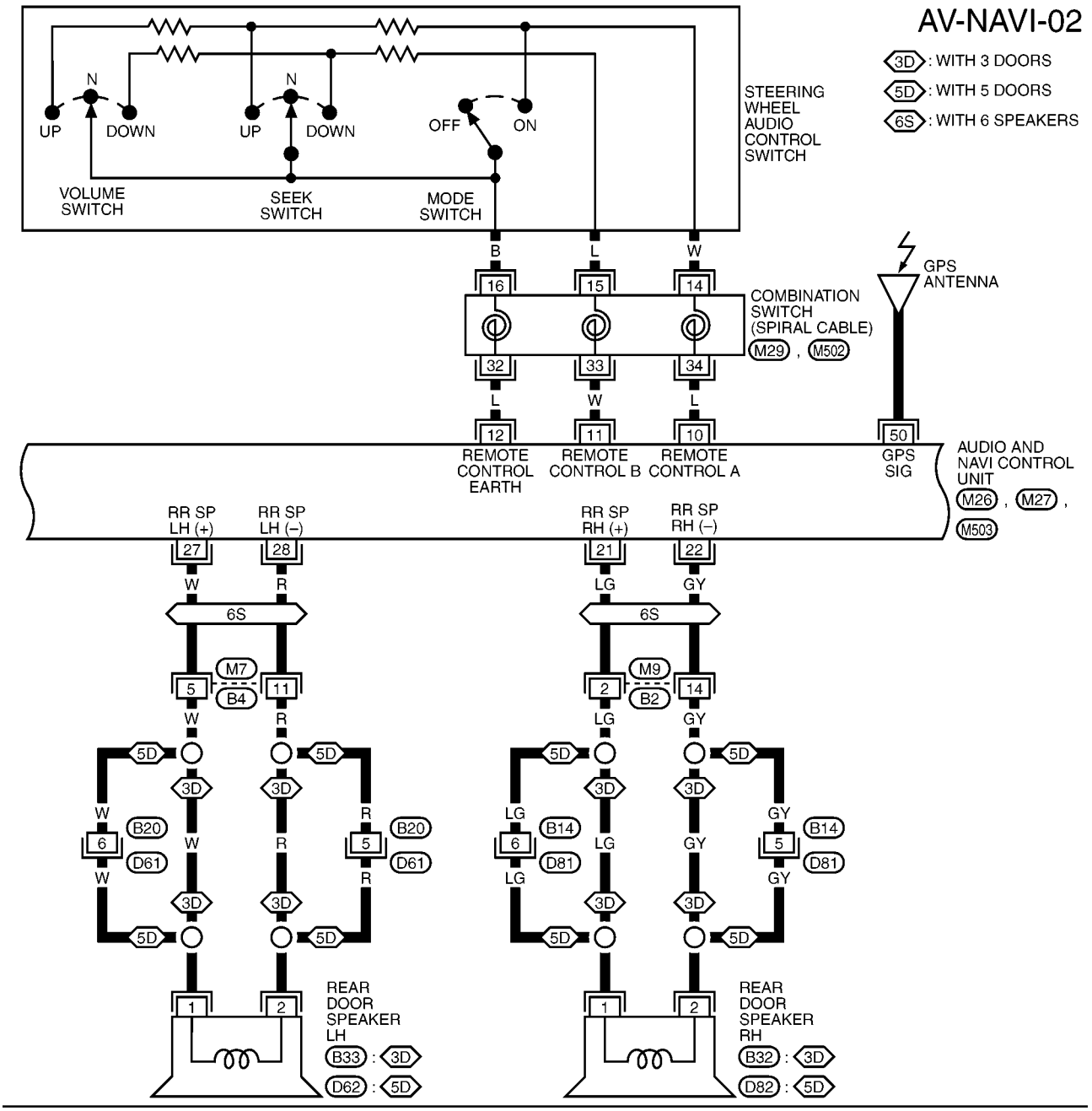






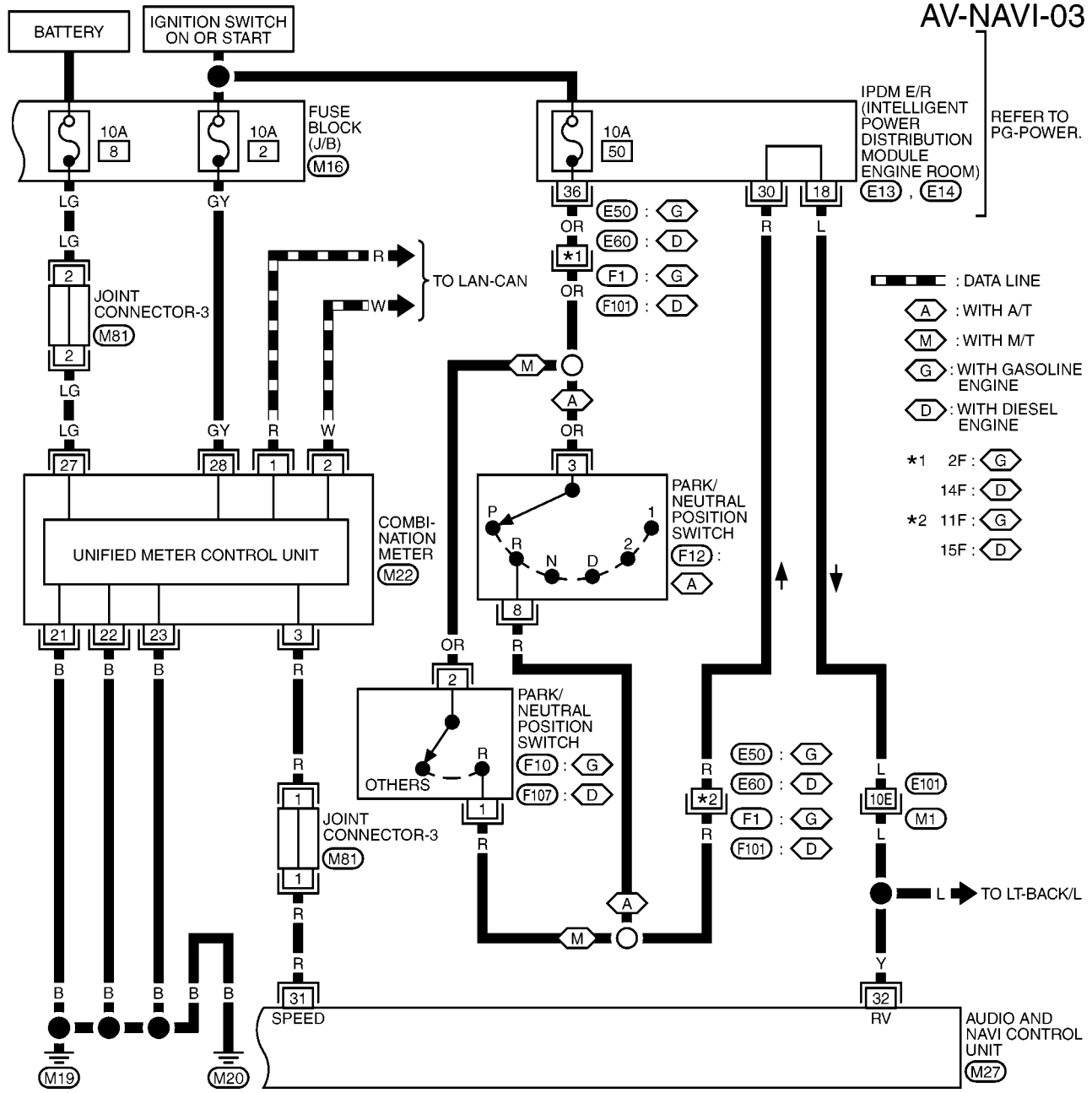
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

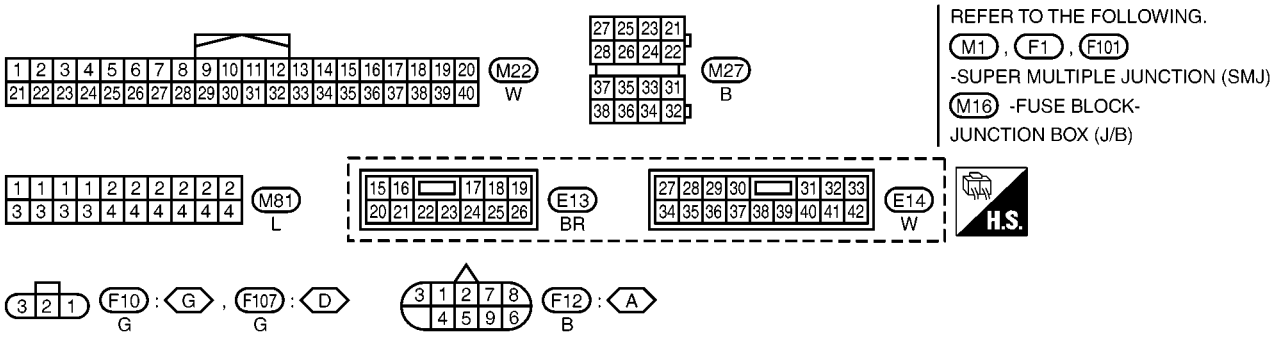
MKWA1822E



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

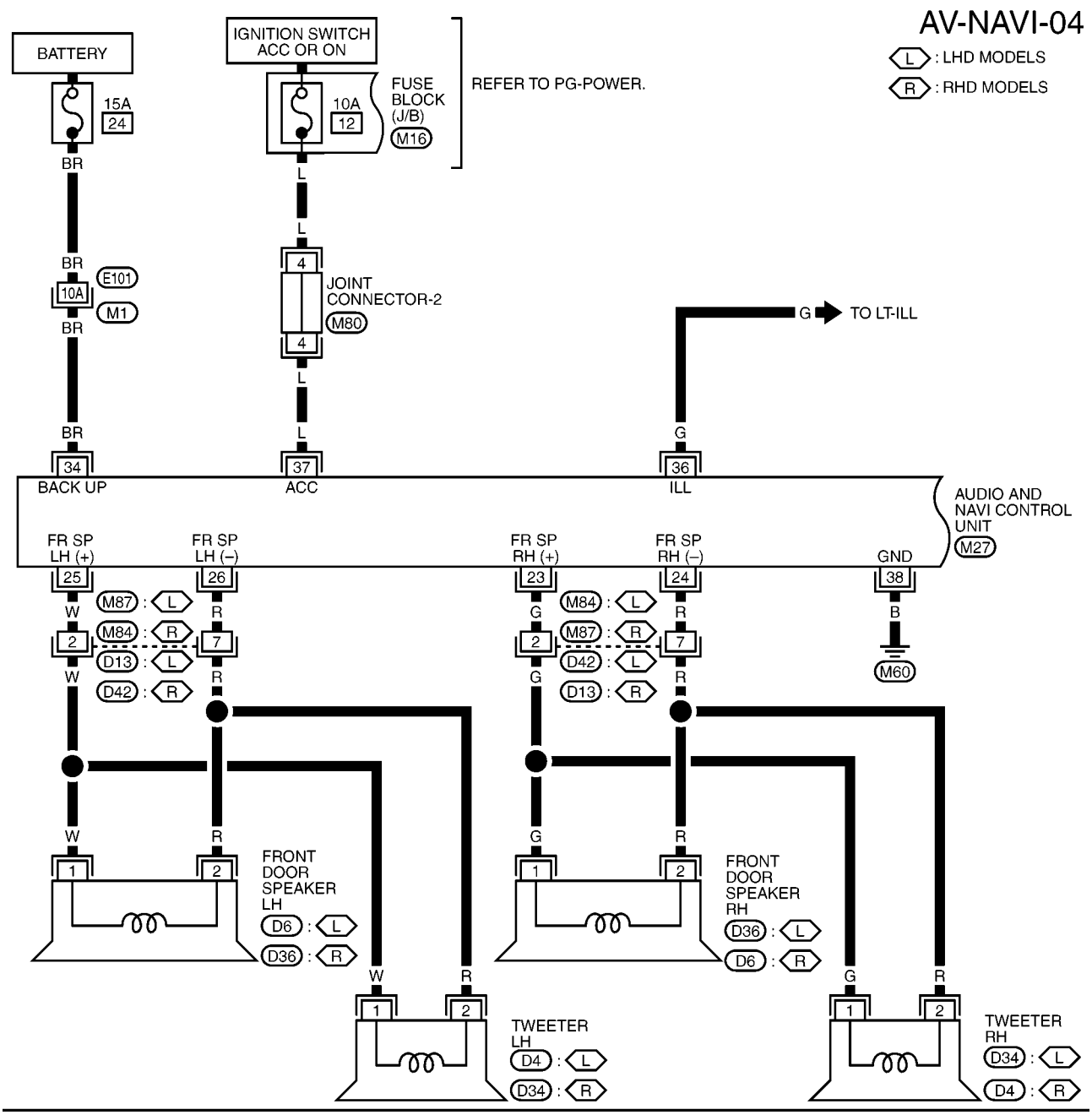
MKWA1823E

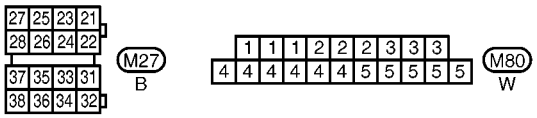

AV-NAVI-03
BATTERY
IGNITION SWITCH ON OR START
FUSE BLOCK (J/B) M16
10A 8
10A 2
10A 50
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E13, E14
REFER TO PG-POWER.
E50 : G
E60 : D
F1 : G
F101 : D
TO LAN-CAN
JOINT CONNECTOR-3 M81
COMBI-NATION METER M22
UNIFIED METER CONTROL UNIT
PARK/ NEUTRAL POSITION SWITCH F12 : A
PARK/ NEUTRAL POSITION SWITCH F10 : G F107 : D
OTHERS
JOINT CONNECTOR-3 M81
TO LT-BACK/L
SPEED
RV
AUDIO AND NAVI CONTROL UNIT M27
M19
M20
: DATA LINE
A : WITH A/T
M : WITH M/T
G : WITH GASOLINE ENGINE
D : WITH DIESEL ENGINE
*1 2F : G
14F : D
*2 11F : G
15F : D

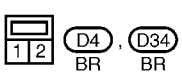

M22 W
M27 B
M81 L
E13 BR
E14 W
H.S.
F10 : G , F107 : D
F12 : A
REFER TO THE FOLLOWING.
M1 , F1 , F101
-SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)

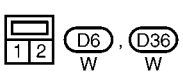
MKWA1386E

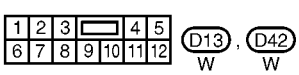
WITH ESP





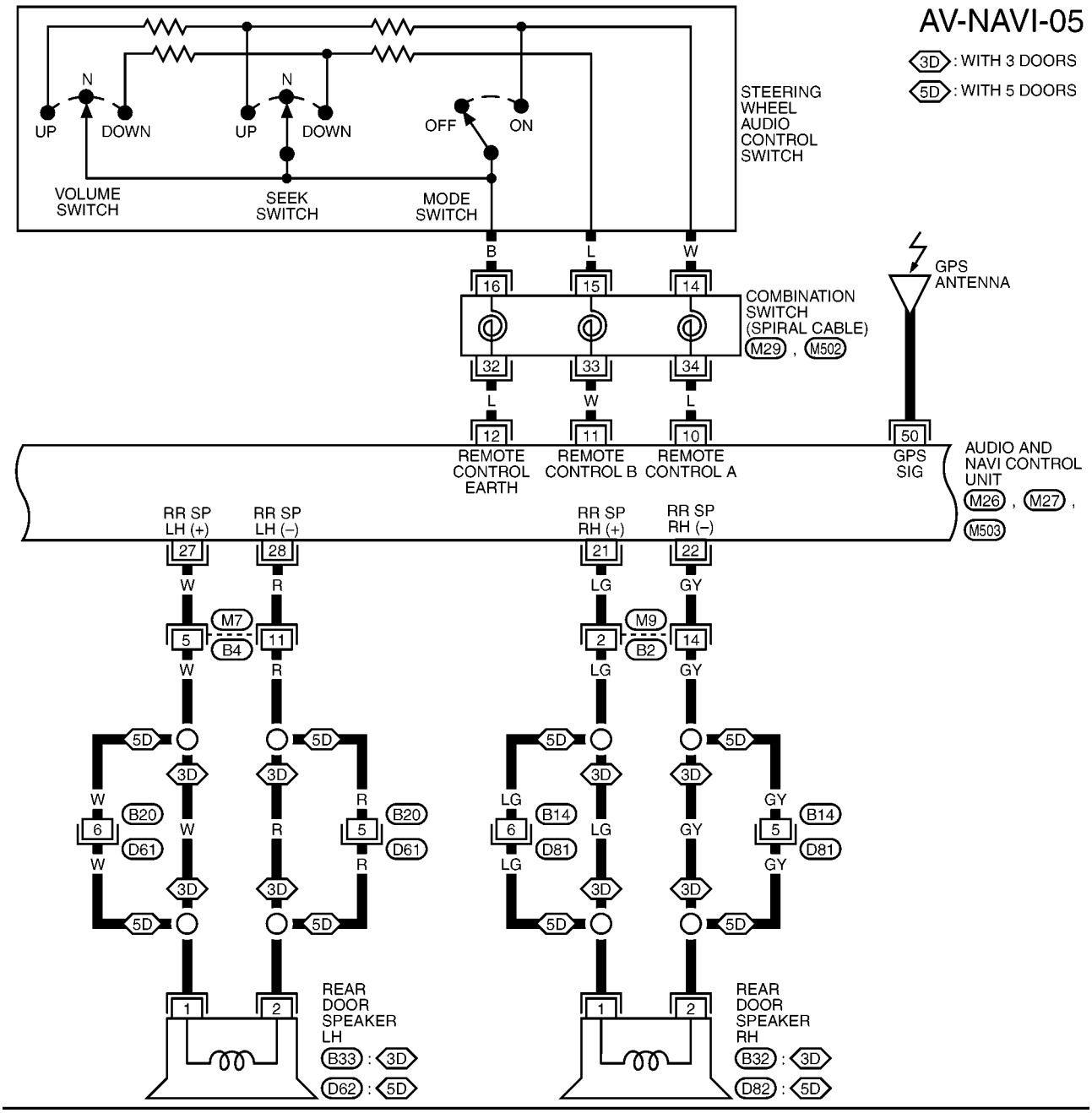


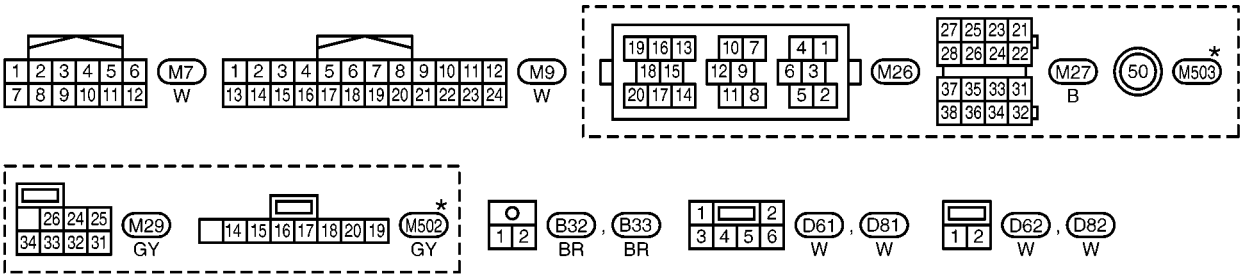




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

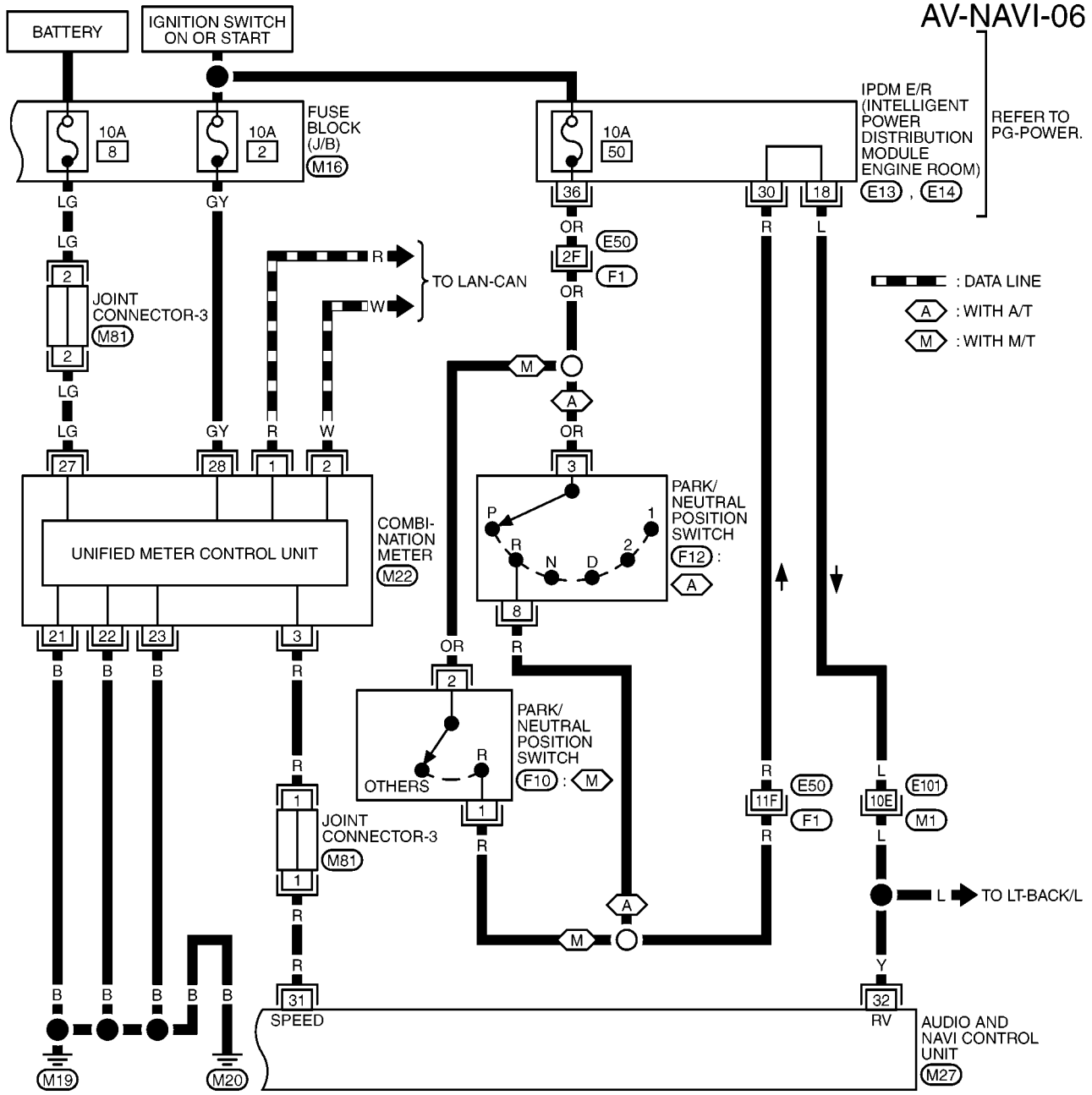
MKWA1824E

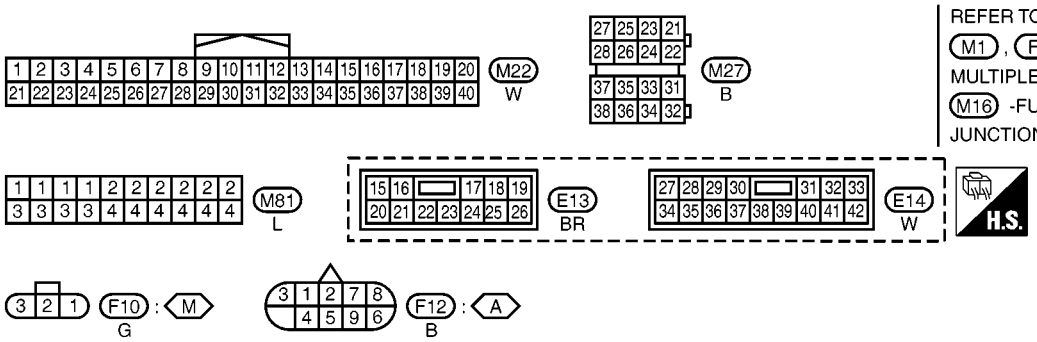




*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

MKWA1825E





REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1826E

SECTION BCS
BODY CONTROL SYSTEM

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Maintenance Information 2
RHD MODELS 2
LHD MODELS 2
Wiring Diagrams and Trouble Diagnosis 2
BCM (BODY CONTROL MODULE) 3
System Description 3
BCM FUNCTION 3
COMBINATION SWITCH READING FUNCTION 3
SYSTEMS CONTROLLED BY BCM 3
SYSTEMS CONTROLLED BY BCM AND IPDM E/R 3
SYSTEMS CONTROLLED BY BCM AND INTELLIGENT KEY UNIT 3
INPUT/OUTPUT 4
CAN COMMUNICATION CONTROL 5
BCM STATUS CONTROL 5
CAN Communication 6
SYSTEM DESCRIPTION 6
CAN Communication Unit 6
TYPE 1/TYPE 2 7
TYPE 3/TYPE 4 10
TYPE 5/TYPE 6 12
TYPE 7/TYPE 8 15
TYPE 9/TYPE 10 17
Schematic 20
CONSULT-II Function (BCM) 22
CONSULT–II INSPECTION PROCEDURE 22
ITEMS OF EACH PART 23
Configuration 24
DESCRIPTION 24
READ CONFIGURATION PROCEDURE 24
WRITE CONFIGURATION PROCEDURE 27
CAN Communication Inspection With CONSULT-II (Self-Diagnosis) 31
Removal and Installation of BCM 31
REMOVAL 31
INSTALLATION 31

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS00736

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EKS008WP

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

Wiring Diagrams and Trouble Diagnosis

EKS00737

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams".
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses".
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident".

BCM (BODY CONTROL MODULE)

PFP:284B2

System Description

EKS007SV

BCM (Body Control Module) controls the operation of various electrical units installed on the vehicle.

BCM FUNCTION

BCM has a combination switch reading function for reading the operation of combination switches (light, wiper washer, turn signal) in addition to the function for controlling the operation of various electrical components. Also, it functions as an interface that receives signals from the A/C auto amplifier, and sends signals to ECM using CAN communication.

COMBINATION SWITCH READING FUNCTION

BCM reads combination switch (headlamp, wiper and washer, turn signal) status, and controls various electrical components according to the results.
BCM reads information of 20 switches and 5 diagnostic results by combining five output terminals (Output 1 - 5) and five input terminals (Input 1 - 5).
Refer to LT-189, "COMBINATION SWITCH" .

SYSTEMS CONTROLLED BY BCM

- Power door lock system. Refer to BL-15, "POWER DOOR LOCK SYSTEM" .
- Super lock system. Refer to BL-70, "POWER DOOR LOCK — SUPER LOCK —" .
- Multi-remote control system. Refer toBL-131, "MULTI-REMOTE CONTROL SYSTEM" .
- Power window system. Refer to GW-52, "POWER WINDOW SYSTEM" .
- Interior room lamp timer. Refer to LT-200, "INTERIOR ROOM LAMP" .
- Warning chime. Refer to DI-81, "WARNING CHIME" .
- Turn signal and hazard warning lamps. Refer to LT-121, "TURN SIGNAL AND HAZARD WARNING LAMPS" .
- Rear wiper. Refer to WW-82, "REAR WIPER AND WASHER SYSTEM" .
- Rear fog lamp. Refer to LT-100, "REAR FOG LAMP" .

SYSTEMS CONTROLLED BY BCM AND IPDM E/R

- NATS. Refer to BL-223, "NATS(Nissan Anti-Theft System)" .
- Front wiper. Refer to WW-5, "FRONT WIPER AND WASHER SYSTEM" (without rain sensor) or WW-48, "FRONT WIPER AND WASHER SYSTEM (WITH RAIN SENSOR)" .
- Front washer. Refer to WW-5, "FRONT WIPER AND WASHER SYSTEM" (without rain sensor) or WW-48, "FRONT WIPER AND WASHER SYSTEM (WITH RAIN SENSOR)" .
- Rear window defogger. Refer to GW-14, "REAR WINDOW DEFOGGER" .
- Front fog lamp. Refer to LT-74, "FRONT FOG LAMP" .
- Headlamp washer. Refer to WW-110, "HEADLAMP WASHER" .

SYSTEMS CONTROLLED BY BCM AND INTELLIGENT KEY UNIT

- Intelligent Key system. Refer to BL-152, "INTELLIGENT KEY SYSTEM" .

INPUT/OUTPUT

System	Input	Output
Multi-remote control system	Remote controller	● Door lock actuator ● Back door release actuator ● Turn signal lamp (LH, RH)
Intelligent Key system	Intelligent Key unit	● Door lock actuator ● Back door release actuator ● Turn signal lamp ● Combination meter
Power door lock system/ Super lock system	● Key switch ● Door lock/unlock switch ● Door switches	● Door lock actuator ● Back door release actuator
Power supply (IGN) to power window system	Ignition power supply	● Power window main switch ● Front power window switch (passenger side) ● Sunroof motor assembly
Power supply (BAT) to power window system	Battery power supply	● Power window main switch ● Front power window switch (passenger side) ● Sunroof motor assembly
Headlamp	Combination switch	IPDM E/R (headlamp relay)
Tail lamp	Combination switch	IPDM E/R (tail lamp relay)
Rear fog lamp	Combination switch	Rear combination lamp (Refer fog)
Turn signal lamp	Combination switch	● Turn signal lamps ● Combination meter
Hazard warning lamp	Hazard switch	● Turn signal lamps ● Combination meter
Interior room lamp timer	● Key switch ● Intelligent Key unit (key switch signal) ● Remote controller ● Door lock/unlock switch ● Front door switch (driver side) ● Door switches	Interior room lamp
Ignition key warning chime	● Key switch ● Intelligent Key unit (key switch signal) ● Front door switch (driver side)	Combination meter (warning buzzer)
Light warning chime	● Combination switch ● Key switch ● Intelligent Key unit (key switch signal) ● Front door switch (driver side)	Combination meter (warning buzzer)
Front wiper with rain sensor	● Combination switch ● Combination meter ● Rain sensor	IPDM E/R (front wiper relays)
Front washer	Combination switch	Washer motor
Rear wiper	Combination switch	Rear wiper motor
Rear washer	Combination switch	Washer motor
Headlamp washer	Headlamp washer switch	Headlamp washer relay (via IPDM E/R)

System	Input	Output
Rear window defogger	● A/C auto amp. (Rear window defogger switch) (with auto amp). ● Heater control panel (Rear window defogger switch) (with manual A/C).	IPDM E/R (rear window defogger relay)
A/C switch signal	A/C auto amp.	ECM
Blower fan switch signal	A/C auto amp.	ECM

CAN COMMUNICATION CONTROL

CAN communication is capable of dealing with a lot of information through the two communication lines (CAN L line, CAN H line) connecting control units in the system. Also each control unit functions to transmit and receive data, and reads necessary information only.

BCM STATUS CONTROL

BCM changes its status depending on the operation status in order to save power consumption.

1. CAN communication status
   - With ignition switch ON, CAN communicates with other control units normally.
   - Control by BCM is being operated properly.
   - When ignition switch is OFF, switching to sleep mode is possible.
   - Even when ignition switch is OFF, if CAN communication with IPDM E/R and combination meter is active, CAN communication status is active.
2. Pre-sleep status
   - This is the status to stop CAN communication when ignition switch is turned OFF.
   - It transmits sleep request signal to IPDM E/R and combination meter.
   - Two seconds after CAN communication with another control unit stops, it switches to CAN communication inactive status.
3. CAN communication inactive status
   - With ignition switch OFF, CAN communication is not active.
   - With ignition switch OFF, control performed only by BCM is active.
   - Two seconds after CAN communication with another control unit stops, it switches to CAN communication inactive status.
4. Sleep status
   - BCM is activated with low-current-consumption mode.
   - CAN communication is not active.
   - When CAN communication operation is detected, it switches to CAN communication status.
   - When control performed only by BCM is required by switch, it shifts to CAN communication inactive mode.
   - It changes combination switch reading function.

CAN Communication

EKS00KBK

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00KBL

Go to CAN system, when selecting your car model from the following table.

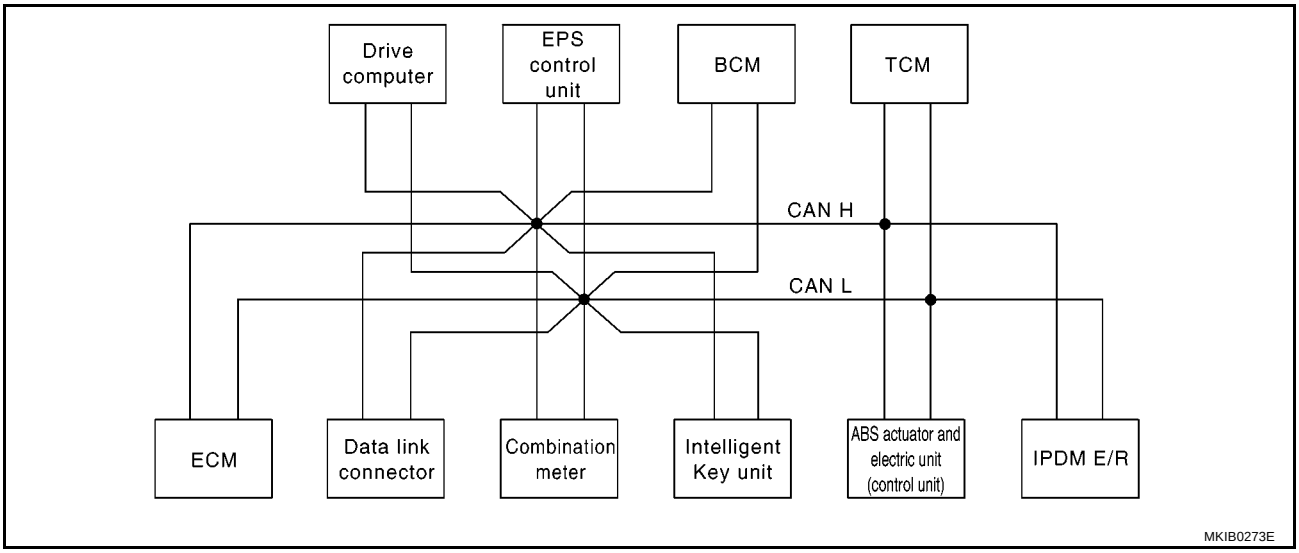
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	BCS-7, "TYPE 1/ TYPE 2"				BCS-10, "TYPE 3/TYPE 4"				BCS-12, "TYPE 5/TYPE 6"				BCS-15, "TYPE 7/TYPE 8"				BCS-17, "TYPE 9/TYPE 10"			

×: Applicable

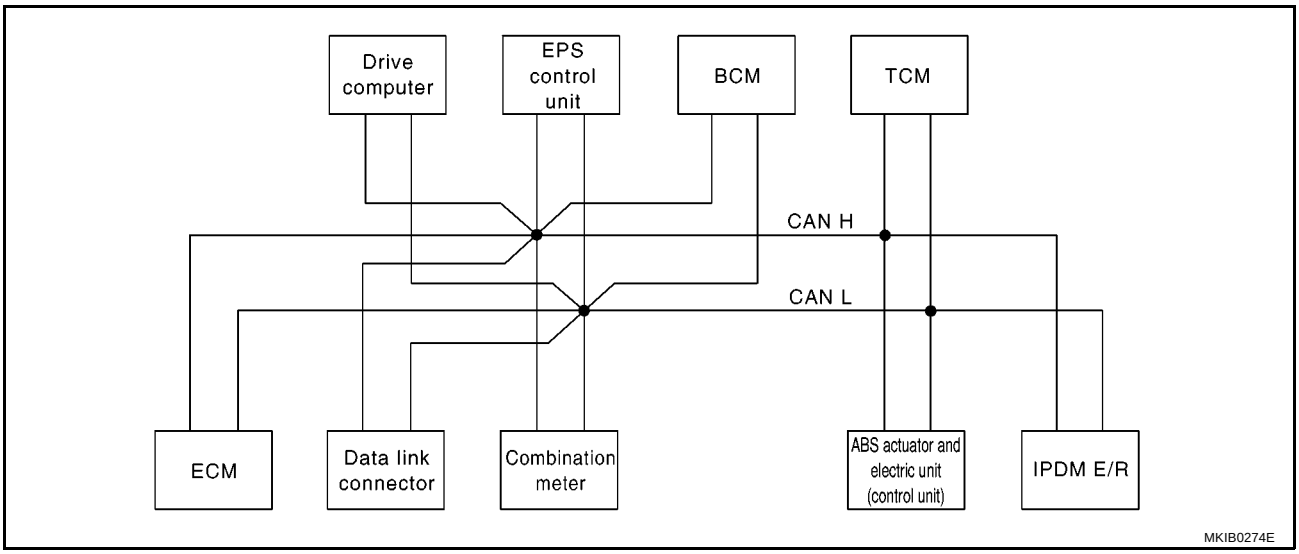
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

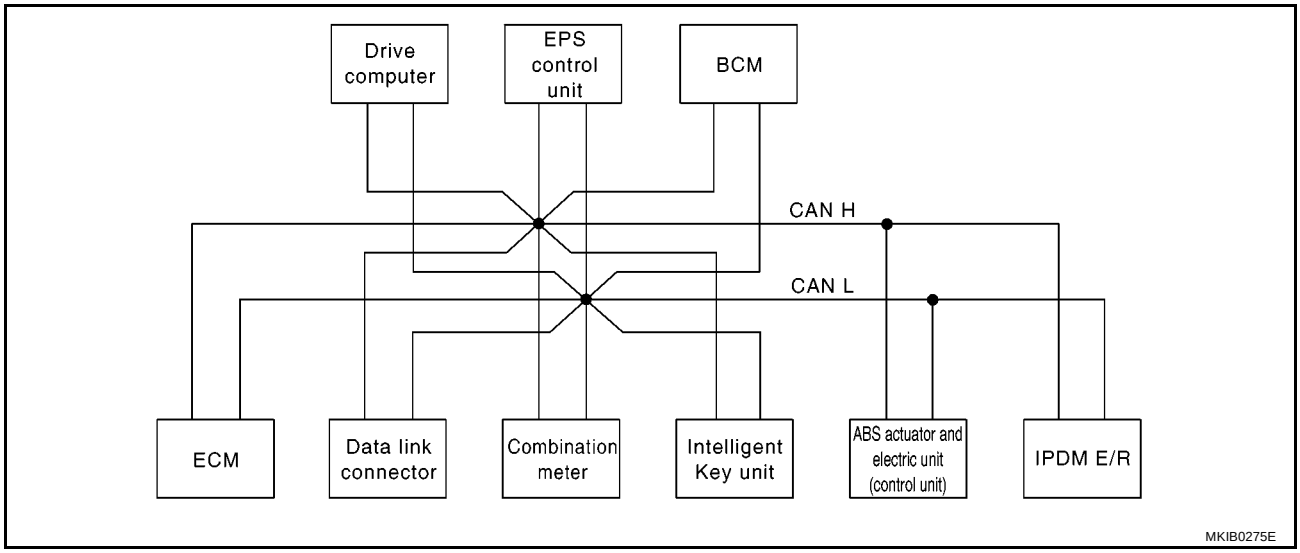
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

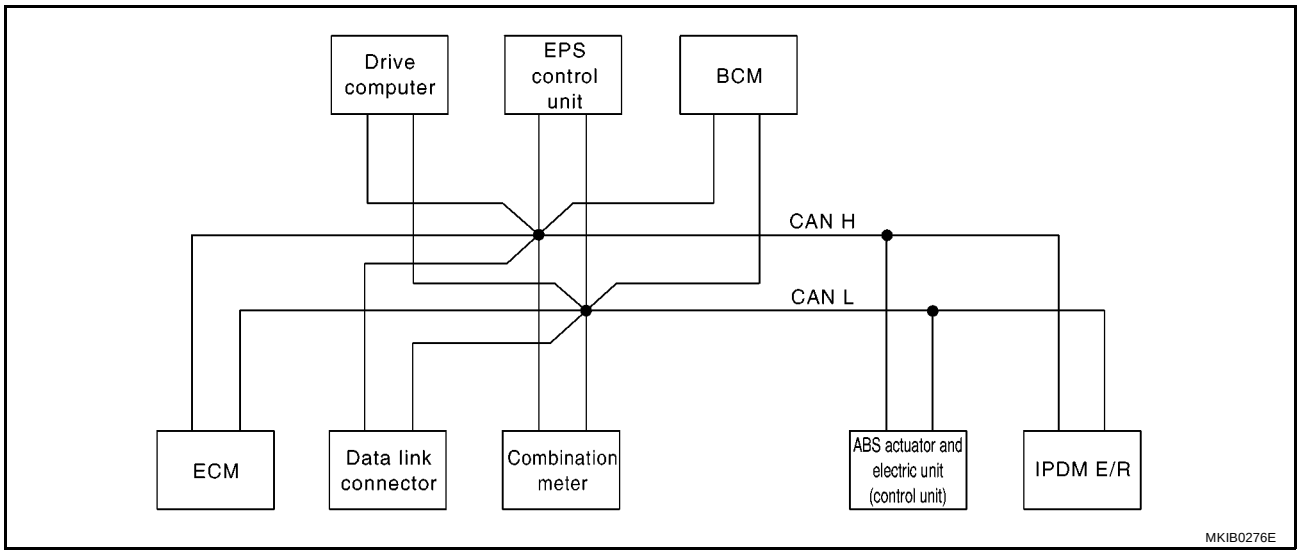
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

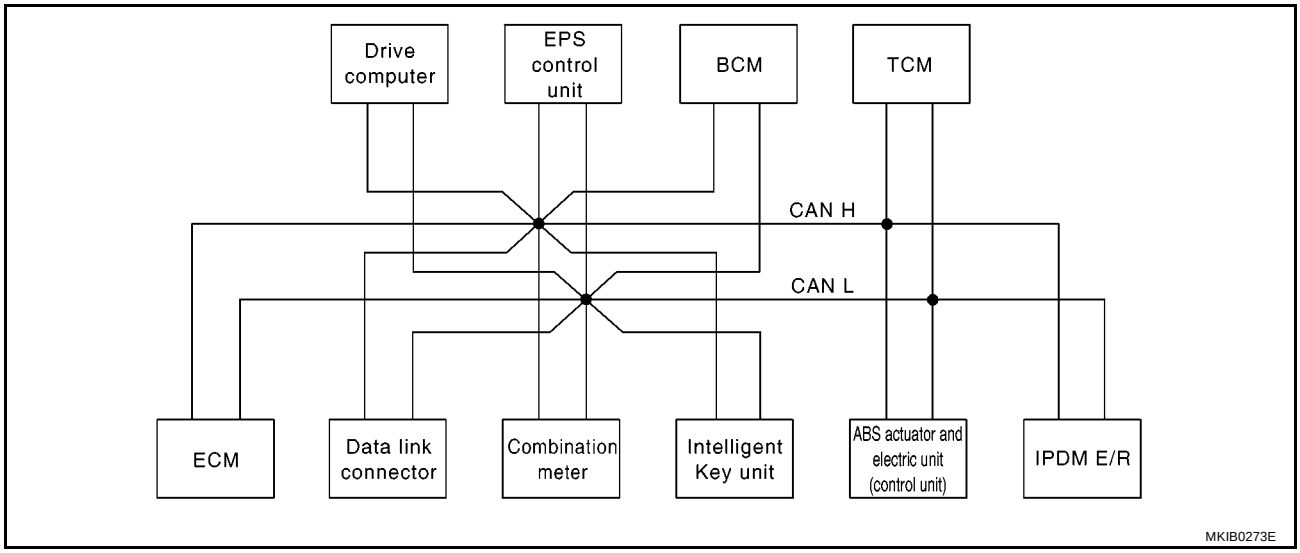
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

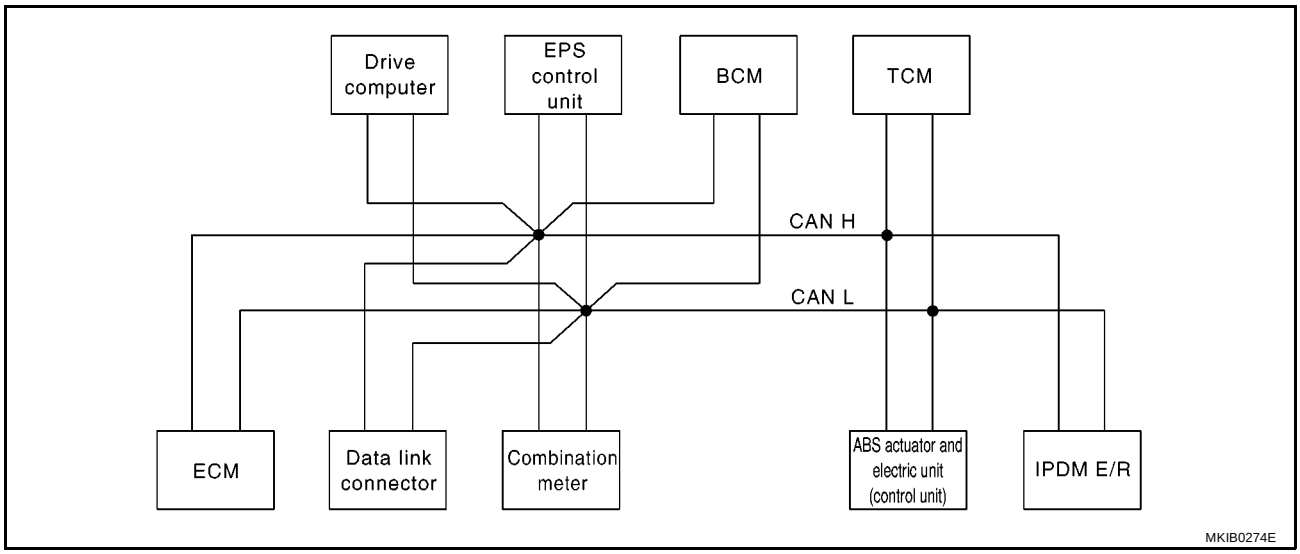
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

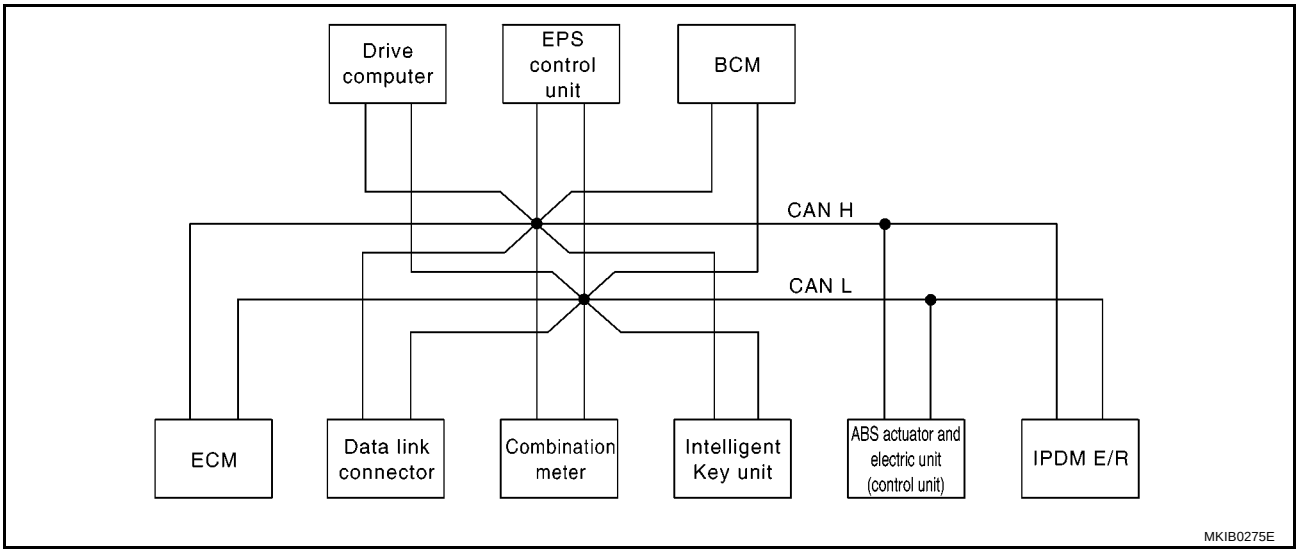
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

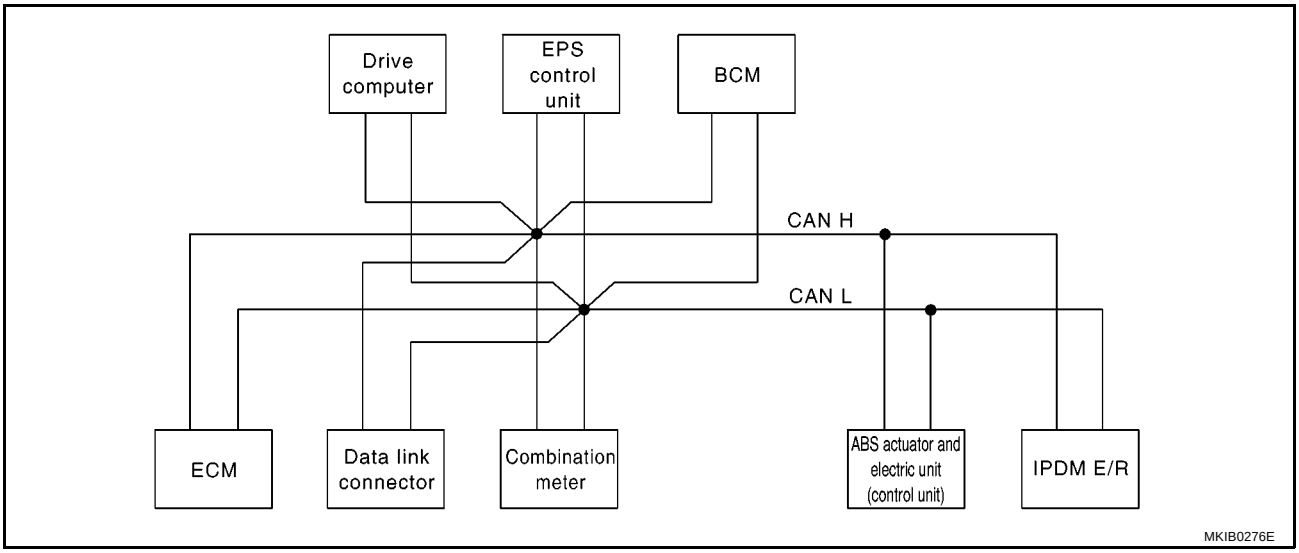
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

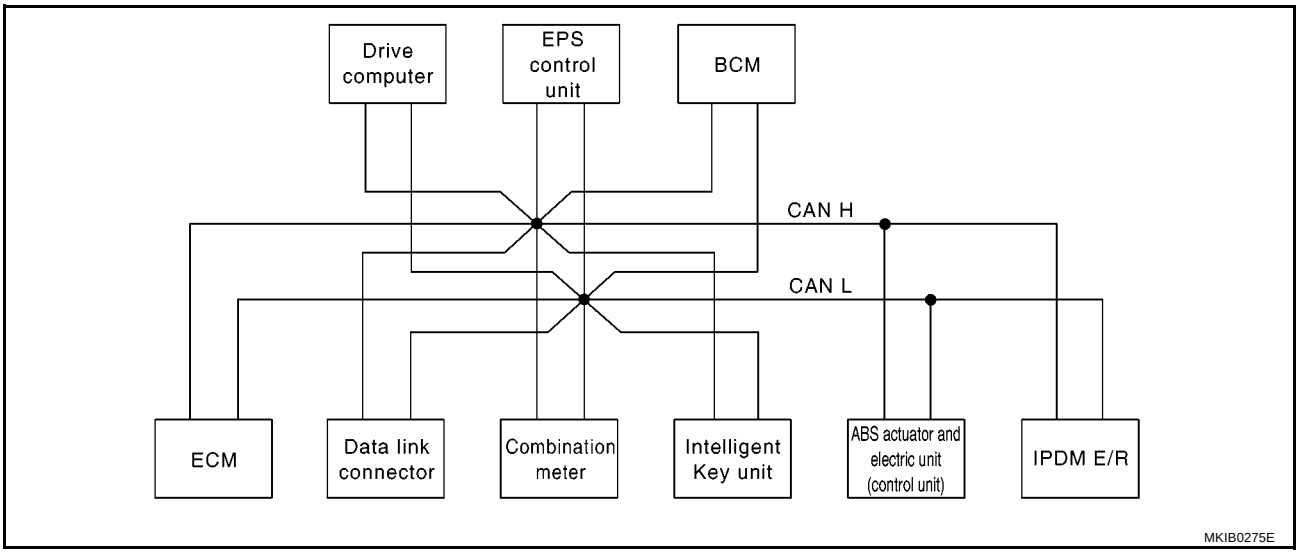
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

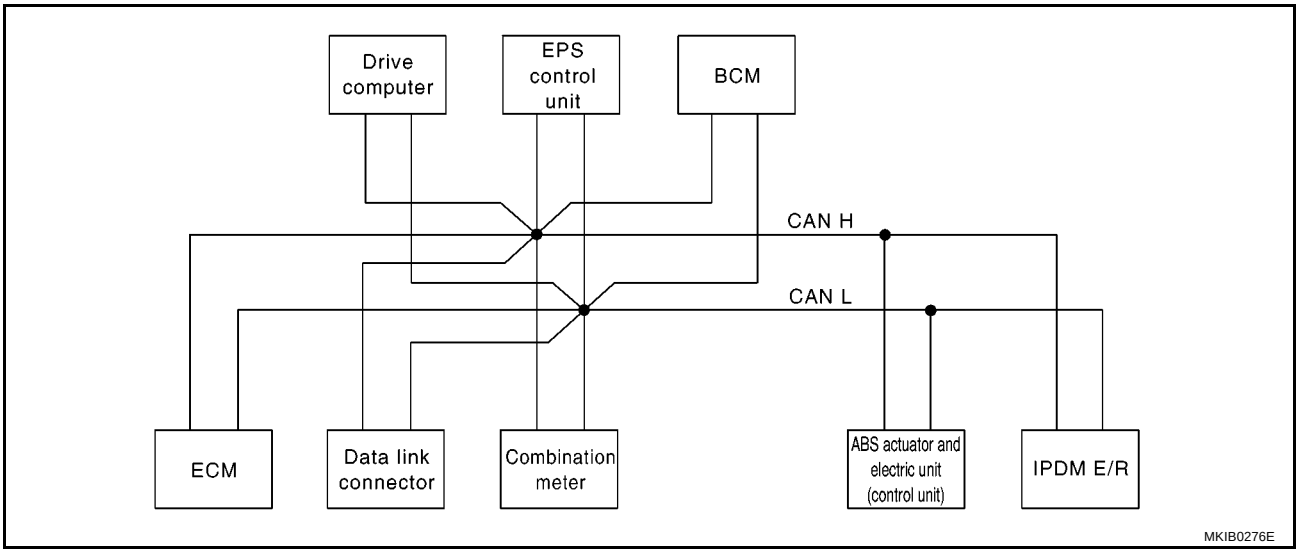
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

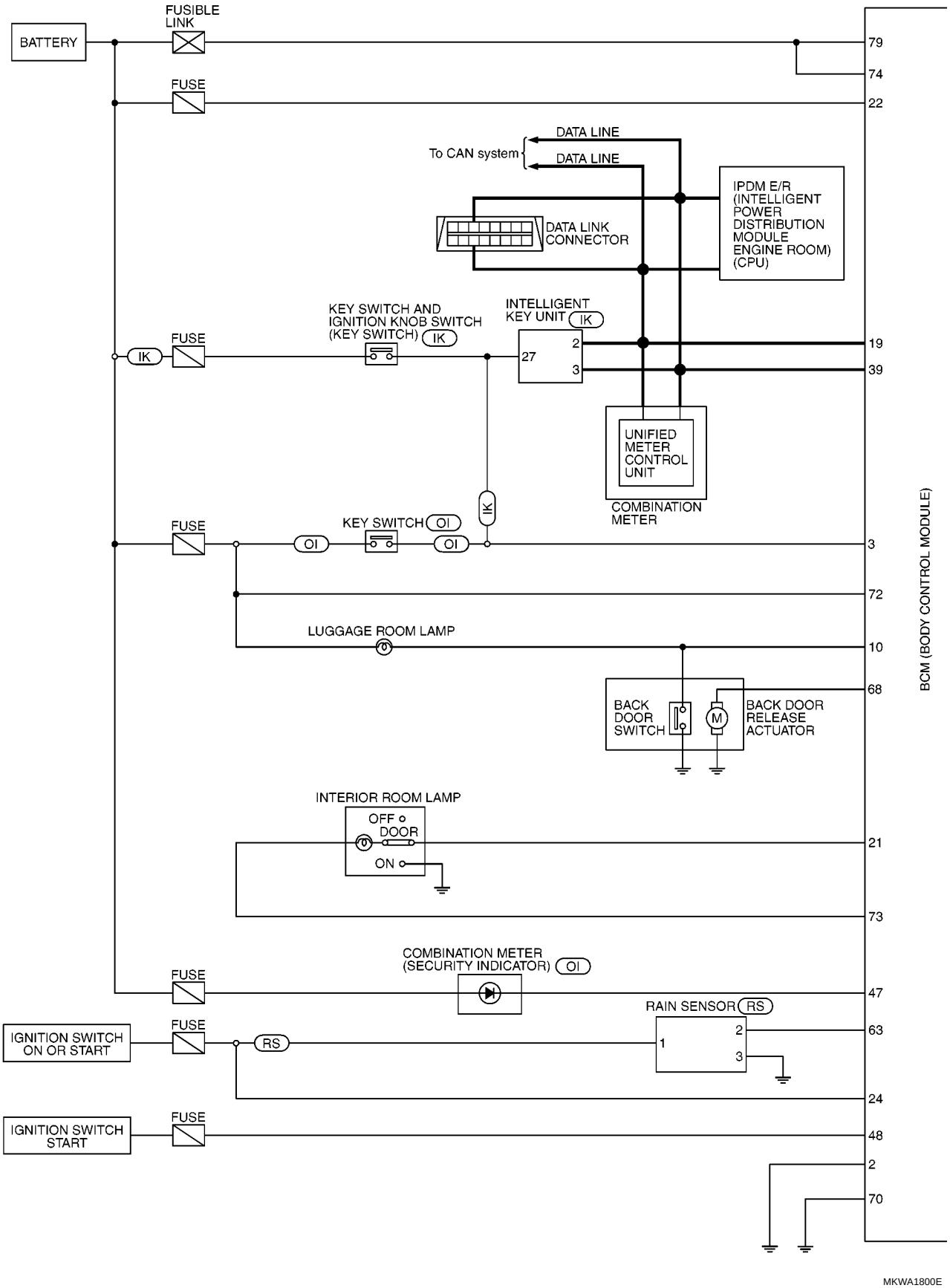
T: Transmit R: Receive

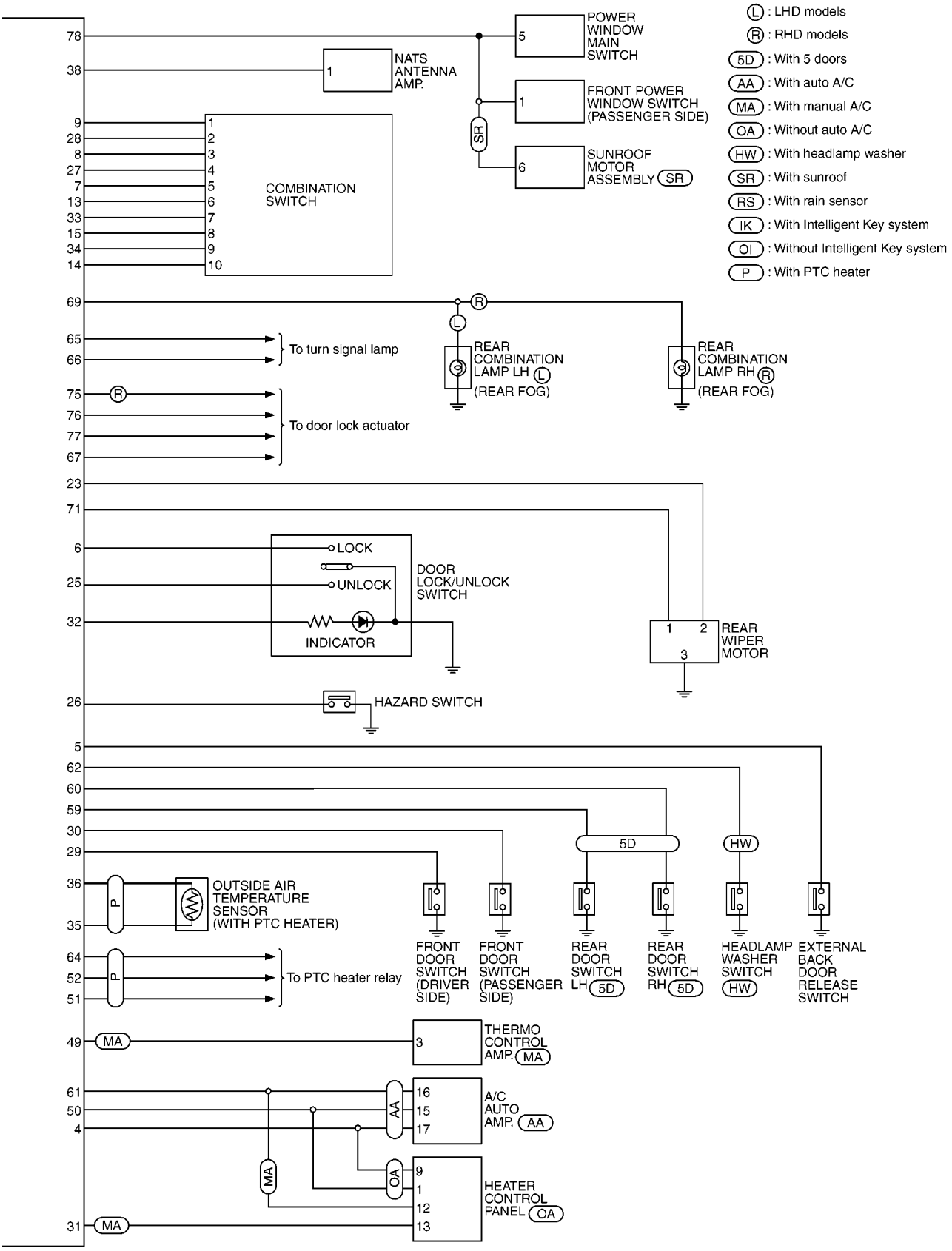
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic

EKS007SY




Ⓛ : LHD models
Ⓡ : RHD models
5D : With 5 doors
AA : With auto A/C
MA : With manual A/C
OA : Without auto A/C
HW : With headlamp washer
SR : With sunroof
RS : With rain sensor
IK : With Intelligent Key system
OI : Without Intelligent Key system
P : With PTC heater
POWER WINDOW MAIN SWITCH
NATS ANTENNA AMP.
FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
SUNROOF MOTOR ASSEMBLY SR
COMBINATION SWITCH
To turn signal lamp
REAR COMBINATION LAMP LH Ⓛ (REAR FOG)
REAR COMBINATION LAMP RH Ⓡ (REAR FOG)
To door lock actuator
LOCK
UNLOCK
INDICATOR
DOOR LOCK/UNLOCK SWITCH
REAR WIPER MOTOR
HAZARD SWITCH
OUTSIDE AIR TEMPERATURE SENSOR (WITH PTC HEATER)
To PTC heater relay
FRONT DOOR SWITCH (DRIVER SIDE)
FRONT DOOR SWITCH (PASSENGER SIDE)
REAR DOOR SWITCH LH 5D
REAR DOOR SWITCH RH 5D
HEADLAMP WASHER SWITCH HW
EXTERNAL BACK DOOR RELEASE SWITCH
THERMO CONTROL AMP. MA
A/C AUTO AMP. AA
HEATER CONTROL PANEL OA

MKWA1550E

CONSULT-II Function (BCM)

EKS007SZ

CONSULT-II can display each diagnostic item using the diagnostic modes shown following. Data is recieved and transmitted via the control module communication line.

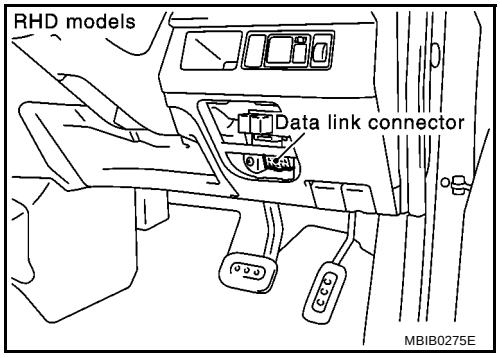
BCM diagnostic test item	Check item, diagnostic test mode	Content
Inspection by part	SELF-DIAGNOSTIC RESULTS	BCM performs self-diagnosis of CAN communication.
	DATA MONITOR	Displays the input data of BCM in real time.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ACTIVE TEST	Gives a drive signal to a load to check the operation.
	ECM PART NUMBER	Displays BCM parts number

CONSULT–II INSPECTION PROCEDURE

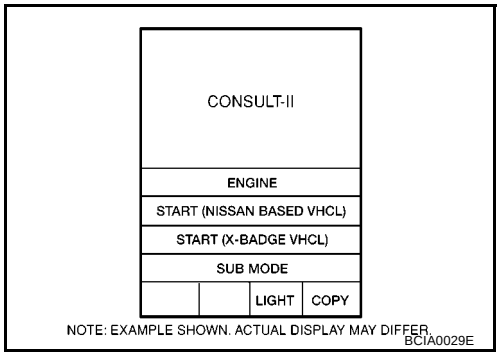
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

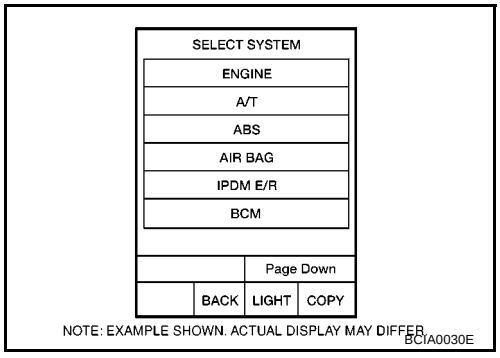
1. With the ignition switch OFF, connect “CONSULT-II” and “CONSULT-II CONVERTER” to the data link connector, then turn the ignition switch ON.



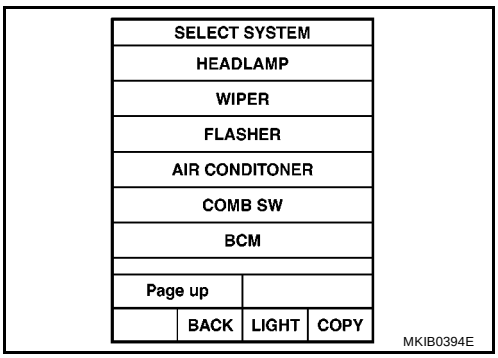
2. Touch “START (NISSAN BASED VHCL)”.



3. Touch “BCM” on “SELECT SYSTEM” screen.
If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



4. Select the desired part to be diagnosed on the “SELECT TEST ITEM” screen.



ITEMS OF EACH PART

×:Applicable

System and item	“TEST ITEM” screen		Diagnostic test mode (Inspection by part)				
			WORK SUPPORT	SELF-DIAG RESULTS	DATA MONITOR	ACTIVE TEST	ECU PARTS NUMBER
Power door lock system	DOOR LOCK		×		×	×	
Rear window defogger	REAR DEFOGGER				×	×	
Ignition key warning chime	BUZZER	KEY REMINDER WARN			×	×	
Light warning chime		LIGHT WARN ALM			×	×	
Back door warning chime		BACK DR OPEN WARN			×	×	
Door warning indicator		DOOR WARN-ING IND			×	×	
Interior room lamp timer	INT LAMP				×	×	
Multi-remote control system	MULTI REMOTE ENT				×		
Headlamp	HEAD LAMP		×		×	×	
Wiper	WIPER		×		×	×	
Turn signal lamp Hazard warning lamp	FLASHER		×		×	×	
A/C switch signal Blower fan switch signal	AIR CONDITIONER				×	×	
Intelligent Key system	INTELLIGENT KEY				×		
Combination switch	COMB SW				×		
BCM	BCM			×	×		×
Theft warning system (Dealer option)	THEFT ALM		×		×		

Configuration

EKS00EJ8

DESCRIPTION

There are two CONFIGURATION functions, as follows.
READ CONFIGURATION is a function for confirming vehicle configuration written on BCM.
WRITE CONFIGURATION is a function for writing a vehicle configuration to BCM.

CAUTION:

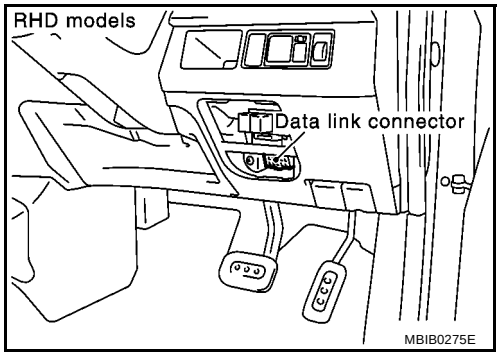
- **When replacing BCM, completely perform WRITE CONFIGURATION with CONSULT-II.**
- **Orderly complete the procedure of WRITE CONFIGURATION.**
- **If you set incorrect WRITE CONFIGURATION, vehicle operation will not be correct.**
- **Configuration is different by each vehicle model, confirm configuration in each case.**

READ CONFIGURATION PROCEDURE

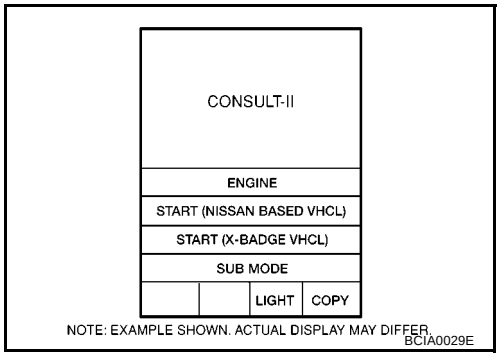
CAUTION:

If CONSULT-II is used with no connection of CONSULT CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

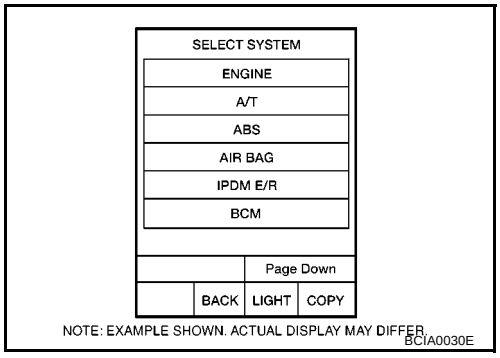
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



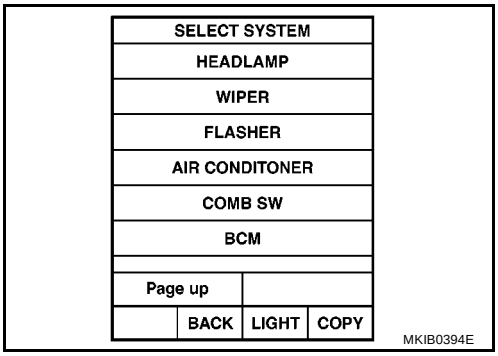
2. Touch “START(NISSAN BASED VHCL)”.



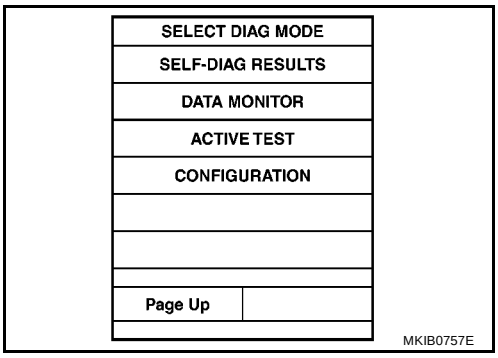
3. Touch “BCM” on “SELECT SYSTEM” screen.
If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



4. Touch “BCM” on “SELECT TEST SYSTEM” screen.

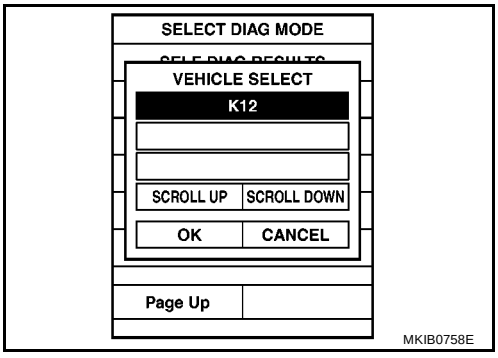


5. Touch “CONFIGURATION” on “SELECT DIAG MODE” screen.

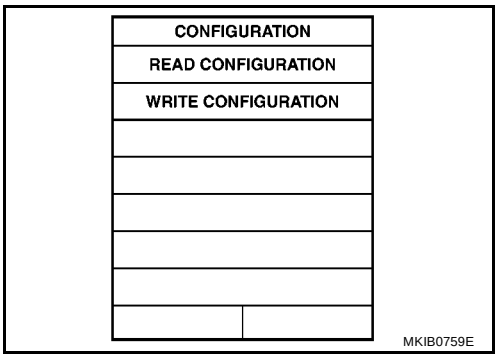


6. Touch “K12”, and “OK” on “VEHICLE SELECT” screen.
For canceling, touch “CANCEL” on “VEHICLE SELECT” screen.

NOTE:
Confirm vehicle model on GI-47, "IDENTIFICATION PLATE" .



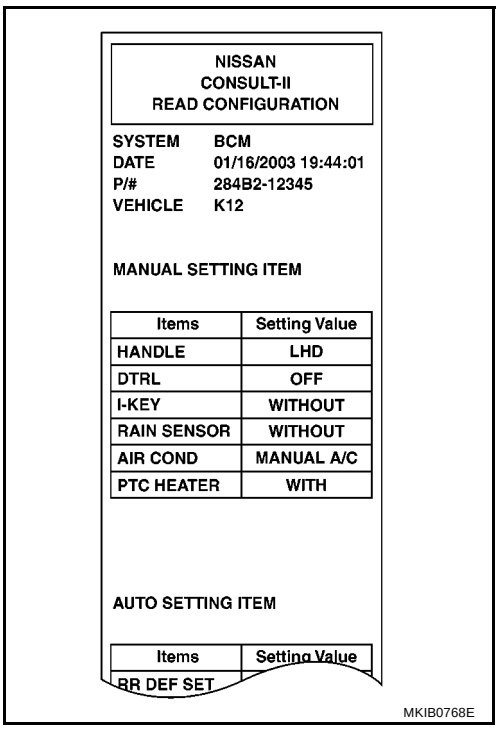
7. Touch “READ CONFIGURATION” on “CONFIGURATION” screen.



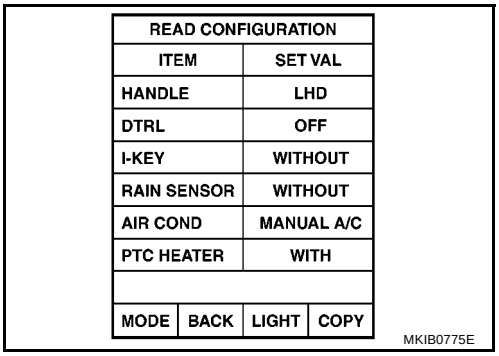
8. Configuration of brand-new BCM are printed out automatically. Configuration of brand-new BCM before executing “WRITE CONFIGURATION” is as follows.

MANUAL SET ITEM	
ITEM	SET VAL
HANDLE	LHD
DTRL	OFF
I-KEY	WITHOUT
RAIN SENSOR	WITHOUT
AIR COND	HEATER
PTC HEATER	WITHOUT

AUTO SET ITEM	
RR DEF SET	YET
H/L WASH FREQ	5
DONGLE	OFF
SUPER LOCK	WITH
DOOR LCK SET 1	5
DOOR LCK SET 2	7
LIT OFF TIMER	ON



9. Touch “BACK” on “ READ CONFIGURATION“screen.

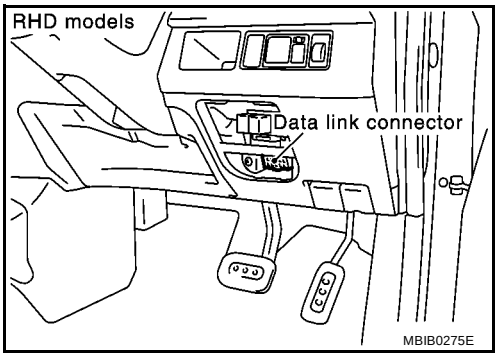


WRITE CONFIGURATION PROCEDURE

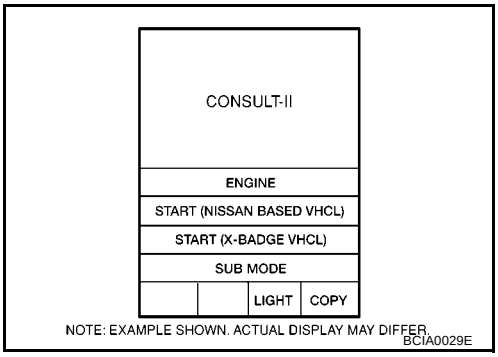
CAUTION:

If CONSULT-II is used with no connection of CONSULT CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

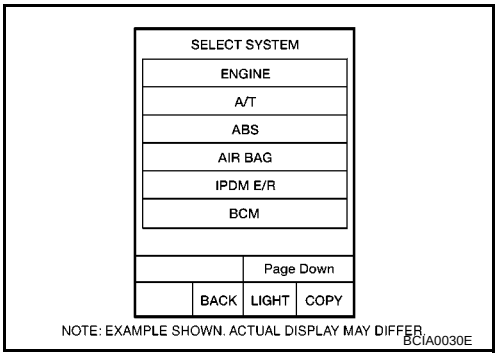
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



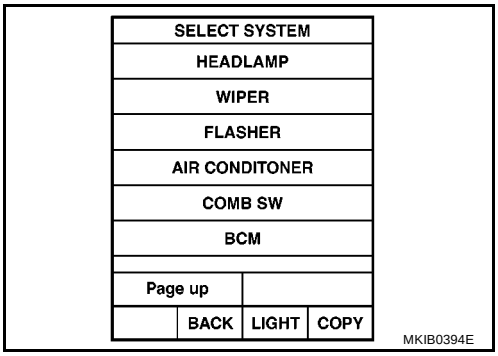
2. Touch “START(NISSAN BASED VHCL)”.



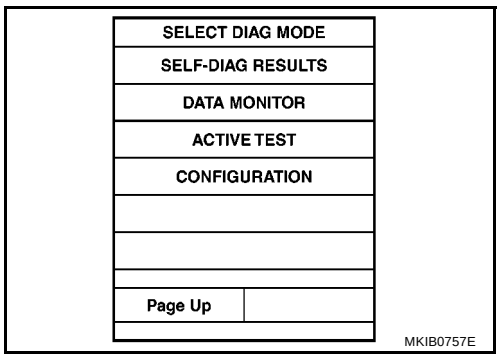
3. Touch “BCM” on “SELECT SYSTEM” screen.
If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



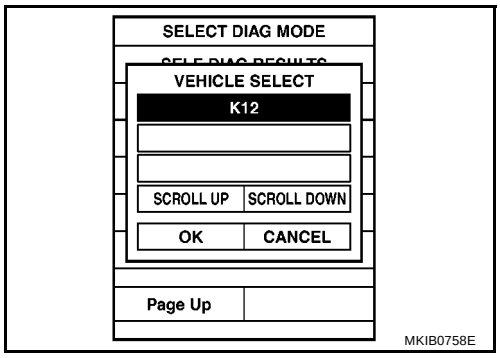
4. Touch “BCM” on “SELECT TEST SYSTEM” screen.



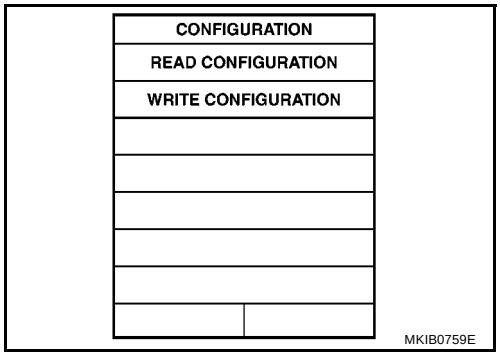
5. Touch “CONFIGURATION” on “SELECT DIAG MODE” screen.



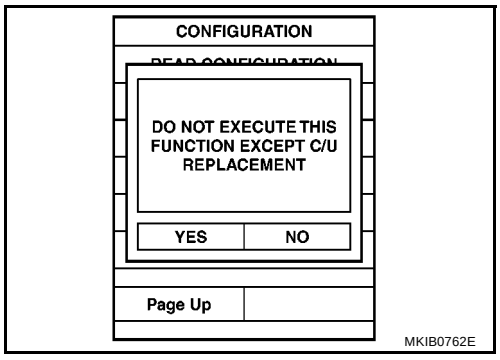
6. Touch “K12”, and “OK” on “VEHICLE SELECT” screen.
For canceling, touch “CANCEL” on “VEHICLE SELECT” screen.
NOTE:
Confirm vehicle model on GI-47, "IDENTIFICATION PLATE" .



7. Touch “WRITE CONFIGURATION” on “CONFIGURATION“screen.

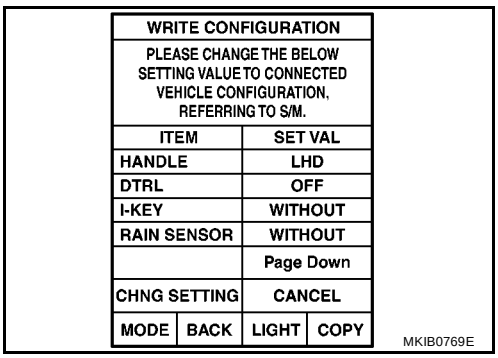


8. Touch “YES”.
For canceling, touch “NO”.

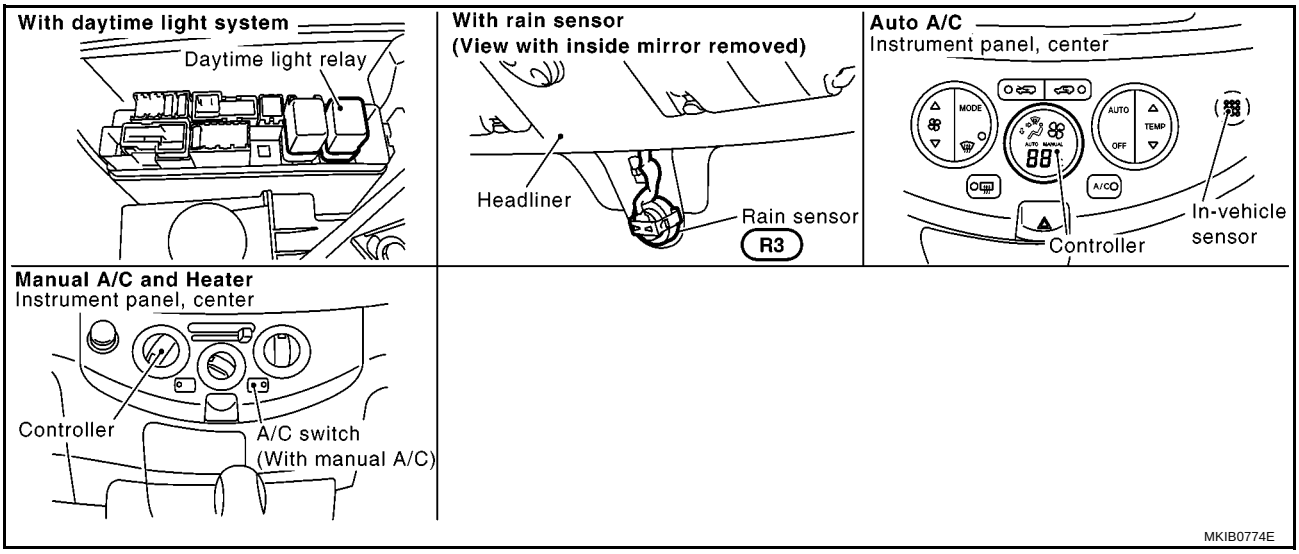


9. Select the configuration for the vehicle on “WRITE CONFIGURATION”screen based on the following ITEM LIST.
< ITEM LIST>

ITEM	SET VAL	NOTE
HANDLE	LHD	For LHD models
	RHD	For RHD models
DTRL (Day time Running Light)	ON	With day time light system*
	OFF	Without day time light system*
I-KEY (Intelligent Key system)	WITH	With Intelligent Key system
	WITHOUT	Without Intelligent Key system
RAIN SENSOR	WITH	With rain sensor*
	WITHOUT	Without rain sensor*
AIR COND	AUTO A/C	With auto A/C*
	MANUAL A/C	With manual A/C*
	HEATER	Heater*
PTC HEATER	WITH	PTC heater is equipped, if 14 digits of the applied model code is marked with “H” or “J”. i.e.:EDHARAFK12EEA “H” …
	WITHOUT	PTC heater is not equipped, if 14 digits of the applied model code is marked without “H” or “J”. i.e.:EDHARAFK12EEA “E” …



*: Refer to bottom illustration to specify the items for “SET VAL”.

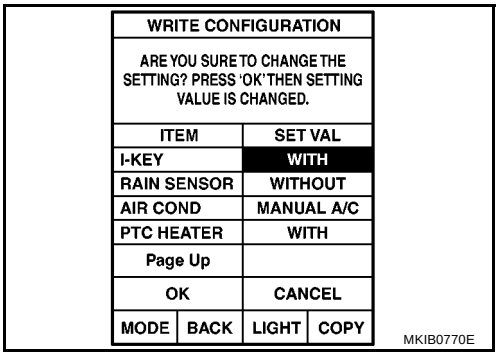


For canceling, touch “CANCEL”.

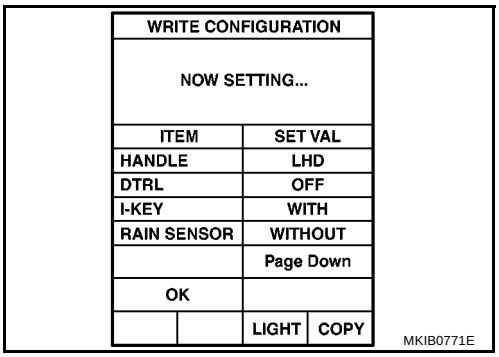
10. Touch “CONFIG” on “WRITE CONFIGURATION“screen.

CAUTION:
Make sure to touch “CONFIG” even if the indicated configuration of brand new BCM is same as the desirable configuration.
If not, configuration which is set automatically by selecting vehicle model can not be memorized.

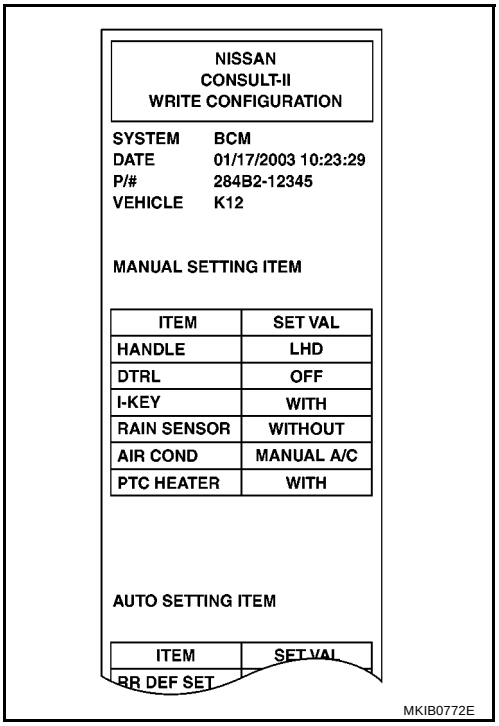
11. Touch “OK” on “WRITE CONFIGURATION”screen. When touched “CANCEL”, go to previous screen.



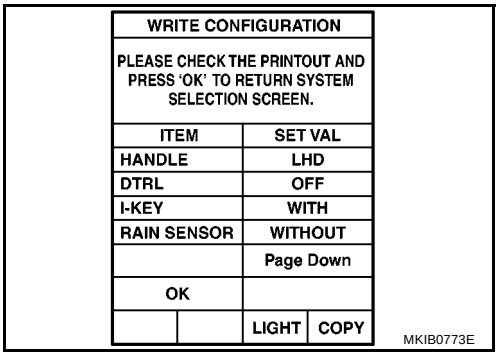
12. Wait until the next screen during setting.



13. WRITE CONFIGURATION results are printed out automatically. Check “WRITE CONFIGURATION” is correctly executed by comparing sheet automatically printed out with desirable configuration.



14. Touch “OK” on “WRITE CONFIGURATION“screen. WRITE CONFIGURATION is completed.



CAN Communication Inspection With CONSULT-II (Self-Diagnosis)

EKS007T0

Go to LAN-4, "Precautions When Using CONSULT-II" .

Removal and Installation of BCM

EKS007T2

CAUTION:

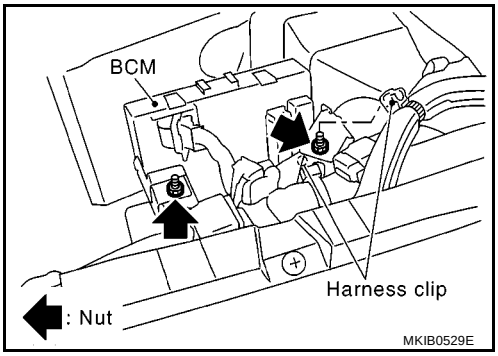
Always replace with new* BCM when the BCM replacement is required.
***: New one means virgin control unit that has never been energized on-board.**

REMOVAL

NOTE:

If possible, before removing BCM, retrieve current BCM configuration to use for reference when configuring brand-new BCM after installation. Refer to BCS-24, "Configuration" .

1. Remove instrument upper panel. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove harness clip.
3. Remove screws to remove BCM.



INSTALLATION

- Install in the reverse order of removal.

SECTION BL

BODY, LOCK & SECURITY SYSTEM

CONTENTS

PRECAUTIONS 5
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 5
Maintenance Information 5
RHD MODELS 5
LHD MODELS 5
Precautions 5
CLIP AND FASTENER 6
List of Table 6
HOOD 7
Fitting Adjustment 7
FRONT END HEIGHT ADJUSTMENT AND LATERAL/LONGITUDINAL CLEARANCE ADJUSTMENT 7
SURFACE MISMATCH ADJUSTMENT 7
Removal and Installation 8
REMOVAL 8
INSTALLATION 9
Removal and Installation of Hood Lock Control 9
REMOVAL 9
INSTALLATION 10
Hood Lock Control Inspection 11
RADIATOR CORE SUPPORT 12
Removal and Installation 12
REMOVAL 12
INSTALLATION 13
FRONT FENDER 14
Removal and Installation 14
REMOVAL 14
INSTALLATION 14
POWER DOOR LOCK SYSTEM 15
Component Parts and Harness Connector Location 15
System Description 16
OPERATION 16
DOOR LOCK AND UNLOCK SWITCH OPERATION 16
KEY REMINDER SYSTEM 17
UNLOCK LINK FUNCTION 17
BACK DOOR OPENER OPERTION 17
CAN Communication 18
SYSTEM DESCRIPTION 18
CAN Communication Unit 18
TYPE 1/TYPE 2 19
TYPE 3/TYPE 4 22
TYPE 5/TYPE 6 24
TYPE 7/TYPE 8 27
TYPE 9/TYPE 10 29
Schematic – D/LOCK – (Without Intelligent Key System) 32
Wiring Diagram — D/LOCK — (Without Intelligent Key System) 33
Schematic – D/LOCK – (With Intelligent Key System) 38
Wiring Diagram — D/LOCK — (With Intelligent Key System) 39
Terminal and Reference Value for BCM 44
CONSULT- II Inspection Procedure 45
CONSULT- II Application Items 46
WORK SUPPORT 46
DATA MONITOR 46
ACTIVE TEST 46
TROUBLE DIAGNOSES CHART BY SYMPTOM/WITHOUT INTELLIGENT KEY SYSTEM 47
TROUBLE DIAGNOSES CHART BY SYMPTOM/WITH INTELLIGENT KEY SYSTEM 48
Check Power Supply and Ground Circuit of BCM 49
Check Door Lock / Unlock Switch 50
Check Key Switch /Without Intelligent Key System 51
Check Key Switch/With Intelligent Key System 52
Check Door Lock Actuator Circuit. 53
Check Door Lock Actuator 54
DRIVER SIDE 54
PASSENGER SIDE 55
REAR LH SIDE 56
REAR RH SIDE 57
Check Door Switch 58
DRIVER SIDE 58
PASSENGER SIDE 60
REAR LH SIDE 62

REAR RH SIDE 64
Check External Back Door Release Switch 66
Check Back Door Release Actuator 68
Check Door Lock/Unlock Switch Indicator 69
Check Door Lock/Unlock Relay Circuit 69
POWER DOOR LOCK — SUPER LOCK — 70
Component Parts and Harness Connector Location.. 70
System Description 71
OUTLINE 71
OPERATION 71
CAN Communication 72
SYSTEM DESCRIPTION 72
CAN Communication Unit 72
TYPE 1/TYPE 2 73
TYPE 3/TYPE 4 76
TYPE 5/TYPE 6 78
TYPE 7/TYPE 8 81
TYPE 9/TYPE 10 83
Schematic – S/LOCK – (Without Intelligent Key System) 86
Wiring Diagram — S/LOCK — (Without Intelligent Key System) 87
Schematic – S/LOCK – (With Intelligent Key System) 93
Wiring Diagram — S/LOCK — (With Intelligent Key System) 94
Terminal and Reference Value for Smart Entrance Control Unit 100
CONSULT- II Inspection Procedure 101
CONSULT- II Application Items 102
WORK SUPPORT 102
DATA MONITOR 102
WORK SUPPORT 102
Trouble Diagnoses 103
PRELIMINARY CHECK 103
SYMPTOM CHART 104
Power Supply and Ground Circuit Check 105
Door Lock / Unlock Switch Check 106
Check Key Switch /Without Intelligent Key System 107
Check Key Switch/With Intelligent Key System ... 108
Power Door Lock / Unlock Output Signal Check. . 109
Super Lock Output Signal Check. 110
Door Lock Actuator Check 111
DRIVER SIDE 111
PASSENGER SIDE 112
REAR LH SIDE 113
REAR RH SIDE 114
Super Lock Actuator Check 115
DRIVER SIDE 115
PASSENGER SIDE 116
REAR LH SIDE 117
REAR RH SIDE 118
Door Switch Check 119
DRIVER SIDE 119
PASSENGER SIDE 121
REAR LH SIDE 123
REAR RH SIDE 125
External Back Door Release Switch Check 127
Back Door Release Actuator Check 129
MULTI-REMOTE CONTROL SYSTEM 131
Component Parts and Harness Connector Location 131
System Description 132
INPUTS 132
OPERATE 132
OPERATED PROCEDURE 132
Schematic 134
Wiring Diagram — MULTI — 135
Terminal and Reference Value for BCM 139
CONSULT- II Inspection Procedure 140
CONSULT- II Application Items 141
DATA MONITOR 141
Work Flow 141
Trouble Diagnosis Chart by Symptom 142
Remote controller Check 143
Door Switch Check 143
DOOR SWITCH DRIVER SIDE 143
DOOR SWITCH PASSENGER SIDE 144
DOOR SWITCH REAR LH 145
DOOR SWITCH REAR RH 146
BACK DOOR SWITCH 147
Key Switch Check 148
Hazard Reminder Check 150
Remote Controller Battery Replacement 151
INTELLIGENT KEY SYSTEM 152
Component Parts and Harness Connector Location 152
System Description 153
DOOR LOCK FUNCTION 153
REMOTE CONTROL ENTRY FUNCTIONS 154
ENGINE STARTUP FUNCTION 155
WARNING AND ALARM FUNCTION 156
CHANGE SETTINGS FUNCTION 158
INTELLIGENT KEY REGISTRATION 158
STEERING LOCK UNIT REGISTRATION 158
CAN Communication 159
SYSTEM DESCRIPTION 159
CAN Communication Unit 159
TYPE 1 160
TYPE 3 162
TYPE 5 164
TYPE 7 167
TYPE 9 169
Schematic —I/KEY— 171
Wiring Diagram — I/KEY— 172
Terminals and Reference Value for INTELLIGENT KEY UNIT 180
Terminals and Reference Value for Steering Lock unit 182
Terminal and Reference Value for BCM 182
Diagnosis Procedure 184
WORK FLOW 184
CONSULT-II Function (INTELLIGENT KEY) 185
CONSULT-II Inspection Procedure 185
BASIC OPERATION 185
CONSULT-II Application Items 186
SELF-DIAGNOSTIC RESULTS 186
DATA MONITOR 186
ACTIVE TEST 186
WORK SUPPORT 187

List of Operation Related Parts 187
Trouble Diagnosis Symptom Chart 188
ALL FUNCTIONS OF THE INTELLIGENT KEY ARE NOT OPERATING 188
REMOTE CONTROL ENTRY FUNCTION MALFUNCTION 188
DOOR LOCK FUNCTION MALFUNCTION 188
ENGINE START FUNCTION MALFUNCTION . 189
WARNING CHIME FUNCTION MALFUNCTION 189
Check CAN Communication System 191
Check Intelligent Key Unit Power Supply and Ground Circuit 191
Check Key Switch 191
Check Ignition Knob Switch 193
Check Door Request Switch 194
Check Intelligent Key Warning Buzzer 196
Check Outside Antenna 197
Check Inside Key Antenna 198
Check Steering Lock Unit 199
Check Stop Lamp Switch 201
Removal and Installation of Intelligent key unit ... 202
REMOVAL 202
INSTALLATION 202
Intelligent Key Inspection 202
INTELLIGENT KEY DISASSEMBLY AND ASSEMBLY 202
REMOTE CONTROLLER BATTERY INSPECTION 203
DOOR 204
Fitting Adjustment (5-Door Vehicles) 204
FRONT DOOR 204
REAR DOOR 204
STRIKER ADJUSTMENT 204
Fitting Adjustment (3-Door Vehicles) 205
FRONT DOOR 205
STRIKER ADJUSTMENT 205
Removal and Installation 205
FRONT DOOR 205
REAR DOOR 206
Door Weatherstrip 207
5 DOORS 207
3 DOORS 207
FRONT DOOR LOCK 209
Component Parts Location 209
Removal and Installation 209
REMOVAL 209
Disassembly and Assembly 212
DOOR KEY CYLINDER ASSEMBLY 212
OUTSIDE HANDLE 212
REAR DOOR LOCK 213
Component Parts Location 213
Removal and Installation 213
REMOVAL 213
BACK DOOR 216
Fitting Adjustment 216
VERTICAL/LATERAL CLEARANCE (SURFACE DIFFERENCE) ADJUSTMENT 216
Back Door Assembly 216
REMOVAL 216
INSPECTION 217
Back Door Striker 217
REMOVAL 217
INSTALLATION 217
Back Door Stay Assembly 218
REMOVAL 218
INSTALLATION 218
Removal and Installation of Back Door Weatherstrip 219
REMOVAL 219
INSTALLATION 219
BACK DOOR LOCK 220
Removal and Installation 220
BACK DOOR LOCK ASSEMBLY 220
BACK DOOR HANDLE ASSEMBLY 220
FUEL FILLER LID OPENER 221
Component Parts Location 221
THEFT WARNING SYSTEM 222
Wiring Diagram — THEFT —/PRWIRE 222
NATS(NISSAN ANTI-THEFT SYSTEM) 223
Component Parts and Harness Connector Location 223
System Description 223
DESCRIPSTION 223
SECURITY INDICATOR 224
System Composition 225
ECM Re-communicating Function 225
Wiring Diagram —NATS— 226
WITHOUT INTELLIGENT KEY SYSTEM 226
WITH INTELLIGENT KEY SYSTEM 227
Terminals and Reference Value for Steering Lock Unit/with Intelligent Key System 229
Terminals and Reference Value for Intelligent Key Unit/with Intelligent Key System 229
Terminals and Reference Value for BCM/without Intelligent Key System 230
CONSULT-II 231
CONSULT-II INSPECTION PROCEDURE 231
CONSULT-II DIAGNOSTIC TEST MODE FUNCTION 231
NATS IMMU FUNCTION CHECK RESULT ITEM CHART 232
Diagnosis Procedure 233
WORK FLOW 233
Trouble Diagnosis Symptom Chart 234
MODELS WITHOUT INTELLIGENT KEY SYSTEM 234
MODELS WITH INTELLIGENT KEY SYSTEM . 235
Security Indicator Inspection 235
Diagnostic Procedure 1 236
Diagnostic Procedure 2 236
MODELS WITHOUT INTELLIGENT KEY SYSTEM 236
MODELS WITH INTELLIGENT KEY SYSTEM . 238
Diagnostic Procedure 3 240
Diagnostic Procedure 4 240
Diagnostic Procedure 5 241
Diagnostic Procedure 6 241

Diagnostic Procedure 7 243
Removal and Installation NATS Antenna Amp. ... 244
REMOVAL 244
INSTALLATION 244

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004QW

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EIS004QX

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

Precautions

EIS004LF

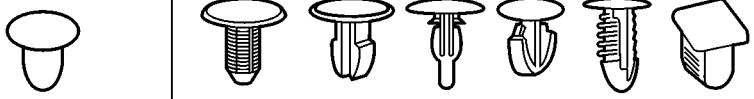
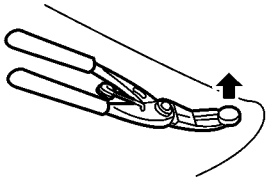
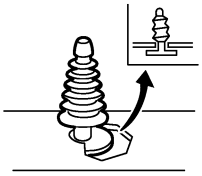
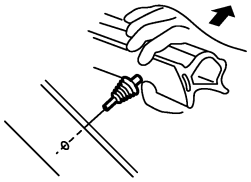
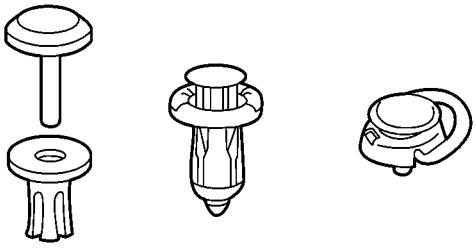
- After installing removed lids or doors, be sure to adjust hinges and mount points so that lids or doors can open and close properly.
- Confirm parts for proper lubrication, damage or wear. Lubricate, repair or replace as necessary.

CLIP AND FASTENER

PFP:76906

List of Table

EIS004LI

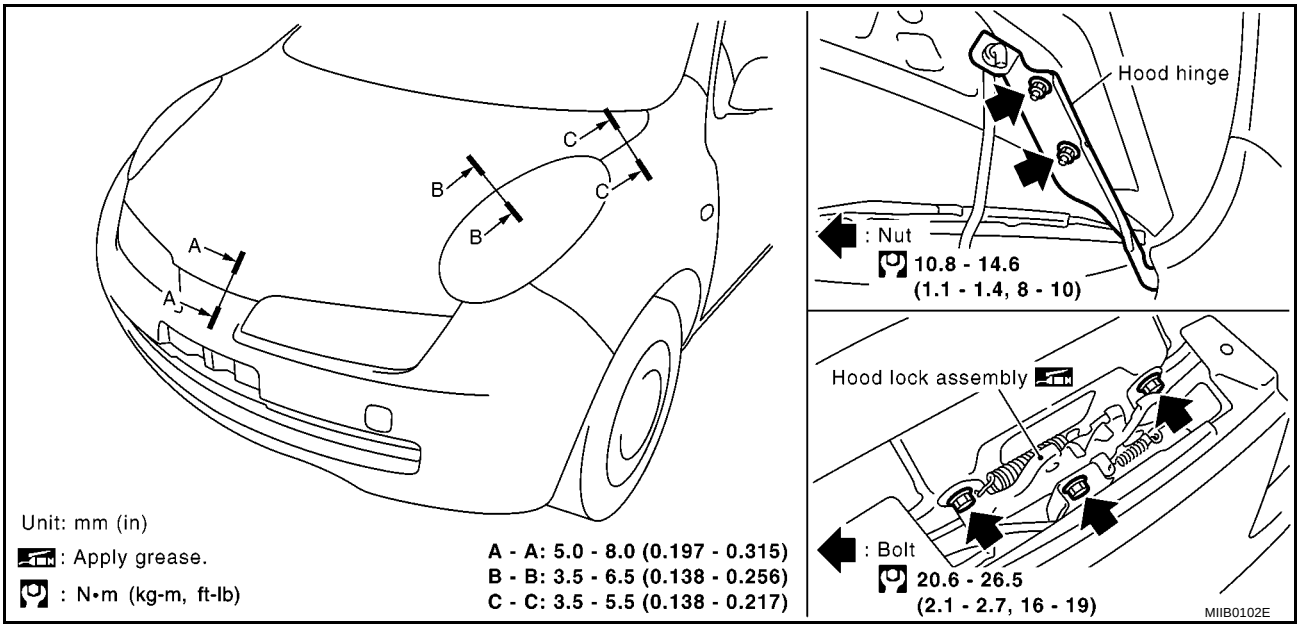
Symbol No.	Shape	Removal and installation
C103		 PIIA1350J
CE103		 PIIA1354J
C205		**Removal:** Flat-bladed screwdriver Clip Finisher MIIB0153E

HOOD

PFP:F5100

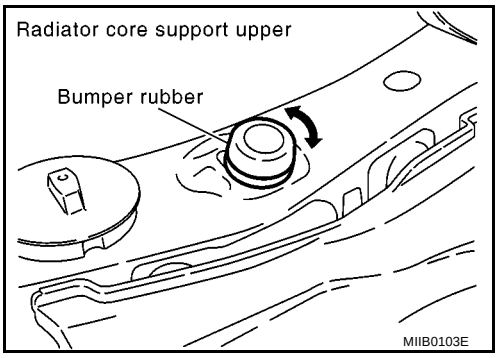
Fitting Adjustment

EIS004LJ



FRONT END HEIGHT ADJUSTMENT AND LATERAL/LONGITUDINAL CLEARANCE ADJUSTMENT

1. Remove hood lock. Rotate bumper rubber to adjust height until hood becomes 1 to 1.5 mm lower than the fender.
2. Position hood lock and engage striker. Check hood lock and striker for looseness. Tighten lock bolts to the specified torque.



CAUTION:

Adjust the clearance between hood and other parts so that the dimensional difference left and right is as follows.

Hood (B) - Headlamp (B) : 1.5 mm or less

Hood (C) - Headlamp (C) : 1.0 mm or less

SURFACE MISMATCH ADJUSTMENT

1. Release hood lock, and adjust surface level difference of hood, fender, and headlamp according to the fitting standard dimension, using RH and LH bumper rubbers.

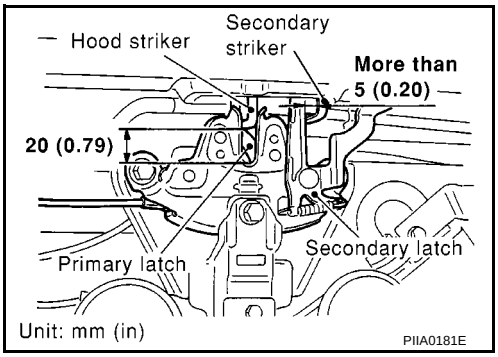
Hood (B) - Headlamp (B) : 1.0 mm

Hood (C) - Headlamp (C) : 0.2 mm

2. Install hood lock, and move hood lock laterally until the centers of striker and lock become vertical when viewed from the front.
3. Make sure the secondary latch is securely engaged with the secondary striker from either the dead weight of the hood (free-fall from approx. 200 mm height), or by applying light pressure (approx. 3 kg).

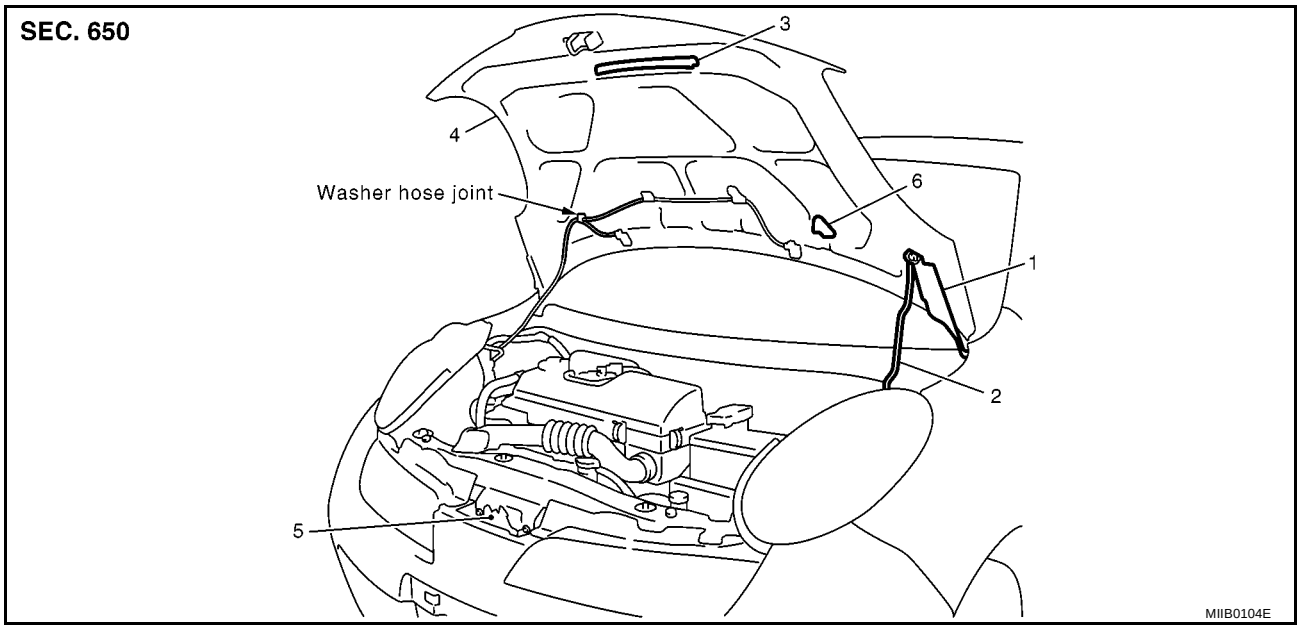
   CAUTION:

   Do not drop hood from a height of 300 mm or more.
4. Move hood lock-up and down until striker smoothly engages the lock when the hood is closed.
5. After adjustment, tighten lock bolts to the specified torque.



Removal and Installation

EIS004LK

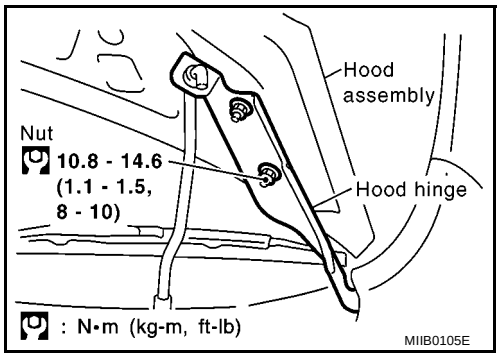


1. Hood hinge
2. Hood stay
3. Radiator core seal rubber
4. Hood assembly
5. Hood lock
6. Hood stay holder

REMOVAL

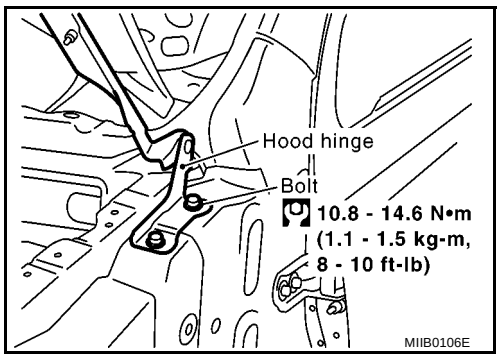
Hood Assembly

1. Disconnect washer hose at the connecting point.
2. Remove hinge nuts on hood and remove hood assembly.



Hood Hinge

1. Remove hood assembly.
2. Remove front fender. Refer to BL-14, "Removal and Installation" .
3. Remove bolts and then remove hood hinge.

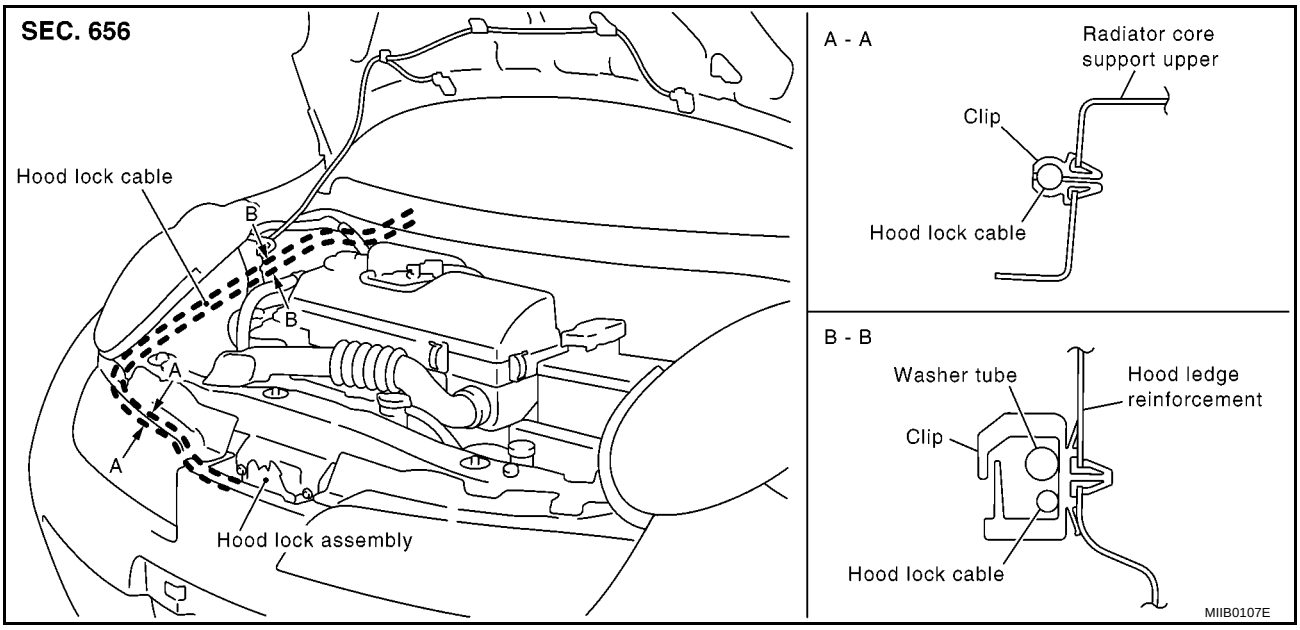


INSTALLATION

- Perform installation in the reverse order of removal while being careful of the following items while performing the work.
- Apply Anti-Corrosion Wax M-97 Super or comparable product to the hood hinge, hood ledge, and hood assembly.
- After installing, perform hood fitting adjustment. Refer to BL-7, "Fitting Adjustment" .

Removal and Installation of Hood Lock Control

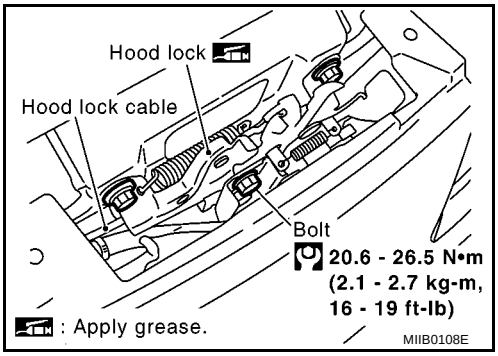
EIS004LL



REMOVAL

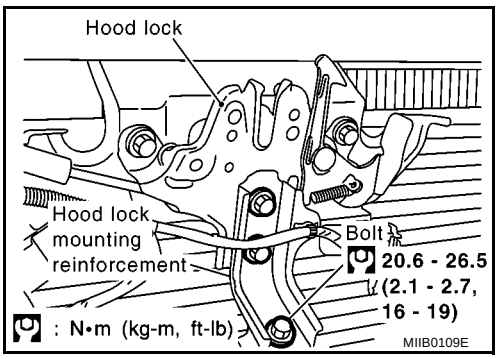
Hood Lock

1. Remove front grille (LH/RH). Refer to EI-8, "Removal and Installation" .
2. Remove hood lock bolts.
3. Remove hood lock cable from hood lock.



Hood Lock Mounting Reinforcement

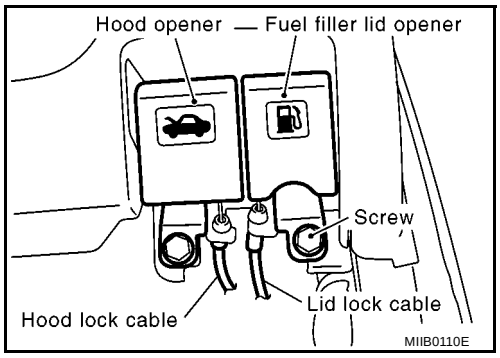
1. Remove front bumper. Refer to EI-4, "Removal and Installation" .
2. Remove bolts, and then remove hood lock mounting reinforcement.



Hood Lock Cable

1. Remove front grille (LH/RH). Refer to EI-8, "Removal and Installation" .
2. Remove fender protector (RH). Refer to EI-11, "Removal and Installation" .
3. Remove hood lock, and remove hood lock cable from hood lock.
4. Remove radiator core upper support and hood ledge clips, and then remove hood lock cable.
5. Remove hood opener on bottom right of instrument panel, and then remove hood lock cable.
6. Remove grommet on lower dashboard, and pull out hood lock cable from passenger room side.

CAUTION:
While pulling the cable, be careful not to damage (peel) hood opener cable outer surface on edges of body through hole.



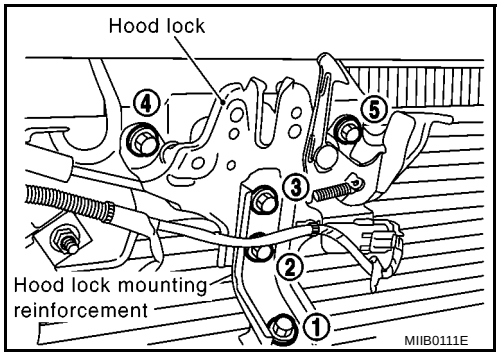
INSTALLATION

- Perform installation in the reverse order of removal while being careful of the following items while performing the work.
- After installing, perform hood fitting adjustment. Refer to BL-7, "Fitting Adjustment" .

Hood Lock Mounting Reinforcement

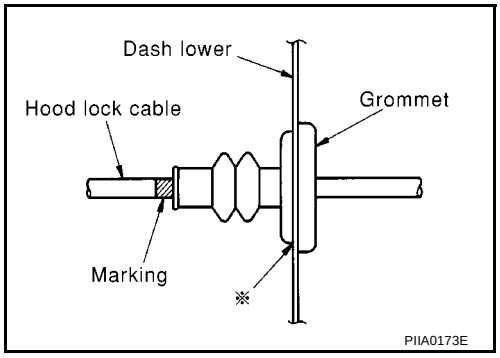
- When installing hood lock mounting reinforcement, loosen hood bolts, and then tighten bolts in the order shown in the figure.

Bolt No. 1 to 5.	**Tightening torque (N·m, (kg-m))** **: 20.6 - 26.5 (2.1 - 2.7)**

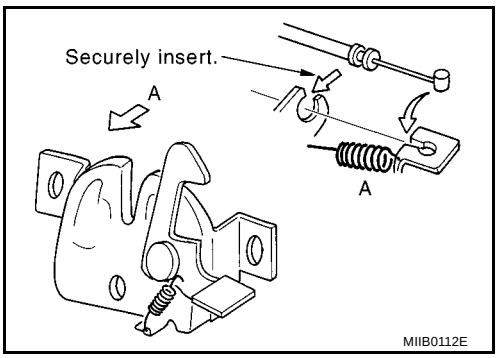


Hood Lock Cable

1. Pass hood lock cable through the opening while keeping the winding radius 100 mm or larger.
2. After confirming grommet is properly positioned, push it securely into the hole.
3. Apply sealant (POS seal) to area on the grommet indicated with the * mark.



4. Install cable securely to lock.
5. After installing, check hood lock adjustment and hood opener operation.



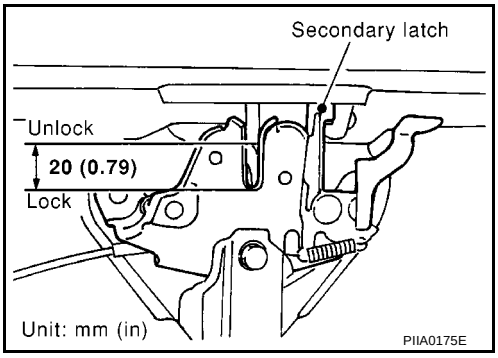
Hood Lock Control Inspection

EIS004LM

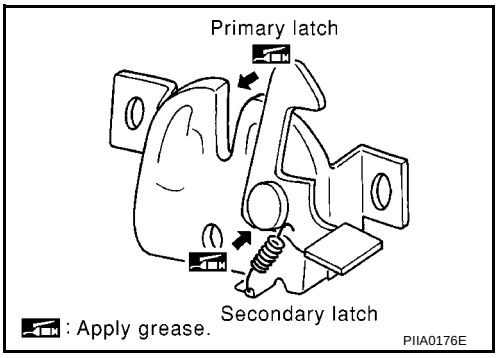
CAUTION:

If hood lock cable is bent or deformed, replace it.

1. Confirm hood lock secondary latch securely engages secondary striker by releasing it from a height of approximately 200 mm.
2. While operating the hood opener carefully, make sure the front end of the hood is lifted by approximately 20 mm. Also, make sure the hood opener returns to the original position.



3. Inspect hood lock grease, and if insufficient, apply grease to the area shown in the figure.

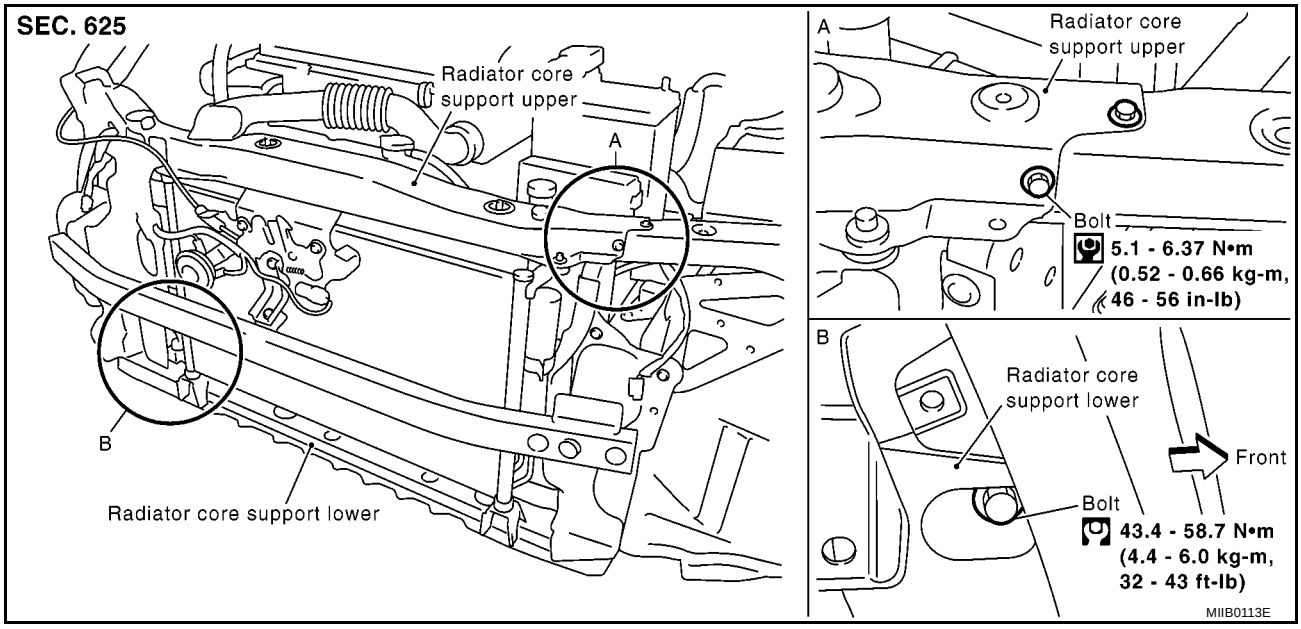


RADIATOR CORE SUPPORT

PFP:62500

Removal and Installation

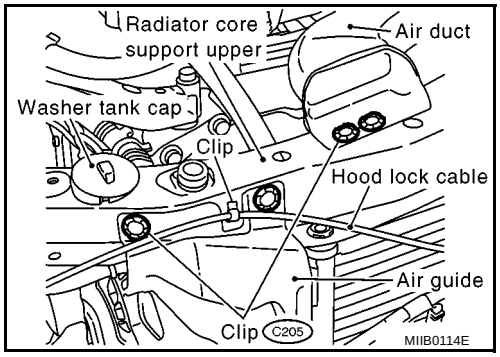
EIS004LN



REMOVAL

Radiator Core Upper Support

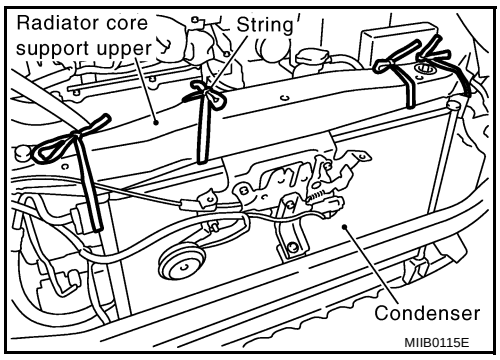
1. Remove headlamp (LH/RH). Refer to LT-41, "Removal and Installation" .
2. Remove hood lock assembly and hood lock mounting reinforcement. Refer to BL-9, "Removal and Installation of Hood Lock Control" .
3. Remove hood lock cable and air duct installation clips at top of air guide (RH).
4. Remove washer tank cap, and then pull washer tank inlet downward to pull it out.
5. Remove bolts, and then remove radiator core upper support.



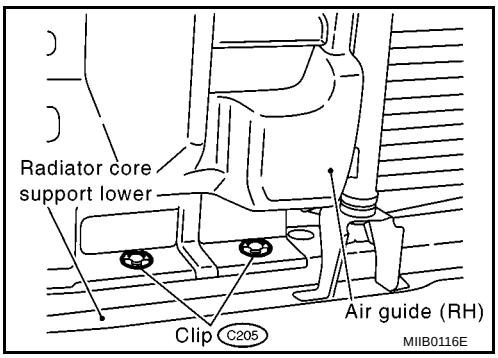
Radiator Core Lower Support

1. Remove front grille (LH/RH). Refer to EI-8, "Removal and Installation" .
2. Remove installation clips on top of air guide (RH).
3. Remove front bumper lower clip. Refer to EI-4, "Removal and Installation" .
4. Remove screws and clips and separate bumper fascia from fender protector left/right.
5. Tie cord to all radiator core upper supports of the radiator and condenser.

   NOTE:
   To prevent the compressor and radiator from being dropped when the radiator core lower support is removed.
6. Remove bolts, and lower radiator core lower supports.



7. Remove air guide (RH) bottom clips, and remove radiator core lower supports from passenger room.



INSTALLATION

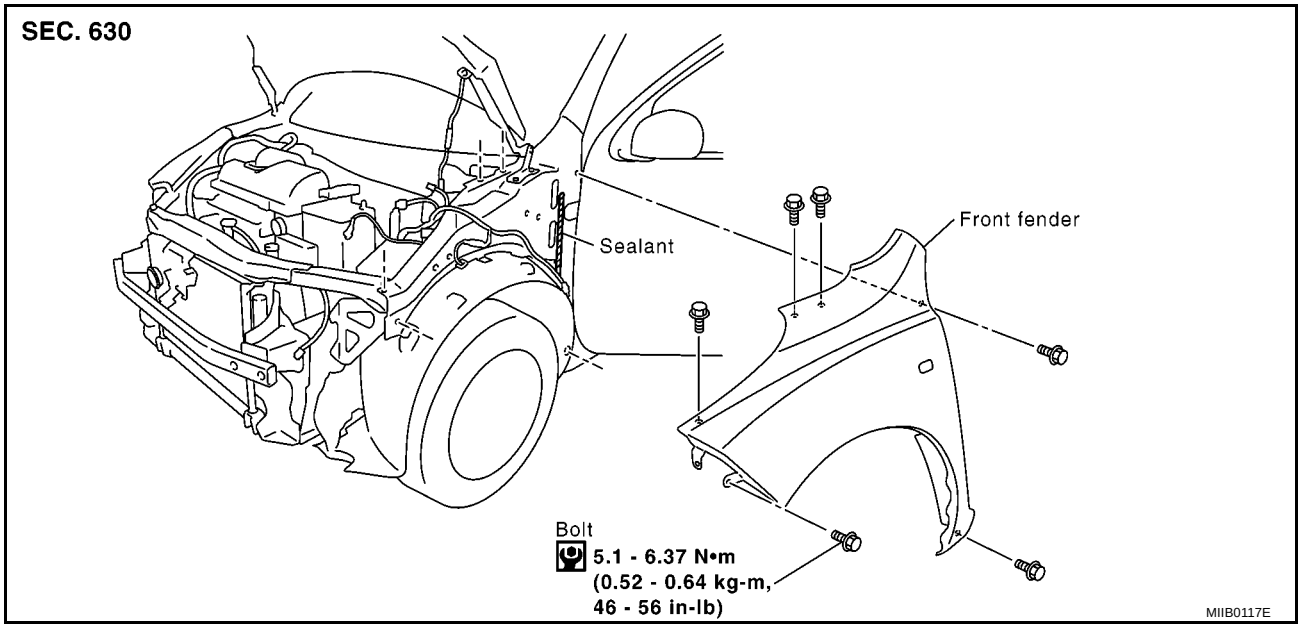
Install in the reverse order of removal.

FRONT FENDER

PFP:63100

Removal and Installation

EIS004LO



REMOVAL

1. Remove side turn signal lamp. Refer to LT-150, "Removal and Installation" .
2. Remove front bumper. Refer to EI-4, "Removal and Installation" .
3. Remove headlamps. Refer to LT-41, "Removal and Installation" .
4. Remove fender protector front fender side clips (2) and screws (3). Refer to EI-11, "Removal and Installation" .
5. Remove bolts and then front fender.

INSTALLATION

Install in the reverse order of removal.

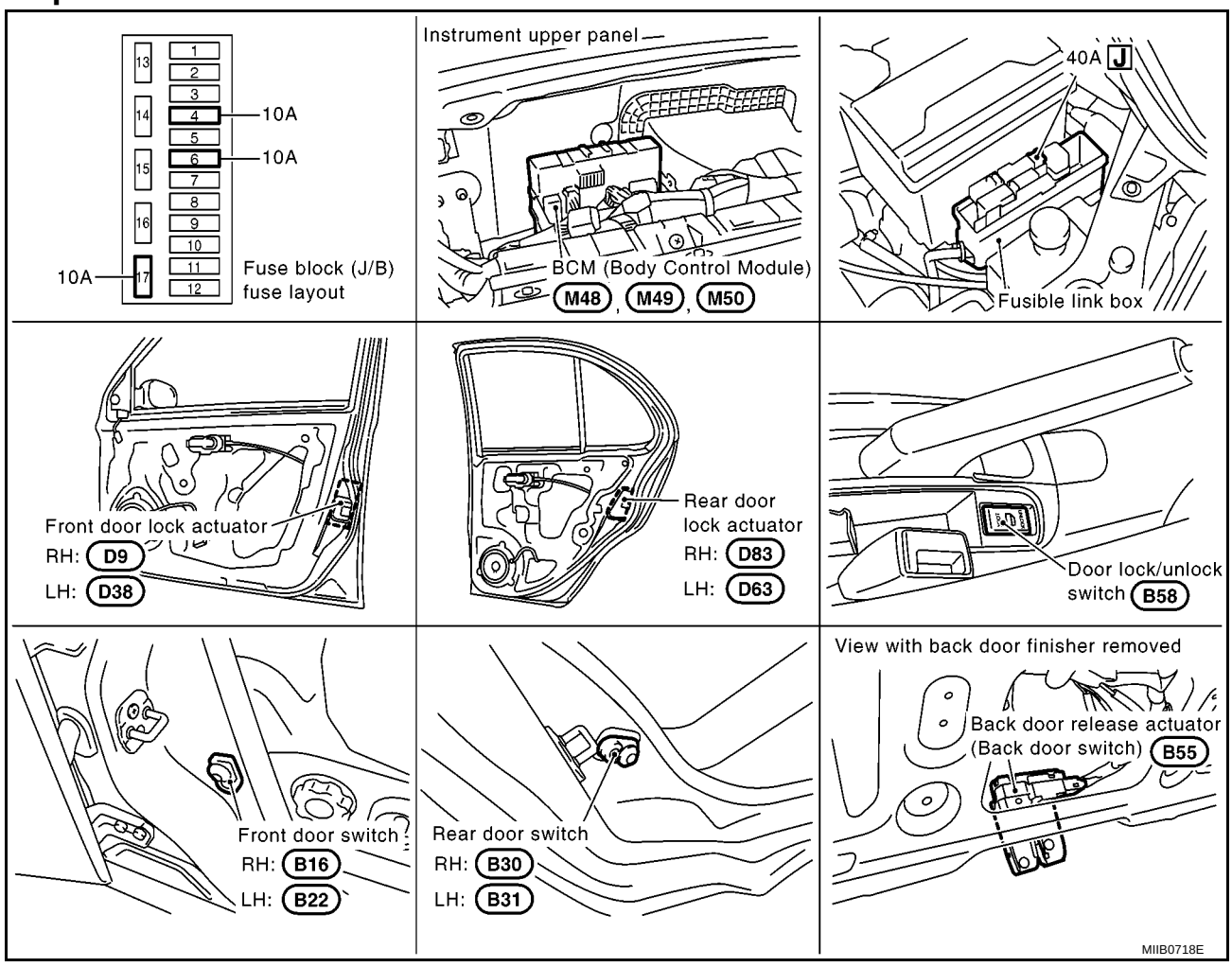
POWER DOOR LOCK SYSTEM

PFP:24814

Component Parts and Harness Connector Location

SMA for VIN >SJN**AK12U1309269

EIS004X9



System Description

EIS004X8

SMA for VIN >SJN**AK12U1309269

OPERATION

Power is supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fusible link box).
- to key switch terminal 1 (Without Intelligent Key system)
- through 10A fuse [No. 6, located in the fuse block (J/B)] (Without Intelligent Key system)
- to key switch and ignition knob switch terminal 3 (With Intelligent Key system)
- through 10A fuse [No. 17, located in the fuse block (J/B)] (With Intelligent Key system).

When the key switch is ON (Ignition key is inserted in ignition key cylinder), power is supplied

- to BCM terminal 3.
- through key switch terminal 2

When the ignition switch is ON or START, power is supplied

- to BCM terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)].

Ground is supplied

- to BCM terminals 2 and 70
- through body ground M19 and M20.

When the front door switch LH (LHD Models) or RH (RHD Models) is ON (door is open), ground supplied

- to BCM terminal 29
- through front door switch LH (LHD Models) or RH (RHD Models) terminal 1
- through front door switch LH (LHD Models) or RH (RHD Models) case ground.

When the front door switch RH (LHD Models) or LH (RHD Models) is ON (door is open), ground supplied

- to BCM terminal 30
- through front door switch RH (LHD Models) or LH (RHD Models) terminal 1
- through front door switch RH (LHD Models) or LH (RHD Models) case ground.

When the rear door switch LH is ON (door is open), ground is supplied

- to BCM terminal 59 (5 door models)
- through rear door switch LH terminal 1
- through rear door switch LH case ground.

When the rear door switch RH is ON (door is open), ground is supplied

- to BCM terminal 60 (5 door models)
- through rear door switch RH terminal 1
- through rear door switch RH case ground.

When the back door switch is ON (back door is open), ground is supplied

- to BCM terminal 10
- through back door switch terminals 1 and 2
- through body grounds B17, B23, B44 and B51.

DOOR LOCK AND UNLOCK SWITCH OPERATION

When door lock/unlock switch is in LOCK position, ground is supplied

- through body grounds B23,B17,B44 and B51
- through door lock/unlock switch terminal 4 and 6
- to BCM (Body Control Module) terminal 6.

With power and ground supplied, doors are locked.

When door lock/unlock switch is in UNLOCK position, ground is supplied

- through body grounds B23,B17,B44 and B51
- through door lock/unlock switch terminal 4 and 5
- to BCM (Body Control Module) terminal 25

With power and ground supplied, all doors are unlocked.

Lock/unlock switch indicated by LED when key in switch is on or on with timer.

KEY REMINDER SYSTEM

- If the ignition key is in the ignition key cylinder and driver door is open, setting door lock/unlock switch, key or remote controller to “LOCK” locks the door once but then immediately unlocks all doors.

UNLOCK LINK FUNCTION

When this function is activated, if the car is door lock/unlock switch locked, opening the drivers repossessing door from the inside handle override will cause the whole car to unlock.

Selectable Function

	Door Lock/unlock switch
How to change setting	Unlock press for more than 4 seconds
contents	Unlock link activate/deactivate
How to confirm	All should have buzzer sound for 0.2 seconds

BACK DOOR OPENER OPERTION

Back door can be opened with back door switch: When all door are unlocked, or When back door request switch pushed (With Intelligent Key system).

CAN Communication

EIS008BZ

SYSTEM DESCRIPTION

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

CAN Communication Unit

EIS00AOQ

Go to CAN system, when selecting your car model from the following table.

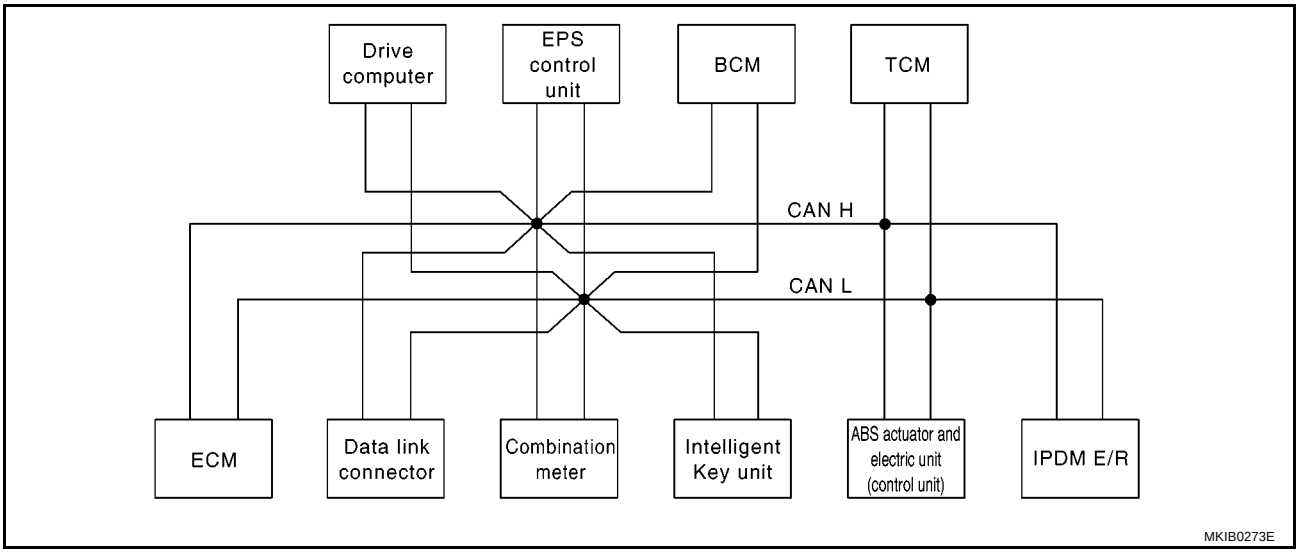
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	BL-19, "TYPE 1/ TYPE 2"				BL-22, "TYPE 3/ TYPE 4"				BL-24, "TYPE 5/ TYPE 6"				BL-27, "TYPE 7/ TYPE 8"				BL-29, "TYPE 9/ TYPE 10"			

×: Applicable

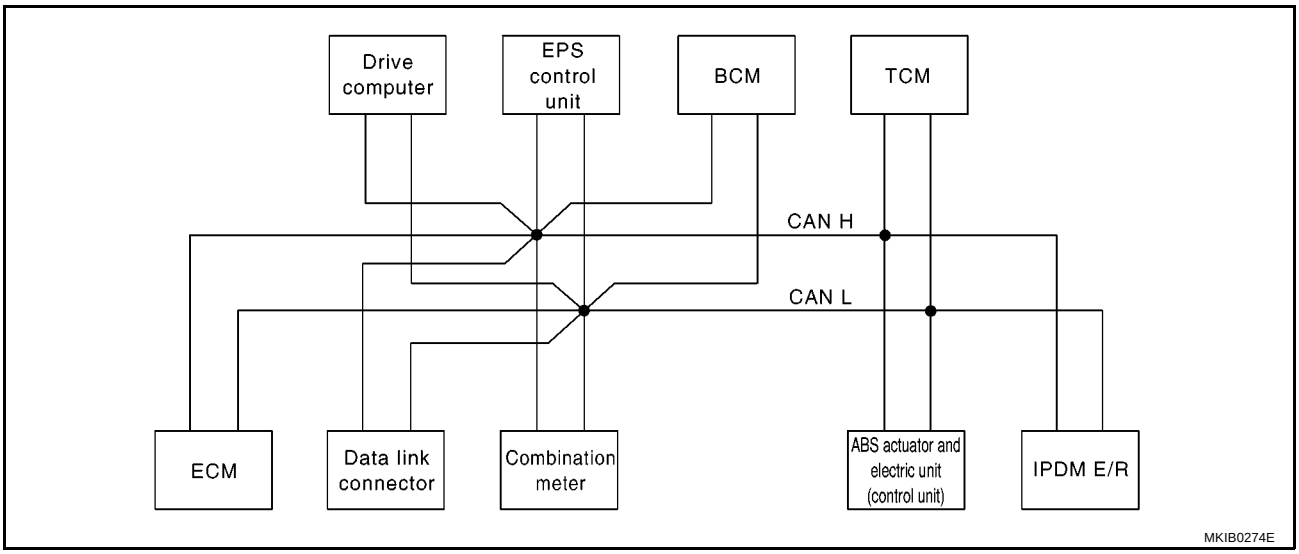
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

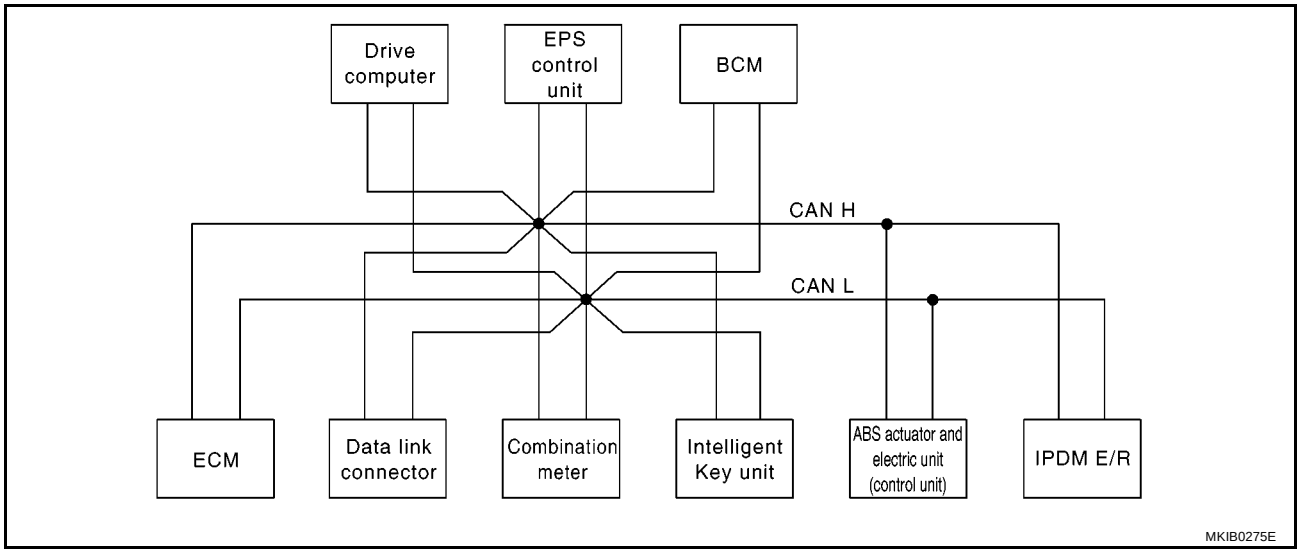
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

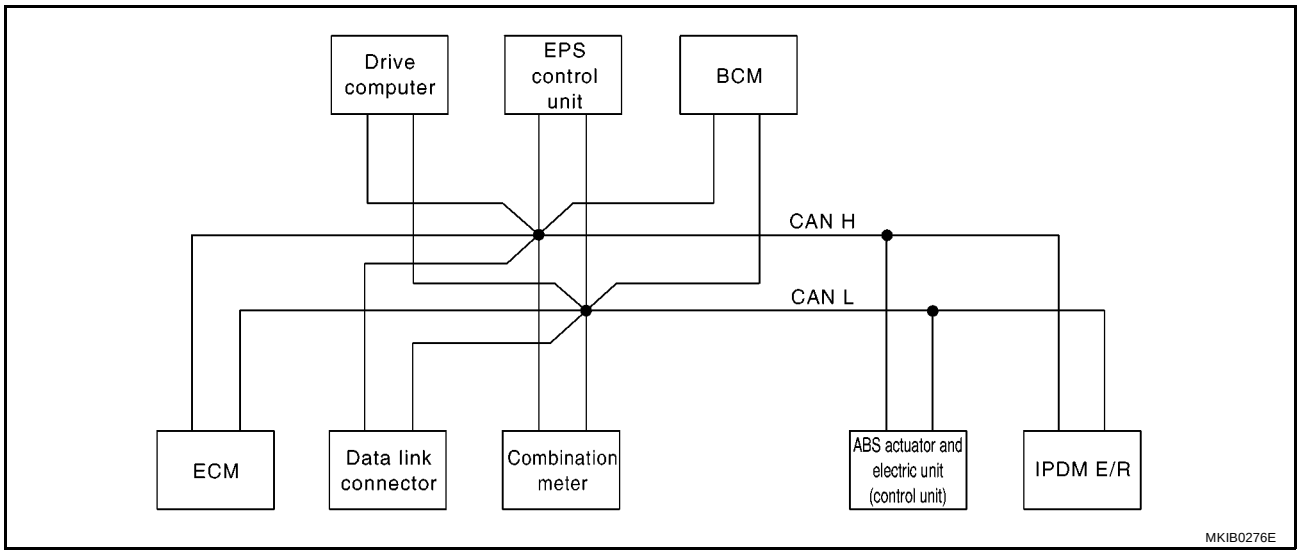
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

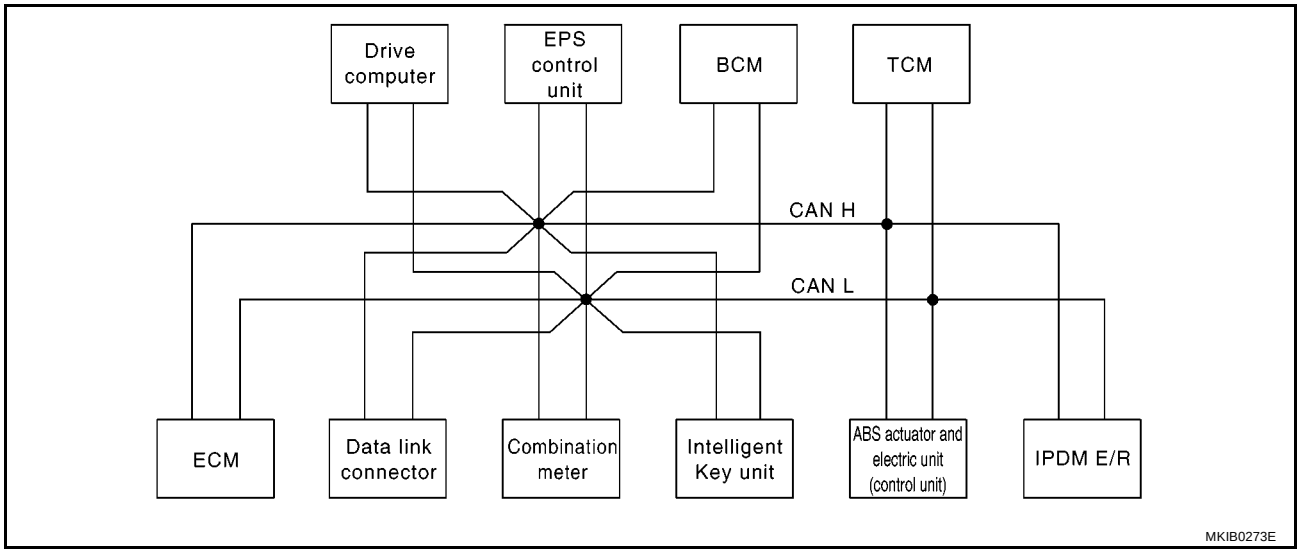
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

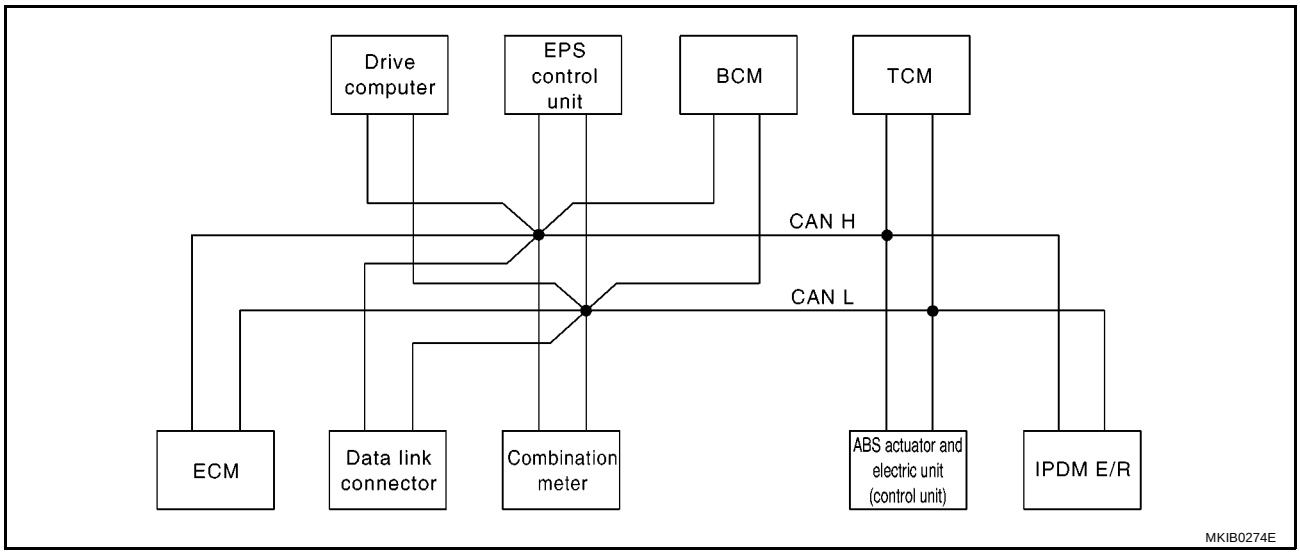
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

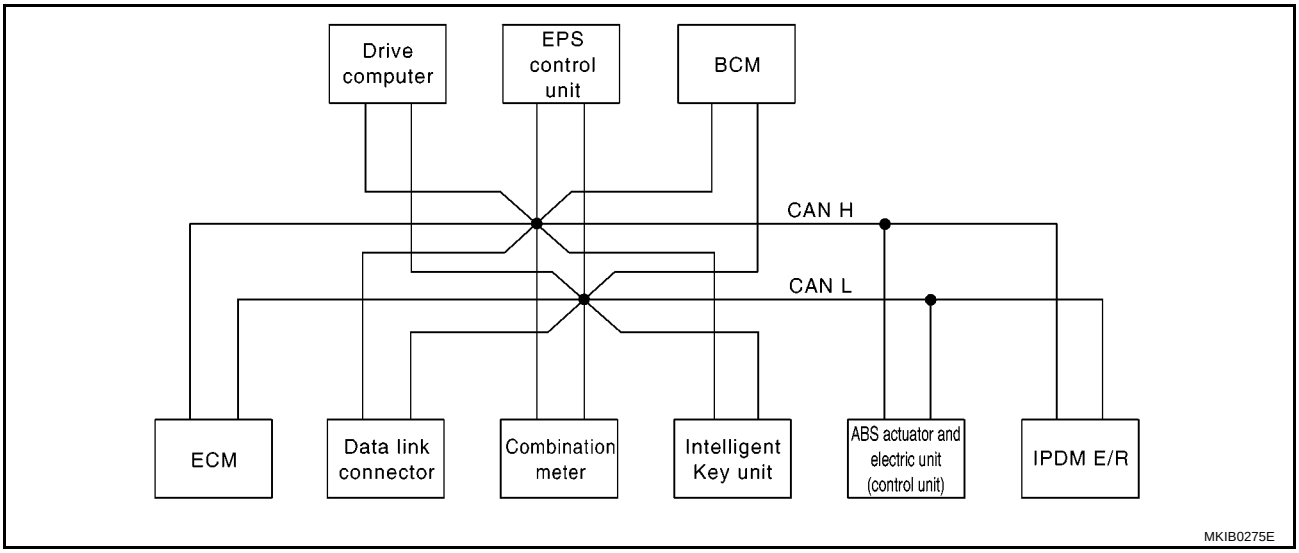
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

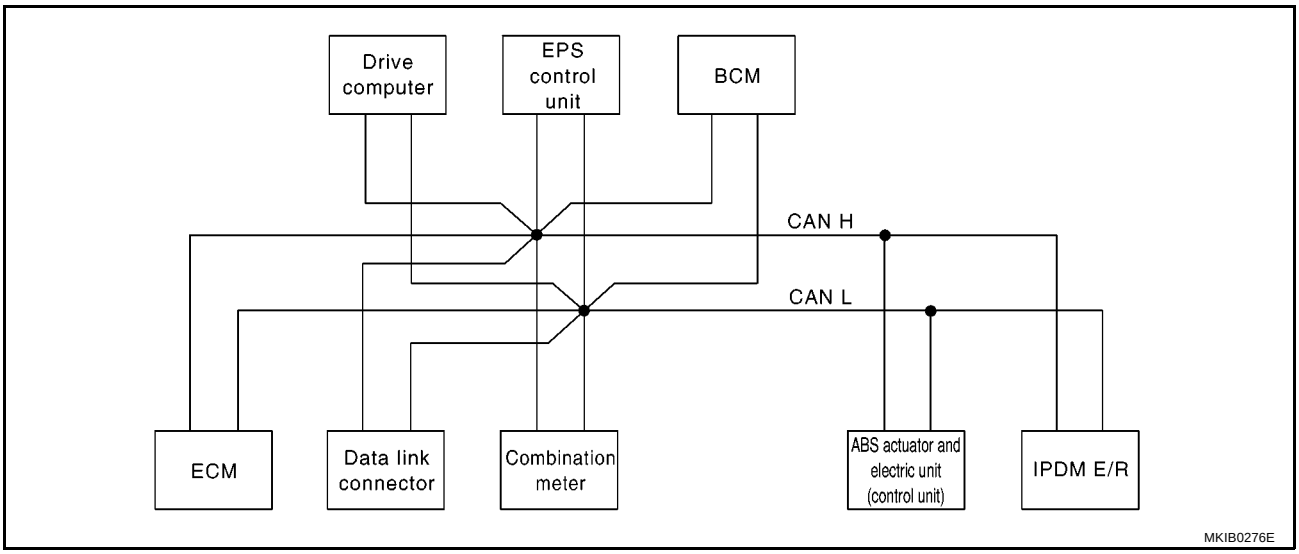
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

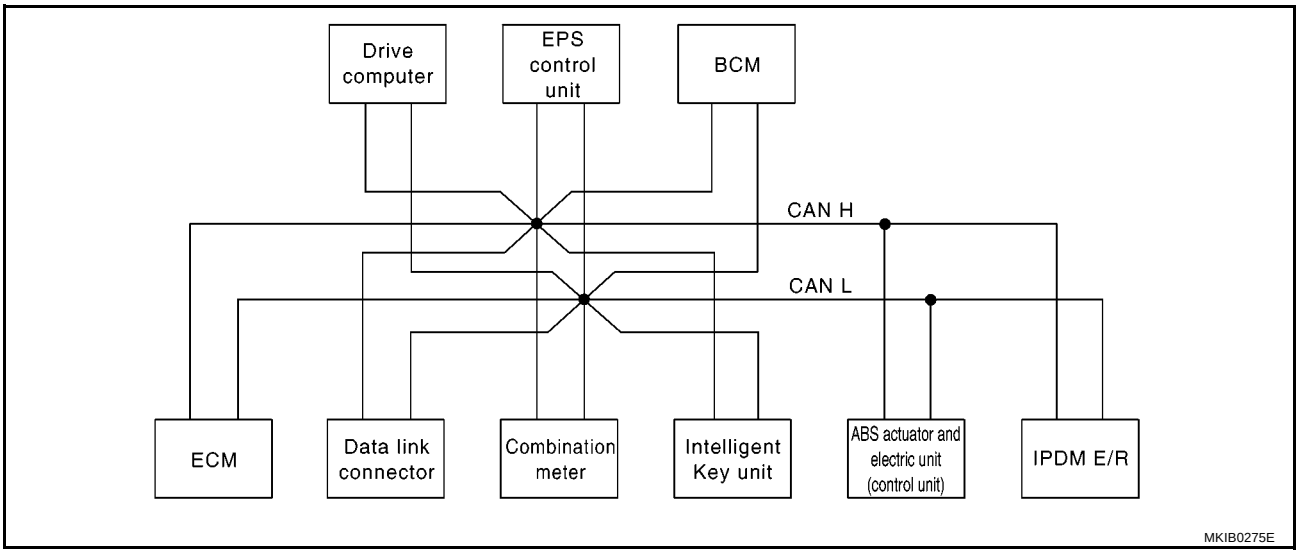
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

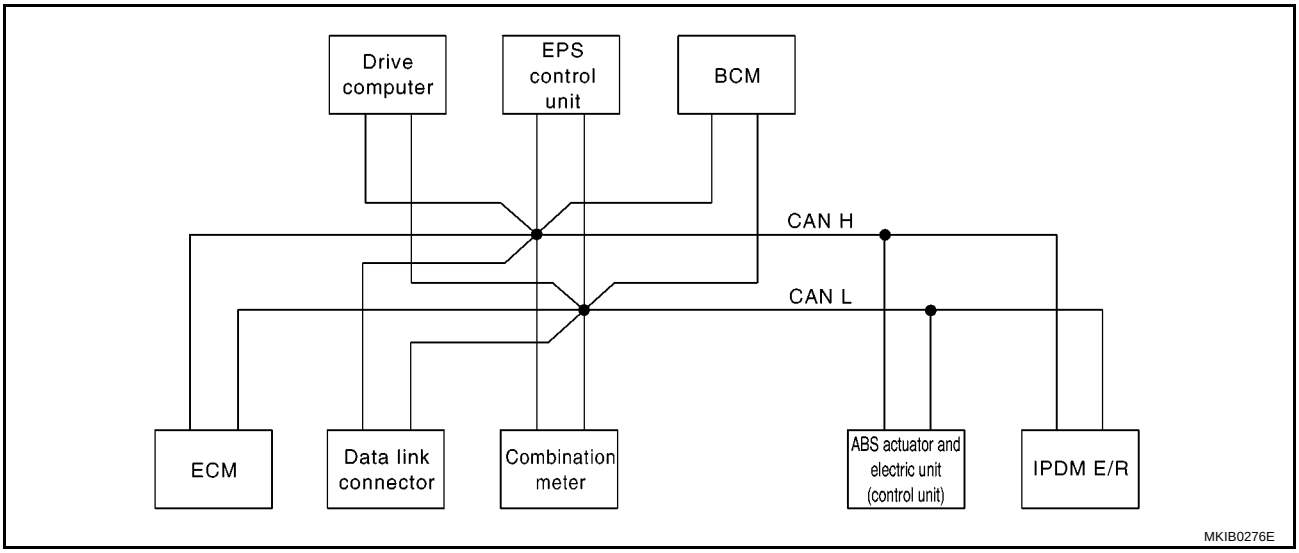
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

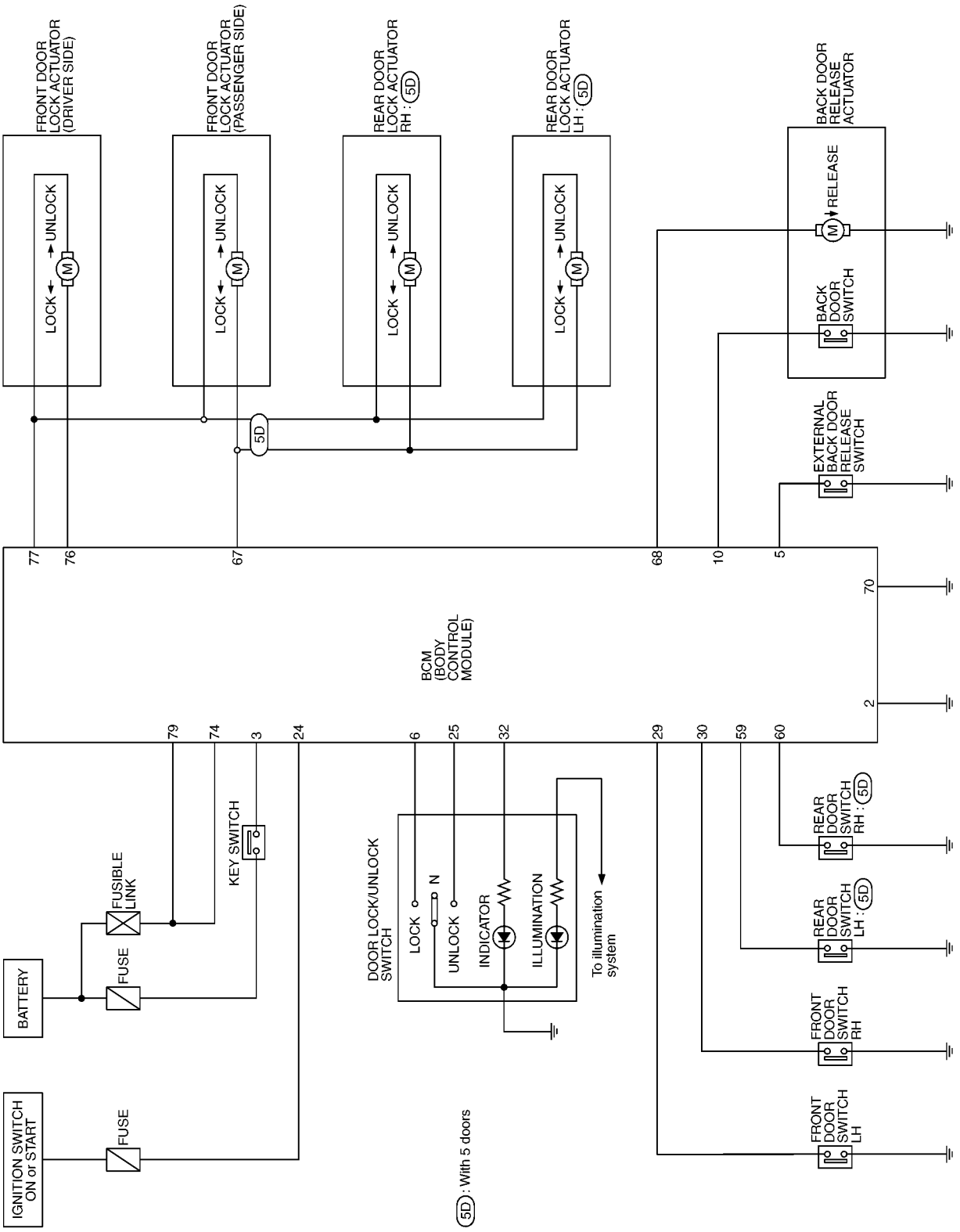
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic – D/LOCK – (Without Intelligent Key System)

EIS00550

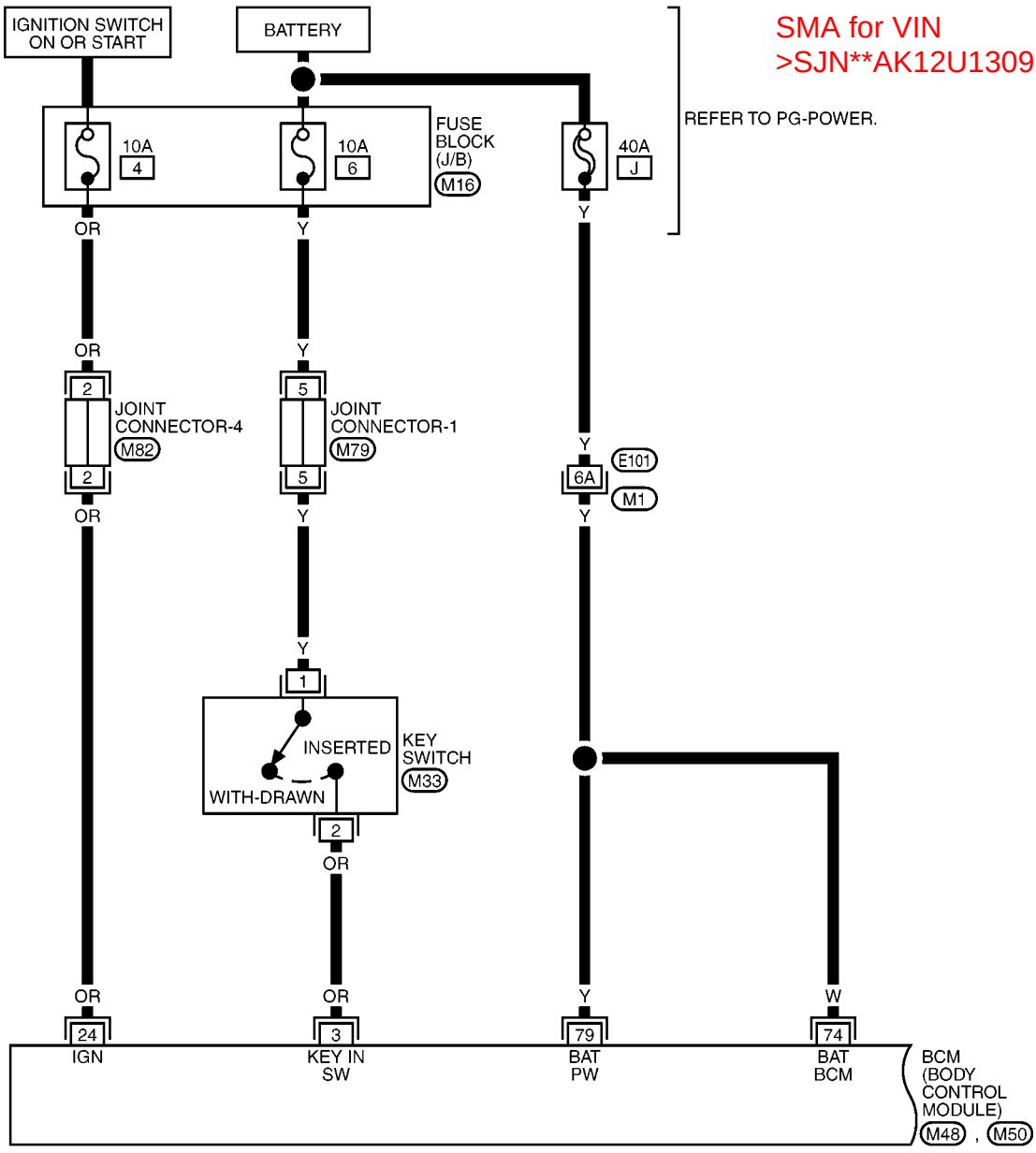


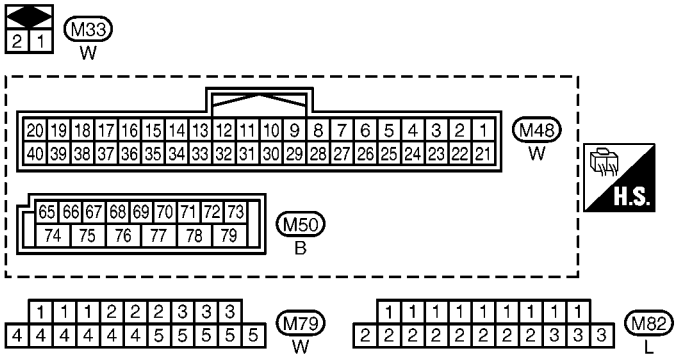
MKWA1773E

Wiring Diagram — D/LOCK — (Without Intelligent Key System)

EIS00551

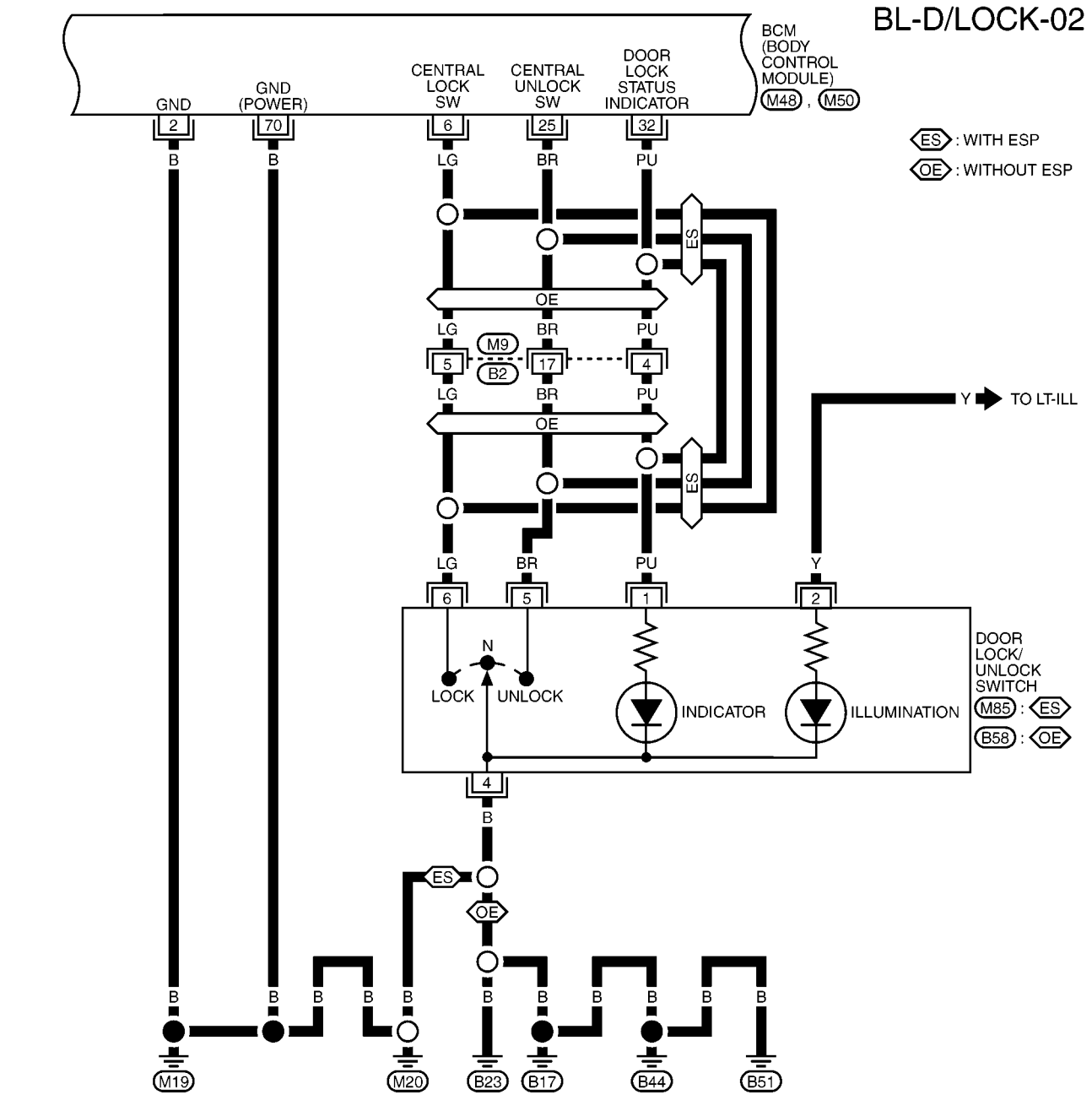
BL-D/LOCK-01

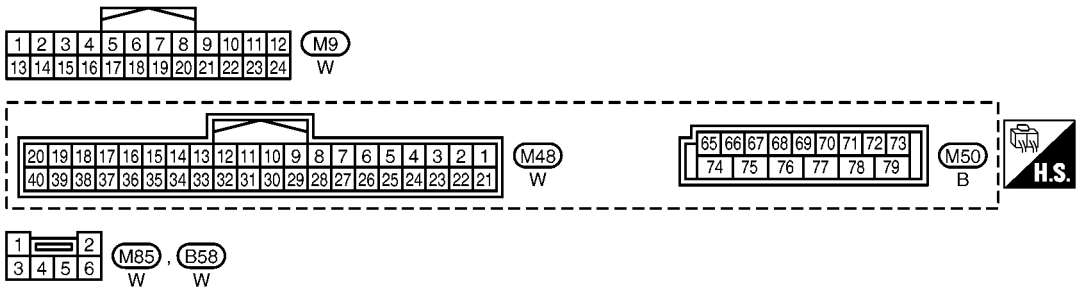




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1774E

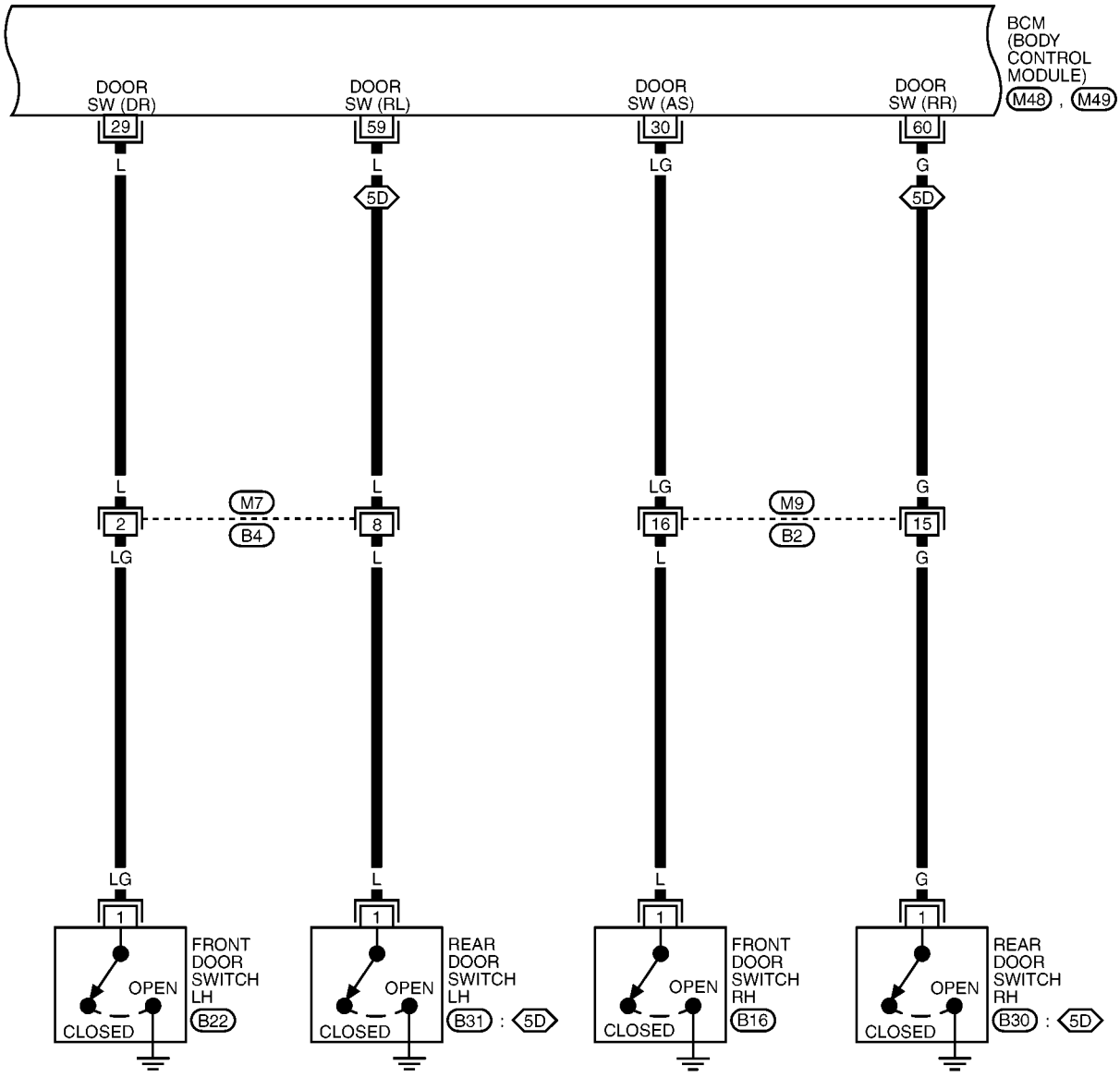

BL-D/LOCK-02
BCM (BODY CONTROL MODULE)
M48 , M50
GND
GND (POWER)
CENTRAL LOCK SW
CENTRAL UNLOCK SW
DOOR LOCK STATUS INDICATOR
2
70
6
25
32
B
B
LG
BR
PU
ES : WITH ESP
OE : WITHOUT ESP
ES
OE
M9
B2
5
17
4
Y
TO LT-ILL
6
5
1
2
N
LOCK
UNLOCK
INDICATOR
ILLUMINATION
DOOR LOCK/ UNLOCK SWITCH
M85 : ES
B58 : OE
M19
M20
B23
B17
B44
B51

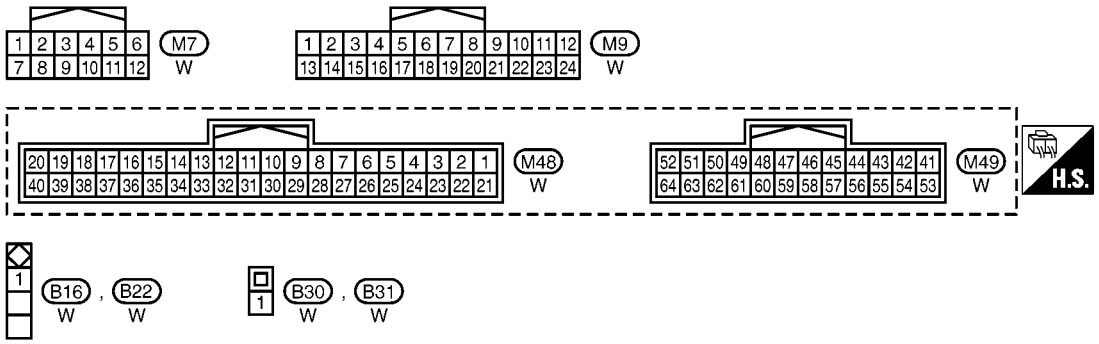

M9
W
M48
W
M50
B
H.S.
M85 , B58
W W

MKWA1775E

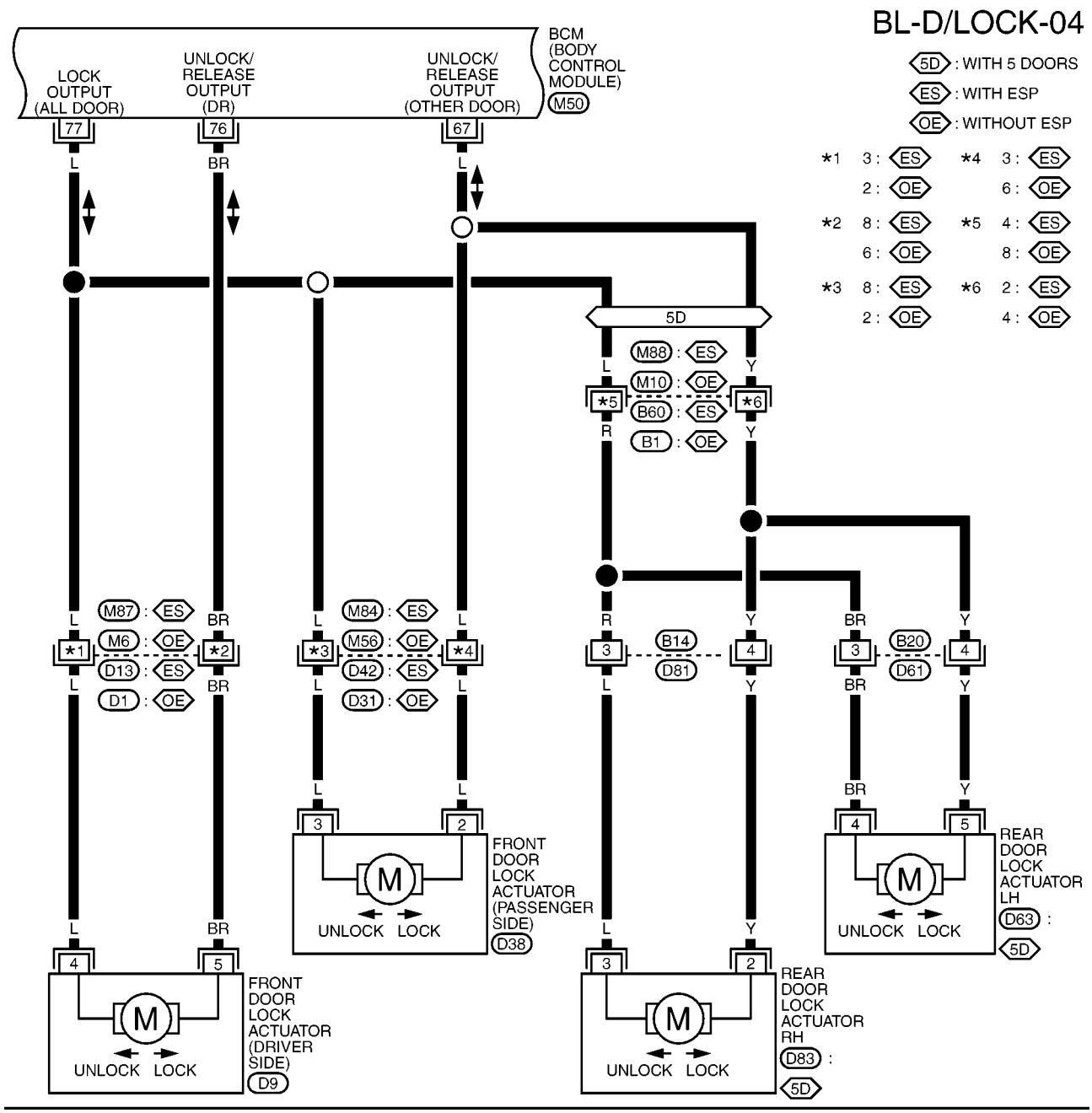
BL-D/LOCK-03

5D : WITH 5 DOORS



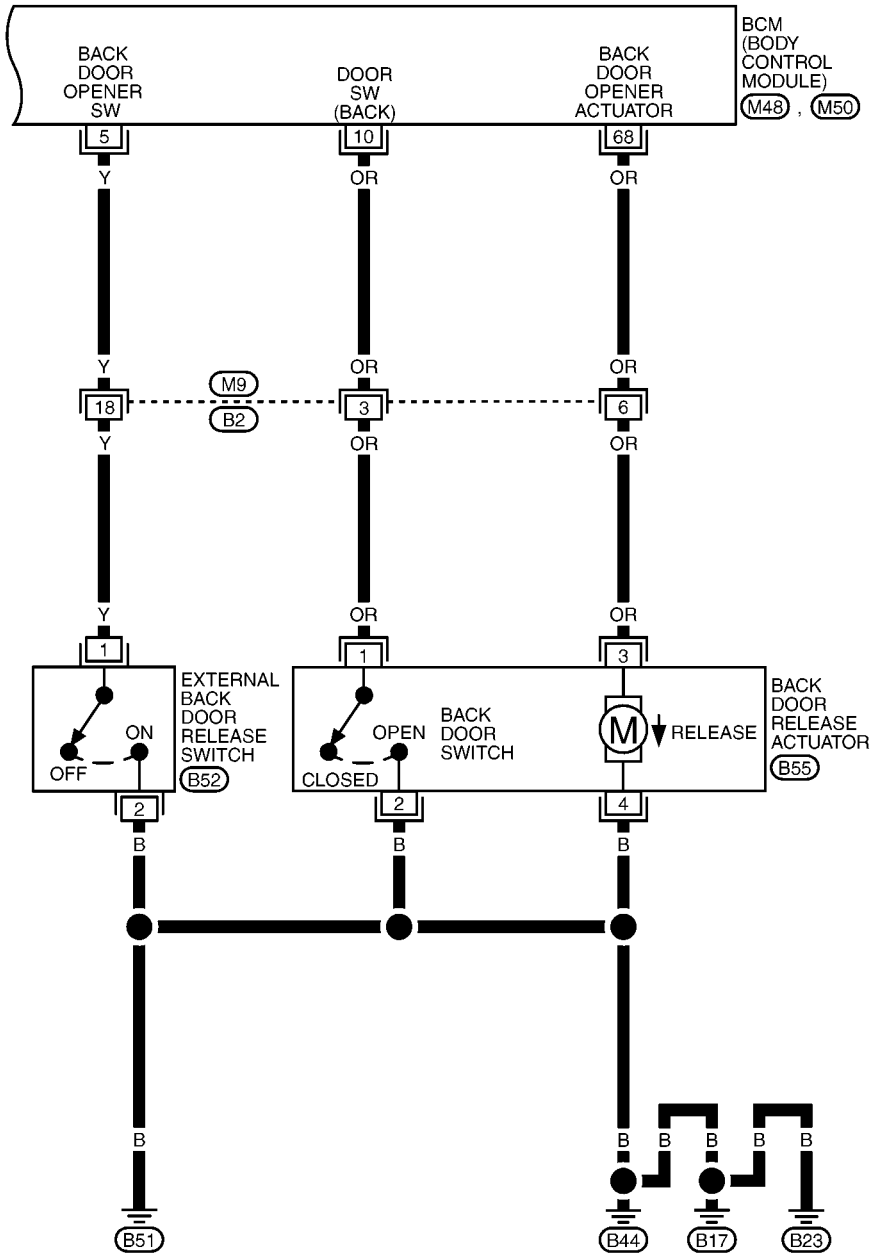


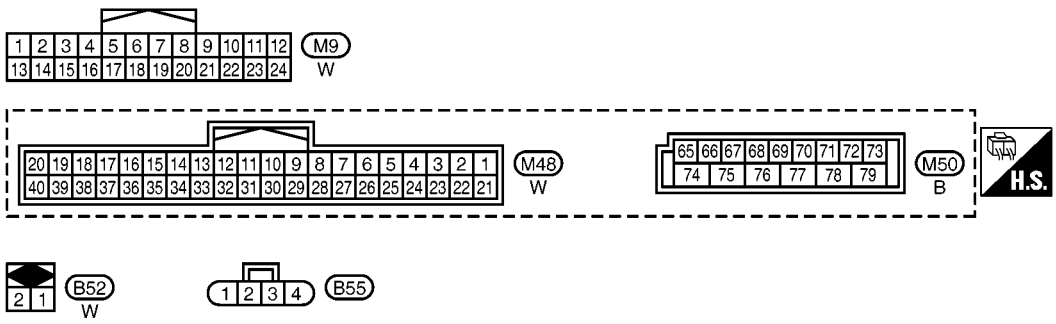
MKWA0865E


BL-D/LOCK-04
5D : WITH 5 DOORS
ES : WITH ESP
OE : WITHOUT ESP
*1 3 : ES 2 : OE
*2 8 : ES 6 : OE
*3 8 : ES 2 : OE
*4 3 : ES 6 : OE
*5 4 : ES 8 : OE
*6 2 : ES 4 : OE
BCM (BODY CONTROL MODULE) M50
LOCK OUTPUT (ALL DOOR) 77
UNLOCK/ RELEASE OUTPUT (DR) 76
UNLOCK/ RELEASE OUTPUT (OTHER DOOR) 67
5D
M88 : ES
M10 : OE
B60 : ES
B1 : OE
M87 : ES
M6 : OE
D13 : ES
D1 : OE
M84 : ES
M56 : OE
D42 : ES
D31 : OE
B14
D81
B20
D61
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE) D9
FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE) D38
REAR DOOR LOCK ACTUATOR RH D83 : 5D
REAR DOOR LOCK ACTUATOR LH D63 : 5D
UNLOCK LOCK
M10 W
D1 W
D31 W
M50 B
H.S.
M88 W
D61 W
D81 W
D9 B
D38 B
D63 B
D83 B
D13 W
D42 W

MKWA1776E

BL-D/LOCK-05

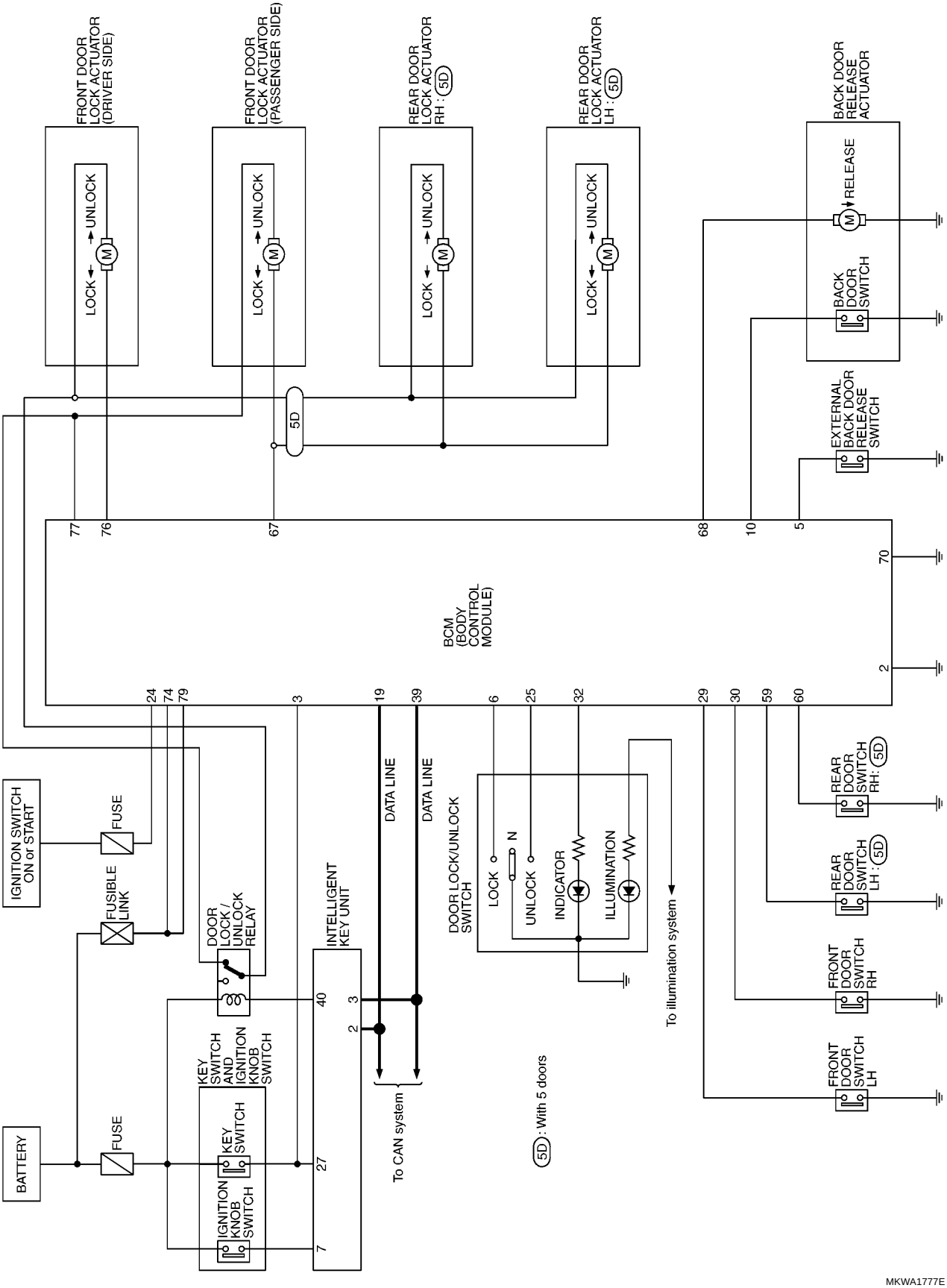




MKWA0867E

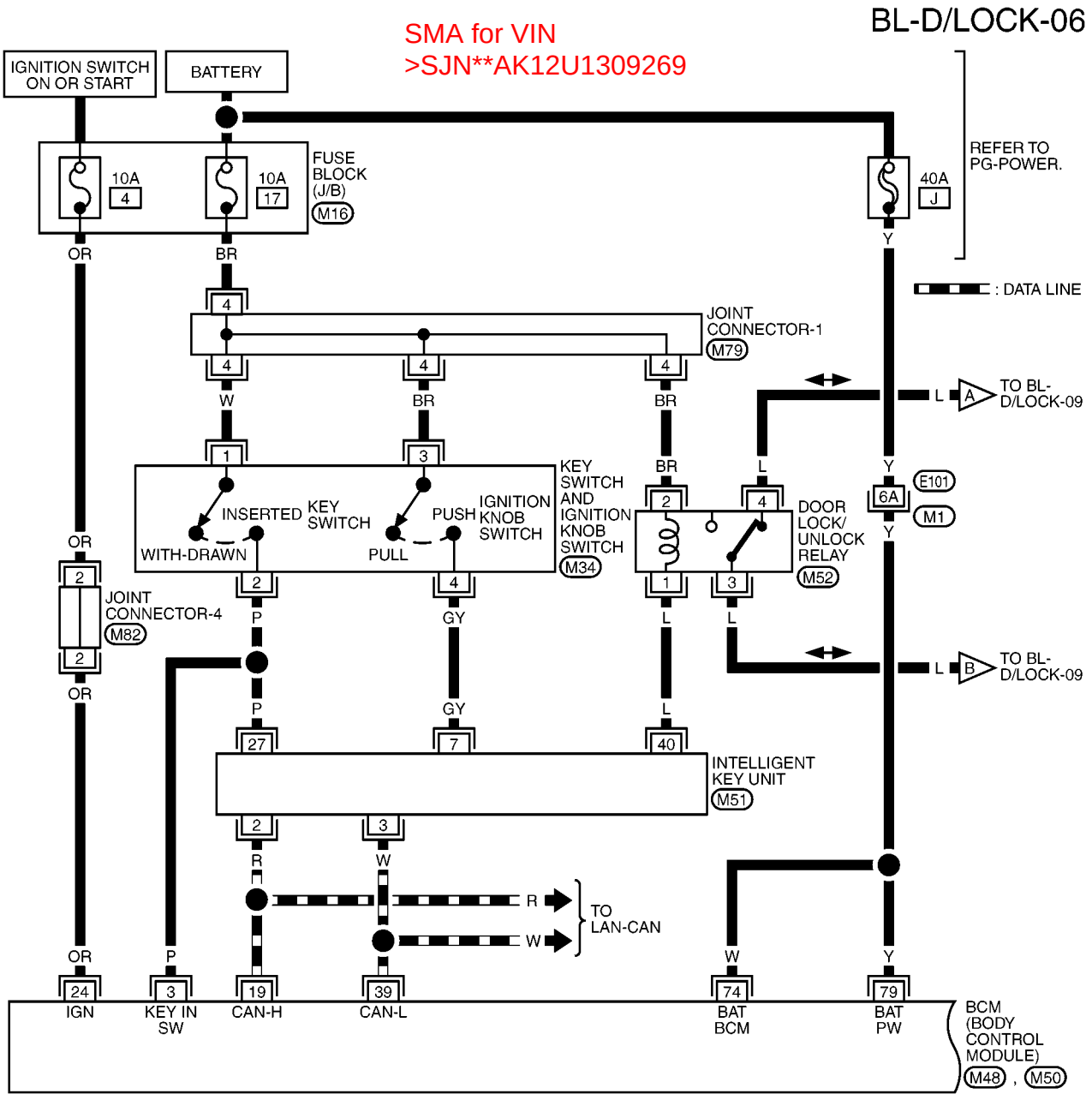
Schematic – D/LOCK – (With Intelligent Key System)

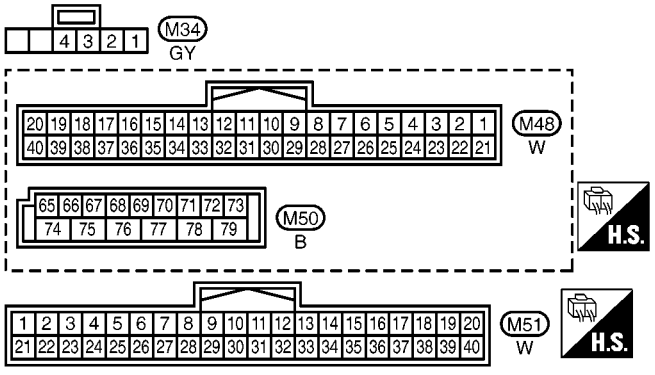
EIS00552



Wiring Diagram — D/LOCK — (With Intelligent Key System)

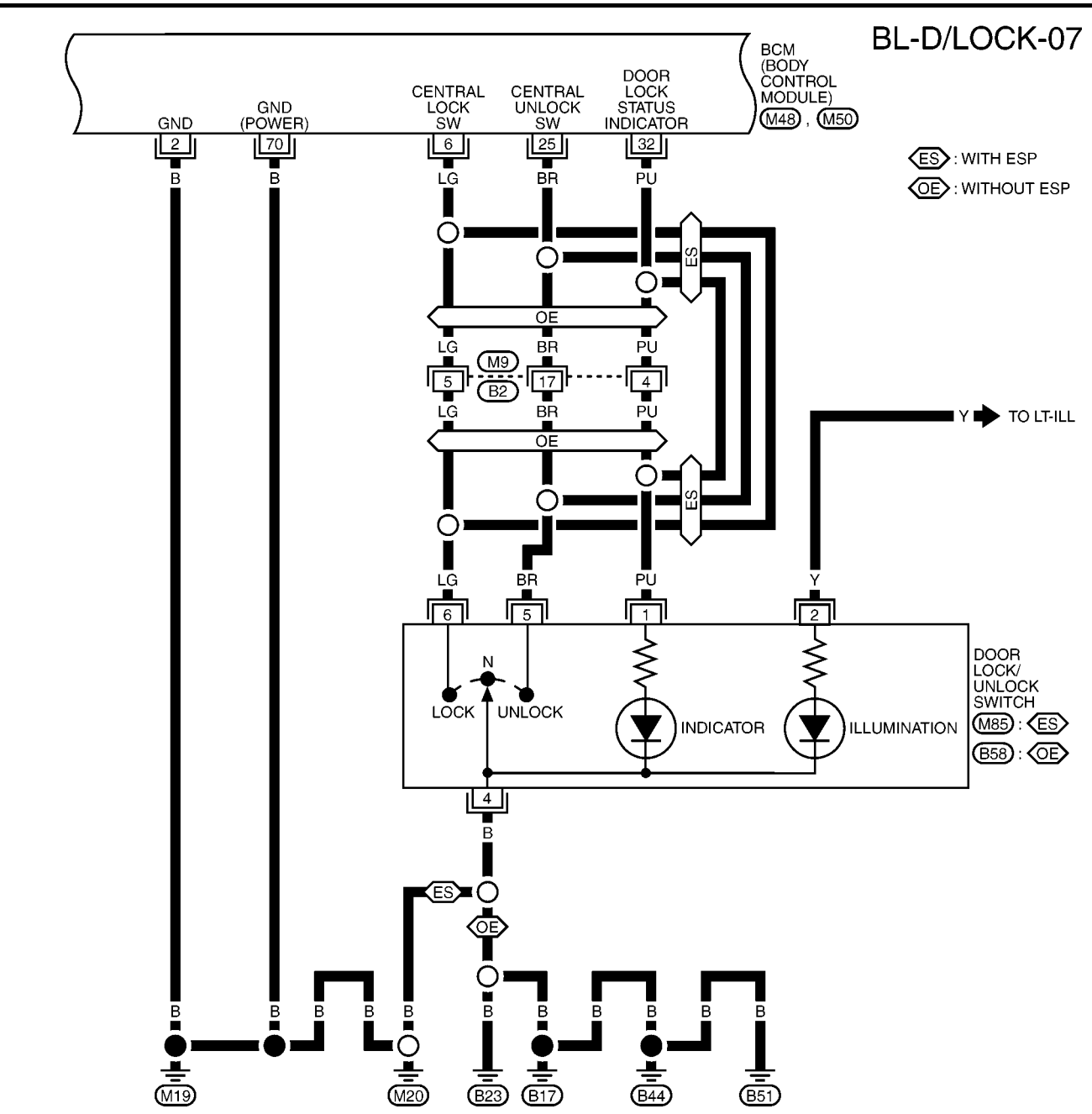
EIS00553

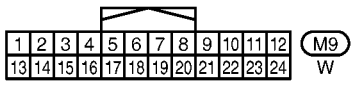


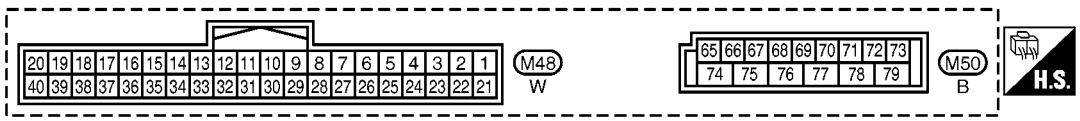


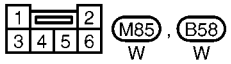
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M79 , M82 -JOINT CONNECTOR (J/C)

MKWA1778E


BL-D/LOCK-07
BCM (BODY CONTROL MODULE)
M48 , M50
GND
GND (POWER)
CENTRAL LOCK SW
CENTRAL UNLOCK SW
DOOR LOCK STATUS INDICATOR
2
70
6
25
32
B
B
LG
BR
PU
ES : WITH ESP
OE : WITHOUT ESP
ES
OE
M9
B2
5
17
4
Y
TO LT-ILL
6
5
1
2
N
LOCK
UNLOCK
INDICATOR
ILLUMINATION
DOOR LOCK/ UNLOCK SWITCH
M85 : ES
B58 : OE
4
M19
M20
B23
B17
B44
B51


1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
M9
W

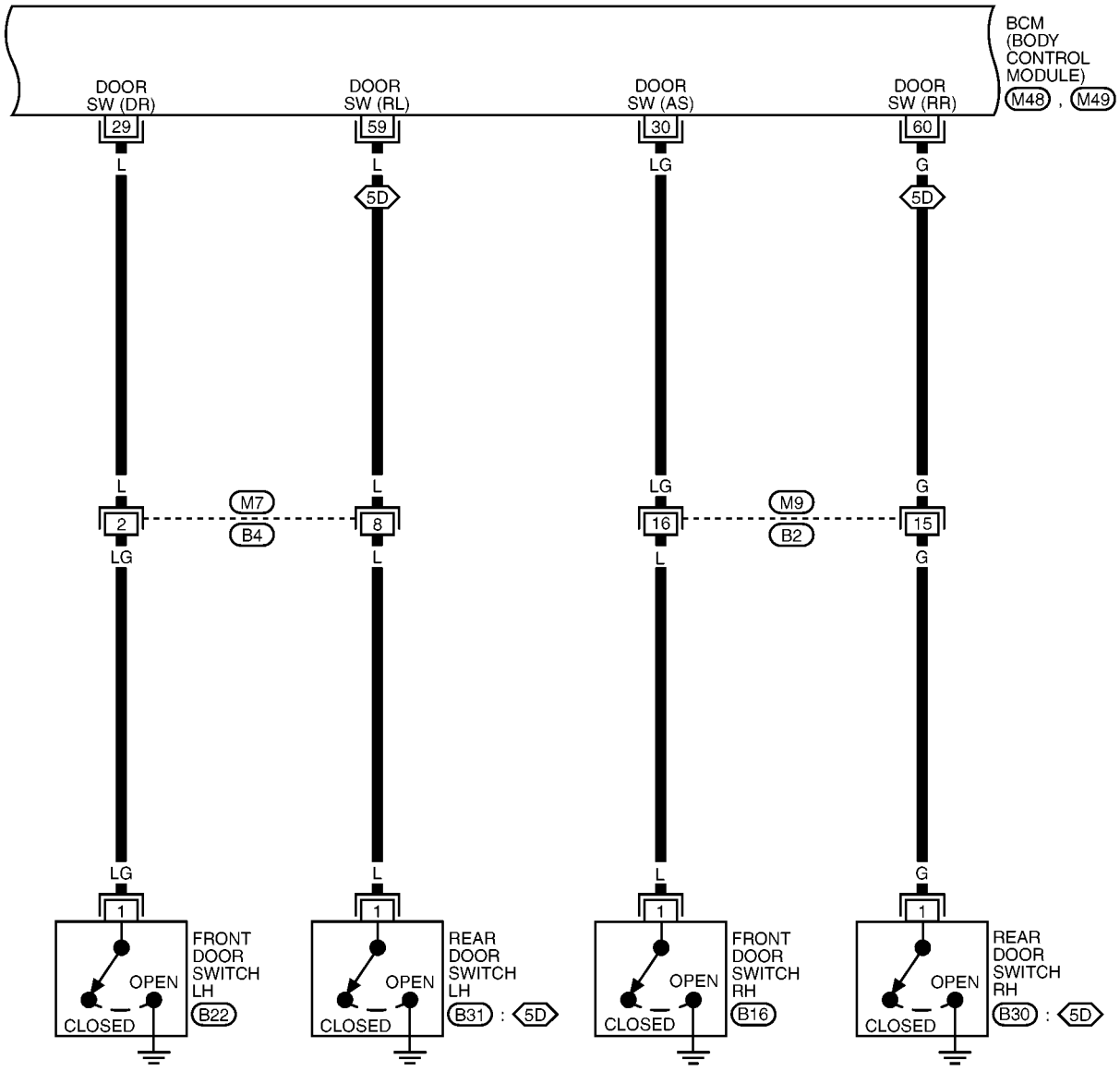

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21
M48
W
65 66 67 68 69 70 71 72 73
74 75 76 77 78 79
M50
B
H.S.

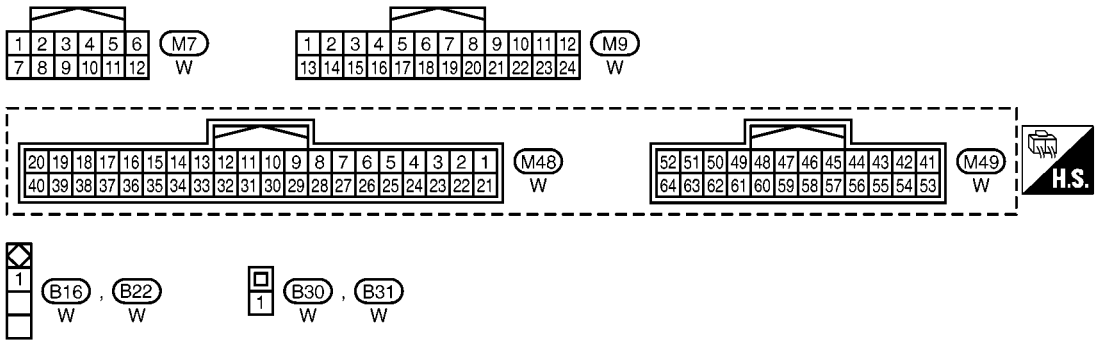

1 2
3 4 5 6
M85 , B58
W W

MKWA1779E

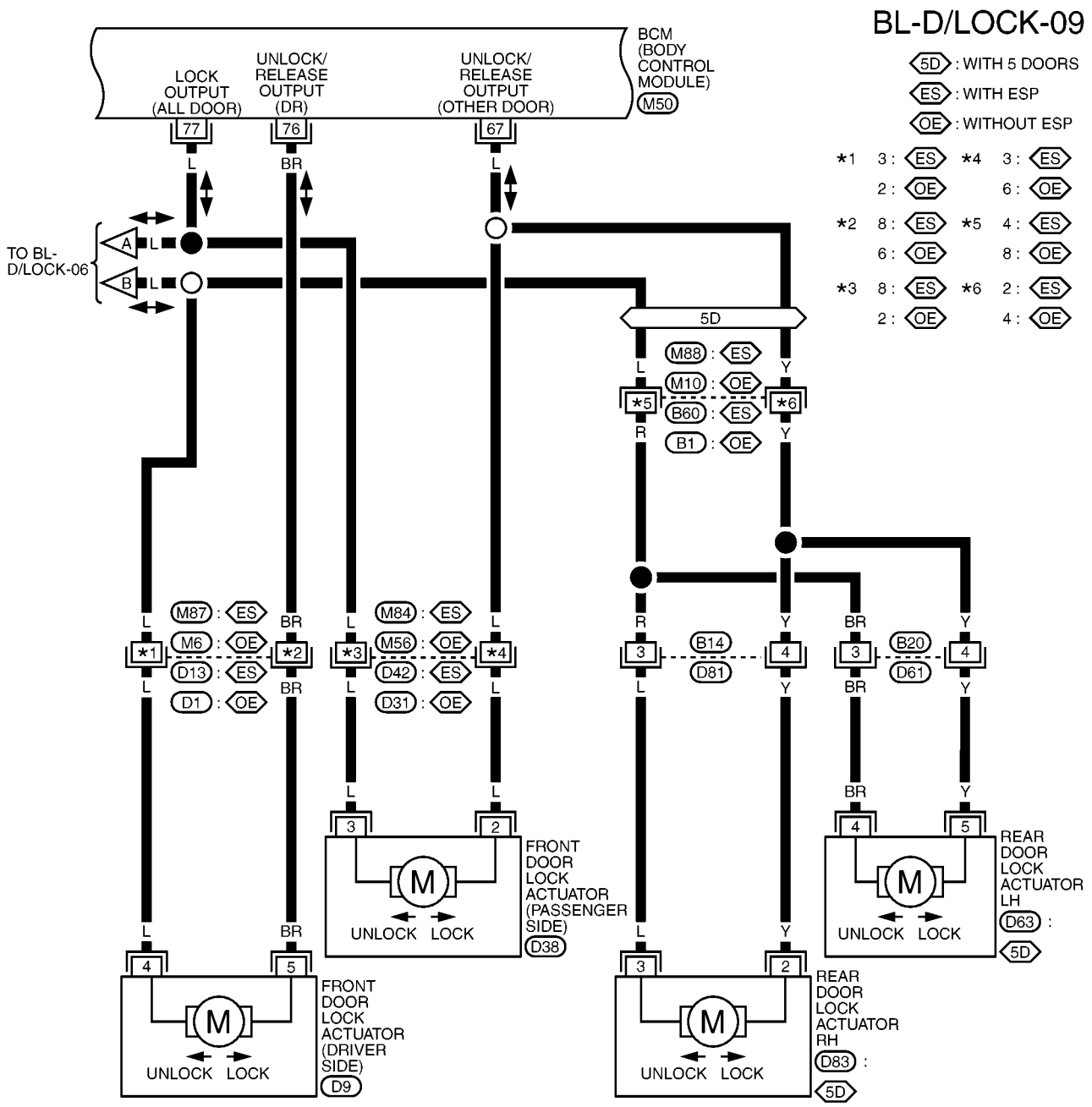
BL-D/LOCK-08

5D : WITH 5 DOORS



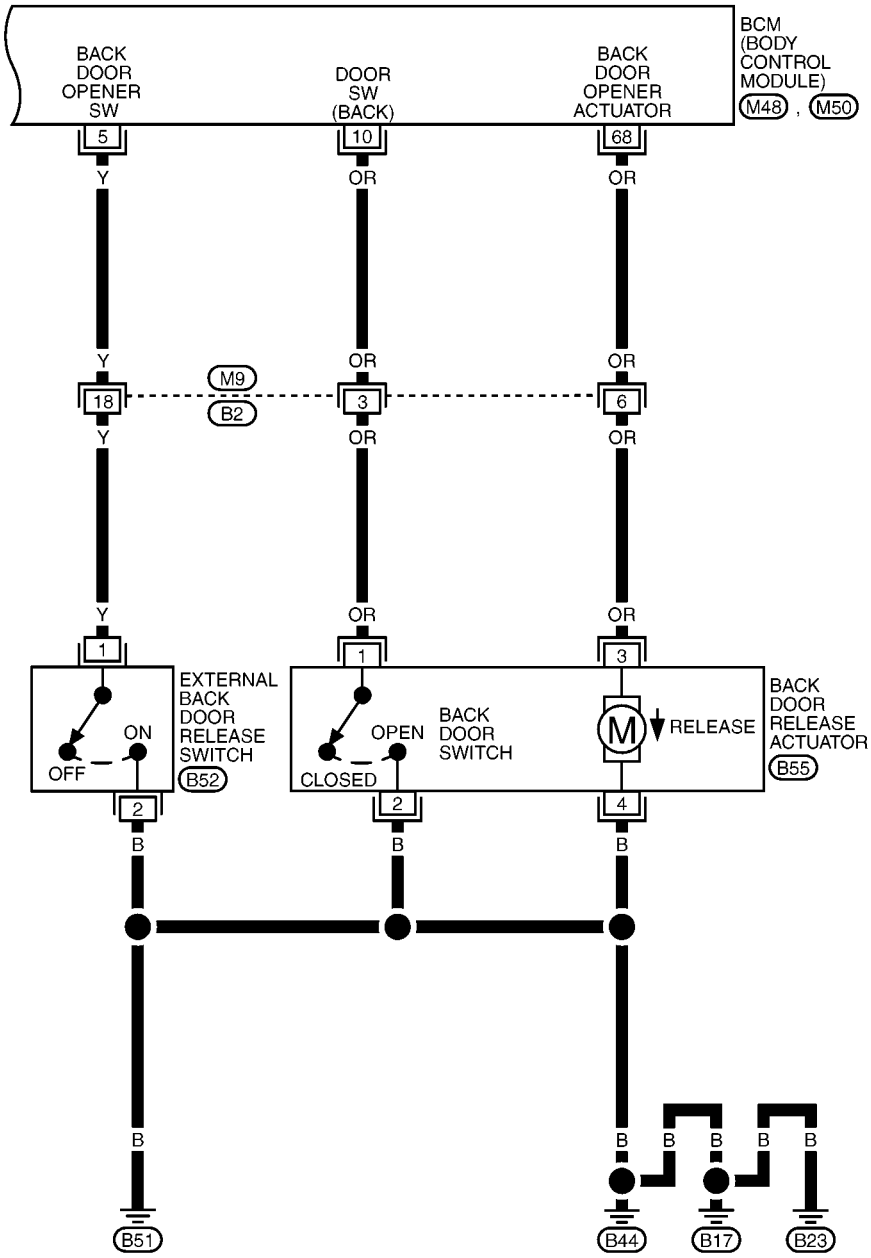


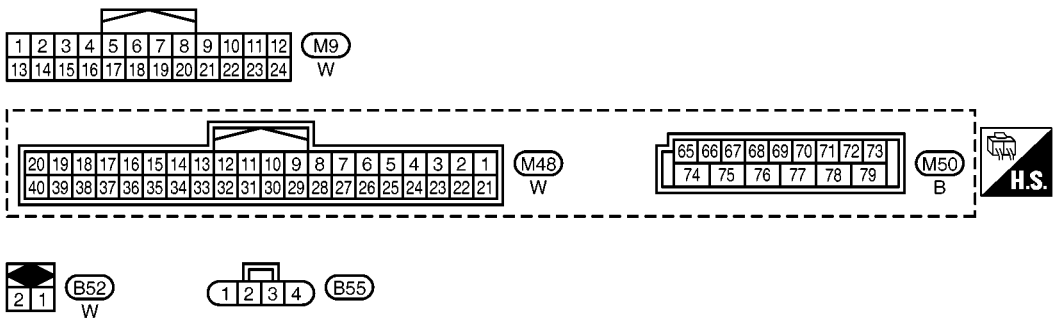
MKWA0871E


BL-D/LOCK-09
5D : WITH 5 DOORS
ES : WITH ESP
OE : WITHOUT ESP
*1 3 : ES 2 : OE
*2 8 : ES 6 : OE
*3 8 : ES 2 : OE
*4 3 : ES 6 : OE
*5 4 : ES 8 : OE
*6 2 : ES 4 : OE
BCM (BODY CONTROL MODULE) M50
LOCK OUTPUT (ALL DOOR) 77
UNLOCK/ RELEASE OUTPUT (DR) 76
UNLOCK/ RELEASE OUTPUT (OTHER DOOR) 67
TO BL-D/LOCK-06
A
B
5D
M88 : ES
M10 : OE
B60 : ES
B1 : OE
M87 : ES
M6 : OE
D13 : ES
D1 : OE
M84 : ES
M56 : OE
D42 : ES
D31 : OE
B14
D81
B20
D61
FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE) D38
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE) D9
REAR DOOR LOCK ACTUATOR RH D83 : 5D
REAR DOOR LOCK ACTUATOR LH D63 : 5D
UNLOCK LOCK
M10 W
D1 W
D31 W
M50 B
H.S.
M88 W
D61 W
D81 W
D9 B
D38 B
D63 B
D83 B
D13 W
D42 W

MIWA0111E

BL-D/LOCK-10





MKWA0873E

Terminal and Reference Value for BCM

EIS00554

Terminal	Wire color	Item	Condition	Voltage (V) (Approx.)
2	B	Ground	—	0
3	OR *P	Key switch	Key inserted (ON) → key removed from Ignition key cylinder (OFF)	Battery voltage → 0
5	Y	External back door release switch	Release switch open operation	5 → 0
6	LG	Door lock / unlock switch (Lock signal)	Lock operation (ON)	0
			Other than above (OFF)	5
10	OR	Back door switch	Open (ON) → Close (OFF)	0 → 5
19	R	CAN-H	—	—
24	OR	Ignition power supply	Ignition switch (ON or START position)	Battery voltage
25	BR	Door lock/unlock switch (Unlock signal)	Unlock operation (ON)	0
			Other than above (OFF)	5
29	L	Front door switch RH	Door open (ON) → close (OFF)	0 → Battery voltage
30	LG	Front door switch LH	Door open (ON) → close (OFF)	0 → Battery voltage
32	PU	Door lock status indicator	Goes OFF→ Illuminates (Ignition switch ON and all door closed)	0 → Battery voltage
39	W	CAN-L	—	—
59	L	Rear door switch LH	Door open (ON) → close (OFF)	0 → Battery voltage
60	G	Rear door switch RH	Door open (ON) → close (OFF)	0 → Battery voltage
67	L	Door lock actuator unlock (Passenger and rear LH, RH doors)	Door lock / unlock switch Unlock operation	0 → Battery voltage
68	OR	Back door release actuator	Power window main switch (Trunk or back door release switch) Open operation	Battery voltage → 0
70	B	Ground (Power)	—	0
74	W	Battery power supply (BCM)	—	Battery voltage
76	BR	Door lock actuator unlock (DR side door)	Door lock / unlock switch Unlock operation	0 → Battery voltage
77	L	Door lock actuator lock signal (All doors)	Door lock/unlock switch & remote controller lock operation	0 → Battery voltage
79	Y	Battery power supply (Power)	—	Battery voltage

*: With Intelligent Key system models

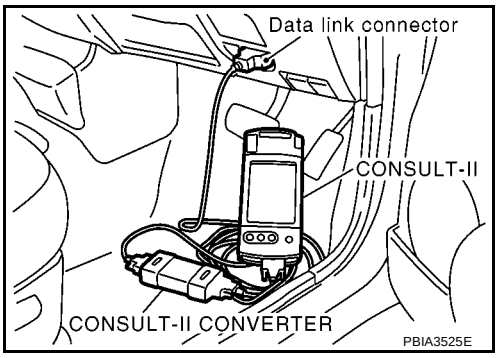
CONSULT- II Inspection Procedure

EIS00555

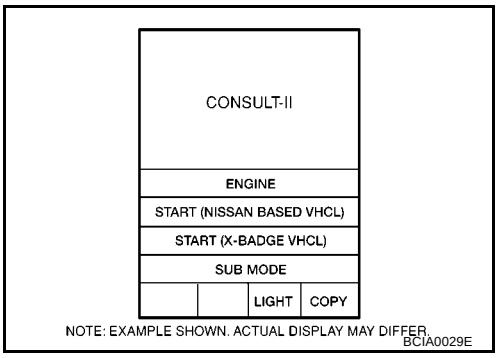
CAUTION:

If CONSULT-II is used with no connector of CONSULT-II CONVERTER, malfunction might be detected in self-diagnosis depending on control which carry out CAN communication.

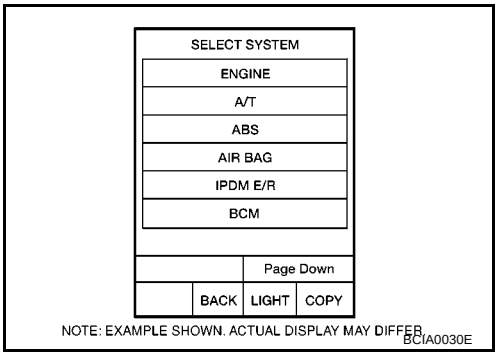
1. Turn ignition switch “OFF”.
2. Connect "CONSULT-II" and "CONSULT-II CONVERTER" to the data link connector.



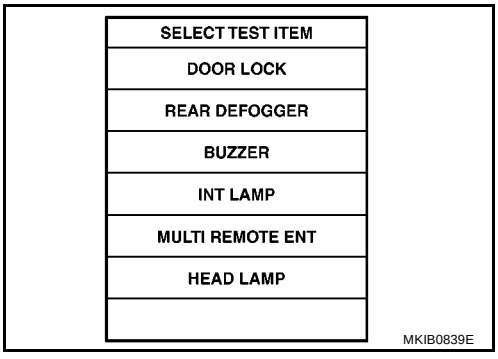
3. Turn ignition switch “ON”.
4. Touch “START (NISSAN BASED VHCL)”.



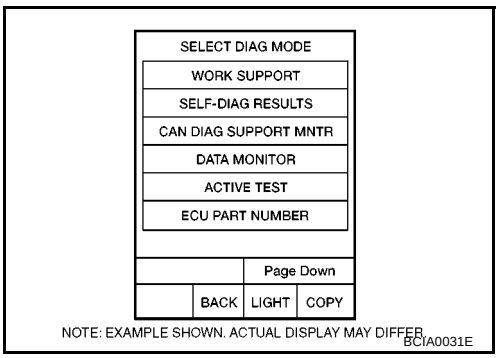
5. Touch “BCM”on “SELECT ITEM” screen. If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “DOOR LOCK”.



7. Touch “WORK SUPPORT”, “DATA MONITOR”,or “ACTIVE TEST” on the “SELECT DIAG MODE” screen.



CONSULT- II Application Items

EIS00556

WORK SUPPORT

Supported Item	Description
SECURITY DOOR LOCK SET	Anti-hijack function mode can be changed in this mode.
AUTO LOCK SET	Auto locking function mode can be changed in this mode.

Security Door Lock Set

	ON	OFF
Anti hijack function	Activation	Deactivation

Auto Lock Set

	MODE1	MODE2	MODE3	MODE4	MODE5	MODE6*	MODE7*	MODE8*
Auto locking function	1 minute	2 minutes	3 minutes	4 minutes	5 minutes	–	–	–

*: These mode are not supported.

DATA MONITOR

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
PUSH SW (*1)	Indicates [ON/OFF] condition of ignition knob switch.
KEY IN SW (*2)	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of lock signal from door lock/ unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of unlock signal from door lock/ unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch LH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch RH.
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of external back door release switch.

*1: Models with Intelligent Key System.
*2: Models without Intelligent Key System.

ACTIVE TEST

Monitored Item	Description
DOOR LOCK	This test is able to check all door lock actuator (except for back door) lock / unlock operation. These actuator lock / unlock when “LOCK” or “UNLOCK” on CONSULT-II screen is touched.
TRUNK / BACK DOOR	This test is able to check back door release actuator open operation. These actuator open when “OPEN” on CONSUT-II screen in touched.

TROUBLE DIAGNOSES CHART BY SYMPTOM/WITHOUT INTELLIGENT KEY SYSTEM

Always check the "Work Flow" before troubleshooting. Refer to Refer to Service Manual

Symptom	Malfunctioning system	Refer to page
Power door lock does not operate with door lock / unlock switch.	1.Check BCM power supply and ground circuit.	BL-49
	2.Check door lock / unlock switch.	BL-50
	3.Check door lock actuator (driver side).	BL-54
	4.Replace BCM.	BCS-31
Specific door lock actuator does not operate.	Check door lock actuator.	BL-54
Front door lock actuator (driver side) does not operate. (All other door lock actuators operate propely)	Check front door lock actuator (driver side).	BL-54
All door lock actuator (except driver side) does not operate.	1.Check door lock actuator circuit.	BL-53
	2. Replace BCM.	BCS-31
Key reminder system does not operate.	1. Check key switch.	BL-51
	2. Check door switch.	BL-58
	3. Replace BCM.	BCS-31
Back door does not open. But power door lock operates properly.	1.Check external back door release switch.	BL-66
	2. Check back door release actuator.	BL-68
	3. Replace BCM.	BCS-31
Door lock/unlock switch indicator does not illumination. (All other door lock system is "OK".	1. Check door lock/unlock switch indicator.	BL-69
	3. Replace BCM.	BCS-31

TROUBLE DIAGNOSES CHART BY SYMPTOM/WITH INTELLIGENT KEY SYSTEM

Always check the "Work Flow" before troubleshooting. Refer to Refer to Service Manual

Symptom	Malfunctioning system	Refer to page
Power door lock does not operate with door lock / unlock switch.	1.Check BCM power supply and ground circuit.	BL-49
	2.Check door lock / unlock switch.	BL-50
	3.Check door lock actuator (driver side).	BL-54
	4.Replace BCM.	BCS-31
Specific door lock actuator does not operate.	Check door lock actuator.	BL-54
Front door lock actuator (driver side) does not operate. (All other door lock actuators operate propely)	Check front door lock actuator (driver side).	BL-54
All door lock actuator (except driver side) does not operate.	1.Check door lock actuator circuit.	BL-53
	2. Replace BCM.	BCS-31
Key reminder system does not operate.	1. Check key switch.	BL-52
	2. Check door switch.	BL-58
	3. Replace BCM.	BCS-31
Back door does not open. But power door lock operates properly.	1.Check external back door release switch.	BL-66
	2. Check back door release actuator.	BL-68
	3. Replace BCM.	BCS-31
Door lock/unlock switch indicator does not illumination. (All other door lock system is "OK".	1. Check door lock/unlock switch indicator.	BL-69
	3. Replace BCM.	BCS-31
All door lock actuator (except passenger side) does not operate.	1. Check door lock/unlock relay circuit.	BL-69

Check Power Supply and Ground Circuit of BCM

EIS00558

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT-II, then perform the each trouble diagnosis of malfunction system indicated “SELF-DIAG RESULTS” of “BCM”, Refer to BCS-22, "CONSULT-II Function (BCM)".

1. FUSE INSPECTION

- Check 10A fuse [No.4, located in fuse block (J/B)]
- Check 40A fusible link (letter **J** located in the fuse and fusible link box).

NOTE:
Refer to BL-15, "Component Parts and Harness Connector Location" .

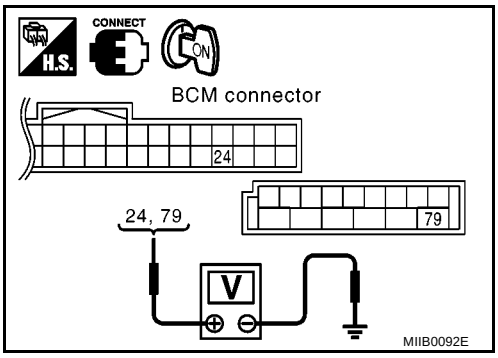
OK or NG

OK >> GO TO 2
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to.PG-4, "POWER SUPPLY ROUTING"

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between BCM connector M48, M50 terminal 24, 79 and ground.

24 (OR) – Ground :Battery voltage.
79 (Y) – Ground :Battery voltage.



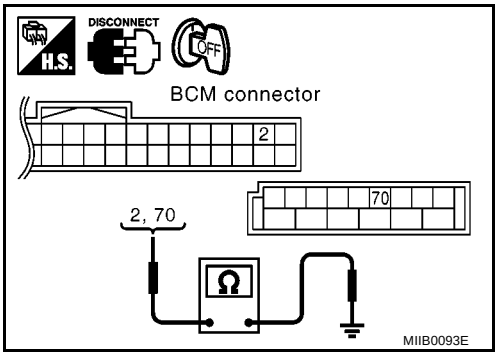
OK or NG

OK >> GO TO 3
NG >> Check BCM power supply circuit for open or short.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector M48, M50 terminal 2, 70 and ground.

2 (B) – Ground :Continuity should exist.
70 (B) – Ground :Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Check BCM ground circuit for open or short.

Check Door Lock / Unlock Switch

EIS00559

1. CHECK DOOR LOCK / UNLOCK SWITCH SIGNAL

With CONSULT- II

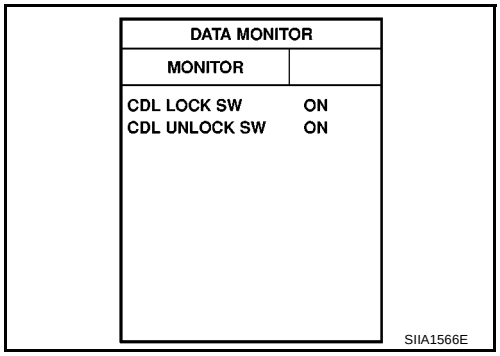
Check door lock / unlock switch input signal (“CDL LOCK SW” “CDL UNLOCK SW”) in “DATA MONITOR” mode with CONSULT- II.

When door lock/unlock switch is turned to LOCK:

CDL LOCK SW ⇒ ON

When door lock/unlock switch is turned to UNLOCK:

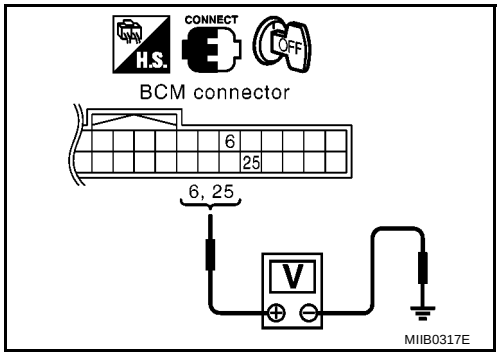
CDL UNLOCK SW ⇒ ON



Without CONSULT- II

Door lock / unlock switch operate, check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	6 (LG)	Ground	Lock	0
			Neutral / Unlock	5
	25 (BR)		Unlock	0
			Neutral / Lock	5



OK or NG

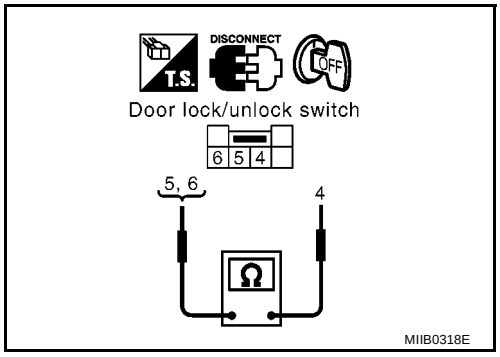
OK >> Door lock / unlock switch is OK.

NG >> GO TO 2.

2. CHECK DOOR LOCK/UNLOCK SWITCH

1. Turn ignition switch OFF.
2. Disconnect door lock / unlock switch connector.
3. Check continuity between door lock / unlock switch terminals 5, 6 and 4.

Terminals		Condition	Continuity
5	4	Unlock	Yes
		Neutral / Lock	No
6		Lock	Yes
		Neutral / Unlock	No



OK or NG

OK >> Check the following.

- Ground circuit for door lock / unlock switch
- Harness for open or short between BCM and door lock / unlock switch.

NG >> Replace door lock / unlock switch.

Check Key Switch /Without Intelligent Key System

EIS0055A

1. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch input signal “KEY IN SW” in “DATA MONITOR” mode with CONSULT- II.

When key is inserted in ignition key cylinder:

KEY IN SW ⇒ ON

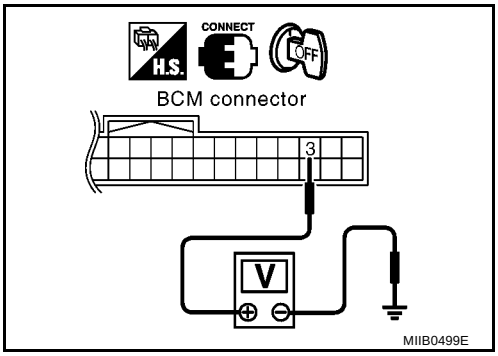
When key is removed from ignition key cylinder:

KEY IN SW ⇒ OFF

Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	3 (OR)	Ground	Key is inserted	Battery voltage
			Key is removed	0



OK or NG

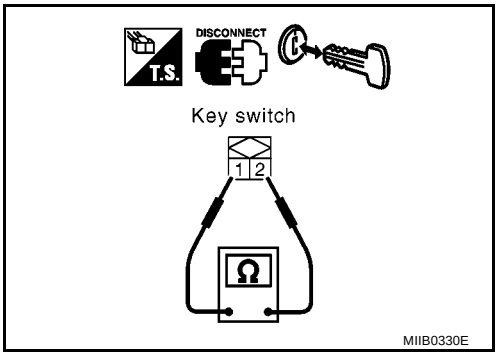
OK >> Key switch is OK.

NG >> GO TO 2.

2. CHECK KEY SWITCH (INSERT)

1. Turn ignition switch OFF.
2. Disconnect key switch connector.
3. Check continuity between key switch terminals 1 and 2.

Terminals		Condition	Continuity
1	2	Key is inserted	YES
		Key is removed	NO



OK or NG?

OK >> Check the following.

- 10A fuse [No. 6, located in fuse block (J/B)].
- Harness for open or short between key switch and fuse.
- Harness for open or short between BCM and key switch.

NG >> Replace key switch.

Check Key Switch/With Intelligent Key System

EIS0056D

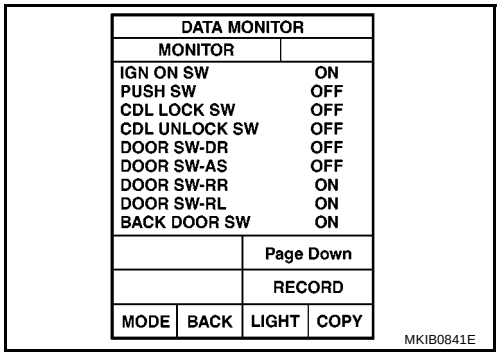
1. KEY SWITCH INSPECTION

With CONSULT-II

Display “PUSH SW” on DATA MONITOR screen, and check if ON-OFF display is linked to ignition knob switch operation.

When ignition knob is pushed : PUSH SW ON

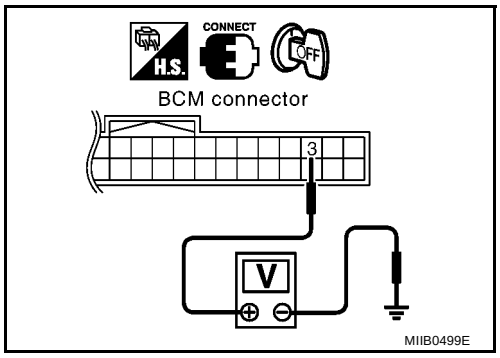
When ignition knob is released : PUSH SW OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	3 (OR)	Ground	Key is inserted	Battery voltage
			Key is removed	0



OK or NG

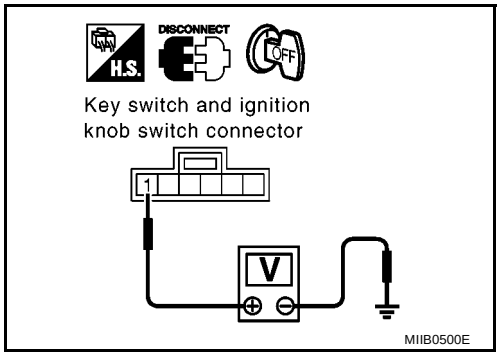
OK >> Key switch is OK.

NG >> GO TO 2.

2. KEY SWITCH POWER SUPPLY CIRCUIT INSPECTION

1. Remove mechanical key from ignition knob.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch connector M34 terminal 1 and ground.

1 (W) - Ground : Approx. 12V



OK or NG

OK >> GO TO 3.

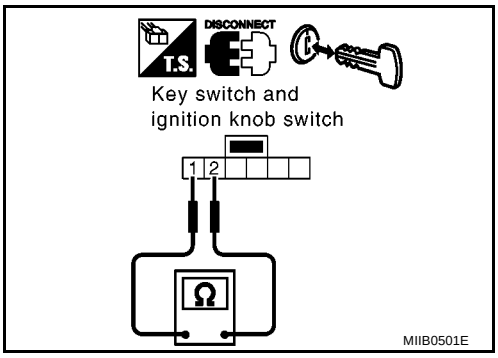
NG >> Repair or replace key switch power supply circuit.

3. KEY SWITCH OPERATION INSPECTION

1. Insert mechanical key into ignition knob.
2. Check continuity between key switch and ignition knob switch connector M34 terminal 1 and 2.

1 - 2

Insert mechanical key into ignition knob.	**: Continuity should exist.**
Remove mechanical key from ignition knob.	**: Continuity should not exist.**



OK or NG

OK >> GO TO 4.
NG >> Replace key switch.

4. KEY SWITCH CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminal 27 and key switch and ignition knob switch connector M34 terminal 2.

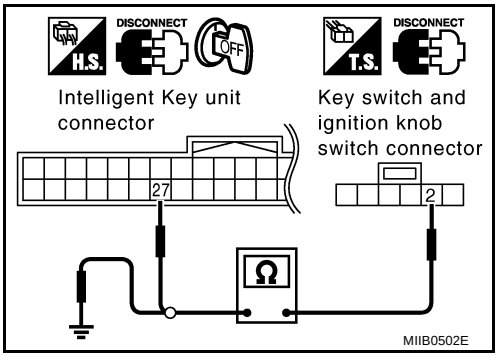
27 (P) - 2 (P) : Continuity should exist.

3. Check continuity between key switch connector M34 terminal 2 and ground.

2 (P) - Ground : Continuity should not exist.

OK or NG

OK >> Key switch is OK.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.



Check Door Lock Actuator Circuit.

EIS0055B

1. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67 and front door lock actuator (passenger side) connector D38 terminal 2.

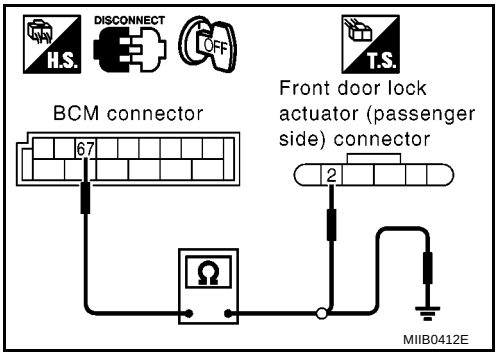
67 (L) – 2 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67 and ground.

67 (L) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.



Check Door Lock Actuator

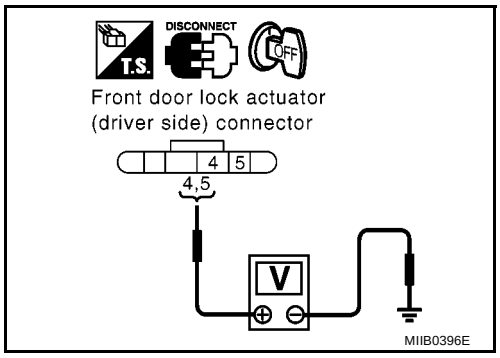
EIS0055C

DRIVER SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (driver side) connector.
3. Door lock / unlock switch operate, check voltage between front door lock actuator (driver side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D9	5 (BR)	Ground	Unlock	0 → Battery voltage → 0
	4 (L)		Lock	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (driver side).
NG >> GO TO 2.

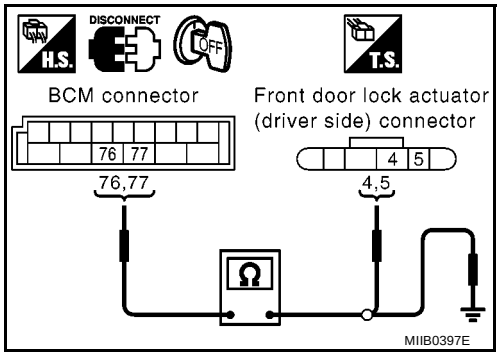
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 76, 77 and front door lock actuator (driver side) connector D9 terminal 4, 5.

76 (BR) – 5 (BR) : Continuity should exist.
77 (L) – 4 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 76, 77 and ground.

76 (BR) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

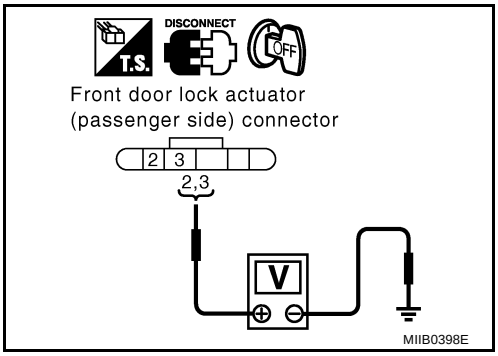
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

PASSENGER SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (passenger side) connector.
3. Door lock / unlock switch operate, check voltage between front door lock actuator (passenger side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D38	3 (L)	Ground	Lock	0 → Battery voltage → 0
	2 (L)		Unlock	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (passenger side).
NG >> GO TO 2.

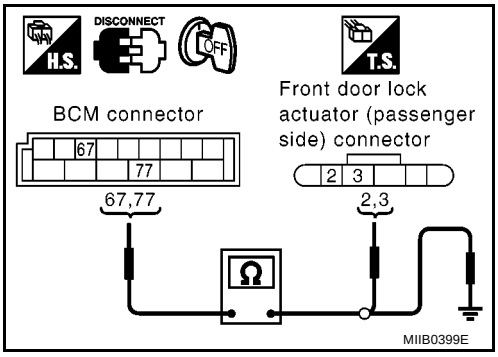
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and front door lock actuator (passenger side) connector D38 terminal 2, 3.

67 (L) – 2 (L) : Continuity should exist.
77 (L) – 3 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

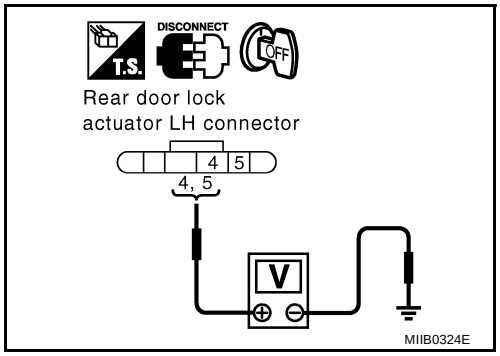
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

REAR LH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator LH connector.
3. Door lock / unlock switch operate, check voltage between rear door lock actuator LH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D63	4 (BR)	Ground	Lock	0 → Battery voltage → 0
	5 (Y)		Unlock	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator LH.
NG >> GO TO 2.

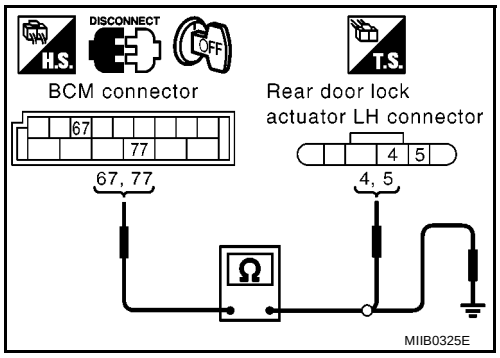
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and rear door lock actuator LH connector D63 terminal 4, 5.

67 (L) – 5 (Y) : Continuity should exist.
77 (L) – 4 (BR) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

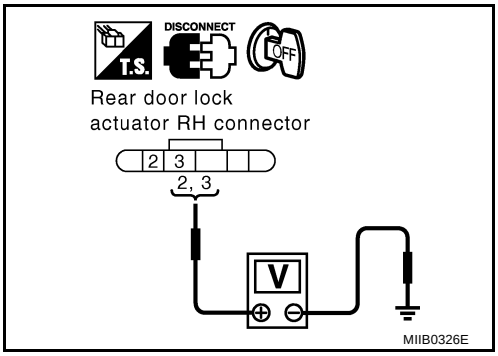
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

REAR RH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator RH connector.
3. Door lock / unlock switch operate, check voltage between rear door lock actuator RH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D83	2 (Y)	Ground	Unlock	0 → Battery voltage → 0
	3 (L)		Lock	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator RH.
NG >> GO TO 2.

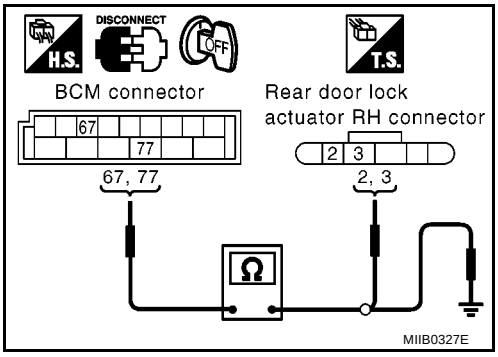
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and rear door lock actuator RH connector D83 terminal 2, 3.

67 (L) – 2 (Y) : Continuity should exist.
77 (L) – 3 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

Check Door Switch

EIS0055D

DRIVER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

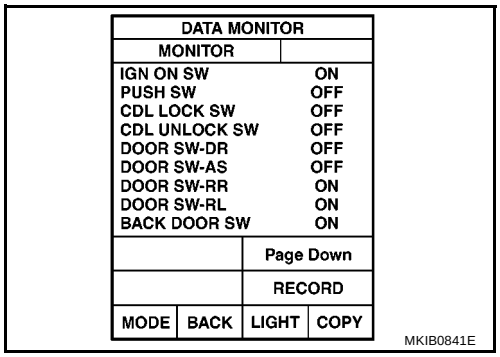
Check door switch “DOOR SW-DR” in “DATA MONITOR” mode with CONSULT- II.

When front door (driver side) is opend:

DOOR SW-DR ⇒ ON

When front door (driver side) is close:

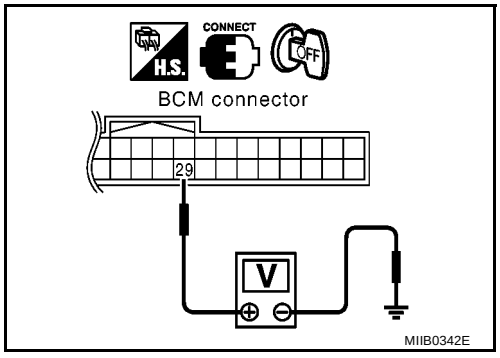
DOOR SW-DR ⇒ OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	29 (L)	Ground	Open	0
			Close	Battery voltage



OK or NG

OK >> Front door switch LH is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front door switch LH connector.
3. Check continuity between BCM connector M48 terminal 29 and front door switch LH connector B22 terminal 1.

   29 (L) – 1 (LG) : Continuity should exist.

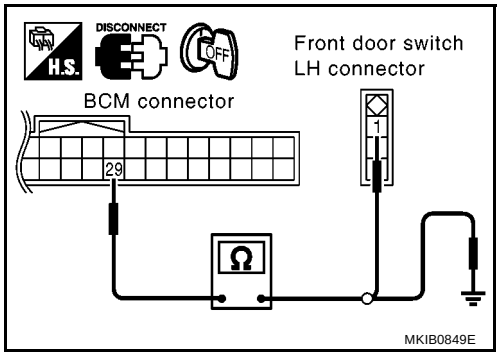
4. Check continuity between BCM connector M48 terminal 29 and ground.

   29 (L) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

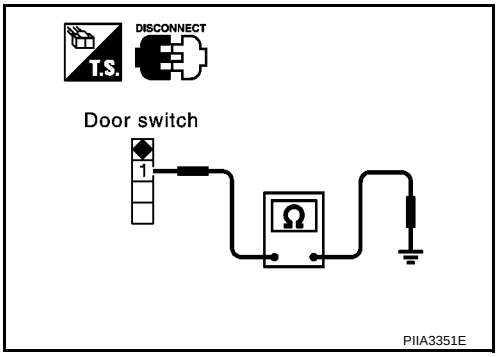
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Body ground part of door switch	Pushed	No
		Released	Yes



OK or NG

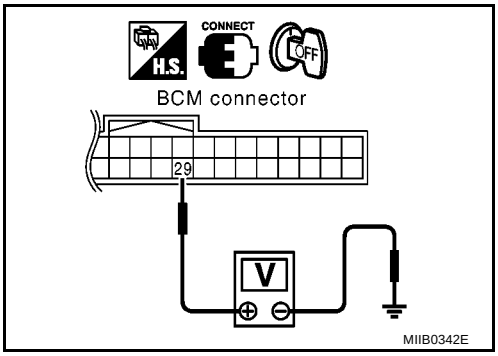
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 29 and ground.

Driver side door is closed.

29 (L) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

PASSENGER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

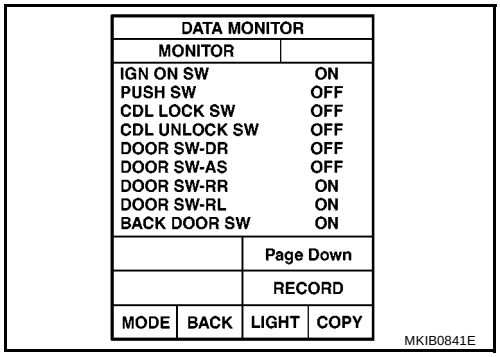
Check door switch “DOOR SW-AS” in “DATA MONITOR” mode with CONSULT- II.

When front door (passenger side) is opend:

DOOR SW-AS ⇒ ON

When front door (passenger side) is close:

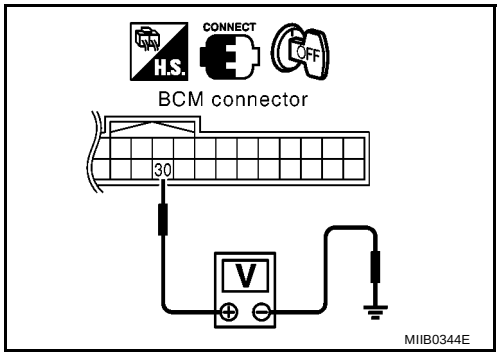
DOOR SW-AS ⇒ OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	30 (LG)	Ground	Open	0
			Close	Battery voltage



OK or NG

OK >> Front door switch RH is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front door switch RH connector.
3. Check continuity between BCM connector M48 terminal 30 and front door switch RH connector B16 terminal 1.

   30 (LG) – 1 (L) : Continuity should exist.

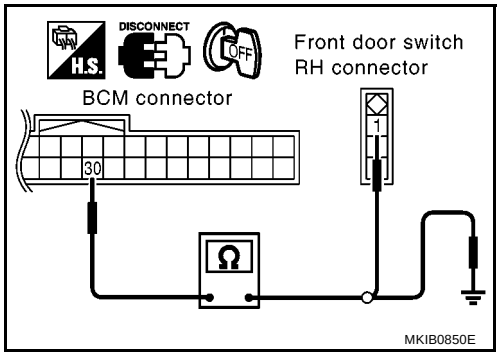
4. Check continuity between BCM connector M48 terminal 30 and ground.

   30 (LG) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

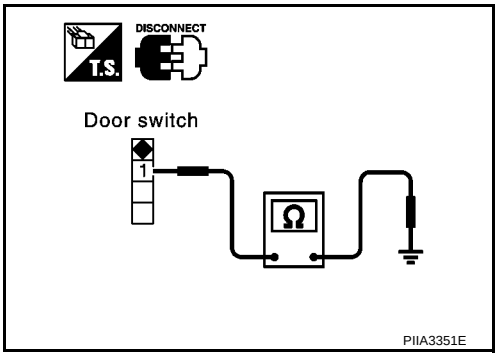
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Ground	Pushed	No
		Released	Yes



OK or NG

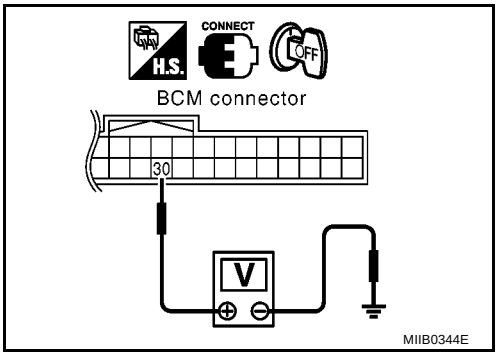
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 30 and ground.

Passenger side door is closed.

30 (LG) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

REAR LH SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

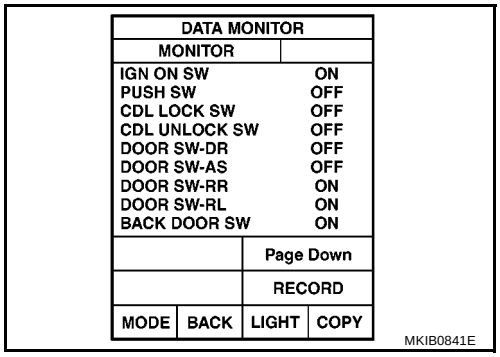
Check door switch “DOOR SW-RL” in “DATA MONITOR” mode with CONSULT- II.

When front door (rear LH side) is opend:

DOOR SW-RL ⇒ ON

When front door (rear LH side) is close:

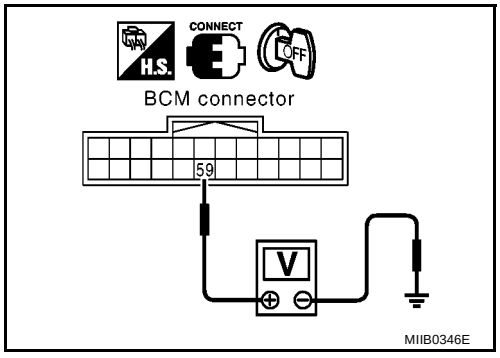
DOOR SW-RL ⇒ OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M49	59 (L)	Ground	Open	0
			Close	Battery voltage



OK or NG

OK >> Rear door switch LH is OK.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door switch LH connector.
3. Check continuity between BCM connector M49 terminal 59 and rear door switch LH connector B31 terminal 1.

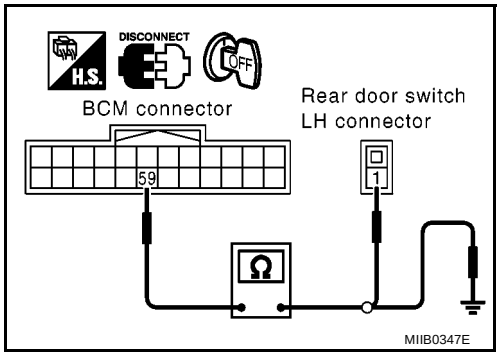
59 (L) – 1 (L) : Continuity should exist.

4. Check continuity between BCM connector M49 terminal 59 and ground.

59 (L) – Ground : Continuity should not exist.

OK or NG

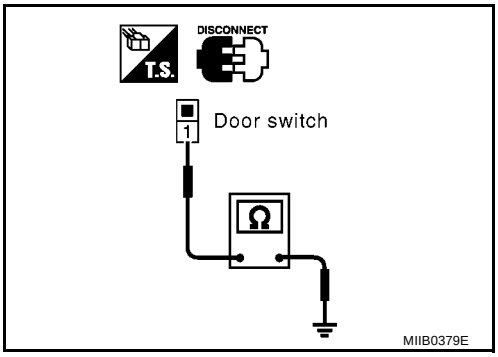
OK >> GO TO 3.
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Ground	Pushed	NO
		Released	YES



OK or NG

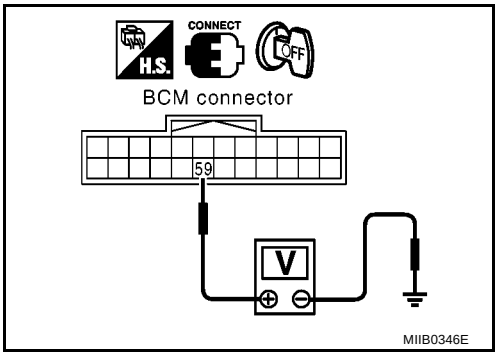
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M49 terminal 59 and ground.

Rear LH door is closed.

59 (L) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

REAR RH SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

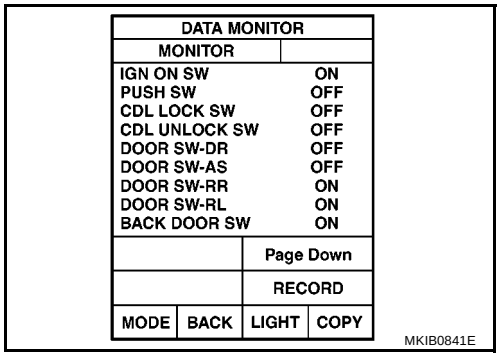
Check door switch “DOOR SW-RR” in “DATA MONITOR” mode with CONSULT- II.

When front door (rear RH side) is opend:

DOOR SW-RR ⇒ ON

When front door (rear RH side) is close:

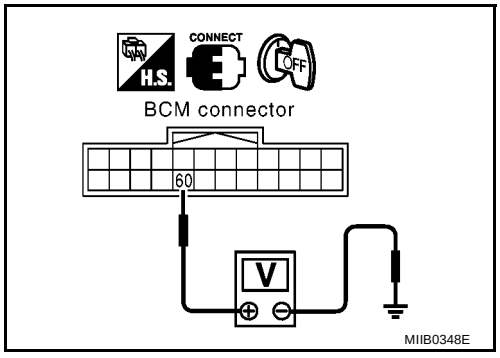
DOOR SW-RR ⇒ OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M49	60 (G)	Ground	Open	0
			Close	Battery voltage



OK or NG

OK >> Rear door switch RH is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door switch RH connector.
3. Check continuity between BCM connector M49 terminal 60 and rear door switch RH connector B30 terminal 1.

60 (G) – 1 (G) : Continuity should exist.

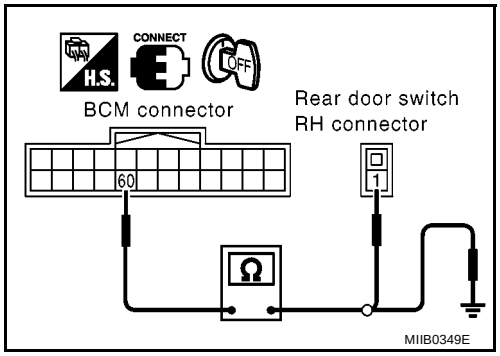
4. Check continuity between BCM connector M49 terminal 60 and ground.

60 (G) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

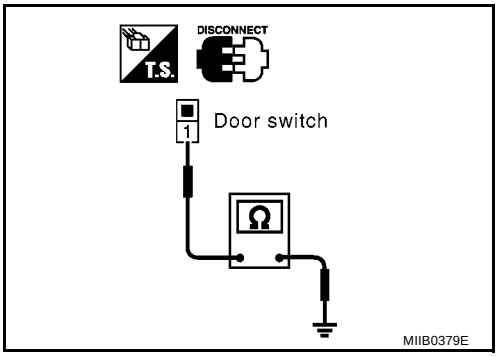
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Ground	Pushed	NO
		Released	YES



OK or NG

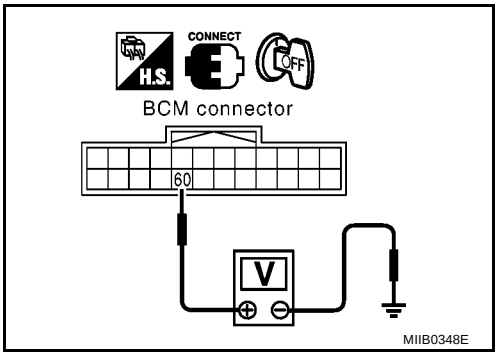
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M49 terminal 60 and ground.

Rear RH door is closed.

60 (G) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

Check External Back Door Release Switch

EIS0055E

1. CHECK EXTERNAL BACK DOOR RELEASE SWITCH INPUT SIGNAL

With CONSULT- II

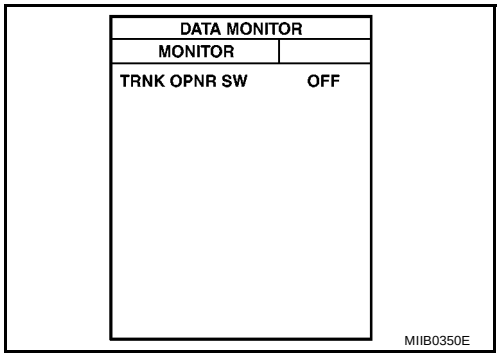
Check external back door release switch “TRNK OPNR SW” in “DATA MONITOR” mode with CONSULT- II.

External back door release switch is pushed

TRNK OPNR SW : ON

External back door release switch is released

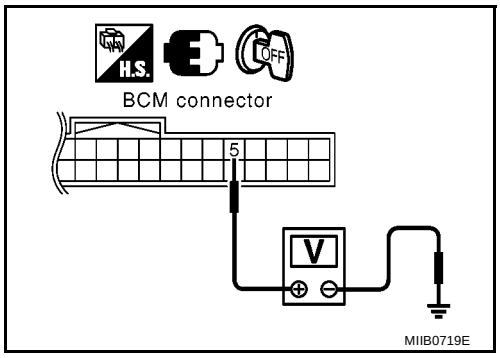
TRNK OPNR SW : OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	5 (Y)	Ground	Pushed	0
			Released	5



OK or NG

OK >> External back door release switch is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and external back door release switch connector.
3. Check continuity between BCM connector M48 terminal 5 and external back door release switch connector B52 terminal.

   5 (Y) – 1 (Y) : Continuity should exist.

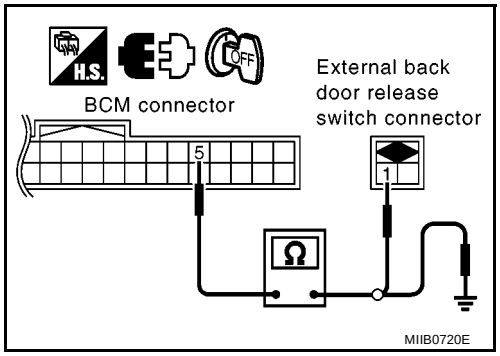
4. Check continuity between BCM connector M48 terminal 5 and ground.

   5 (Y) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace harness.



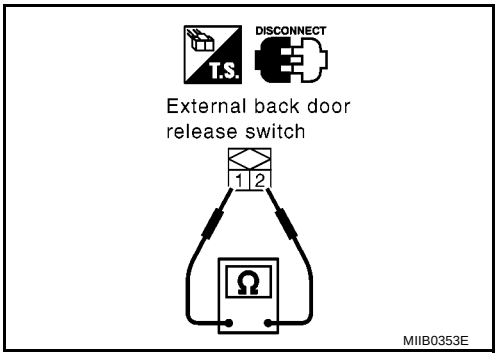
3. CHECK EXTERNAL BACK DOOR RELEASE SWITCH

Check continuity between external back door release switch terminal 1 and 2.

Terminals		Condition	Continuity
1	2	Pushed	Yes
		Released	No

OK or NG

OK >> GO TO 4.
NG >> Replace external back door release switch.



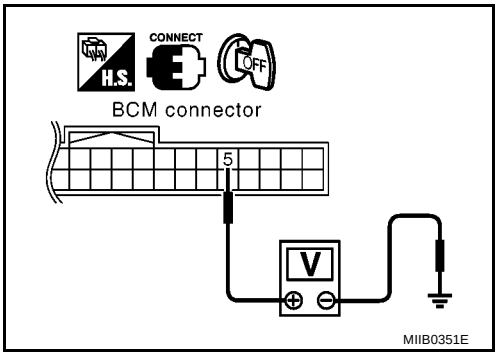
4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 5 and ground.

5 (Y) – Ground : Approx. 5V

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace BCM.



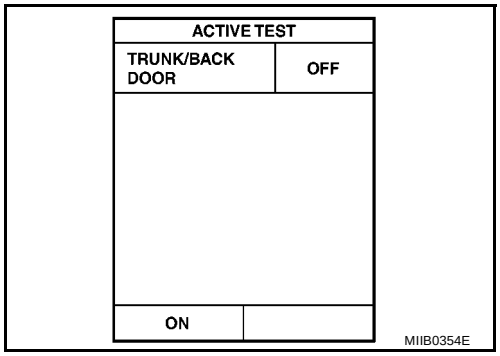
Check Back Door Release Actuator

EIS0055F

1. CHECK BCM OUTPUT SIGNAL

Check back door release output signal
Perform (“TRUNK/BACK DOOR”) in “ACTIVE TEST” mode with CONSULT-II.

When “ACTIVE TEST” is executed, does the back door open?



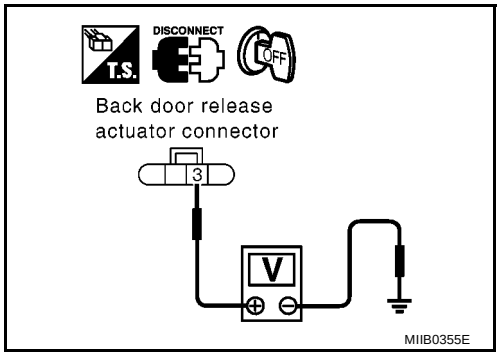
OK or NG

OK >> Back door release output is OK.
NG >> GO TO 2.

2. CHECK BACK DOOR RELEASE ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect back door release actuator connector.
3. External back door release switch operate, check voltage between back door release actuator connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
B55	3 (OR)	Ground	Pushed	0 → Battery voltage → 0



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 68 and back door release actuator connector B55 terminal 3.

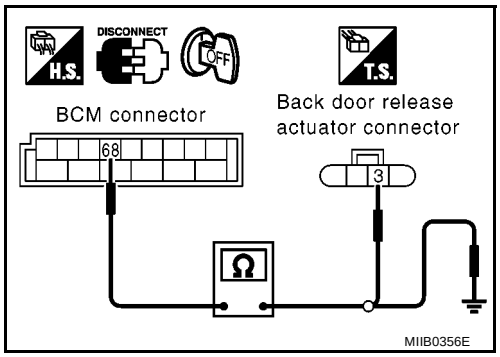
68 (OR) – 3 (OR) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 68 and ground.

68 (OR) – Ground : Continuity should not exist.

OK or NG

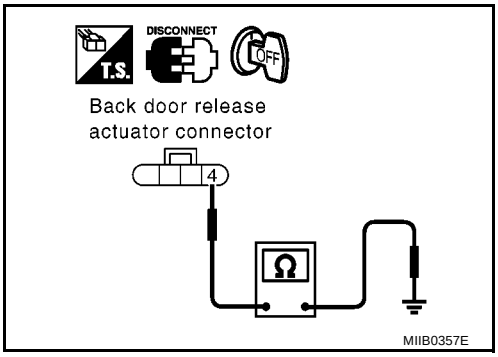
OK >> Replace BCM.
NG >> Repair or replace harness.



4. CHECK GROUND CIRCUIT

Check continuity between back door release actuator connector B55 terminal 4 and ground.

4 (B) – Ground : Continuity should exist.



OK or NG

OK >> Replace back door release actuator.
NG >> Repair or replace harness.

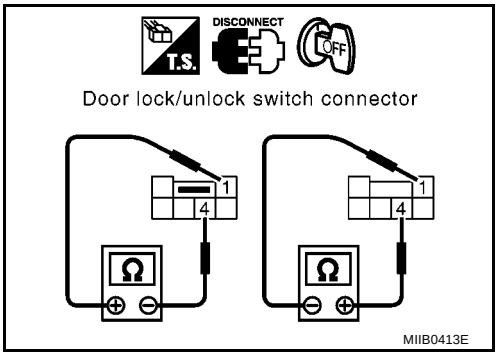
Check Door Lock/Unlock Switch Indicator

EIS00566

1. CHECK DOOR LOCK/UNLOCK SWITCH INDICATOR

Check continuity between door lock/unlock switch indicator harness connector terminal 1 and 4.

Terminals		Continuity
(+)	(-)	
1	4	Yes
4	1	No



OK or NG

OK >> Check harness for open or short between BCM and door lock/unlock switch.
NG >> replace door lock/unlock switch.

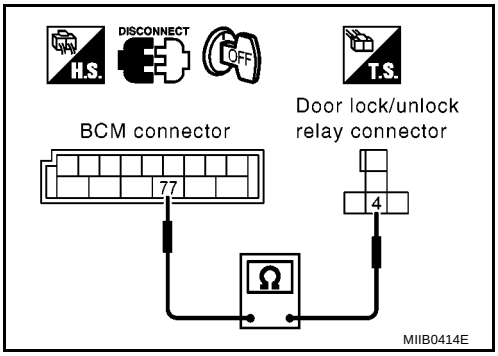
Check Door Lock/Unlock Relay Circuit

EIS00567

1. CHECK HARNESS CONTINUITY

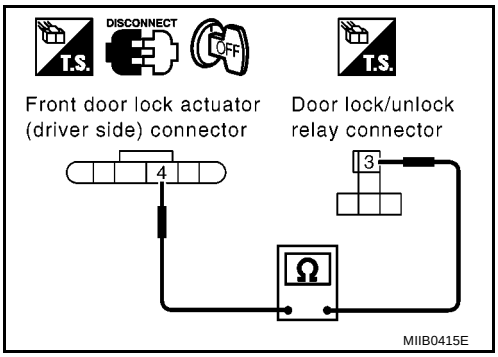
1. Disconnect BCM and door lock/unlock relay and front door lock actuator (driver side).
2. Check continuity between BCM connector M50 terminal 77 and door lock/unlock relay connector M52 terminal 4.

77 (L) – 4 (L) : Continuity should exist.



3. Check continuity between door lock/unlock relay connector M52 terminal 3 and front door lock actuator (driver side) connector D9 terminal 4.

3 (L) – 4 (L) : Continuity should not exist.



OK or NG

OK >> Check door lock/unlock relay.
NG >> Repair or replace harness.

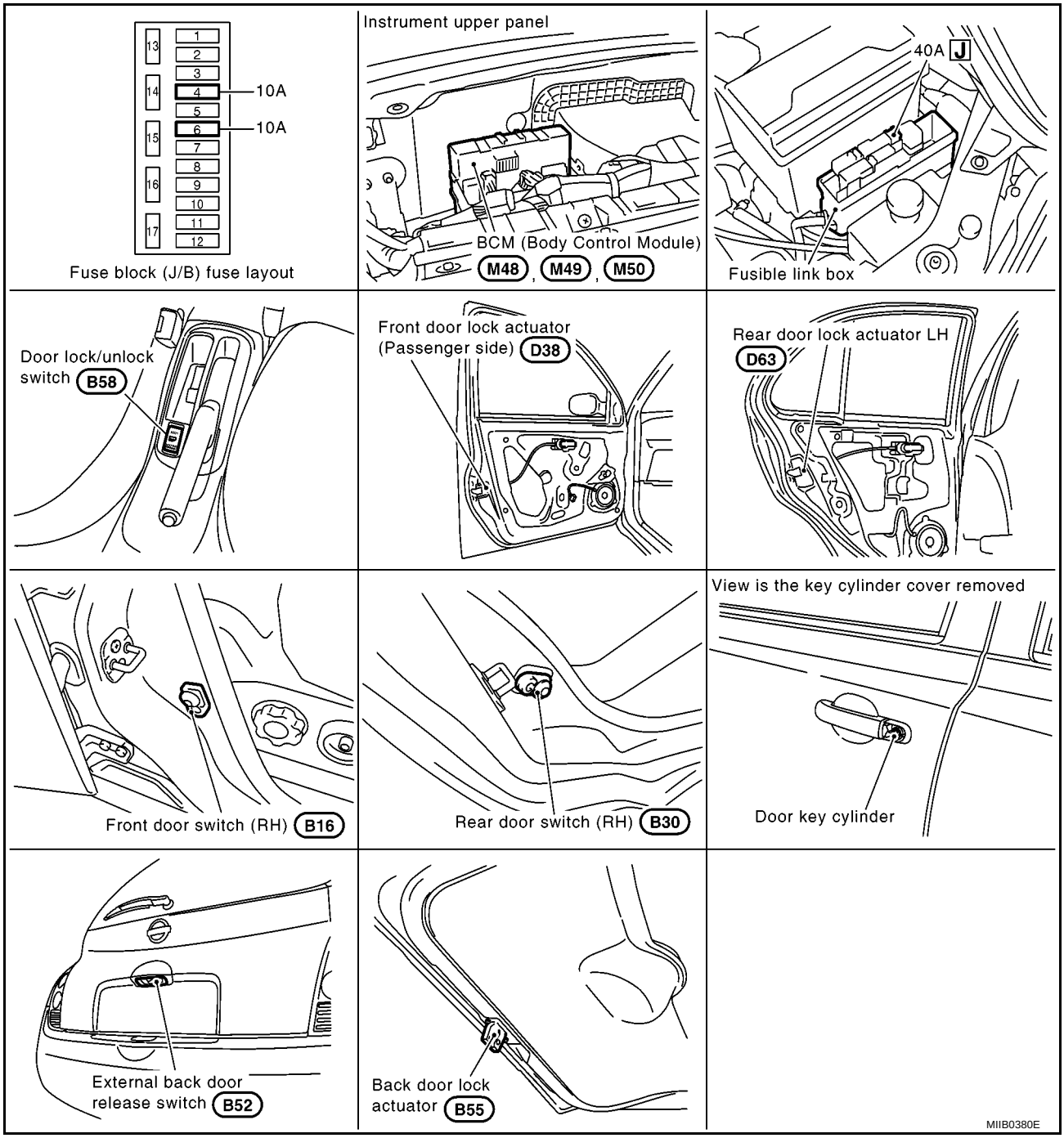
POWER DOOR LOCK — SUPER LOCK —

PFP:24814

Component Parts and Harness Connector Location

SMA for VIN >SJN**AK12U1309269

EIS0054P



System Description

EIS004XP

OUTLINE

Power door lock system with super lock and key reminder is controlled by BCM (Body Control Module). Super lock has a higher anti-theft performance than conventional power door lock systems.
When super lock is in released condition, lock knob operation locks or unlocks door.
When super lock is in set condition, lock knob operation cannot lock nor unlock door.

OPERATION

Power door lock / unlock and super lock set / release operation by remote controller

- Pressing remote controller LOCK button will lock all doors and set super lock. (Super lock will not be set while key is inserted in the ignition key cylinder.)
- Pressing remote controller UNLOCK button once will unlock driver door and release super lock. Then, if an unlock signal is sent from the remote controller again within 5 seconds, all other doors will be unlocked.

Power door lock / unlock and super lock release operation by door key cylinder

With the key inserted into driver door key cylinder, turning it to UNLOCK will unlock passenger door and release super lock.

Power door lock and super lock release operation

When the super lock is set, turning the ignition key switch to ON will release the super lock. All doors will unlock once, but then immediately lock again.

Power door lock / unlock operation by lock / unlock switch

- With door lock / unlock switch on center console setting to LOCK will lock all doors.
- With door lock / unlock switch on center console setting to UNLOCK will unlock all doors.

Door lock / unlock switch operation cannot control super lock

Key reminder system

If the ignition key is in the ignition key cylinder and driver door is open, setting door lock / unlock switch, lock knob, key or remote controller to “LOCK” locks the door once but then immediately unlocks all doors.
(signal from door unlock sensor driver side)

System initialization

- System initialization is required when battery cables are reconnected. Conduct the following to release super lock once;

– insert the key into the ignition key cylinder and turn it to ON.
– LOCK / UNLOCK operation using remote controller.

Back door open operation

Back door open operates when all doors door lock and super lock are unlocked.

CAN Communication

EIS008C1

SYSTEM DESCRIPTION

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

CAN Communication Unit

EIS00AOR

Go to CAN system, when selecting your car model from the following table.

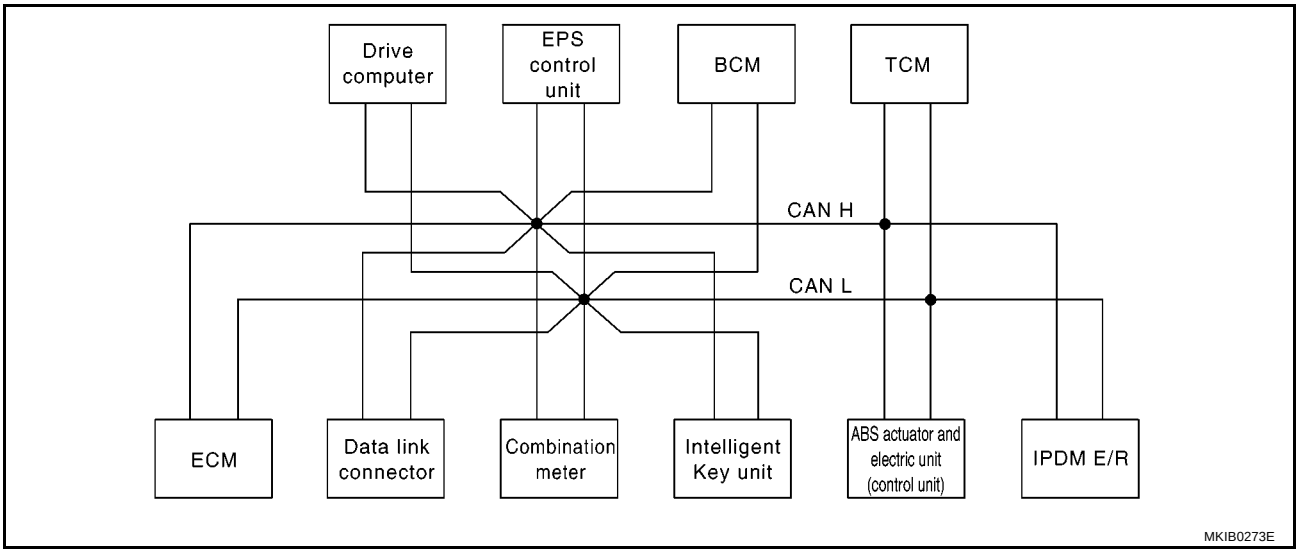
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	BL-73, "TYPE 1/ TYPE 2"				BL-76, "TYPE 3/ TYPE 4"				BL-78, "TYPE 5/ TYPE 6"				BL-81, "TYPE 7/ TYPE 8"				BL-83, "TYPE 9/ TYPE 10"			

×: Applicable

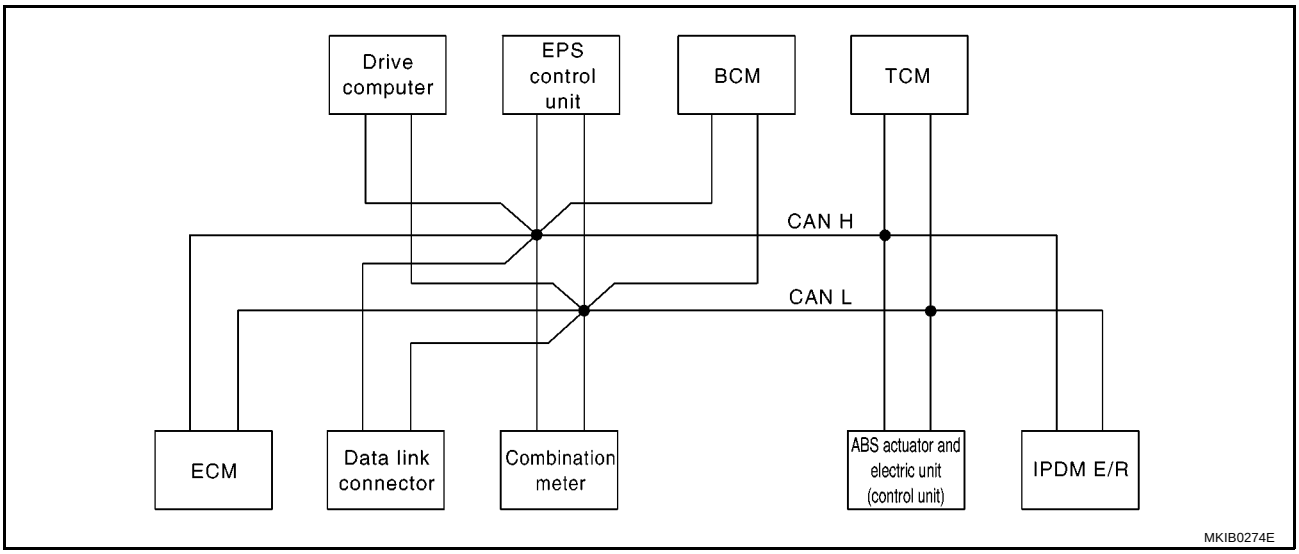
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

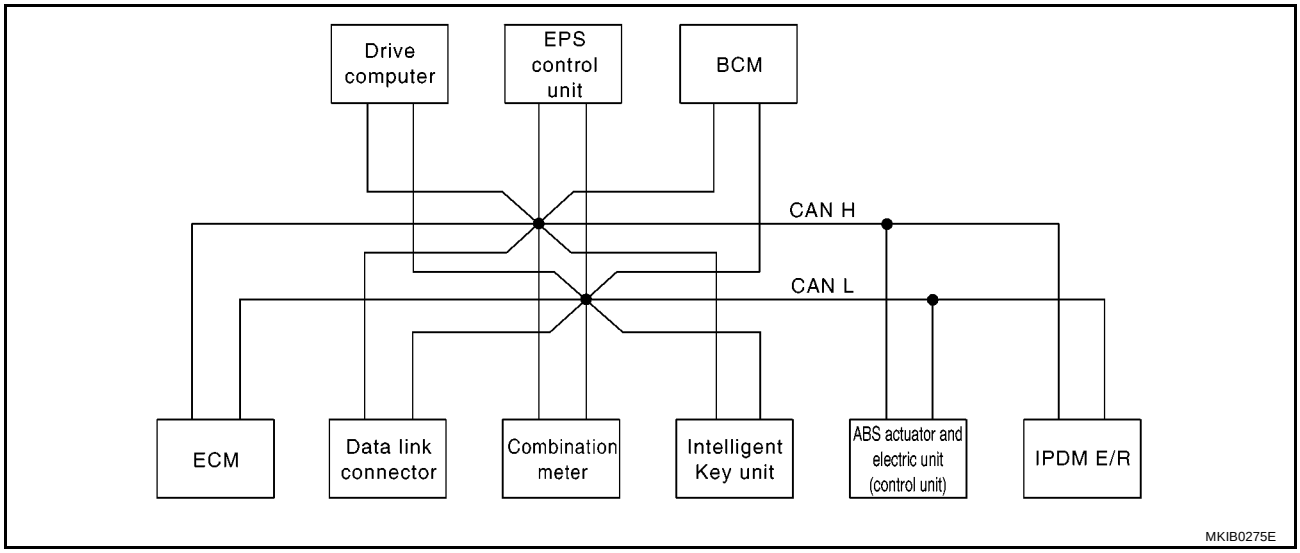
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

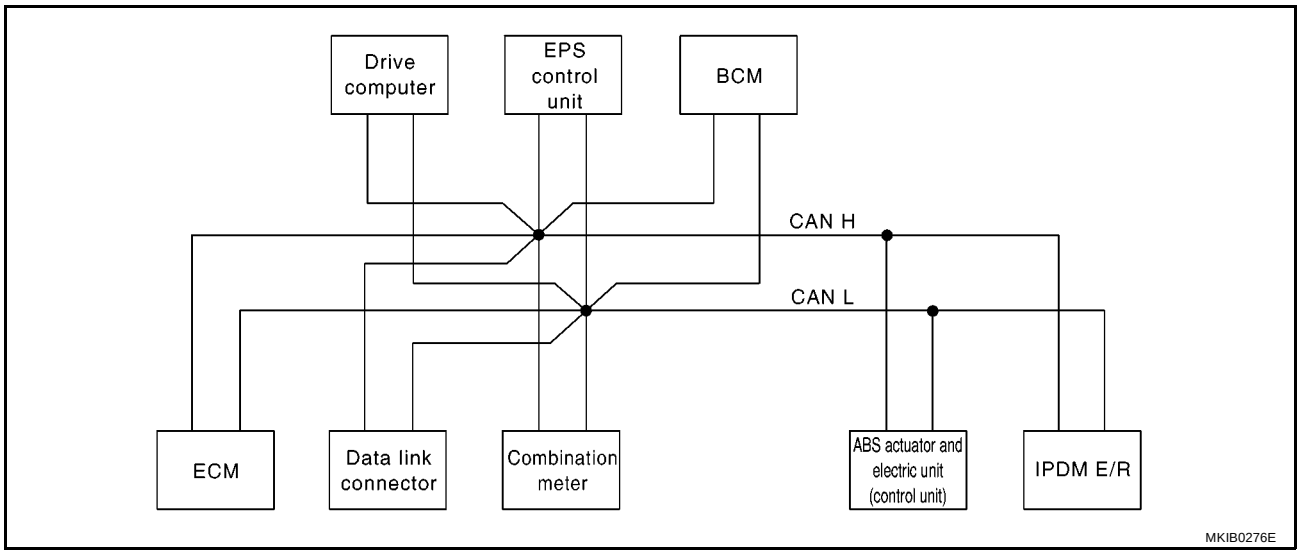
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

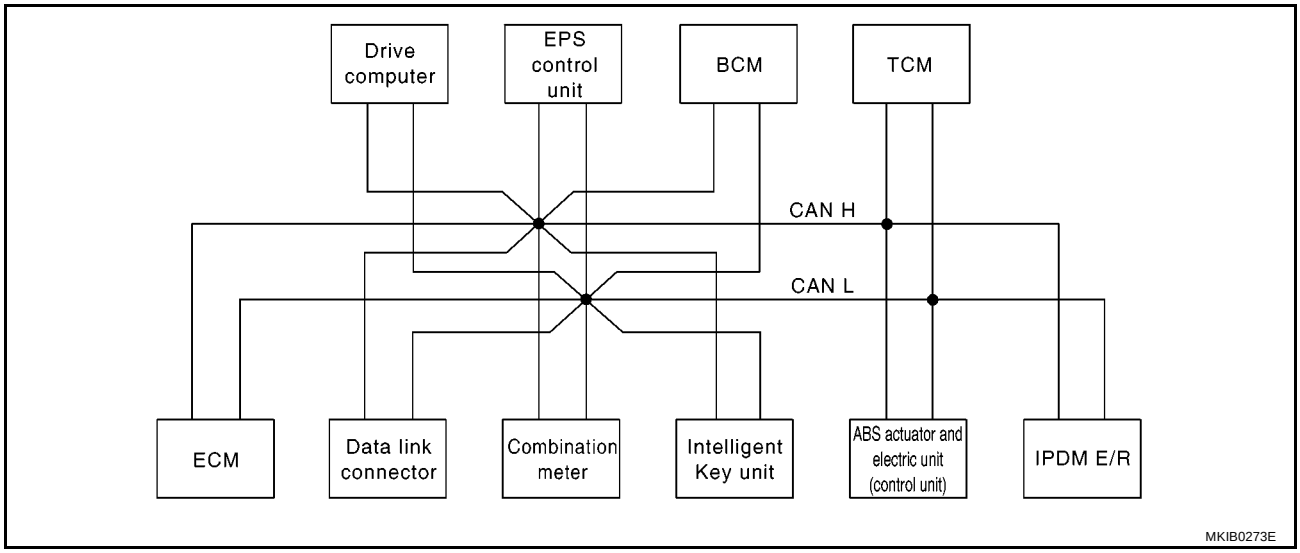
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

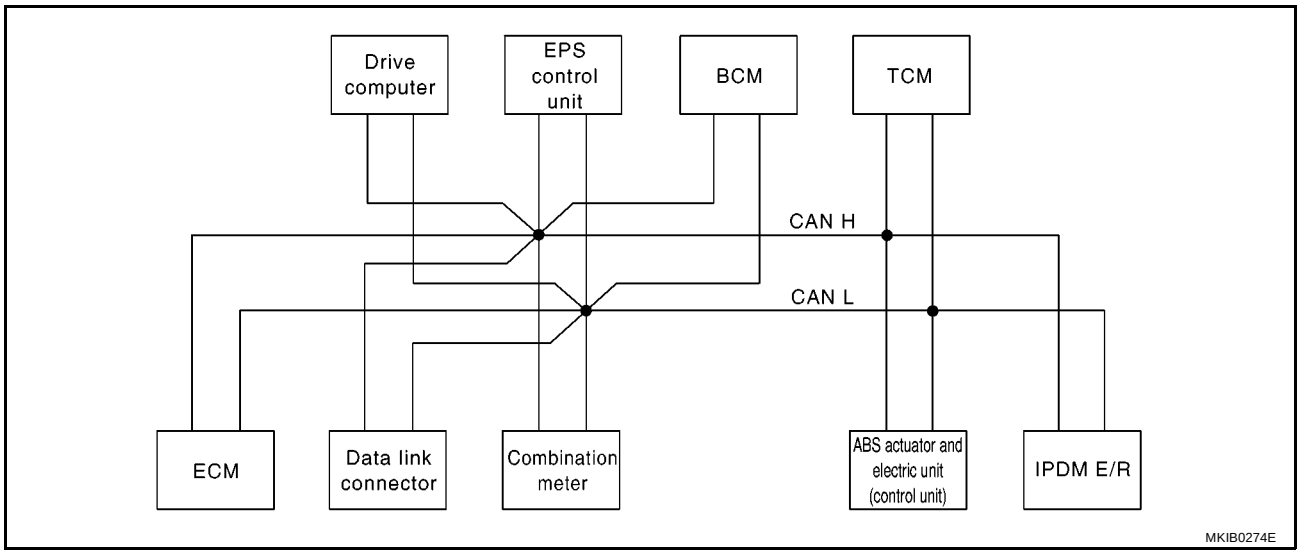
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

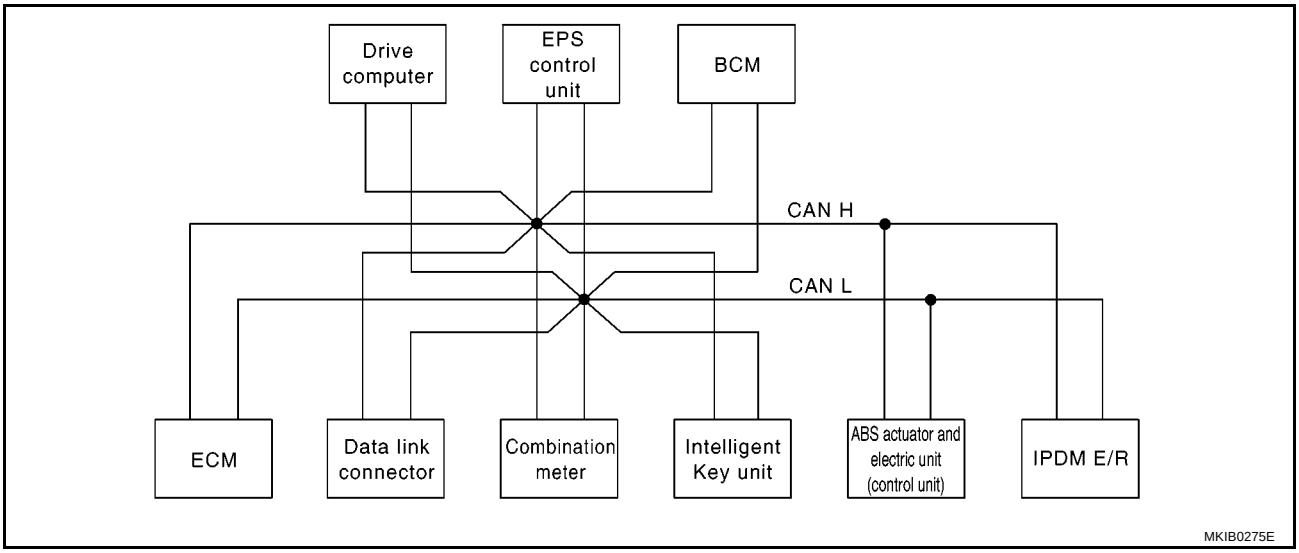
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

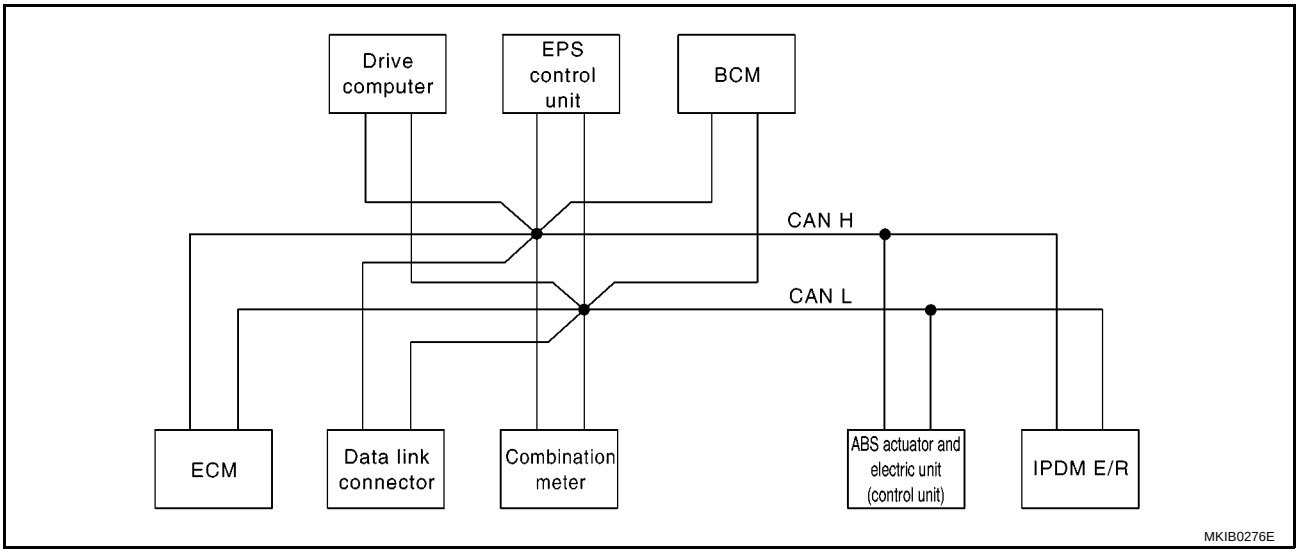
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

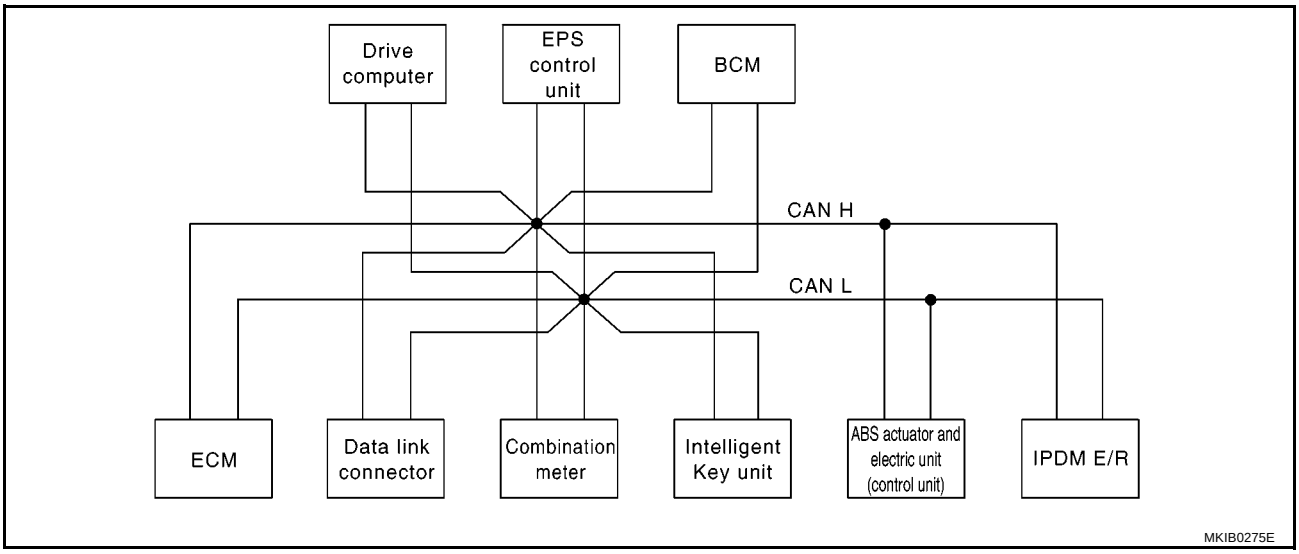
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

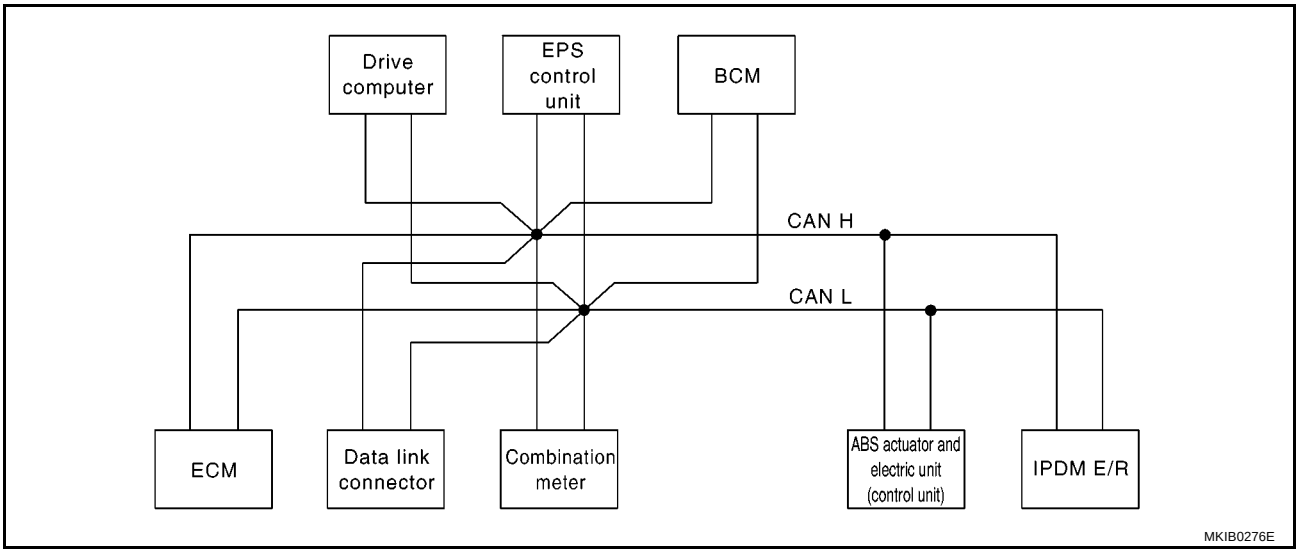
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

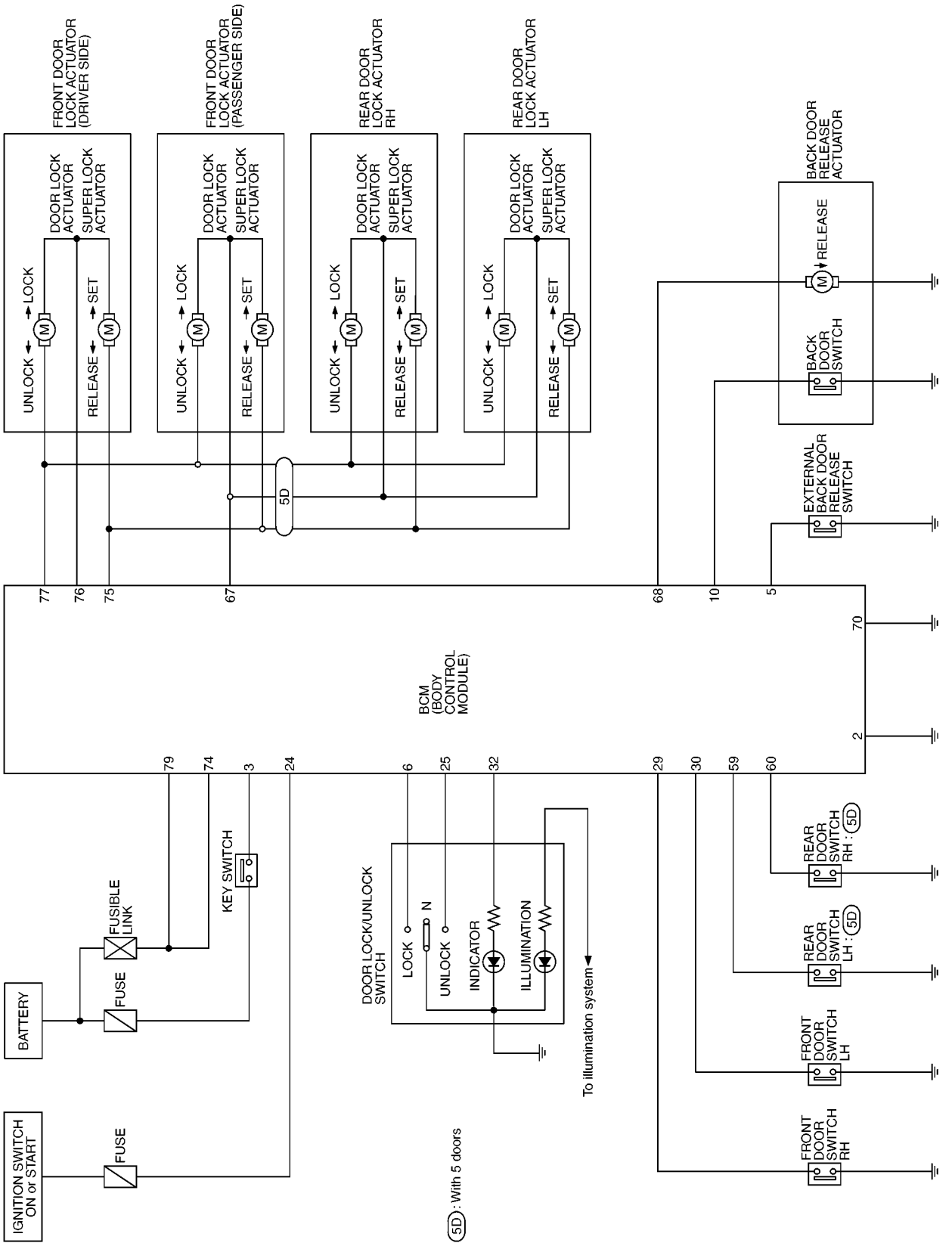
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic – S/LOCK – (Without Intelligent Key System)

EIS004XQ



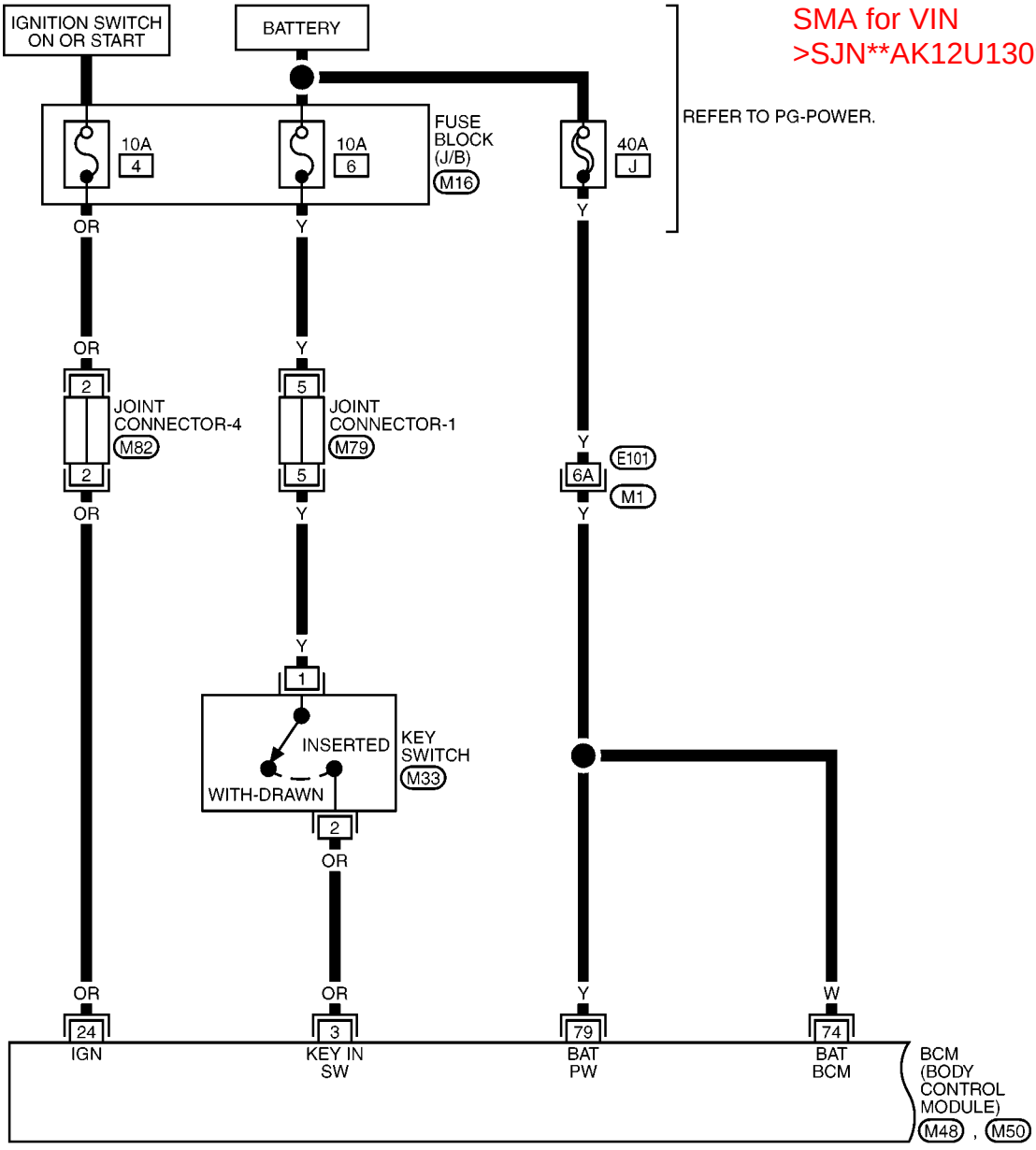
MKWA1781E

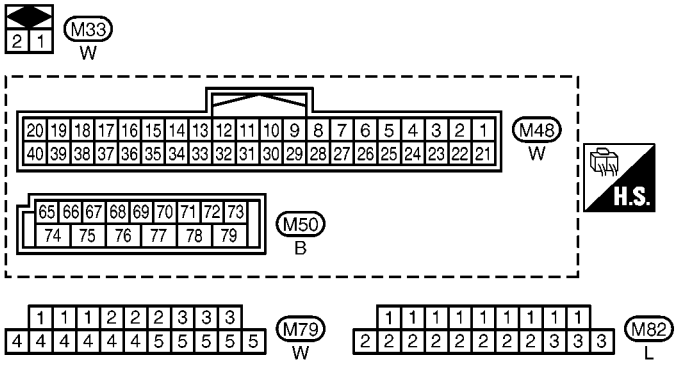
Wiring Diagram — S/LOCK — (Without Intelligent Key System)

EIS004XR

BL-S/LOCK-01

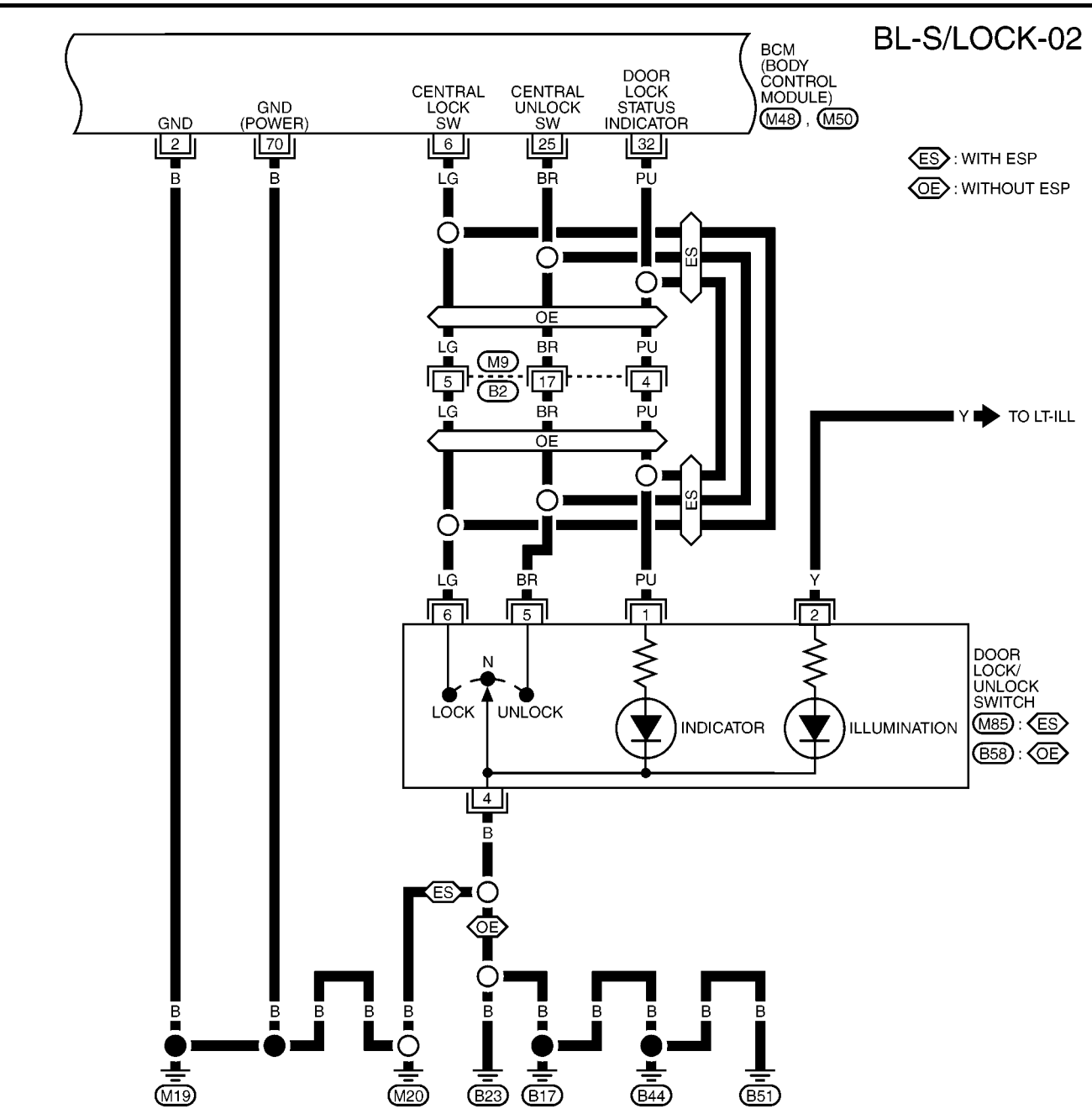
SMA for VIN
>SJN**AK12U1309269

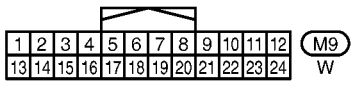


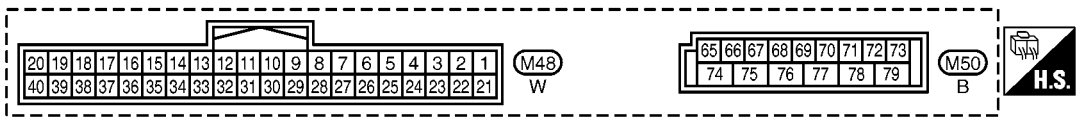


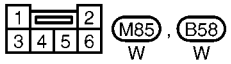
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1782E


BL-S/LOCK-02
BCM (BODY CONTROL MODULE)
M48 , M50
GND
GND (POWER)
CENTRAL LOCK SW
CENTRAL UNLOCK SW
DOOR LOCK STATUS INDICATOR
2
70
6
25
32
B
B
LG
BR
PU
ES : WITH ESP
OE : WITHOUT ESP
ES
OE
M9
B2
5
17
4
Y
TO LT-ILL
6
5
1
2
N
LOCK
UNLOCK
INDICATOR
ILLUMINATION
DOOR LOCK/ UNLOCK SWITCH
M85 : ES
B58 : OE
4
M19
M20
B23
B17
B44
B51


1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19 20 21 22 23 24
M9
W

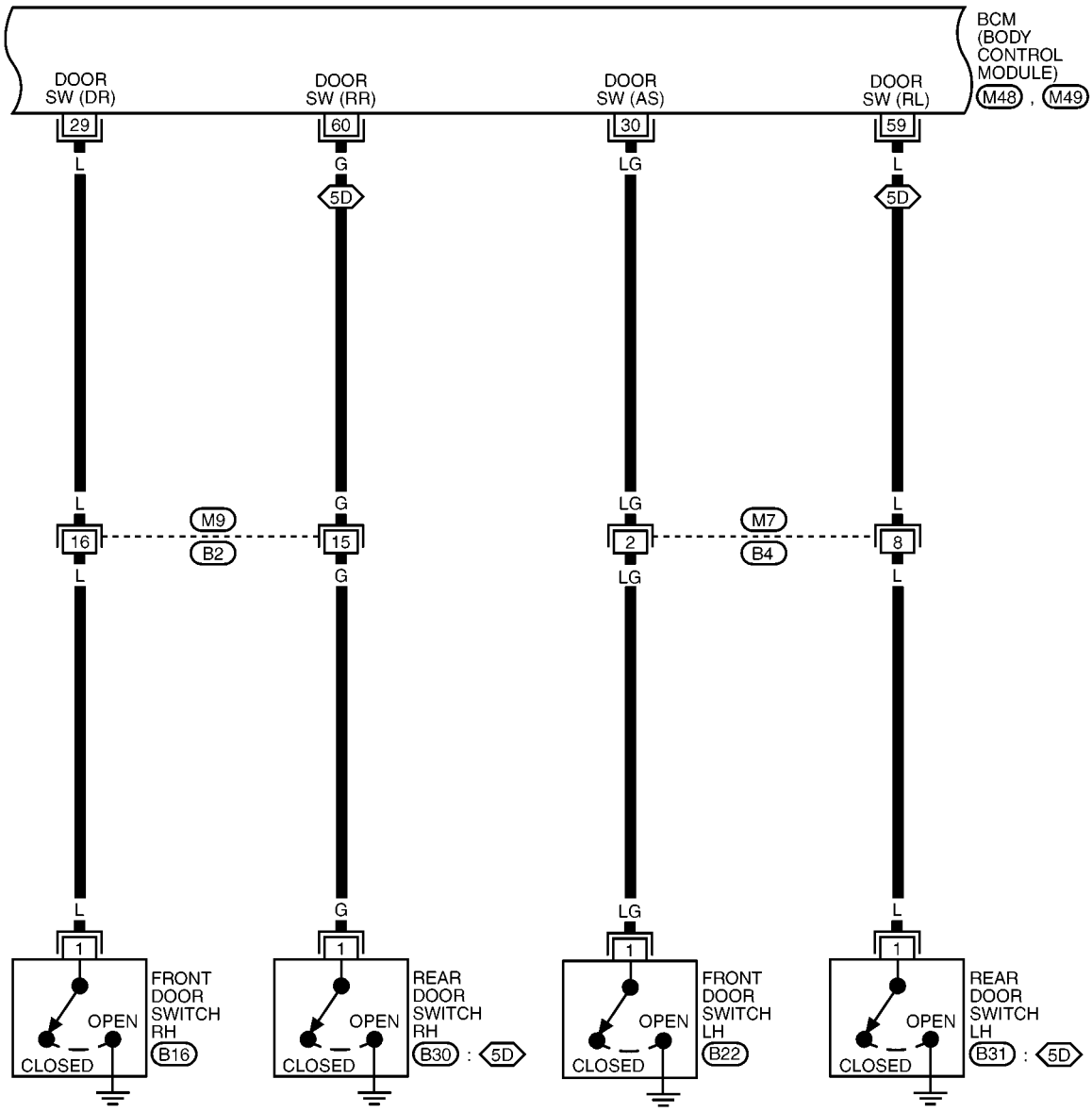

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21
M48
W
65 66 67 68 69 70 71 72 73
74 75 76 77 78 79
M50
B
H.S.

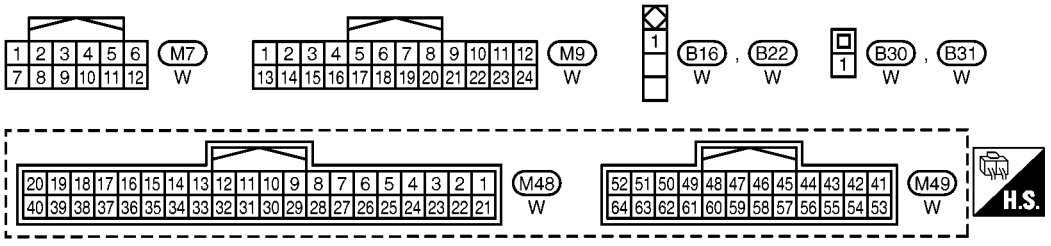

1 2
3 4 5 6
M85 , B58
W W

MKWA1783E

BL-S/LOCK-03

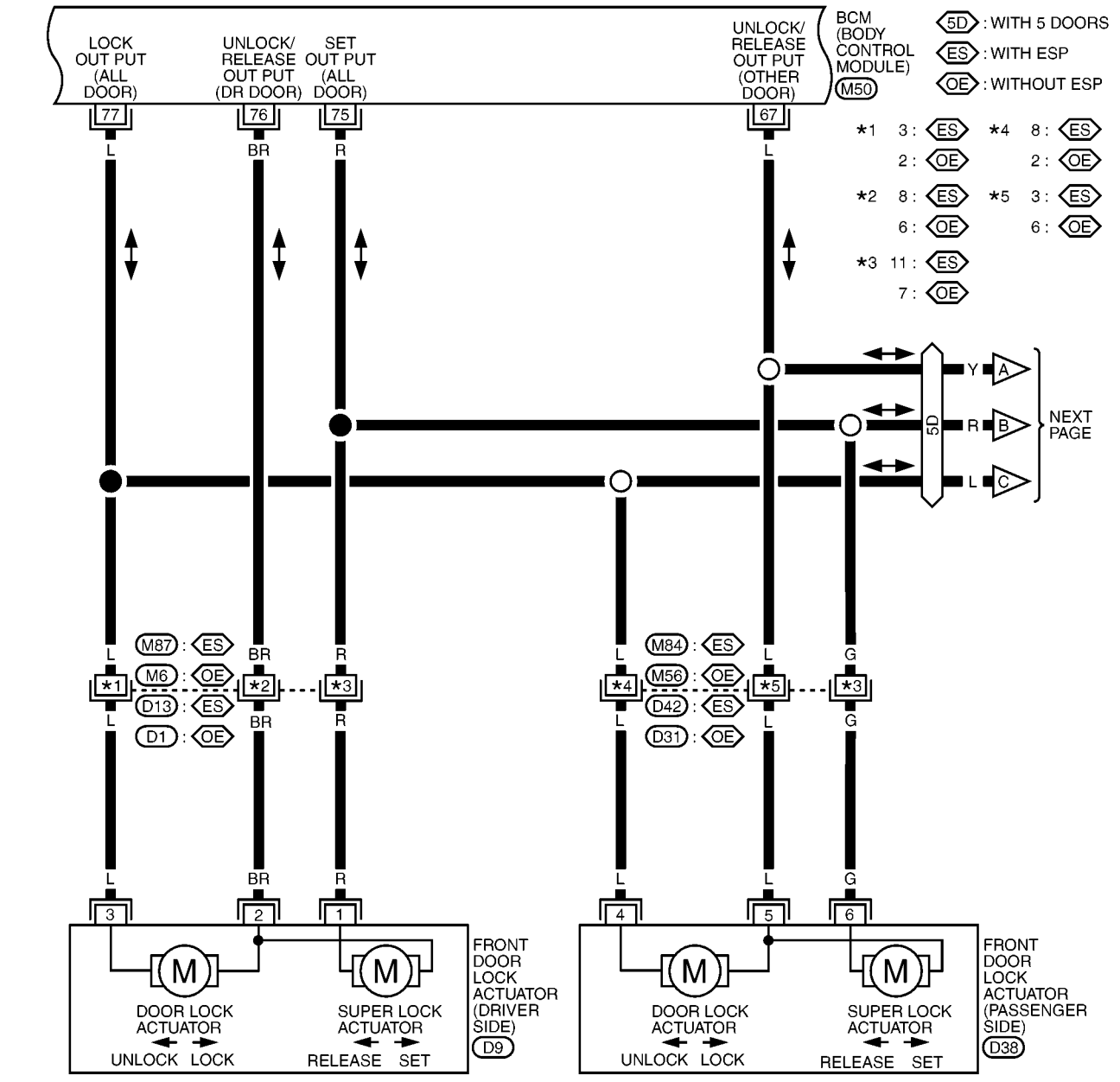
5D : WITH 5 DOORS

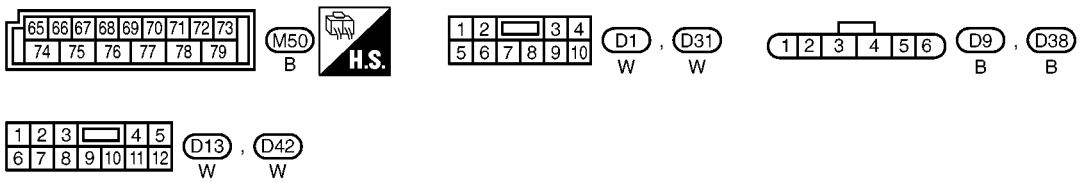




MKWA0877E

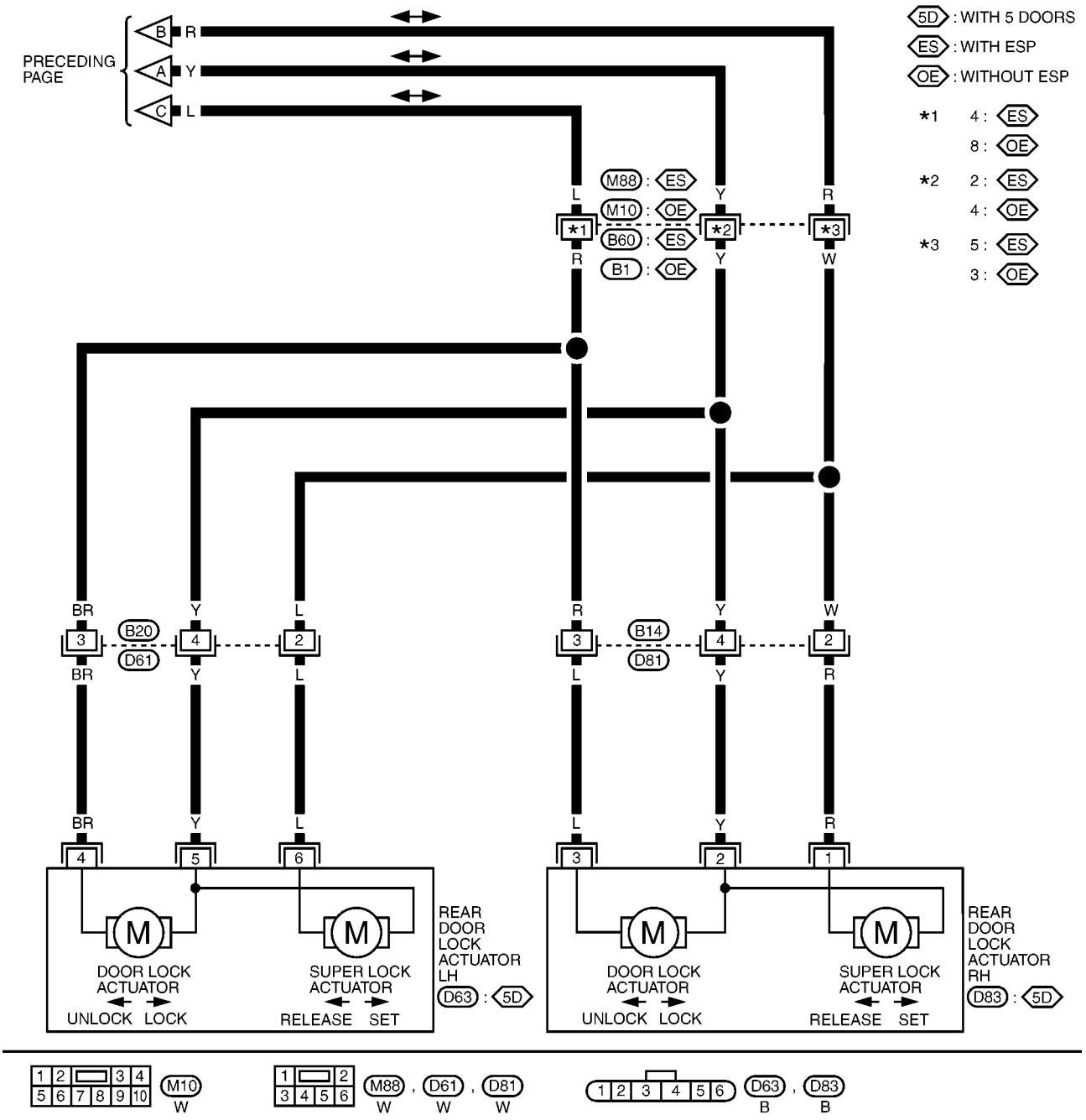
BL-S/LOCK-04





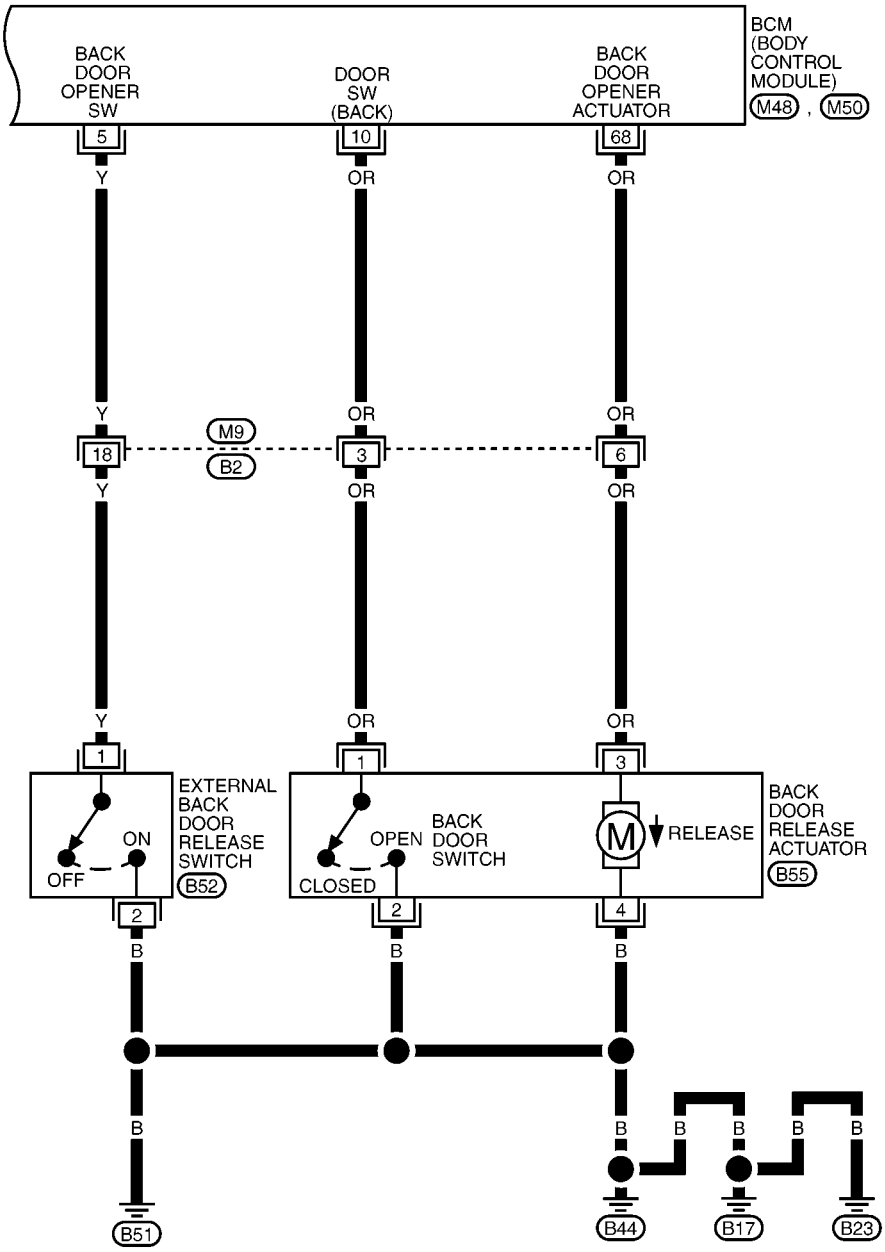
MKWA1784E

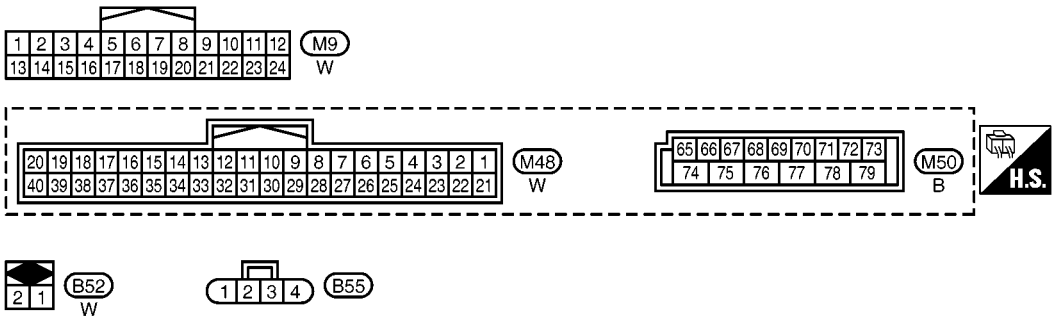
BL-S/LOCK-05



MKWA1785E

BL-S/LOCK-06

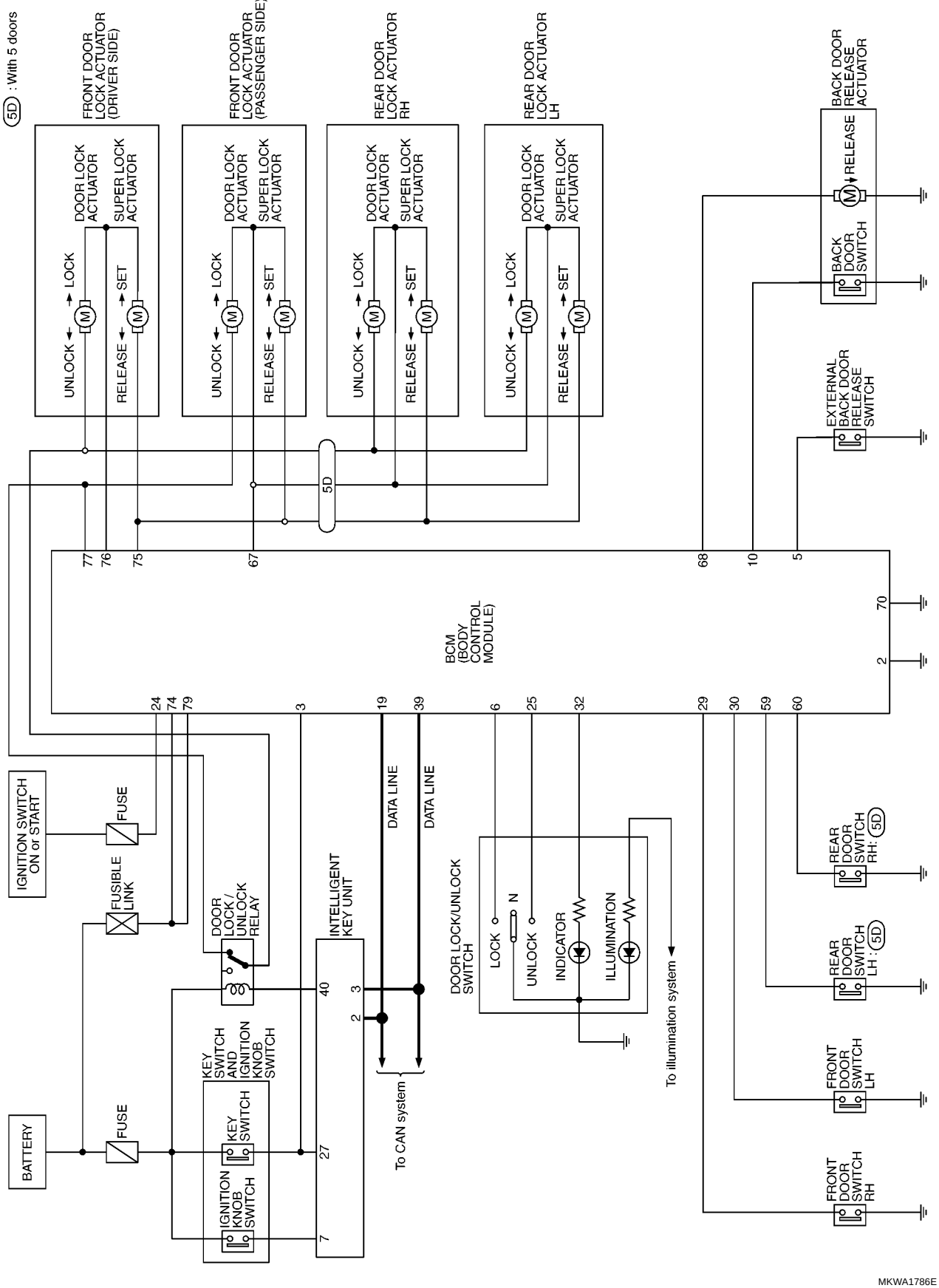




MKWA0880E

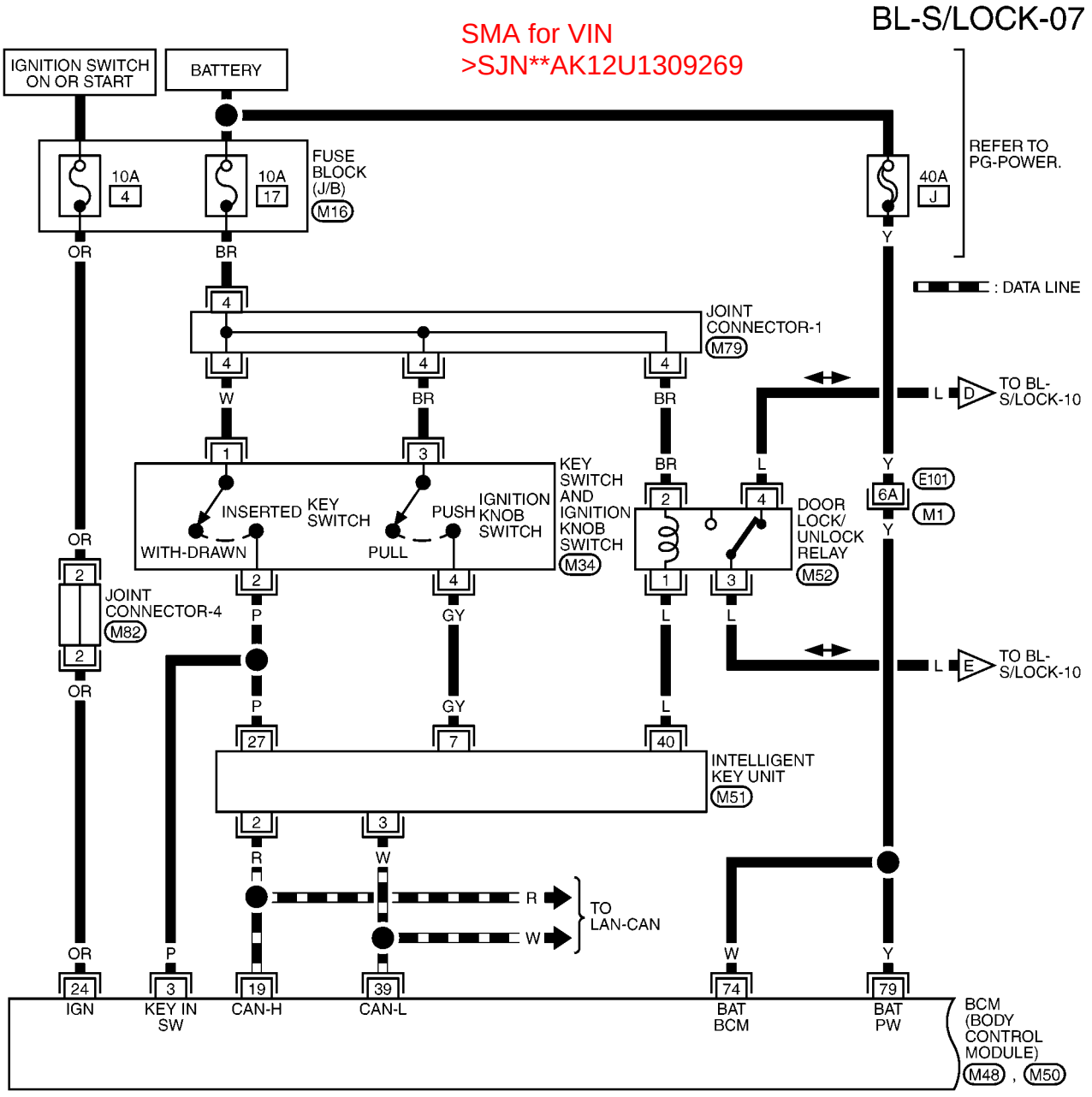
Schematic – S/LOCK – (With Intelligent Key System)

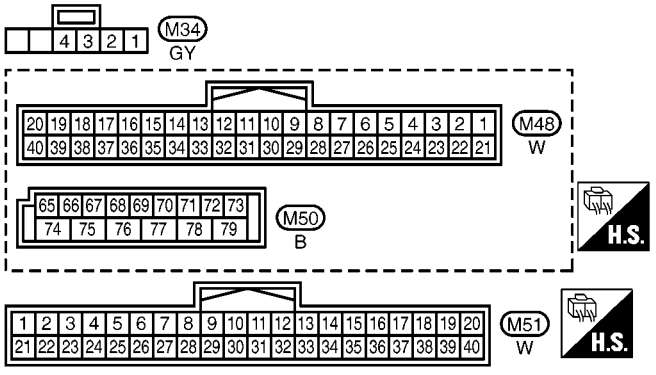
EIS0054Q



Wiring Diagram — S/LOCK — (With Intelligent Key System)

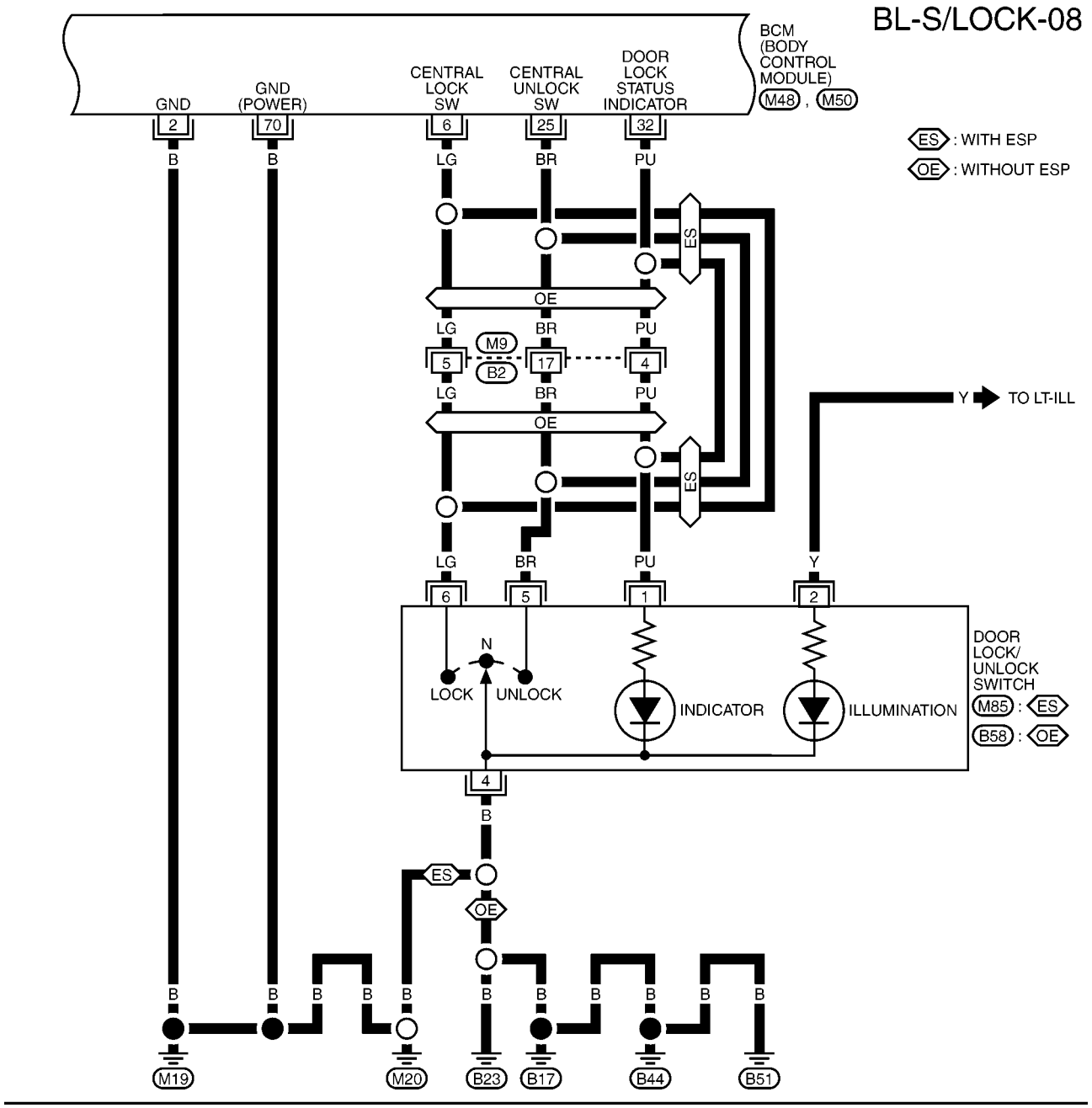
EIS0054R

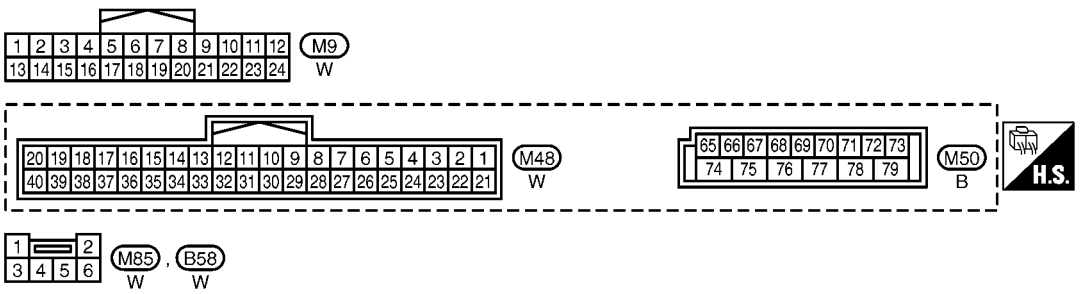




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M79 , M82 -JOINT CONNECTOR (J/C)

MKWA1787E

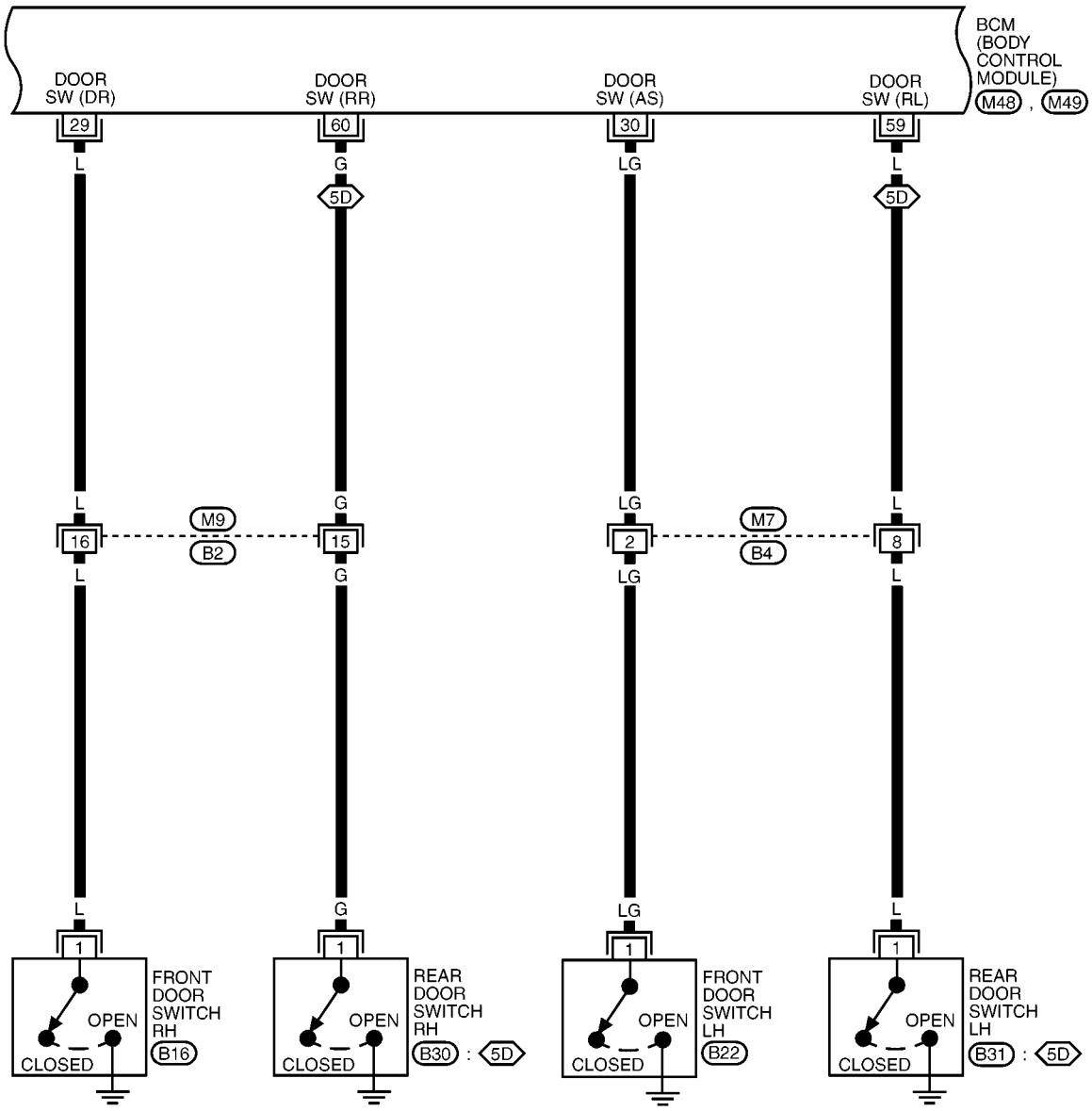

BL-S/LOCK-08
BCM (BODY CONTROL MODULE)
M48 , M50
GND
GND (POWER)
CENTRAL LOCK SW
CENTRAL UNLOCK SW
DOOR LOCK STATUS INDICATOR
2
70
6
25
32
B
B
LG
BR
PU
ES : WITH ESP
OE : WITHOUT ESP
ES
OE
M9
B2
5
17
4
Y
TO LT-ILL
6
5
1
2
N
LOCK
UNLOCK
INDICATOR
ILLUMINATION
DOOR LOCK/ UNLOCK SWITCH
M85 : ES
B58 : OE
4
M19
M20
B23
B17
B44
B51

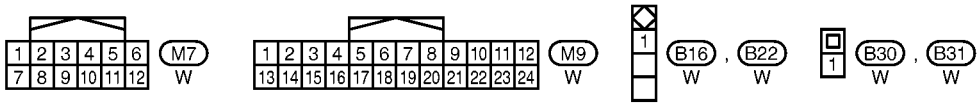

M9
W
M48
W
M50
B
H.S.
M85 , B58
W W

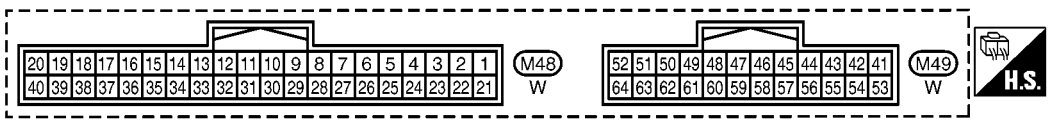
MKWA1788E

BL-S/LOCK-09

5D : WITH 5 DOORS

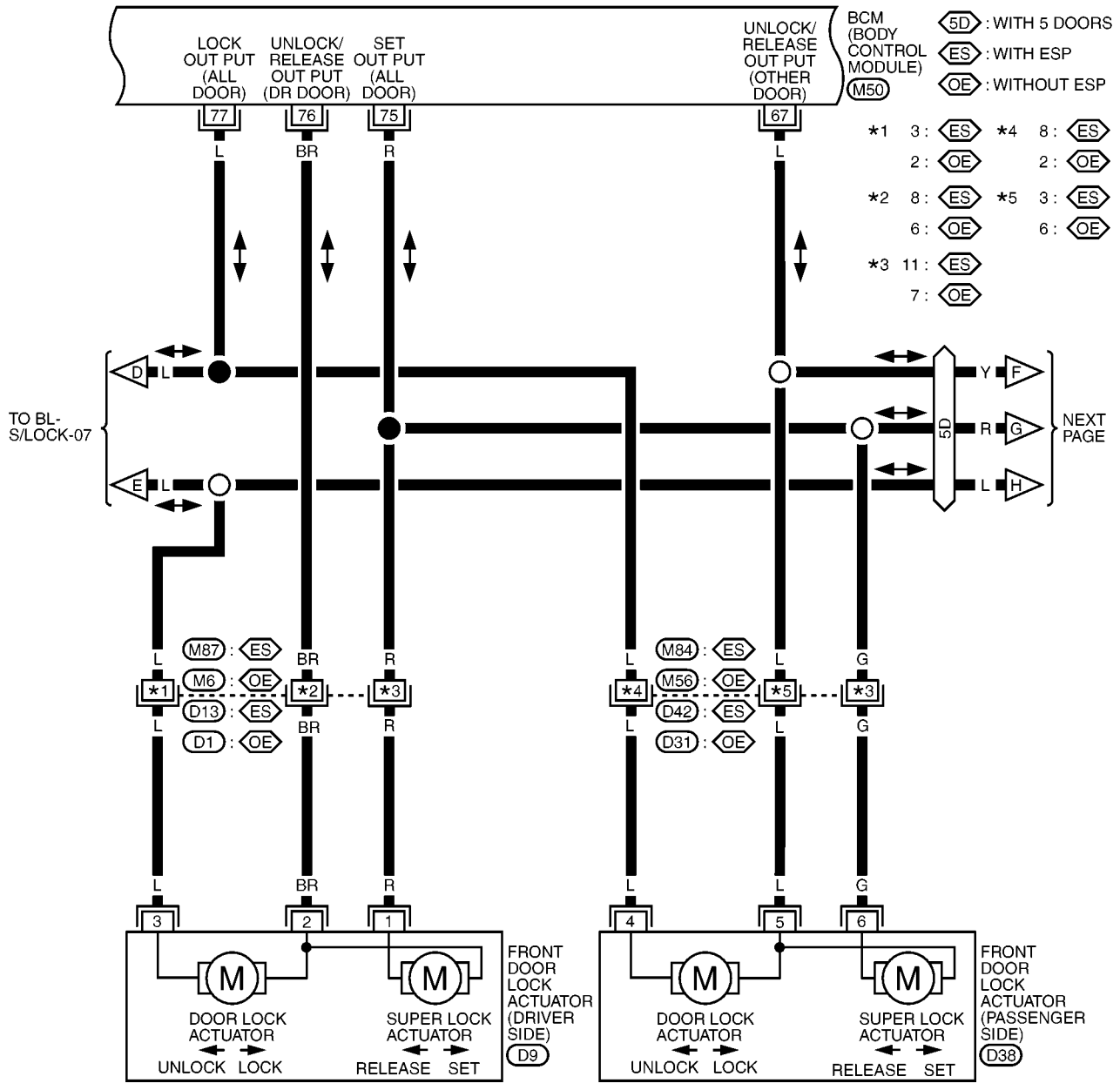


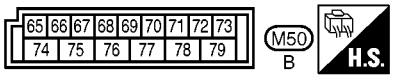


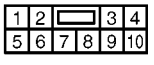


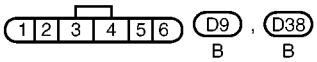
MKWA0884E

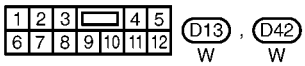
BL-S/LOCK-10





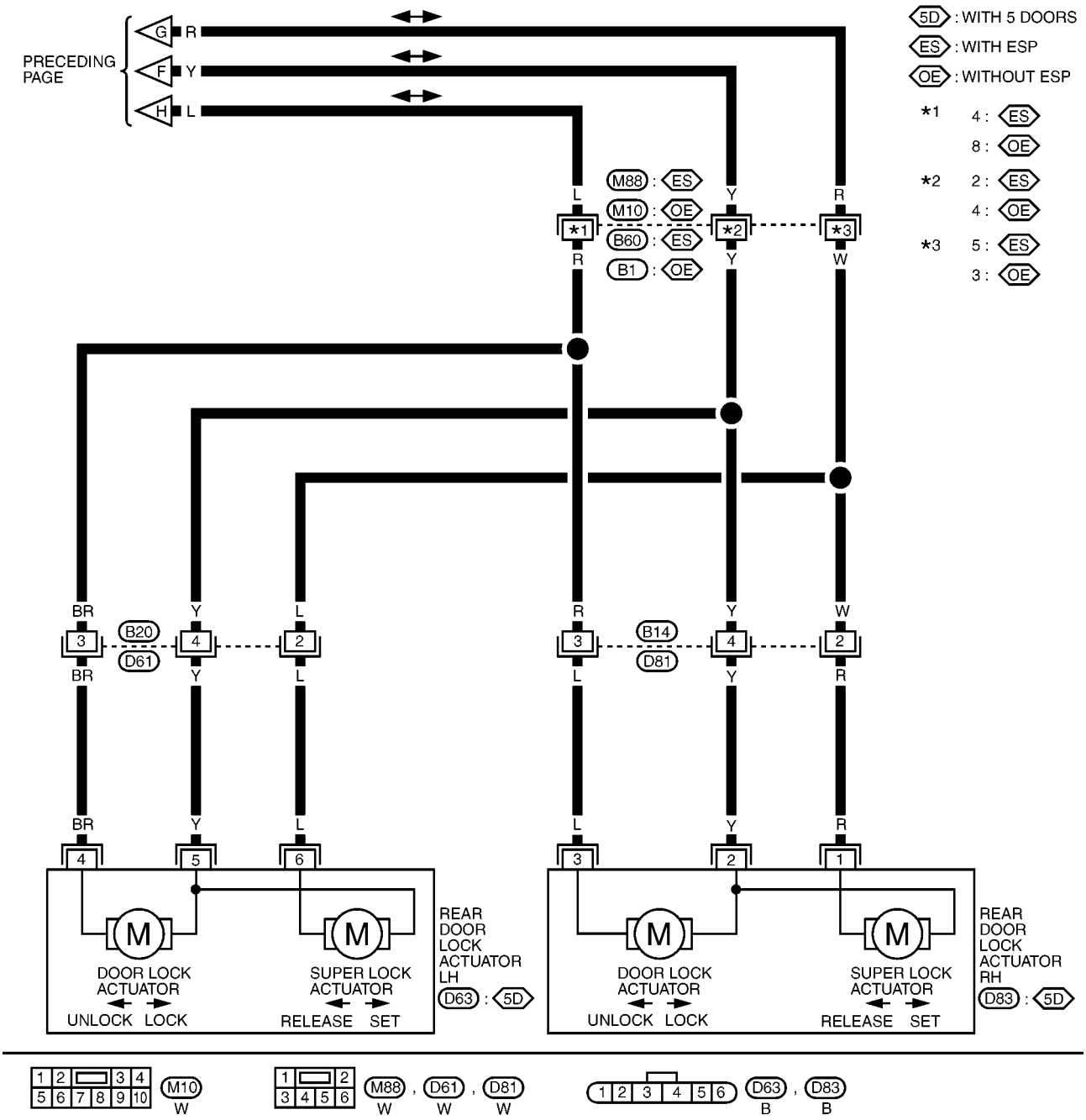






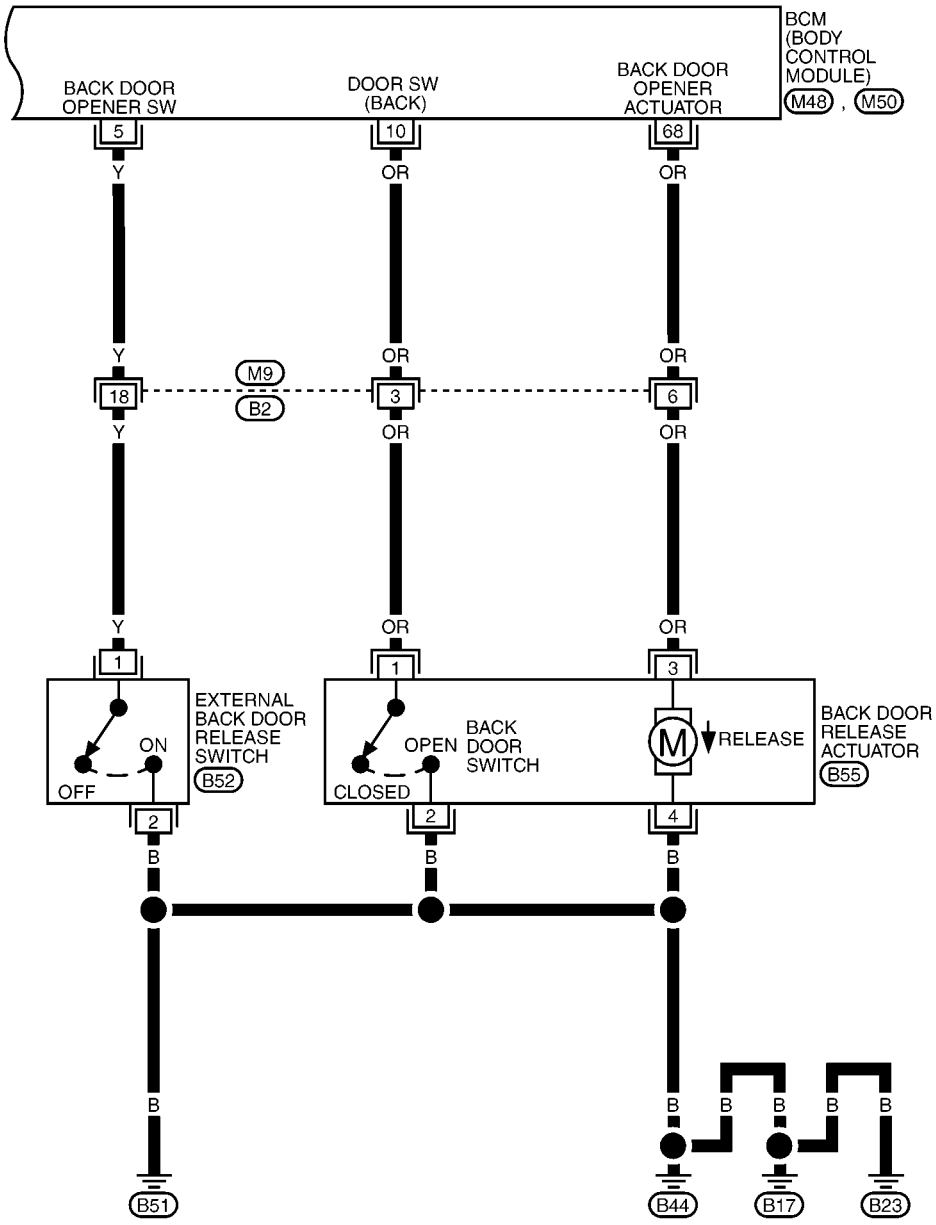
MKWA1789E

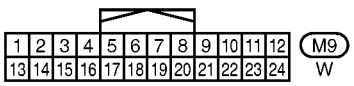
BL-S/LOCK-11

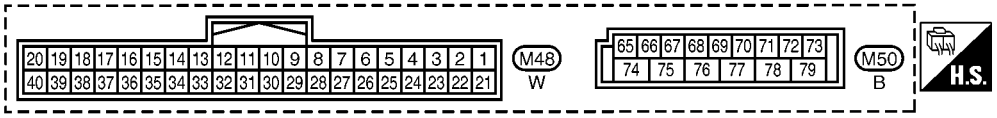


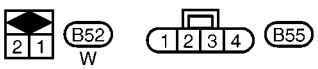
MKWA1790E

BL-S/LOCK-12









MKWA0887E

Terminal and Reference Value for Smart Entrance Control Unit

EIS004XS

Terminal	Wire color	Item	Condition	Voltage (V) (Approx.)
2	B	Ground	—	0
3	OR (P)	Key switch	Key inserted (ON) → key removed from IGN key cylinder (OFF)	Battery voltage → 0
5	Y	External back door release switch	Release switch open operation	5 → 0
6	LG	Door lock / unlock switch (Lock signal)	Lock operation (ON)	0
			Other than above (OFF)	5
10	OR	Back door switch	Open (ON) → Close (OFF)	0 → 5
19	R	CAN-H	—	—
24	OR	IGN power supply	Ignition switch (ON or START position)	Battery voltage
25	BR	Door lock/unlock switch (Unlock signal)	Unlock operation (ON)	0
			Other than above (OFF)	5
29	L	Front door switch RH	Door open (ON) → close (OFF)	0 → Battery voltage
30	LG	Front door switch LH	Door open (ON) → close (OFF)	0 → Battery voltage
32	PU	Door lock status indicator	Goes OFF→ Illuminates (Ignition switch ON and all door closed)	0 → Battery voltage
39	W	CAN-L	—	—
59	L	Rear door switch LH	Door open (ON) → close (OFF)	0 → Battery voltage
60	G	Rear door switch RH	Door open (ON) → close (OFF)	0 → Battery voltage
67	L	Door lock actuator & super lock actuator unlock signal (Passenger and rear LH, RH doors)	Door lock / unlock switch & remote controller unlock operation *	0 → Battery voltage
68	OR	Back door release actuator	Power window main switch (Trunk or back door release switch) Open operation	Battery voltage → 0
70	B	Ground (Power)	—	0
74	W	BAT power supply (BCM)	—	Battery voltage
75	R	Super lock actuator lock signal (All doors)	Remote controller lock operation	0 → Battery voltage
76	BR	Door lock actuator & super loci actuator unlock signal (Driver side)	Door lock / unlock switch & remote controller unlock operation *	0 → Battery voltage
77	L	Door lock actuator lock signal (All doors)	Door lock/unlock switch & remote controller lock operation	0 → Battery voltage
79	Y	BAT power supply (PW)	—	Battery voltage

() : With Intelligent Key switch models

* : It is operation only of door lock actuator to operate door lock / unlock switch.

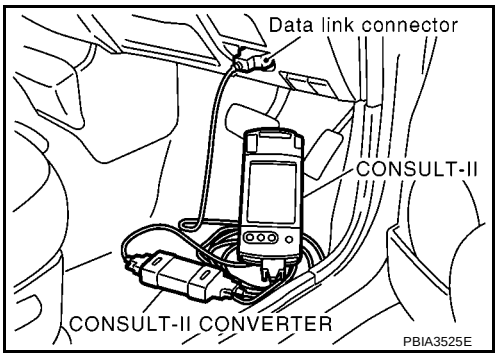
CONSULT- II Inspection Procedure

EIS004XT

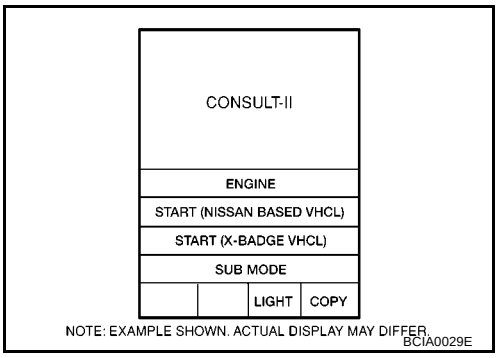
CAUTION:

If CONSULT-II is used with no connector of CONSULT-II CONVERTER, malfunction might be detected in self-diagnosis depending on control which carry out CAN communication.

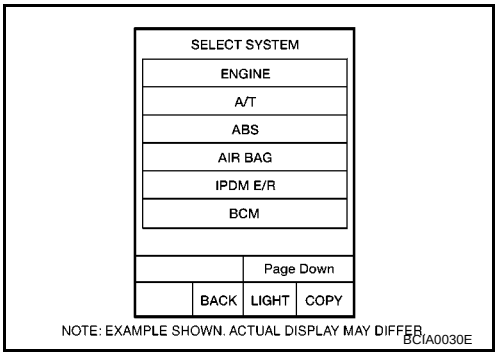
1. Turn ignition switch “OFF”.
2. Connect "CONSULT-II" and "CONSULT-II CONVERTER" to the data link connector.



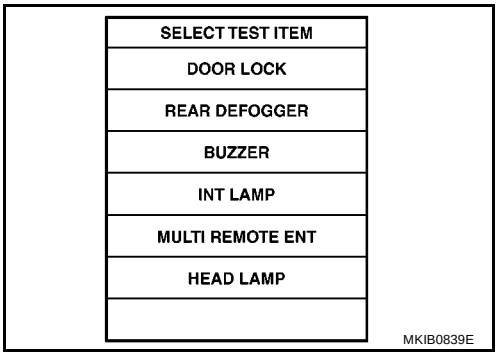
3. Turn ignition switch “ON”.
4. Touch “START (NISSAN BASED VHCL)”.



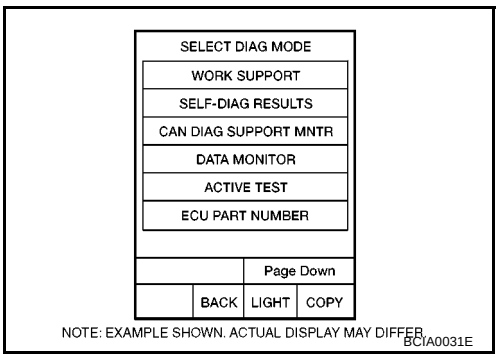
5. Touch “BCM”.



6. Touch “DOOR LOCK” .



7. Select diagnosis mode.
“WORK SUPPORT”, “DATA MONITOR” and “ACTIVE TEST” are available.



CONSULT- II Application Items

EIS004XU

WORK SUPPORT

Supported Item	Description
SECURITY DOOR LOCK SET	Anti-hijack function mode can be changed in this mode.
AUTO LOCK SET	Auto locking function mode can be changed in this mode.

Security Door Lock Set

	ON	OFF
Anti hijack function	Activation	Deactivation

Auto Lock Set

	MODE1	MODE2	MODE3	MODE4	MODE5	MODE6*	MODE7*	MODE8*
Auto locking function	1 minute	2 minutes	3 minutes	4 minutes	5 minutes	–	–	–

*: These mode are not supported.

DATA MONITOR

Monitored Item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
PUSH SW (*1)	Indicates [ON/OFF] condition ignition knob switch.
KEY IN SW (*2)	Indicates [ON/OFF] condition of key switch.
CDL LOCK SW	Indicates [ON/OFF] condition of lock signal from door lock/ unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of unlock signal from door lock/ unlock switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch (RH).
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch (LH).
BACK DOOR SW	Indicates [ON/OFF] condition of back door switch.
TRNK OPNR SW	Indicates [ON/OFF] condition of external back door release switch.

*1: Models with Intelligent Key System.
*2: Models without Intelligent Key System.

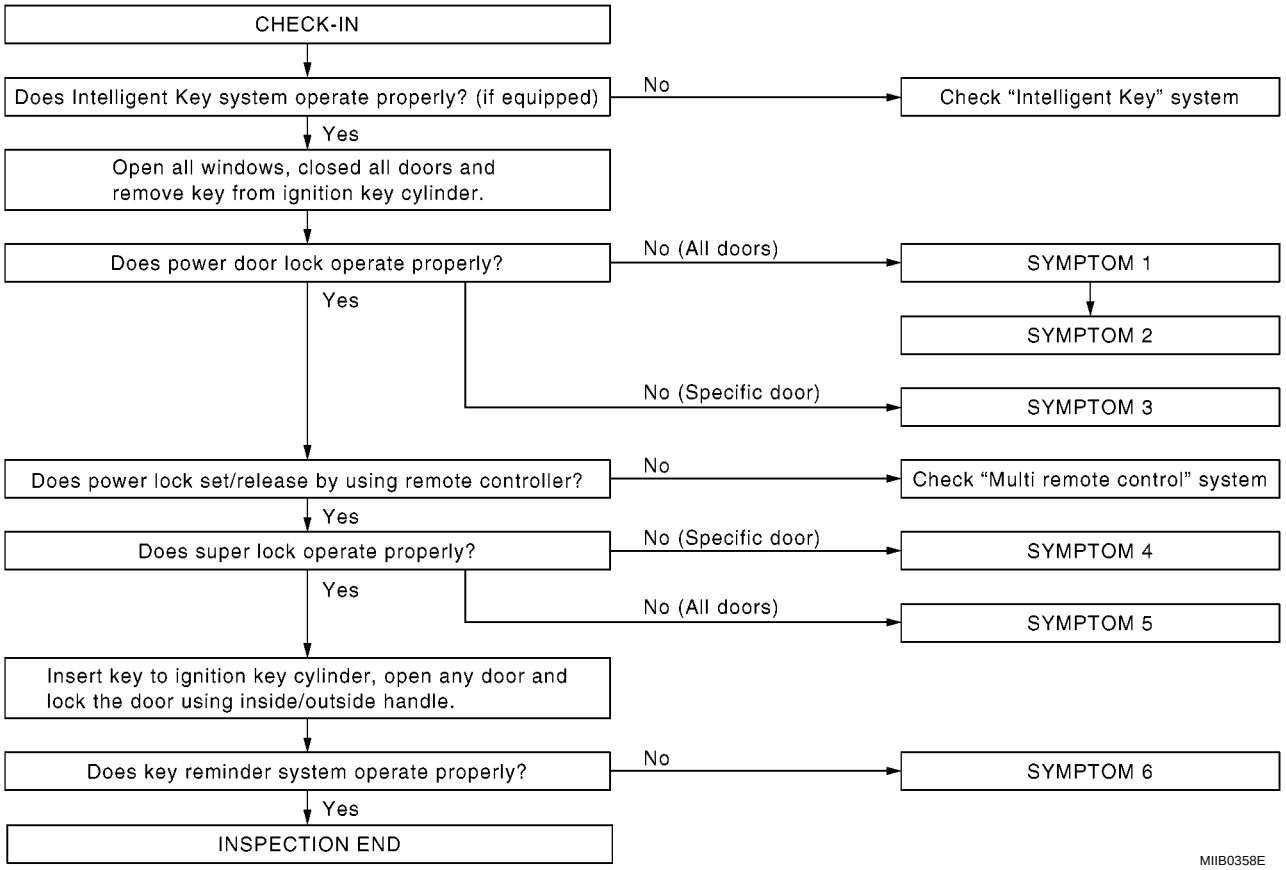
WORK SUPPORT

Monitored Item	Description
DOOR LOCK	This test is able to check all door lock actuator (except for back door) lock / unlock operation. These actuator lock / unlock when “LOCK” or “UNLOCK” on CONSULT-II screen is touched.
TRUNK / BACK DOOR	This test is able to check back door release actuator open operation. These actuator open when “OPEN” on CONSUT-II screen in touched.

Trouble Diagnoses

EIS004XV

PRELIMINARY CHECK



After performing preliminary check, go to SYMPTOM CHART.
Before starting trouble diagnoses below, perform preliminary check.
Symptom numbers in the symptom chart correspond with those of Preliminary check.

SYMPTOM CHART

Symptom	Malfunctioning system	Refer to page
SYMPTOM 1 Power door lock does not operate with door lock / unlock switch	1. Power supply and ground circuit check	BL-105
	2. Key switch check	BL-107
	3. Door lock / unlock switch check.	BL-106
	4. Replace BCM.	BCS-31
SYMPTOM 2 Power door lock does not operate with door lock / unlock switch.	1. Power door lock / unlock output signal check.	BL-109
	2. Replace BCM.	BCS-31
SYMPTOM 3 Specific door lock actuator does not operate.	1. Door lock actuator check.	BL-111
	2. Replace BCM.	BCS-31
SYMPTOM 4 Super lock does not operate.	1. Super lock output signal check.	BL-110
	2. Replace BCM.	BCS-31
SYMPTOM 5 Specific super lock does not unlock operate.	1. Super lock actuator check.	BL-115
	2. Replace BCM.	BCS-31
SYMPTOM 6 Key reminder system does not operate.	1. Door switch check.	BL-119
	2. Replace BCM.	BCS-31
SYMPTOM 7 Back door does not open. But power door lock operate is properly.	1. External back door release switch check.	BL-127
	2. Back door release actuator check.	BL-129
	3. Replace BCM.	BCS-31

Power Supply and Ground Circuit Check

EIS0054S

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT-II, then perform the each trouble diagnosis of malfunction system indicated “SELF-DIAG RESULTS” of “BCM”, Refer to BCS-22, "CONSULT-II Function (BCM)" .

1. FUSE INSPECTION

- Check 10A fuse [No.4, located in fuse block (J/B)]
- Check 40A fusible link (letter **J** located in the fuse and fusible link box).

NOTE:
Refer to BL-70, "Component Parts and Harness Connector Location" .

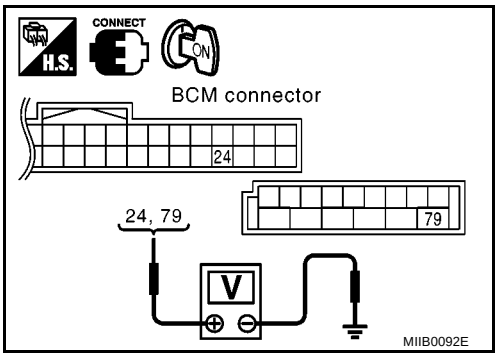
OK or NG

OK >> GO TO 2
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between BCM connector M48, M50 terminal 24, 79 and ground.

24 (OR) – Ground :Battery voltage.
79 (Y) – Ground :Battery voltage.



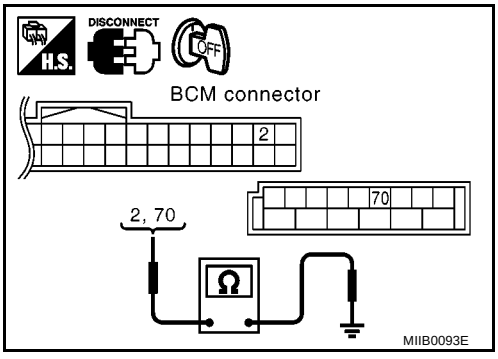
OK or NG

OK >> GO TO 3
NG >> Check BCM power supply circuit for open or short.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector M48, M50 terminal 2, 70 and ground.

2 (B) – Ground :Continuity should exist.
70 (B) – Ground :Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Check BCM ground circuit for open or short.

Door Lock / Unlock Switch Check

EIS004XY

1. CHECK DOOR LOCK / UNLOCK SWITCH SIGNAL

With CONSULT- II

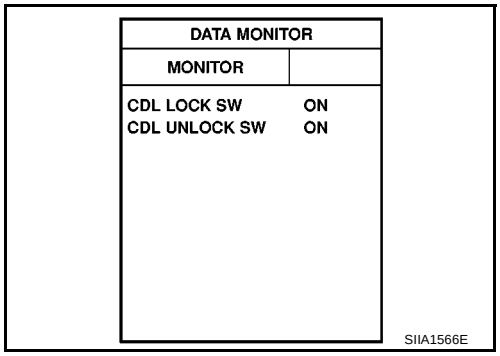
Check door lock / unlock switch input signal (“CDL LOCK SW” “CDL UNLOCK SW”) in “DATA MONITOR” mode with CONSULT- II.

When door lock/unlock switch is turned to LOCK:

CDL LOCK SW ⇒ ON

When door lock/unlock switch is turned to UNLOCK:

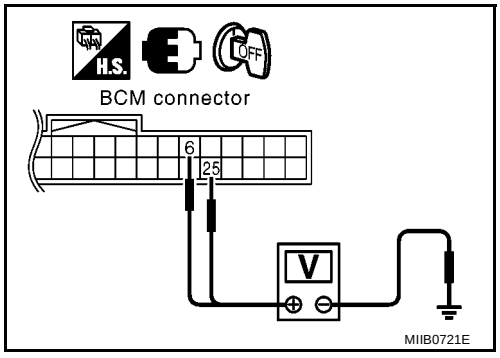
CDL UNLOCK SW ⇒ ON



Without CONSULT- II

Door lock / unlock switch operate, check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	6 (LG)	Ground	Lock	0
			Neutral / Unlock	5
	25 (BR)		Unlock	0
			Neutral / Lock	5



OK or NG

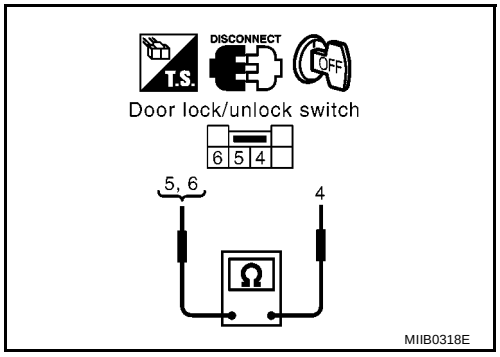
OK >> Door lock / unlock switch is OK.

NG >> GO TO 2.

2. CHECK DOOR LOCK/UNLOCK SWITCH

1. Turn ignition switch OFF.
2. Disconnect door lock / unlock switch connector.
3. Check continuity between door lock / unlock switch terminals 5, 6 and 4.

Terminals		Condition	Continuity
5	4	Unlock	YES
		Neutral / Lock	NO
6		Lock	YES
		Neutral / Unlock	NO



OK or NG

OK >> Check the following.

- Ground circuit for door lock / unlock switch
- Harness for open or short between BCM and door lock / unlock switch.

NG >> Replace door lock / unlock switch.

Check Key Switch /Without Intelligent Key System

EIS00AQ1

1. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch input signal “KEY ON SW” in “DATA MONITOR” mode with CONSULT- II.

When key is inserted in ignition key cylinder:

KEY IN SW ⇒ ON

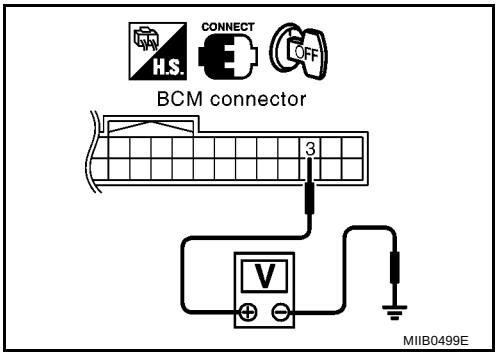
When key is removed from ignition key cylinder:

KEY IN SW ⇒ OFF

Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	3 (OR)	Ground	Key is inserted	Battery voltage
			Key is removed	0



OK or NG

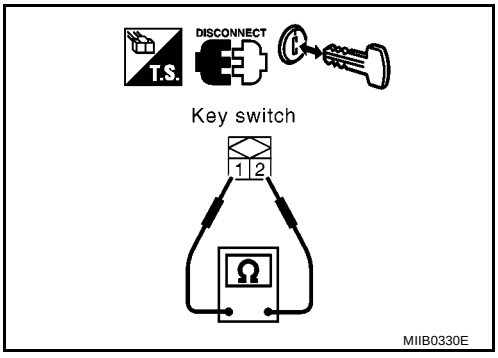
OK >> Key switch is OK.

NG >> GO TO 2.

2. CHECK KEY SWITCH (INSERT)

1. Turn ignition switch OFF.
2. Disconnect key switch connector.
3. Check continuity between key switch terminals 1 and 2.

Terminals		Condition	Continuity
1	2	Key is inserted	YES
		Key is removed	NO



OK or NG?

OK >> Check the following.

- 10A fuse [No. 6, located in fuse block (J/B)].
- Harness for open or short between key switch and fuse.
- Harness for open or short between BCM and key switch.

NG >> Replace key switch.

Check Key Switch/With Intelligent Key System

EIS00AQ2

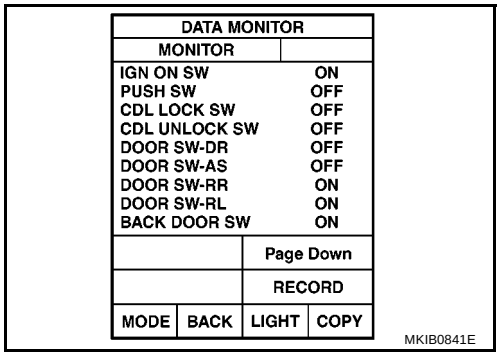
1. KEY SWITCH INSPECTION

With CONSULT-II

Display “PUSH SW” on DATA MONITOR screen, and check if ON-OFF display is linked to ignition knob switch operation.

When ignition knob is pushed : PUSH SW ON

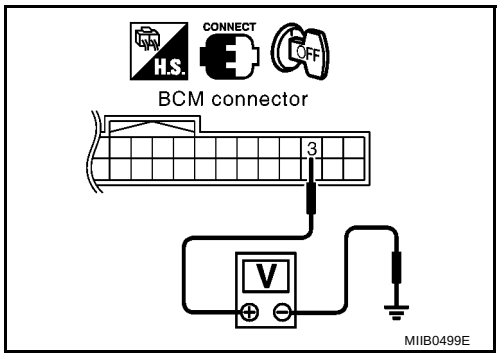
When ignition knob is released : PUSH SW OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	3 (OR)	Ground	Key is inserted	Battery voltage
			Key is removed	0



OK or NG

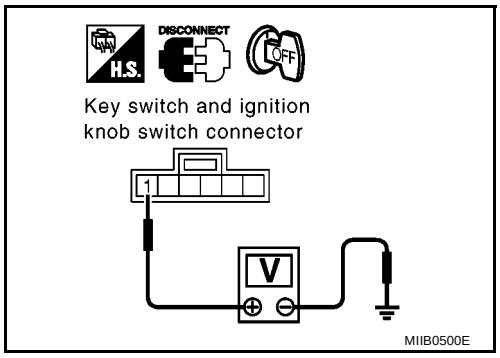
OK >> Key switch is OK.

NG >> GO TO 2.

2. KEY SWITCH POWER SUPPLY CIRCUIT INSPECTION

1. Remove mechanical key from ignition knob.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch connector M34 terminal 1 and ground.

1 (W) - Ground : Approx. 12V



OK or NG

OK >> GO TO 3.

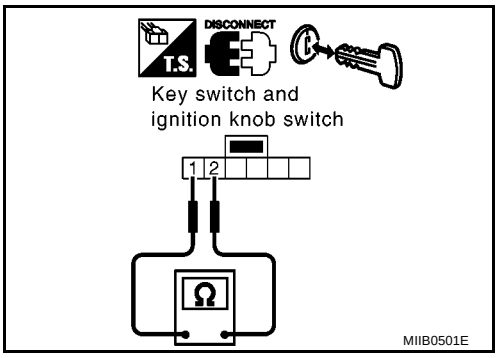
NG >> Repair or replace key switch power supply circuit.

3. KEY SWITCH OPERATION INSPECTION

1. Insert mechanical key into ignition knob.
2. Check continuity between key switch and ignition knob switch connector M34 terminal 1 and 2.

1 - 2

Insert mechanical key into ignition knob.	**: Continuity should exist.**
Remove mechanical key from ignition knob.	**: Continuity should not exist.**



OK or NG

OK >> GO TO 4.
NG >> Replace key switch.

4. KEY SWITCH CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminal 27 and key switch and ignition knob switch connector M34 terminal 2.

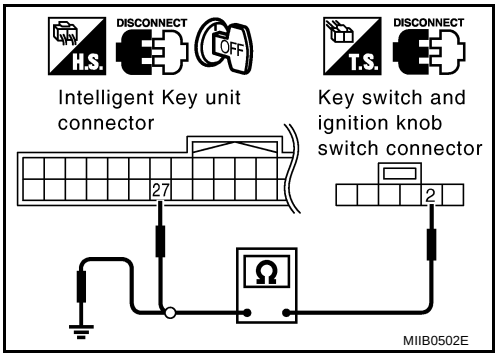
27 (P) - 2 (P) : Continuity should exist.

3. Check continuity between key switch connector M34 terminal 2 and ground.

2 (P) - Ground : Continuity should not exist.

OK or NG

OK >> Key switch is OK.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.



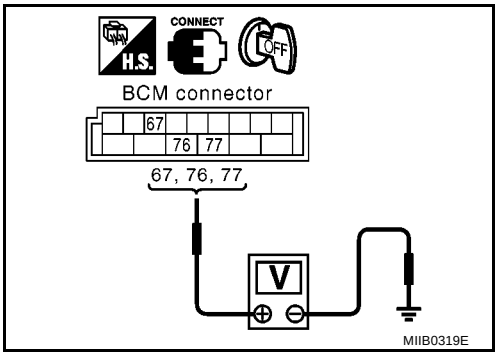
Power Door Lock / Unlock Output Signal Check.

EIS00AQ3

1. CHECK POWER DOOR LOCK OUTPUT SIGNAL

Door lock / unlock switch operate, check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M50	67 (L)	Ground	Unlock	0 → Battery voltage→ 0
	76 (BR)		Unlock	0 → Battery voltage→ 0
	77 (L)		Lock	0 → Battery voltage→ 0



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace BCM.

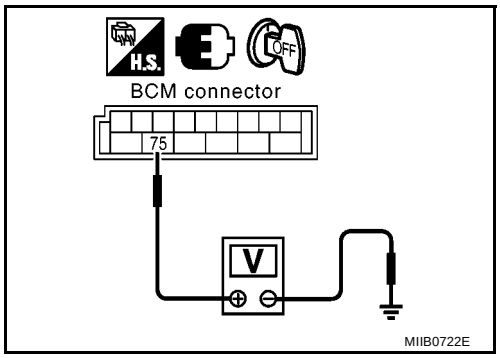
Super Lock Output Signal Check.

EIS00AQ4

1. CHECK SUPER LOCK OUTPUT SIGNAL

Remote controller operate, check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M50	75 (R)	Ground	Lock button is pressed.	0 → Battery voltage→ 0



OK or NG

OK >> Check the condition of the harness and connector.
NG >> Replace BCM.

Door Lock Actuator Check

EIS00AQ5

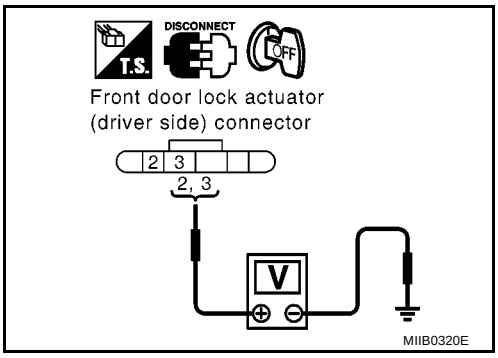
SMA for VIN >SJN**AK12U1309269

DRIVER SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (driver side) connector.
3. Door lock / unlock switch operate, check voltage between front door lock actuator (driver side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D9	2 (BR)	Ground	Unlock	0 → Battery voltage → 0
	3 (L)		Lock	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (driver side).
NG >> GO TO 2.

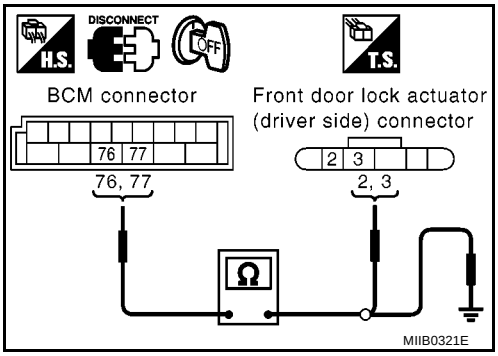
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 76, 77 and front door lock actuator (driver side) connector D9 terminal 2, 3.

76 (BR) – 2 (BR) : Continuity should exist.
77 (L) – 3 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 76, 77 and ground.

76 (BR) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

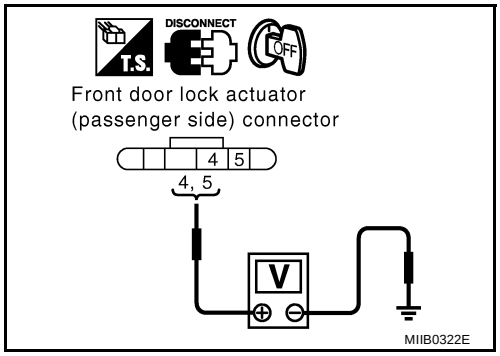
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

PASSENGER SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (passenger side) connector.
3. Door lock / unlock switch operate, check voltage between front door lock actuator (passenger side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D38	4 (L)	Ground	Lock	0 → Battery voltage → 0
	5 (L)		Unlock	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (passenger side).
NG >> GO TO 2.

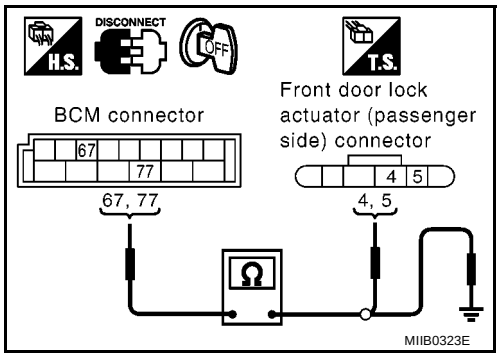
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and front door lock actuator (passenger side) connector D38 terminal 4, 5.

67 (L) – 5 (L) : Continuity should exist.
77 (L) – 4 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

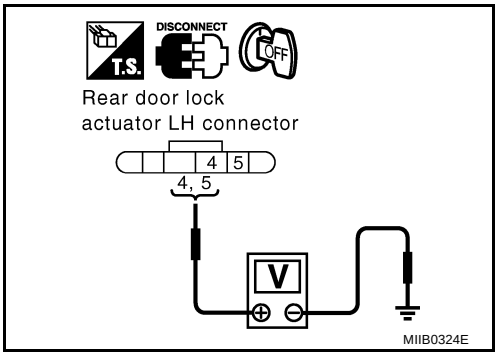
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

REAR LH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator LH connector.
3. Door lock / unlock switch operate, check voltage between rear door lock actuator LH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D63	4 (BR)	Ground	Lock	0 → Battery voltage → 0
	5 (Y)		Unlock	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator LH.
NG >> GO TO 2.

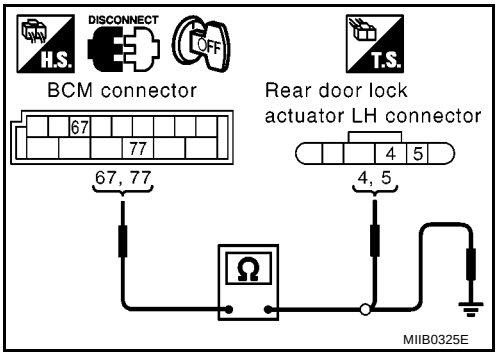
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and rear door lock actuator LH connector D63 terminal 4, 5.

67 (L) – 5 (Y) : Continuity should exist.
77 (L) – 4 (BR) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

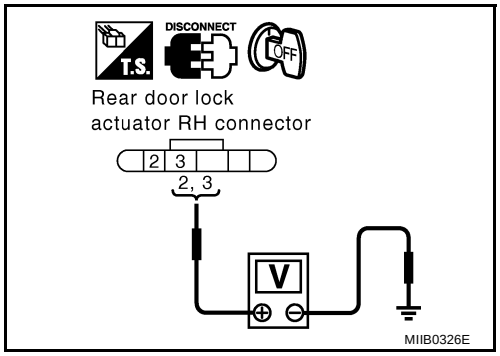
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

REAR RH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator RH connector.
3. Door lock / unlock switch operate, check voltage between rear door lock actuator RH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D83	2 (Y)	Ground	Unlock	0 → Battery voltage → 0
	3 (L)		Lock	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator RH.
NG >> GO TO 2.

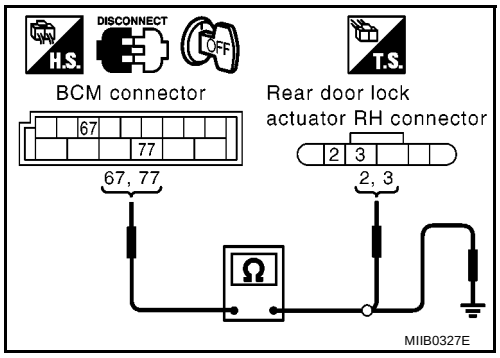
2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 67, 77 and rear door lock actuator RH connector D83 terminal 2, 3.

67 (L) – 2 (Y) : Continuity should exist.
77 (L) – 3 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 67, 77 and ground.

67 (L) – Ground : Continuity should not exist.
77 (L) – Ground : Continuity should not exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

Super Lock Actuator Check

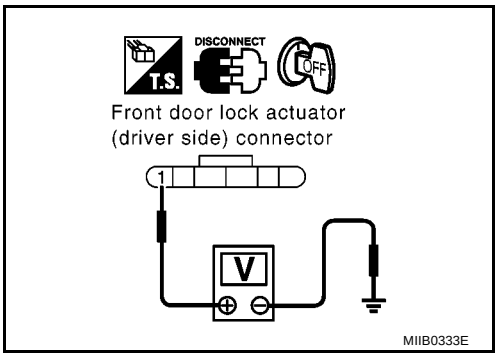
EIS00AQ6

DRIVER SIDE

1. CHECK SUPER LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (driver side) connector.
3. Door lock / unlock switch operate, check voltage between front door lock actuator (driver side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D9	1 (OR)	Ground	Lock button is pressed.	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (driver side).
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 75 and front door lock actuator (driver side) connector D9 terminal 1.

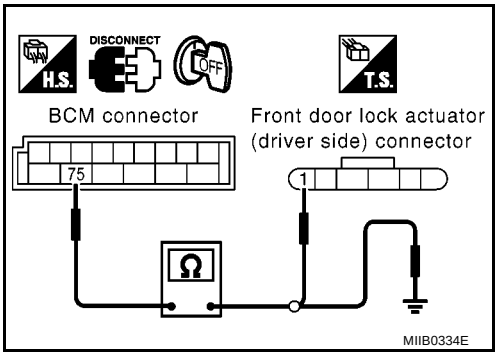
75 (R) – 1 (OR) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 75 and ground.

75 (R) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

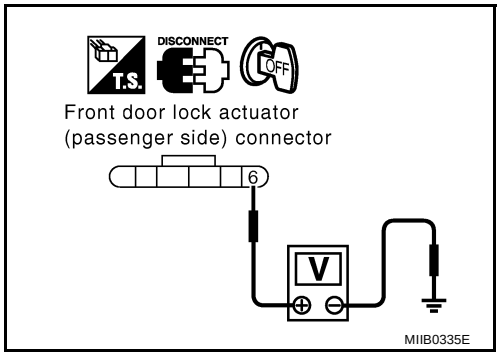


PASSENGER SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (passenger side) connector.
3. Remote controller operate, check voltage between front door lock actuator (passenger side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D38	6 (G)	Ground	Lock button is pressed.	0 → Battery voltage → 0



OK or NG

OK >> Replace front door lock actuator (passenger side).
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 75 and front door lock actuator (passenger side) connector D38 terminal 6.

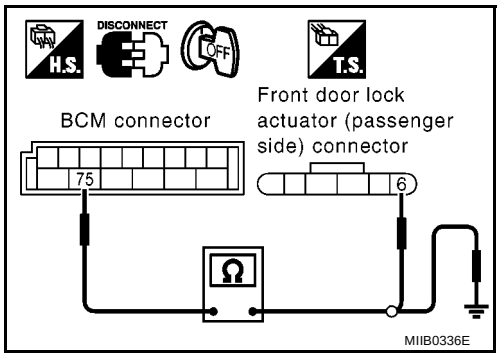
75 (R) – 6 (G) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 75 and ground.

75 (R) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

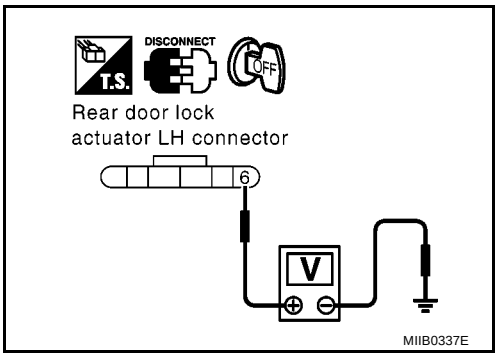


REAR LH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator LH connector.
3. Remote controller operate, check voltage between rear door lock actuator LH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D63	6 (L)	Ground	Lock button is pressed.	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator LH.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 75 and rear door lock actuator LH connector D63 terminal 6.

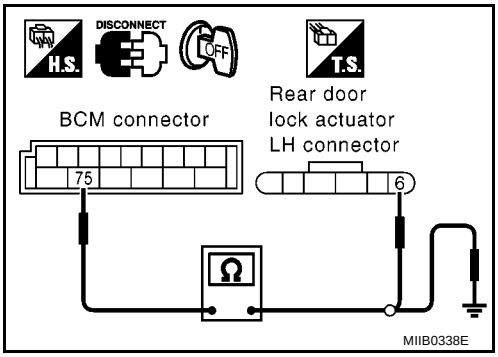
75 (R) – 6 (L) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 75 and ground.

75 (R) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

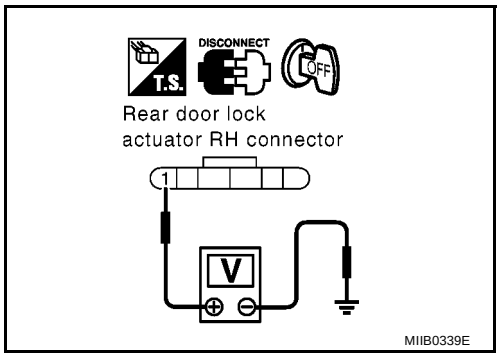


REAR RH SIDE

1. CHECK DOOR LOCK ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator RH connector.
3. Remote controller operate, check voltage between rear door lock actuator RH connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D83	1 (R)	Ground	Lock button is pressed.	0 → Battery voltage → 0



OK or NG

OK >> Replace rear door lock actuator RH.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 75 and rear door lock actuator RH connector D83 terminal 1.

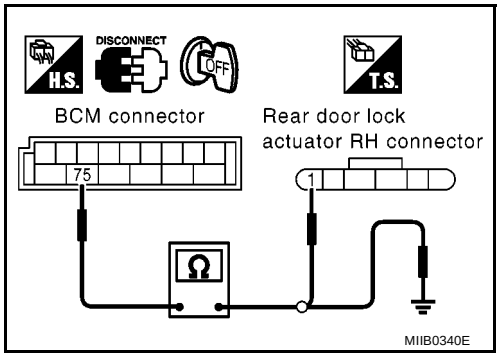
75 (R) – 1 (R) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 75 and ground.

75 (R) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.



Door Switch Check

EIS00AQ7

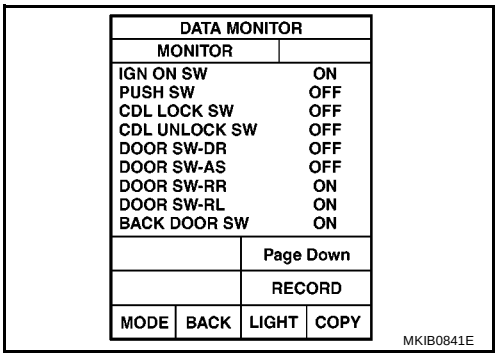
DRIVER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

Check door switch “DOOR SW-DR” in “DATA MONITOR” mode with CONSULT- II.

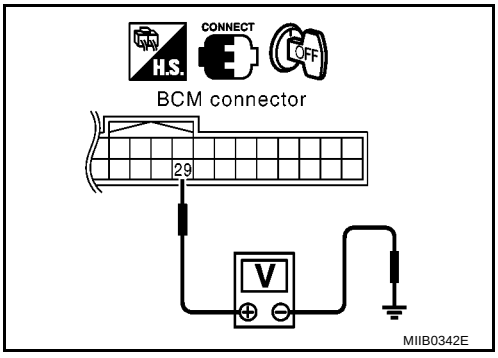
Monitor item	Condition	
DOOR SW-DR	OPEN	: ON
	CLOSE	:OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	29 (L)	Ground	OPEN	0
			CLOSE	Battery voltage



OK or NG

OK >> Front door switch RH is OK.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front door switch RH connector.
3. Check continuity between BCM connector M48 terminal 29 and front door switch RH connector B16 terminal 1.

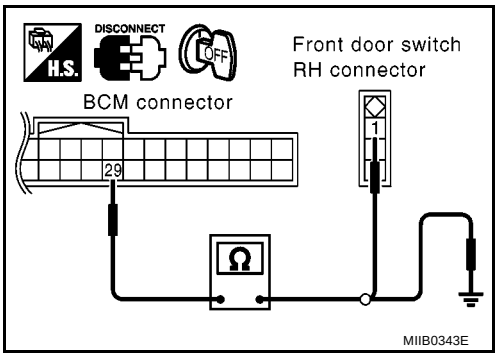
29 (L) – 1 (L) : Continuity should exist.

4. Check continuity between BCM connector M48 terminal 29 and ground.

29 (L) – Ground : Continuity should not exist.

OK or NG

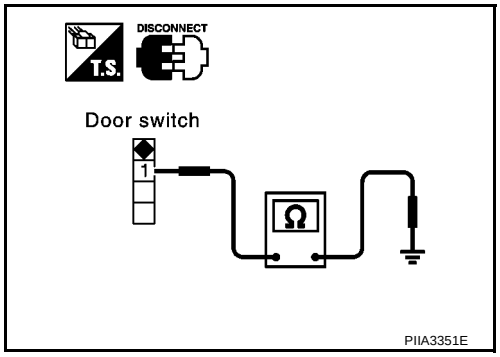
OK >> GO TO 3.
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Body ground part of door switch	Pushed	NO
		Released	YES



OK or NG

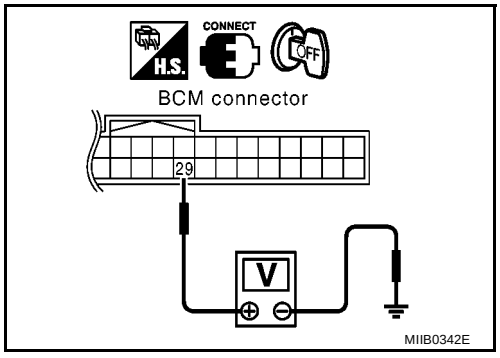
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 29 and ground.

Driver side door is closed.

29 (L) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

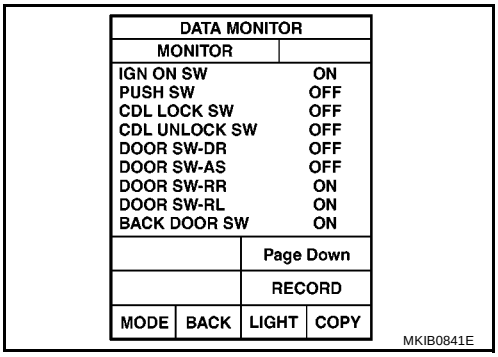
PASSENGER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

Check door switch “DOOR SW-AS” in “DATA MONITOR” mode with CONSULT- II.

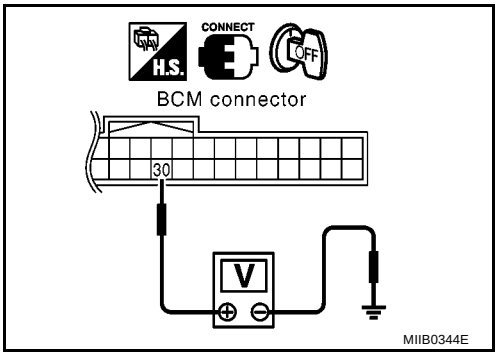
Monitor item	Condition	
DOOR SW-AS	OPEN	: ON
	CLOSE	:OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	30 (LG)	Ground	OPEN	0
			CLOSE	Battery voltage



OK or NG

OK >> Front door switch LH is OK.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front door switch LH connector.
3. Check continuity between BCM connector M48 terminal 30 and front door switch LH connector B22 terminal 1.

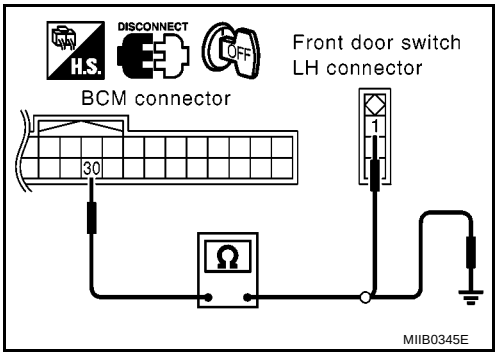
30 (LG) – 1 (LG) : Continuity should exist.

4. Check continuity between BCM connector M48 terminal 29 and ground.

30 (LG) – Ground : Continuity should not exist.

OK or NG

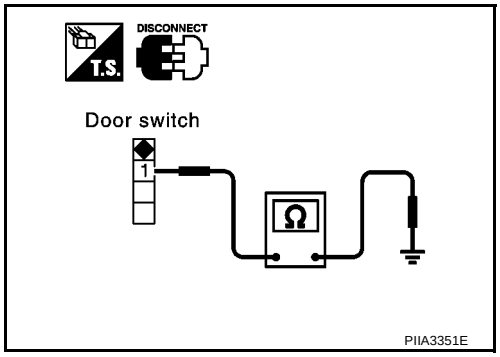
OK >> GO TO 3.
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Body ground part of door switch	Pushed	NO
		Released	YES



OK or NG

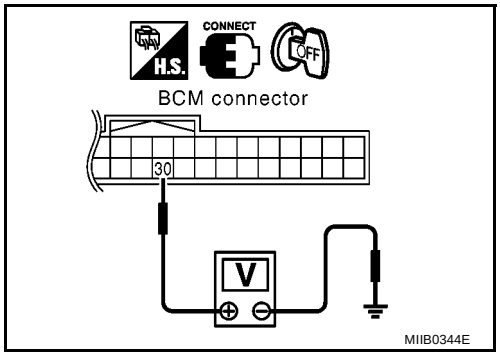
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 30 and ground.

Passenger side door is closed.

30 (LG) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

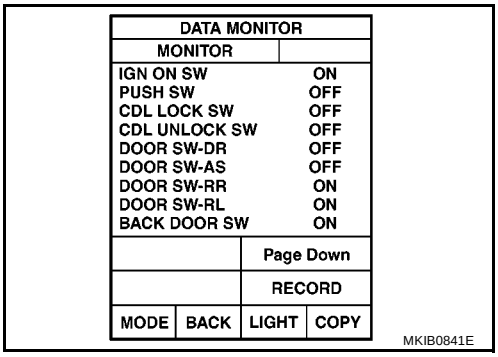
REAR LH SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

Check door switch “DOOR SW-RL” in “DATA MONITOR” mode with CONSULT- II.

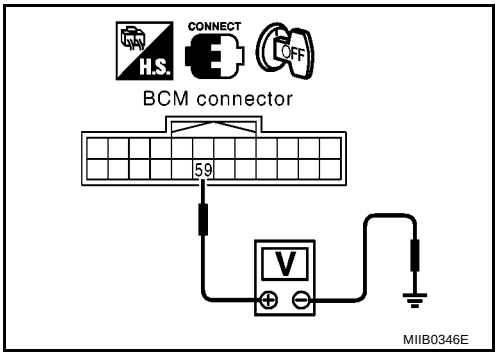
Monitor item	Condition	
DOOR SW-RL	OPEN	: ON
	CLOSE	:OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M49	59 (L)	Ground	OPEN	0
			CLOSE	Battery voltage



OK or NG

OK >> Rear door switch LH is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door switch LH connector.
3. Check continuity between BCM connector M49 terminal 59 and rear door switch LH connector B31 terminal 1.

59 (L) – 1 (L) : Continuity should exist.

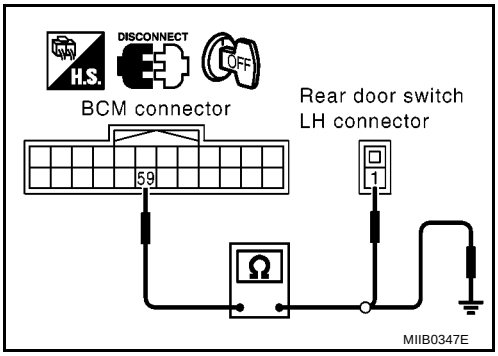
4. Check continuity between BCM connector M49 terminal 59 and ground.

59 (L) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

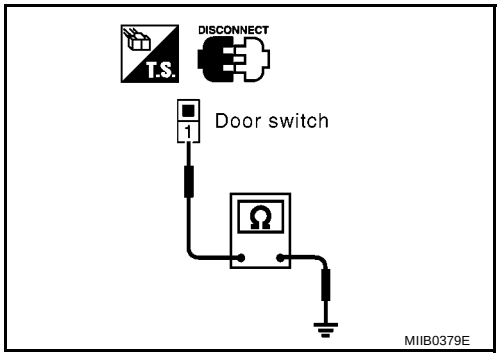
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Body ground part of door switch	Pushed	NO
		Released	YES



OK or NG

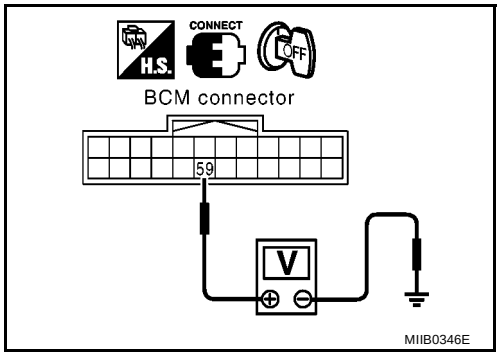
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M49 terminal 59 and ground.

Rear LH door is closed.

59 (L) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

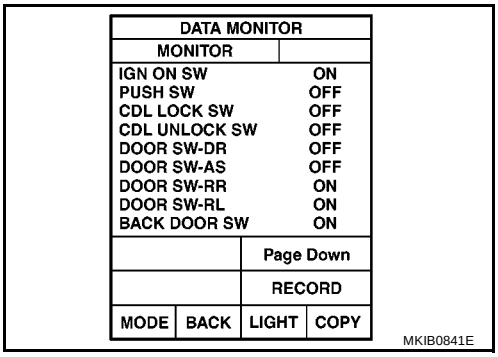
REAR RH SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

With CONSULT- II

Check door switch “DOOR SW-RR” in “DATA MONITOR” mode with CONSULT- II.

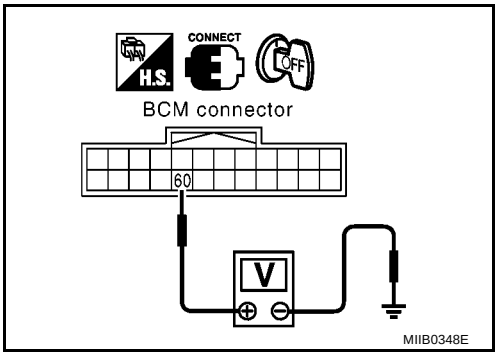
Monitor item	Condition	
DOOR SW-RR	OPEN	: ON
	CLOSE	:OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M49	60 (G)	Ground	OPEN	0
			CLOSE	Battery voltage



OK or NG

OK >> Rear door switch RH is OK.

NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and rear door switch RH connector.
3. Check continuity between BCM connector M49 terminal 60 and rear door switch RH connector B30 terminal 1.

60 (G) – 1 (G) : Continuity should exist.

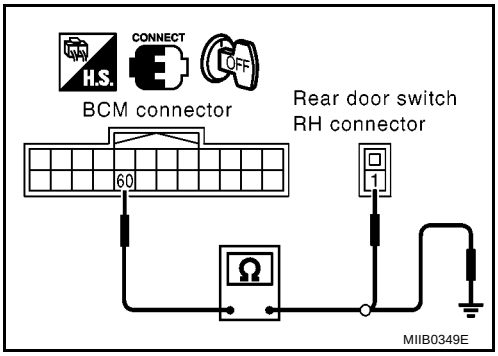
4. Check continuity between BCM connector M49 terminal 60 and ground.

60 (G) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 3.

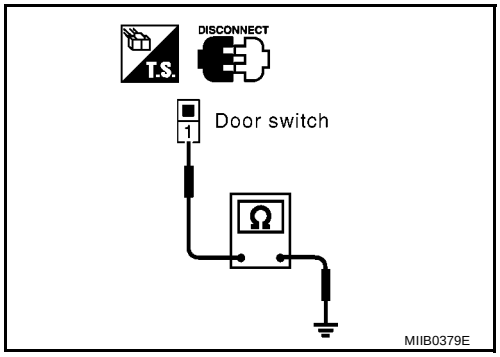
NG >> Repair or replace harness.



3. CHECK DOOR SWITCH

Check continuity between door switch terminal 1 and body ground part of door switch.

Terminals		Condition	Continuity
1	Body ground part of door switch	Pushed	NO
		Released	YES



OK or NG

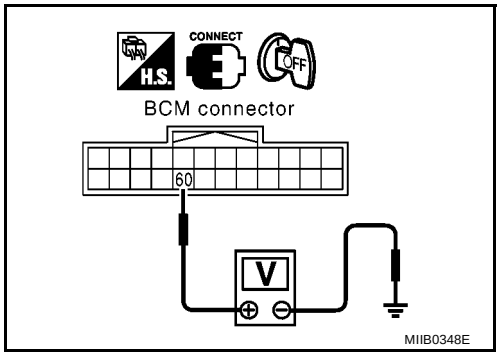
OK >> GO TO 4.
NG >> Replace door switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M49 terminal 60 and ground.

Rear RH door is closed.

60 (G) – Ground : Battery voltage



OK or NG

OK >> Check door switch ground condition.
NG >> Replace BCM.

External Back Door Release Switch Check

EIS00AQ8

1. CHECK EXTERNAL BACK DOOR RELEASE SWITCH INPUT SIGNAL

With CONSULT- II

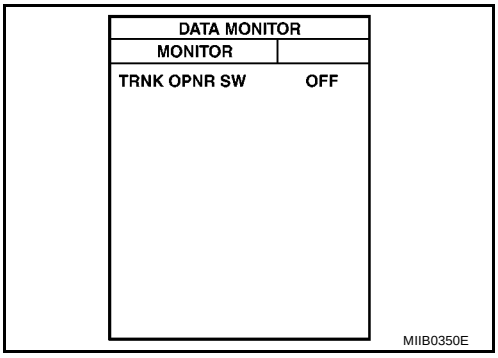
Check external back door release switch “TRNK OPNR SW” in “DATA MONITOR” mode with CONSULT- II.

External back door release switch is pushed

TRNK OPNR SW : ON

External back door release switch is released

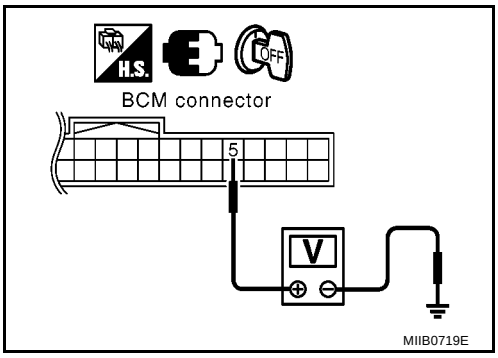
TRNK OPNR SW : OFF



Without CONSULT- II

Check voltage between BCM connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
M48	5 (Y)	Ground	Pushed	0
			Released	5



OK or NG

OK >> External back door release switch is OK.

NG >> GO TO 2.

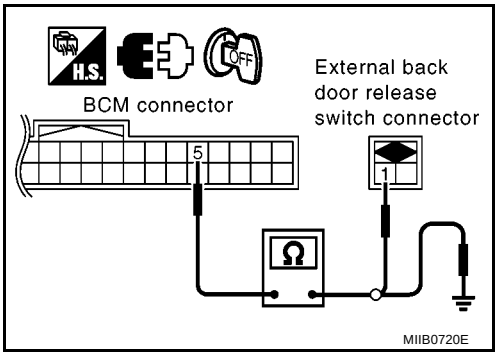
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and external back door release switch connector.
3. Check continuity between BCM connector M48 terminal 5 and external back door release switch connector B52 terminal.

5 (Y) – 1 (Y) : Continuity should exist.

4. Check continuity between BCM connector M48 terminal 5 and ground.

5 (Y) – Ground : Continuity should not exist.



OK or NG

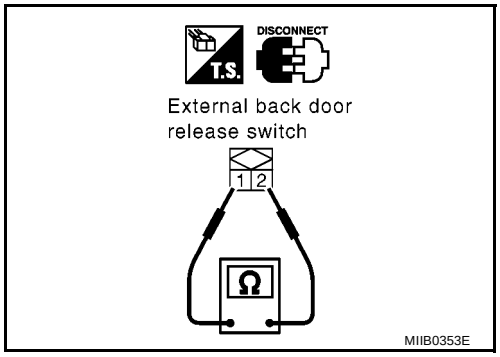
OK >> GO TO 3.

NG >> Repair or replace harness.

3. CHECK EXTERNAL BACK DOOR RELEASE SWITCH

Check continuity between external back door release switch terminal 1 and 2.

Terminals		Condition	Continuity
1	2	Pushed	YES
		Released	NO



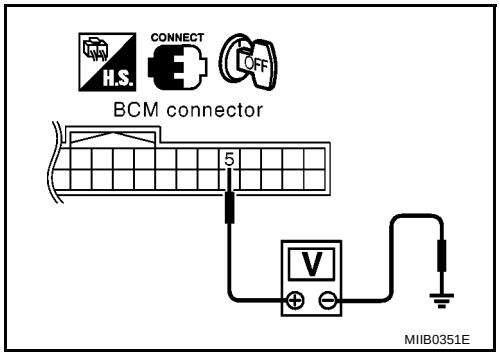
OK or NG

OK >> GO TO 4.
NG >> Replace external back door release switch.

4. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Check voltage between BCM connector M48 terminal 5 and ground.

5 (Y) – Ground : Approx. 5V



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace BCM.

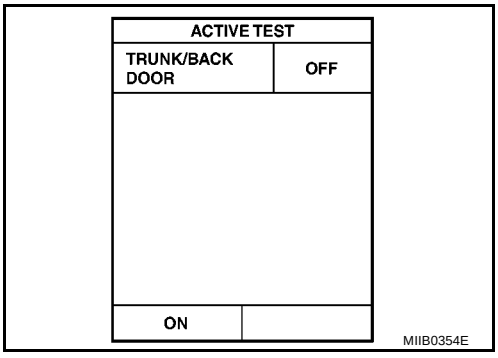
Back Door Release Actuator Check

EIS00AQ9

1. CHECK BCM OUTPUT SIGNAL

Check back door release output signal
Perform (“TRUNK/BACK DOOR”) in “ACTIVE TEST” mode with CONSULT-II.

When “ACTIVE TEST” is executed, does the back door open?



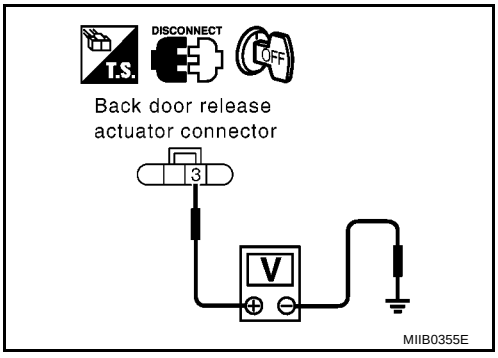
OK or NG

OK >> Back door release output is OK.
NG >> GO TO 2.

2. CHECK BACK DOOR RELEASE ACTUATOR

1. Turn ignition switch OFF.
2. Disconnect back door release actuator connector.
3. External back door release switch operate, check voltage between back door release actuator connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
B55	3 (OR)	Ground	Pushed	0 → Battery voltage → 0



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 68 and back door release actuator connector B55 terminal 3.

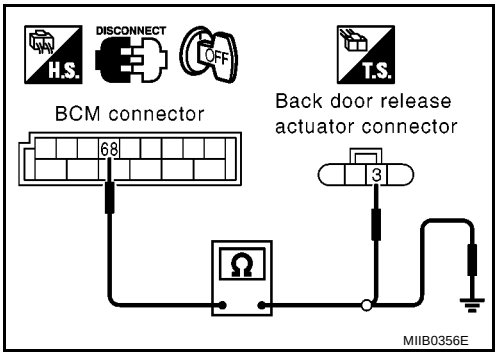
68 (OR) – 3 (OR) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 68 and ground.

68 (OR) – Ground : Continuity should not exist.

OK or NG

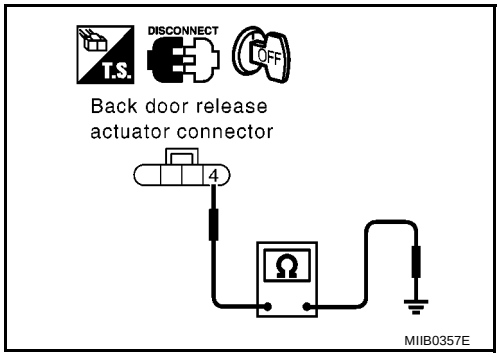
OK >> Replace BCM.
NG >> Repair or replace harness.



4. CHECK GROUND CIRCUIT

Check continuity between back door release actuator connector B55 terminal 4 and ground.

4 (B) – Ground : Continuity should exist.



OK or NG

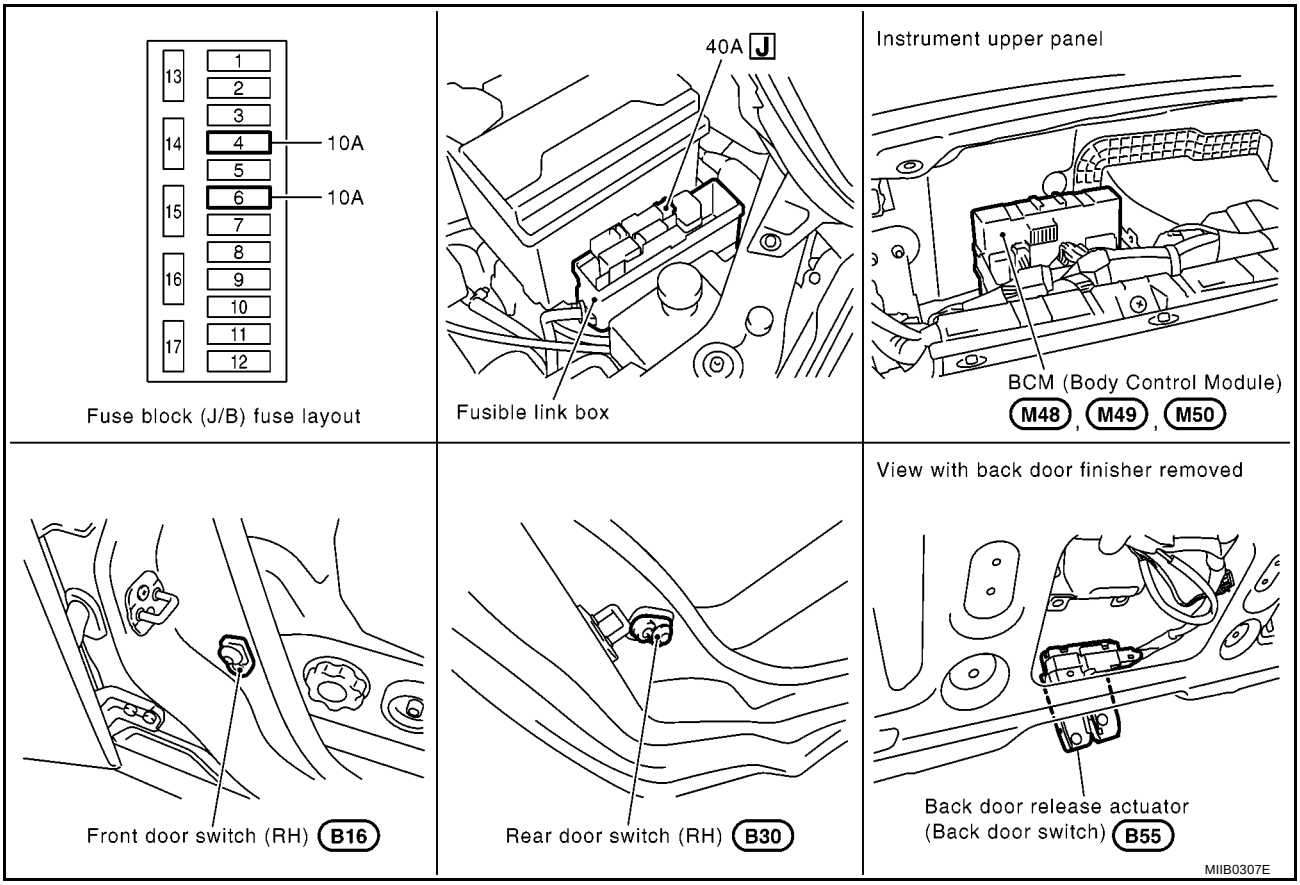
OK >> Replace back door release actuator.
NG >> Repair or replace harness.

MULTI-REMOTE CONTROL SYSTEM

PFP:28596

Component Parts and Harness Connector Location

EIS004Y9



System Description

EIS004YA

INPUTS

Power is supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fusible link box).
- to key switch terminal 1
- through 10A fuse [No. 6, located in the fuse block (J/B)].

When the key switch is ON (Ignition key is inserted in ignition key cylinder), power is supplied

- to BCM terminal 3.
- through key switch terminal 2

When the ignition switch is ON or START, power is supplied

- to BCM terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)].

Ground is supplied

- to BCM terminals 2 and 70
- through body grounds M19 and M20.

When the front door switch LH (LHD Models) or RH (RHD Models) is ON (door is open), ground supplied

- to BCM terminal 29
- through front door switch LH (LHD Models) or RH (RHD Models) terminal 1
- through front door switch LH (LHD Models) or RH (RHD Models) case ground.

When the front door switch RH (LHD Models) or LH (RHD Models) is ON (door is open), ground supplied

- to BCM terminal 30
- through front door switch RH (LHD Models) or LH (RHD Models) terminal 1
- through front door switch RH (LHD Models) or LH (RHD Models) case ground.

When the rear door switch LH is ON (door is open), ground is supplied

- to BCM terminal 59
- through rear door switch LH terminal 1
- through rear door switch LH case ground.

When the rear door switch RH is ON (door is open), ground is supplied

- to BCM terminal 60
- through rear door switch RH terminal 1
- through rear door switch RH case ground.

When the back door switch is ON (back door is open), ground is supplied

- to BCM terminal 10
- through back door switch terminals 1 and 2
- through body grounds B17, B23, B44 and B51.

Remote controller signal is inputted to BCM (The antenna of the system is combined with BCM).

OPERATE

The multi-remote control system controls operation of the

- power door lock
- answer back
- auto door lock

OPERATED PROCEDURE

Power Door Lock Operation

NORMAL MODE

BCM receives a LOCK/UNLOCK signal from remote controller.
Then BCM locks/unlocks all doors with input of LOCK/UNLOCK signal from remote controller.

ANTI HI-JACK MODE

BCM receives a LOCK signal from remote controller.

Then BCM locks all doors with input of LOCK signal from remote controller.
When an UNLOCK signal is sent from remote controller once, driver's door will be unlocked.
Then, if an UNLOCK signal is sent from remote controller again within 5 seconds, all door will be unlocked.

HOW TO CHANGE DOOR LOCK FUNCTION MODE

With CONSULT-II

Door lock function can be changed using “SECURITY DOOR LOCK SET” mode in “WORK SUPPORT” of “DOOR LOCK”.
Refer to BL-46, "WORK SUPPORT" .

Without CONSULT-II

When LOCK and UNLOCK signals are sent from the remote controller for more than 5 seconds at the same time, the lock function mode is changed.

Answer Back

When the doors are locked or unlocked by remote controller, supply power to hazard warning lamp flashes as follows

- LOCK operation: Flash once
- UNLOCK operation: Flash twice

Answer back mode can be changed using “HAZARD LAMP SET” mode in “WORK SUPPORT” of “FLUSHER”.
Refer to LT-145, "WORK SUPPORT" .

Auto Door Lock Operation

Auto door lock function signal is sent for operation when any of the following signals are not sent within 2 minutes after the unlock signal is sent from remote controller:

- when door switch is turned on for door open.
- when key switch is turned on.
- when the lock signal is sent from the remote controller.

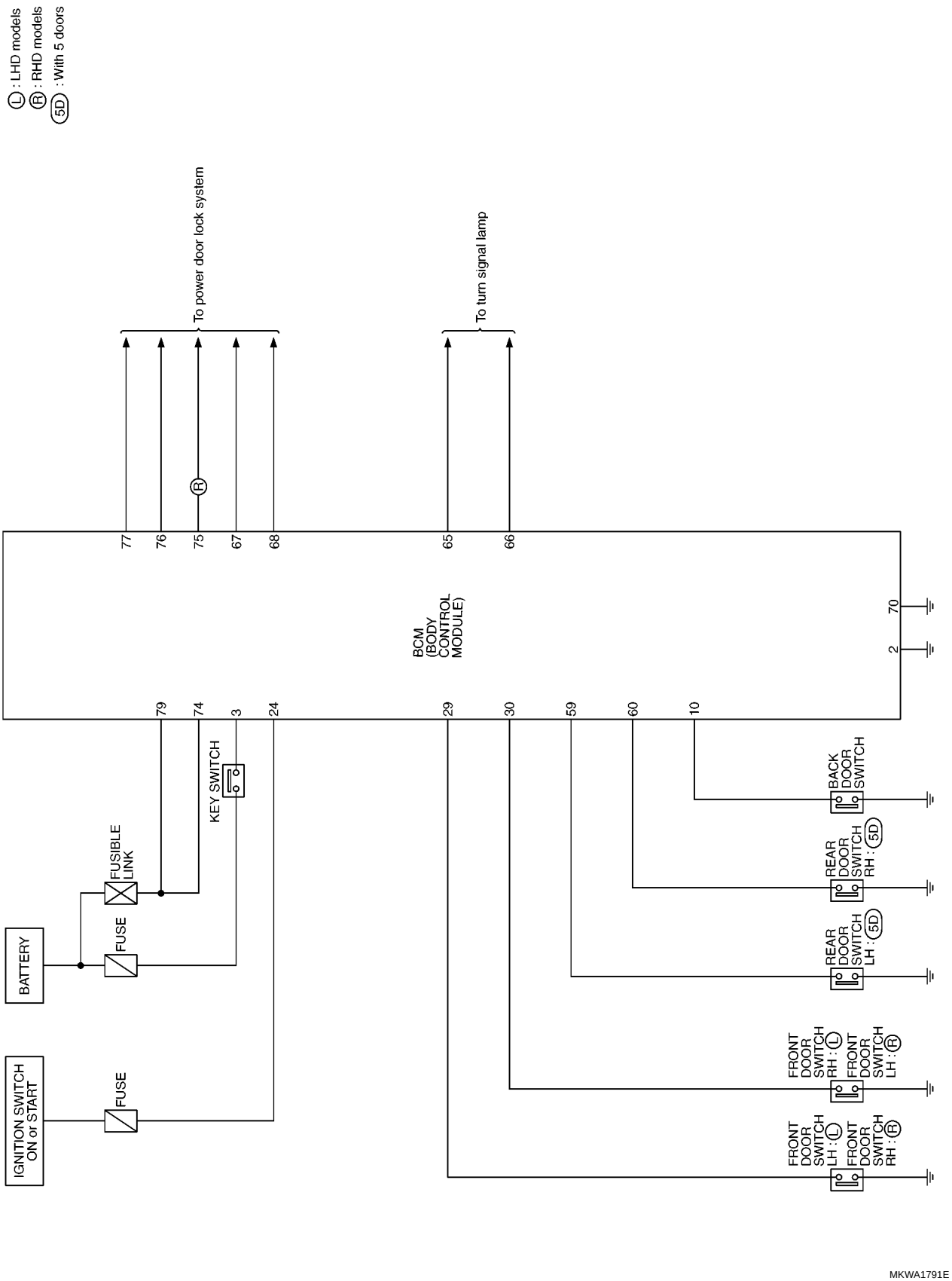
Auto door lock mode can be changed using “AUTO LOCK SET” mode in “WORK SUPPORT” of “DOOR LOCK”.
Refer to BL-46, "WORK SUPPORT" .

Remote Controller ID Code Entry

A maximum of four remote controller can be entered.
Dedicated remote controller ID registration procedure is not required.
Remote controller ID registration must be completed in conjunction with immobilizer transponder ID registration.

Schematic

EIS004YB

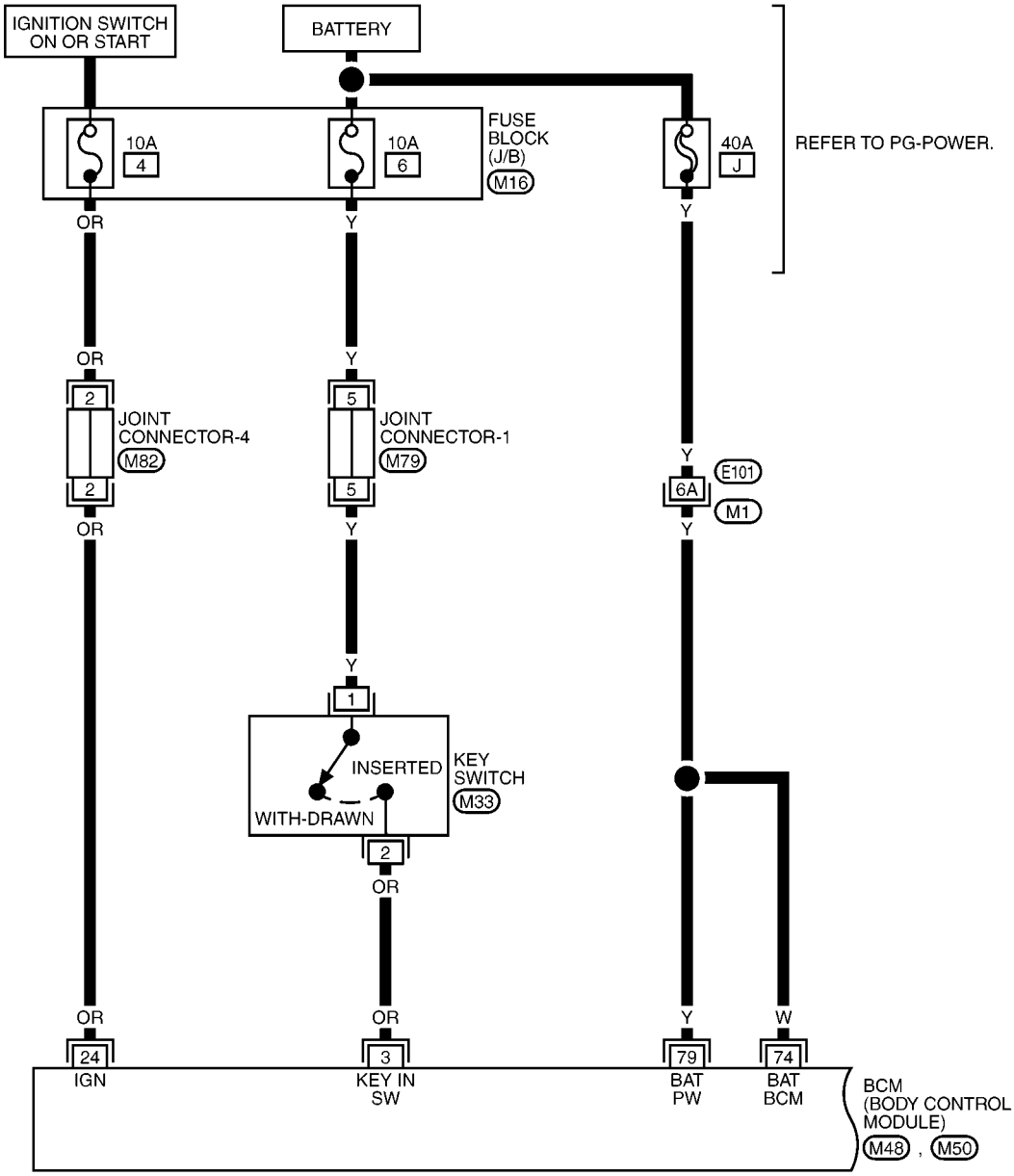


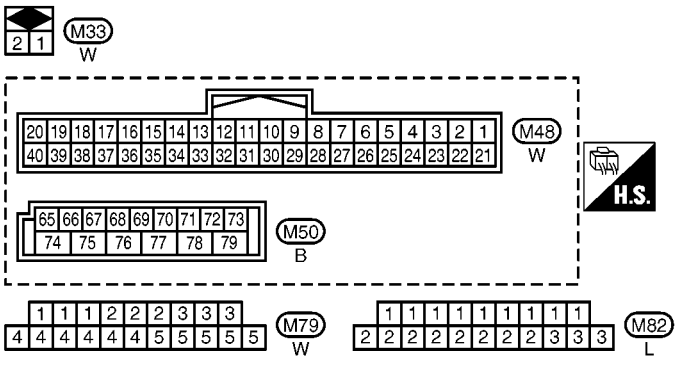
MKWA1791E

Wiring Diagram — MULTI —

EIS004YC

BL-MULTI-01

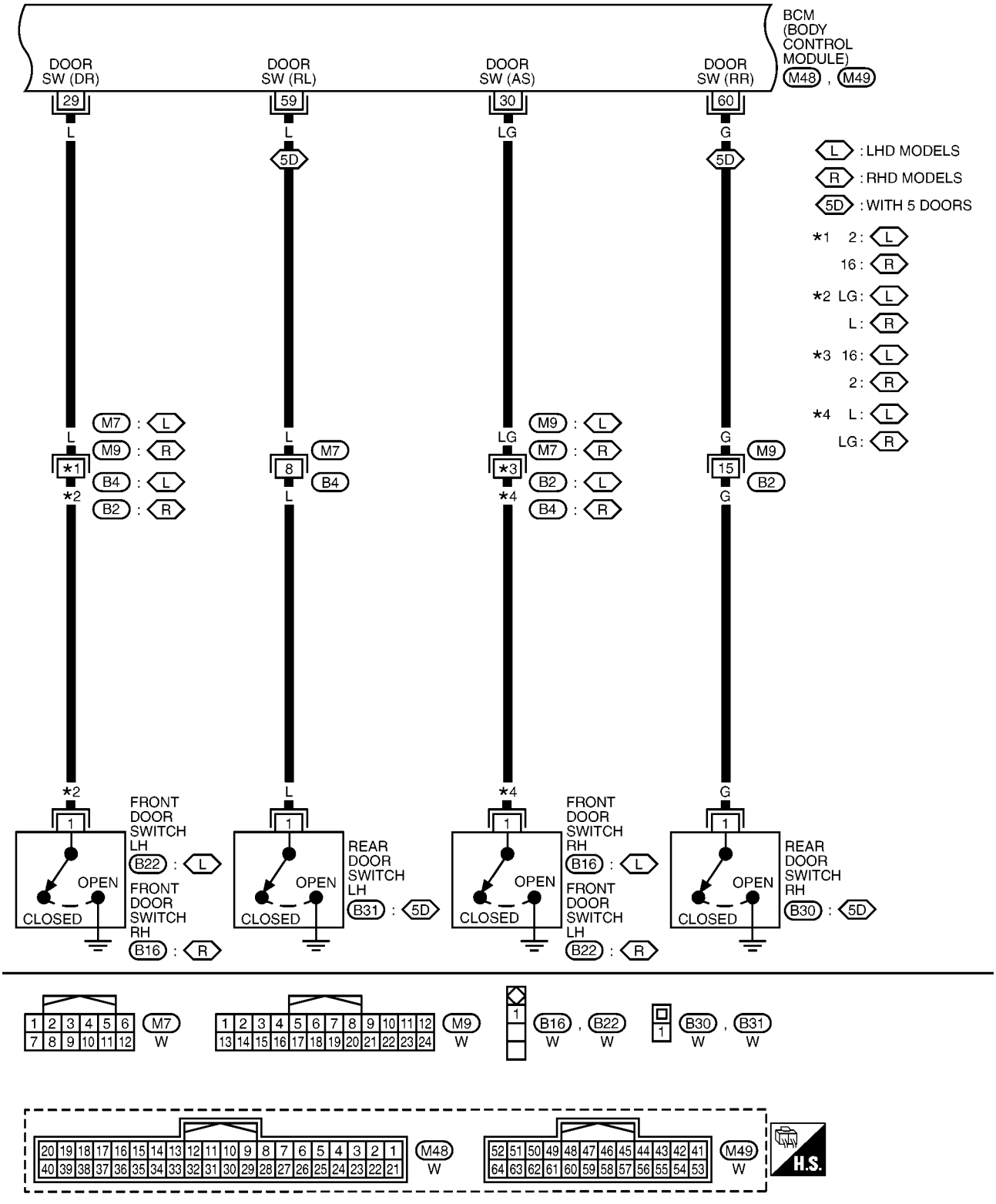




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

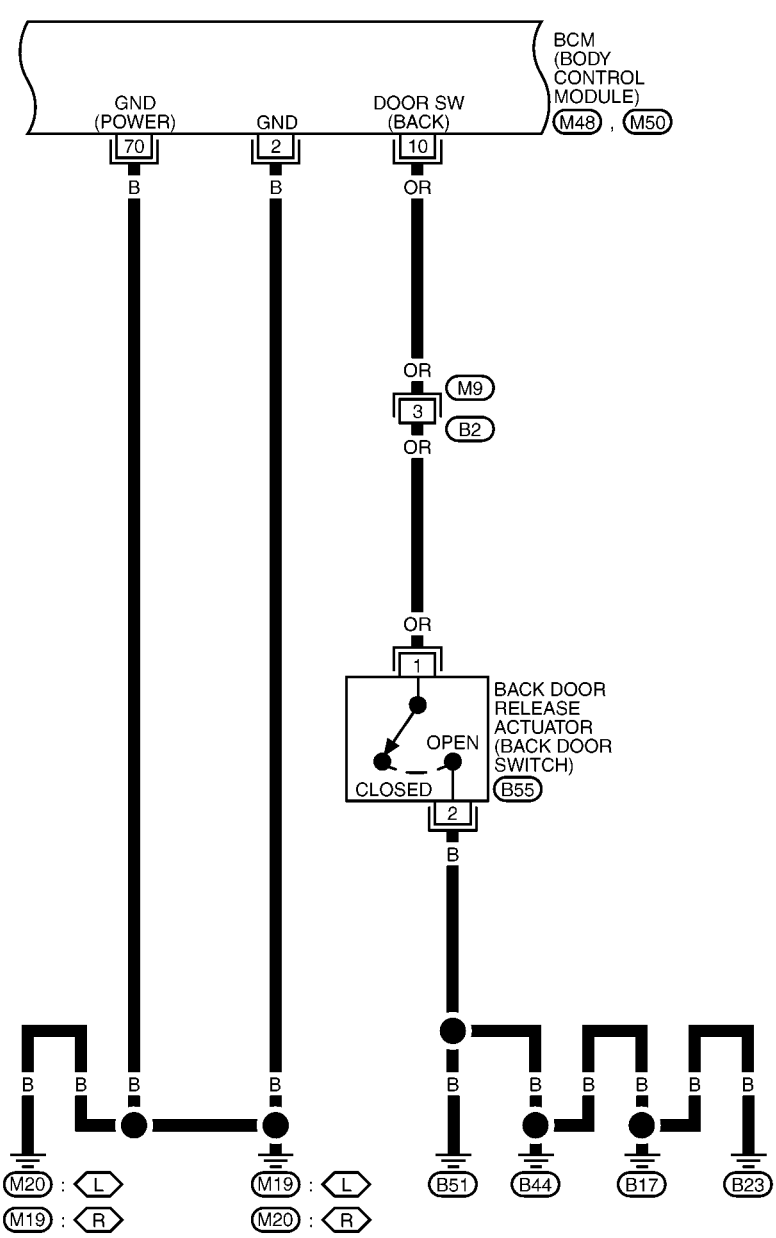
MKWA1792E

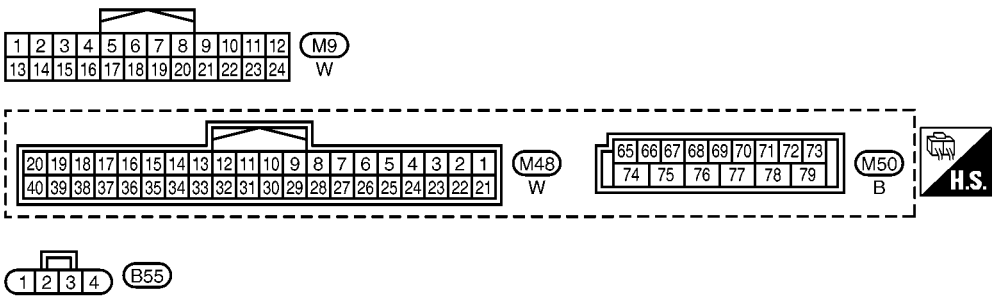
BL-MULTI-02



MKWA0890E

BL-MULTI-03

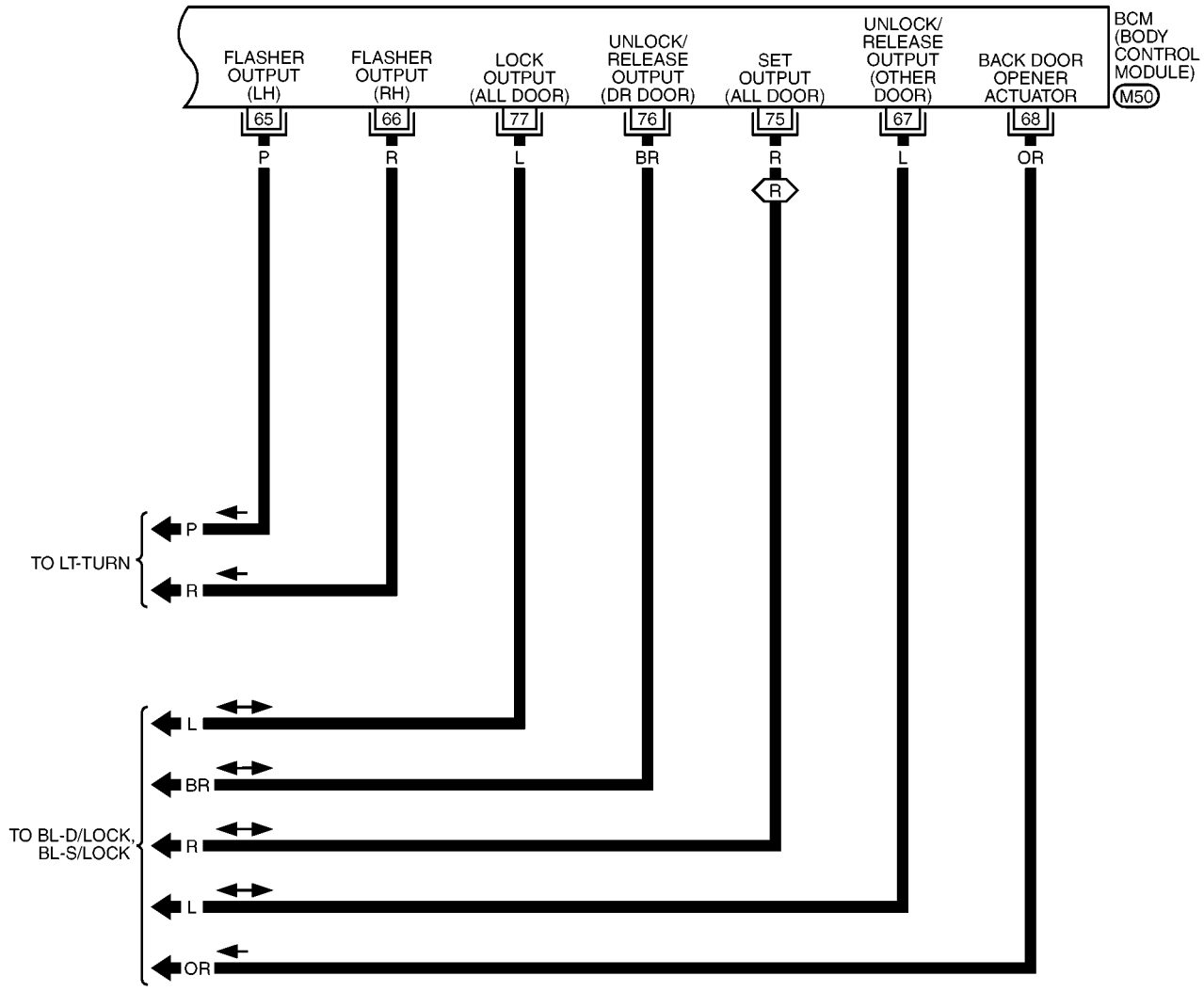


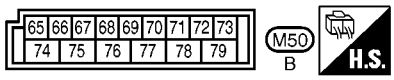


MKWA0891E

BL-MULTI-04

R : RHD MODELS

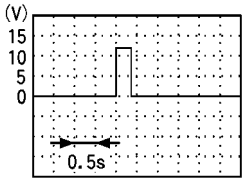
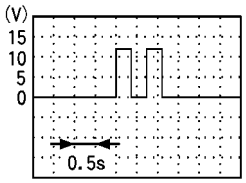
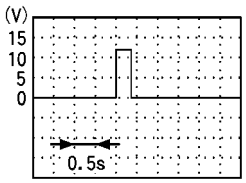
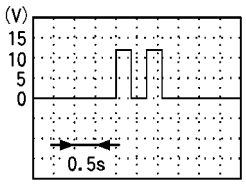




MKWA0892E

Terminal and Reference Value for BCM

EIS004YD

TER-MINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) Approx.
2	B	Ground	—	0
3	OR	Key switch	Key is removed from IGN key cylinder (OFF) → Key is inserted in IGN key cylinder (ON)	0 → Battery voltage
10	OR	Back door switch	Back door open (ON) → Back door close (OFF)	0 → Battery voltage
19	R	CAN-H	—	—
24	OR	IGN power supply	Ignition switch is in ON or START position	Battery voltage
29	L	Front door switch LH (LHD models) Front door switch RH (RHD models)	Door open (ON) → Door close (OFF)	0 → Battery voltage
30	LG	Front door switch RH (LHD models) Front door switch LH (RHD models)	Door open (ON) → Door close (OFF)	0 → Battery voltage
39	W	CAN-L	—	—
59	L	Rear door switch LH	Door open (ON) → Door close (OFF)	0 → Battery voltage
60	G	Rear door switch RH	Door open (ON) → Door close (OFF)	0 → Battery voltage
65	P	Answer back (Turn signal lamp LH)	When door lock operated using remote controller*1	 PIIA2486J
			When door unlock operated using remote controller*1	 PIIA2487J
66	R	Answer back (Turn signal lamp RH)	When door lock operated using remote controller*1	 PIIA2486J
			When door unlock operated using remote controller*1	 PIIA2487J
67	L	Door lock actuator unlock (ALL Door) (Except driver side)	Door lock/unlock switch UNLOCK operation	0 → Battery voltage

TER-MINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) Approx.
68	OR	Back door opener actuator	Power window main switch (Back door release switch) OPEN operation	Battery voltage → 0
70	B	Ground	—	0
74	W	BAT power supply (fusible link) (BCM)	—	Battery voltage
75*2	R	Super lock set output (All door)	Super lock operation (Set)	0 → Battery voltage
76	BR	Door lock actuator unlock (Driver side)	Door lock/unlock switch Unlock operation	0 → Battery voltage
77	L	Door lock actuator lock (ALL Door)	Door lock/unlock switch LOCK operation	0 → Battery voltage
79	Y	BAT power supply (fusible link) (Power window)	—	Battery voltage

*1 : In the state that answer back operates

*2 : Only the model equipped with super lock system (RHD Models)

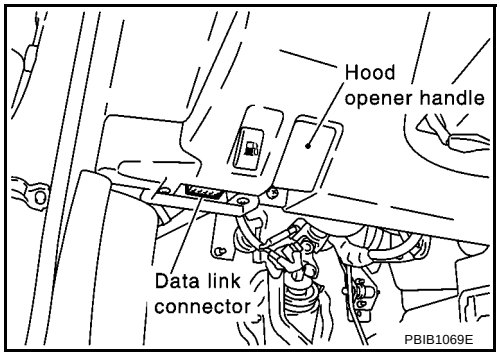
CONSULT- II Inspection Procedure

EIS004YE

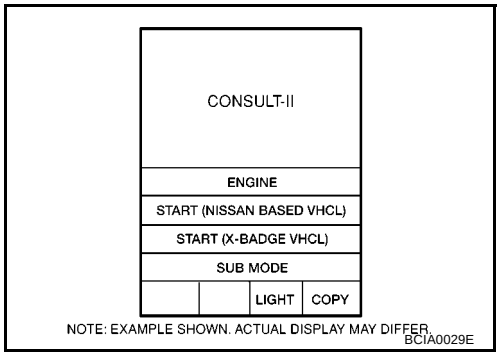
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

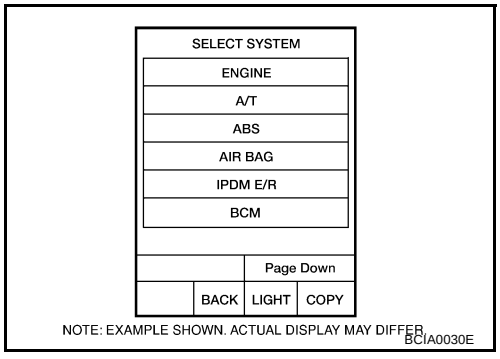
1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to the data link connector.



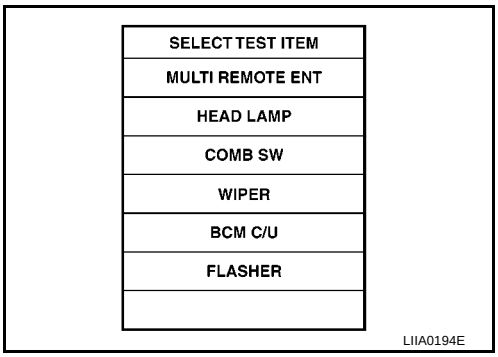
3. Turn ignition switch “ON”.
4. Touch “START(NISSAN BASED VHCL)”.



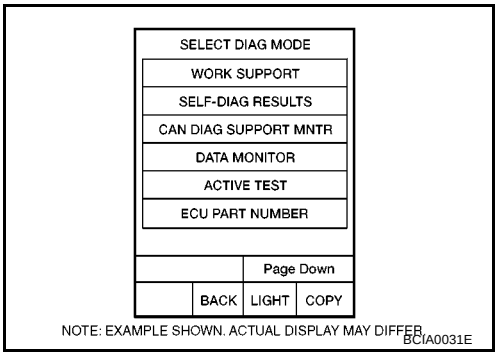
5. Touch “BCM”.
   If “BCM” is not indicated, Refer to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “MULTI REMOTE ENT”.



7. Select diagnosis mode.
“DATA MONITOR” is available.



CONSULT- II Application Items

EIS004YF

DATA MONITOR

Monitored Item	Description
MEMORY 1	Indicates [ON/OFF] condition of remote controller ID code registration.
MEMORY 2	Indicates [ON/OFF] condition of remote controller ID code registration.
MEMORY 3	Indicates [ON/OFF] condition of remote controller ID code registration.
MEMORY 4	Indicates [ON/OFF] condition of remote controller ID code registration.

Work Flow

EIS0055G

1. Check the trouble symptom and customer's requests.
2. Understand outline of system. Refer to BL-132, "System Description" .
3. Confirm that power door lock system operates normally.
Refer to BL-15, "POWER DOOR LOCK SYSTEM" .
4. Refer to trouble diagnosis chart by symptom, repair or replace any malfunctioning parts.
5. INSPECTION END

Trouble Diagnosis Chart by Symptom

EIS004YG

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT-II, when perform the each trouble diagnosis. Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .

NOTE:

- Always check “Work Flow” before troubleshooting. Refer to BL-141, "Work Flow" .
- Always check remote controller battery before replacing remote controller.

Symptom	Diagnoses/service procedure	Reference page
All function of multi-remote control system do not operate.	1. Remote controller check	BL-143
	2. Replace remote controller. **NOTE:** If the result of remote controller function check with CONSULT-II is OK, remote controller is not malfunction.	BL-133
	3. Replace BCM.	BCS-31
Door lock or unlock does not function with remote controller. (Power door lock system is “OK”)	1. Remote controller check	BL-143
	2. Key switch check	BL-148
	3. Replace remote controller. **NOTE:** If the result of remote controller function check with CONSULT-II is OK, remote controller is not malfunction.	BL-133
	4. Replace BCM.	BCS-31
Answer back does not activate properly when pressing lock or unlock button of remote controller.	1. Check answer back mode.* *: Answer back mode can be changed. First check the hazard reminder setting.	LT-145
	2. Hazard reminder check	BL-150
	3. Replace BCM.	BCS-31
Auto door lock operation does not activate properly. (All other remote keyless entry system function is “OK”.)	1. Check auto door lock operation mode.* *: Auto door lock operation can be changed. First check the auto door lock operation setting.	BL-46
	2. Door switch check	BL-143
	3. Replace BCM.	BCS-31

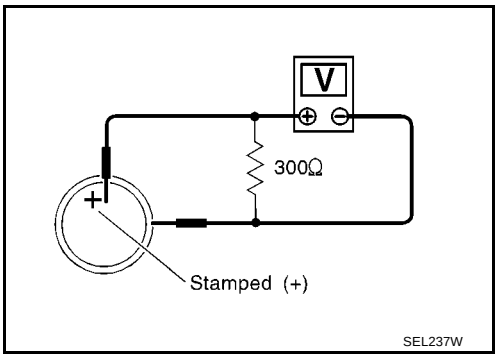
Remote controller Check

EIS004YH

1. CHECK REMOTE CONTROLLER BATTERY

Remove battery and measure voltage across battery positive and negative terminals, (+) and (–).

Battery voltage : 2.5V – 3.0V



NOTE:
Remote controller does not function if battery is not set correctly.

OK or NG

OK >> GO TO 2
NG >> Replace battery. Refer to BL-151, "Remote Controller Battery Replacement" .

2. CHECK REMOTE CONTROLLER FUNCTION

With CONSULT-II
Check remote controller function.

Remote controller function	Check item
Pushing LOCK button	All of doors are locked
Pushing UNLOCK button	All of doors are unlocked

OK or NG

OK >> Remote controller is OK.
NG >> Replace remote controller.

Door Switch Check

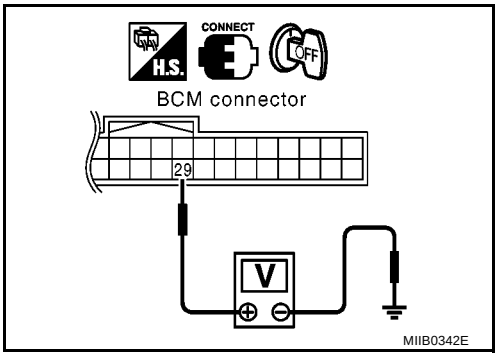
EIS0054Y

DOOR SWITCH DRIVER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector M48 terminal 29 and ground.

Terminal		Driver door condition	Voltage (V) Approx.
(+)	(–)		
29 (L)	Ground	Closed	5
		Open	0



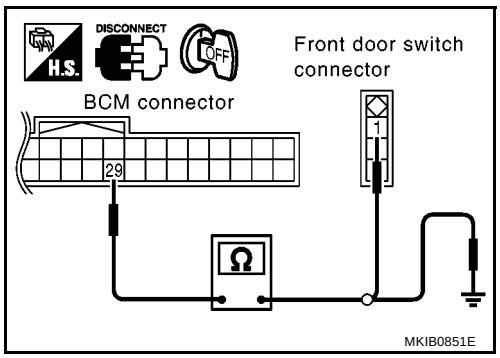
OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH HARNESS

1. Check continuity between BCM connector M48 terminal 29 and driver door switch connector B22(LHD Models) or B16 (RHD Models) terminal 1.

Terminal		Continuity
LHD Models	29 (L) - 1 (LG)	Yes
RHD Models	29 (L) - 1 (L)	



2. Check continuity between BCM connector M48 terminal 29 and ground.

29 (L) – Ground : Continuity should not exist.

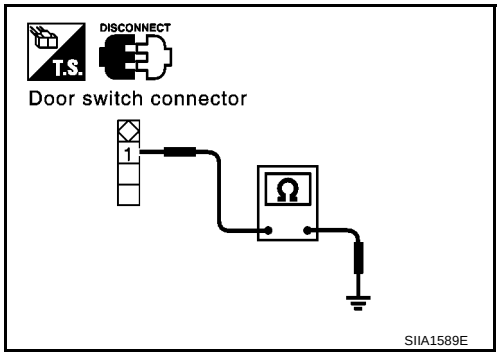
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between driver door switch terminal 1 and ground part of door switch.

Terminal	Driver door switch condition	Continuity
1 - Ground part of door switch	Pushed	No
	Released	Yes



OK or NG

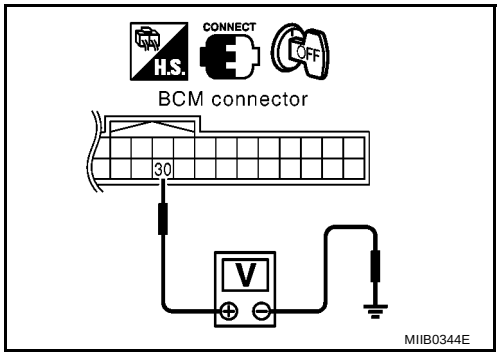
OK >> Check driver door switch ground condition.
NG >> Replace driver door switch.

DOOR SWITCH PASSENGER SIDE

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector M48 terminal 30 and ground.

Terminal		Passenger door condition	Voltage (V) Approx.
(+)	(–)		
30 (LG)	Ground	Closed	5
		Open	0



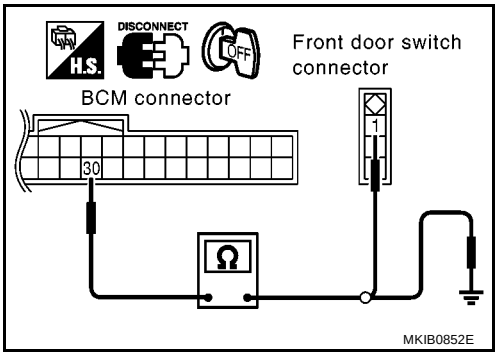
OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

2. CHECK DOOR SWITCH HARNESS

1. Check continuity between BCM connector M48 terminal 30 and passenger door switch connector B16(LHD Models) or B22 (RHD Models) terminal 1.

Terminal		Continuity
LHD Models	30 (LG) - 1 (L)	Yes
RHD Models	30 (LG) - 1 (LG)	



2. Check continuity between BCM connector M48 terminal 30 and ground.

30 (LG) – Ground : Continuity should not exist.

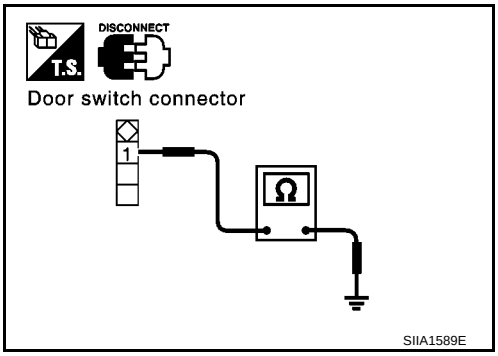
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between passenger door switch terminal 1 and ground part of door switch.

Terminal	Passenger door switch condition	Continuity
1 - Ground part of door switch	Pushed	No
	Released	Yes



OK or NG

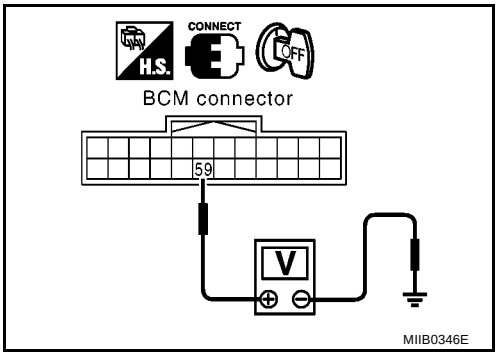
OK >> Check passenger door switch ground condition.
NG >> Replace passenger door switch.

DOOR SWITCH REAR LH

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector M49 terminal 59 and ground.

Terminal		Rear door LH condition	Voltage (V) Approx.
(+)	(–)		
59 (L)	Ground	Closed	5
		Open	0



OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

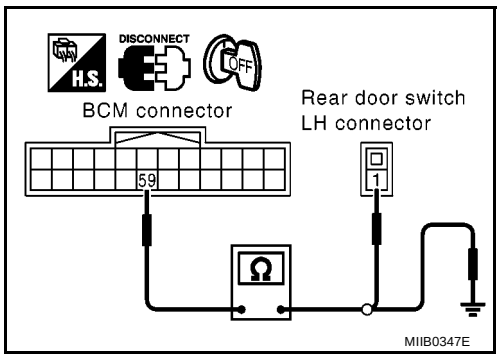
2. CHECK DOOR SWITCH HARNESS

1. Check continuity between BCM connector M49 terminal 59 and rear door switch LH connector B31 terminal 1.

   59 (L) – 1 (L) : Continuity should exist.

2. Check continuity between BCM connector M49 terminal 59 and ground

   59 (L) – Ground : Continuity should not exist.



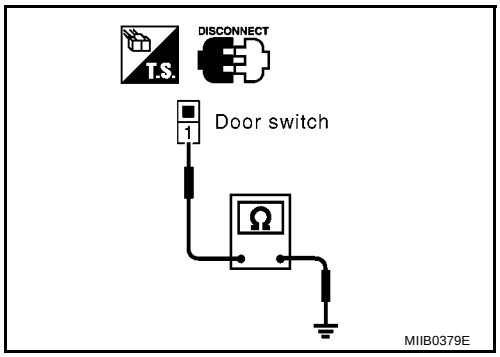
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between rear door switch LH terminal 1 and ground part of door switch.

Terminal	Rear door switch LH condition	Continuity
1 - Ground part of door switch	Pushed	No
	Released	Yes



OK or NG

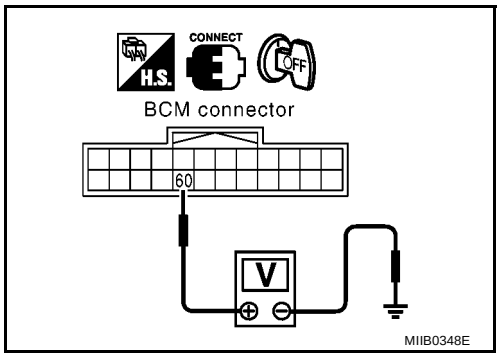
OK >> Check rear door switch LH ground condition.
NG >> Replace rear door switch LH.

DOOR SWITCH REAR RH

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector M49 terminal 60 and ground.

Terminal		Rear door RH condition	Voltage (V) Approx.
(+)	(–)		
60 (G)	Ground	Closed	5
		Open	0



OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2

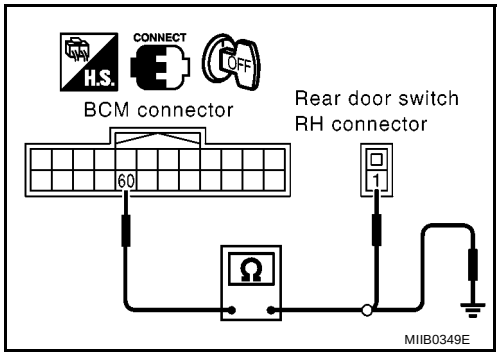
2. CHECK DOOR SWITCH HARNESS

1. Check continuity between BCM connector M49 terminal 60 and rear door switch LH connector B31 terminal 1.

   60 (G) – 1 (G) : Continuity should exist.

2. Check continuity between BCM connector M49 terminal 60 and ground

   60 (G) – Ground : Continuity should not exist.



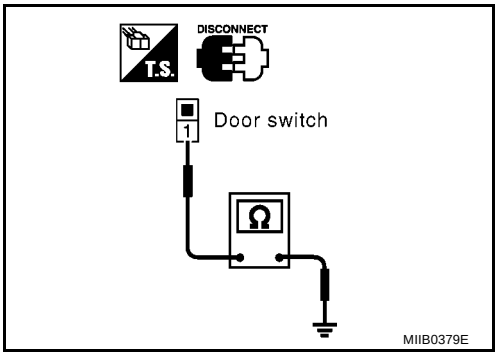
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK DOOR SWITCH

Check continuity between rear door switch RH terminal 1 and ground part of door switch.

Terminal	Rear door switch RH condition	Continuity
1 - Ground part of door switch	Pushed	No
	Released	Yes



OK or NG

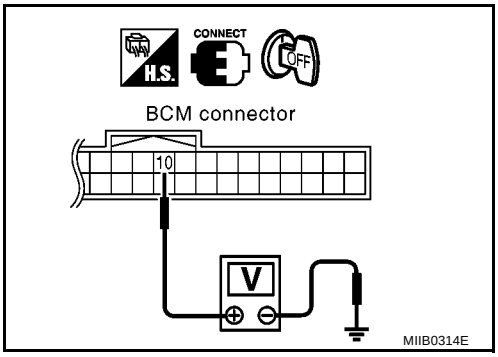
OK >> Check rear door switch RH ground condition.
NG >> Replace rear door switch RH.

BACK DOOR SWITCH

1. CHECK BACK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between BCM connector M48 terminal 10 and ground.

Terminal		Back door condition	Voltage (V) Approx.
(+)	(–)		
10 (OR)	Ground	Closed	5
		Open	0



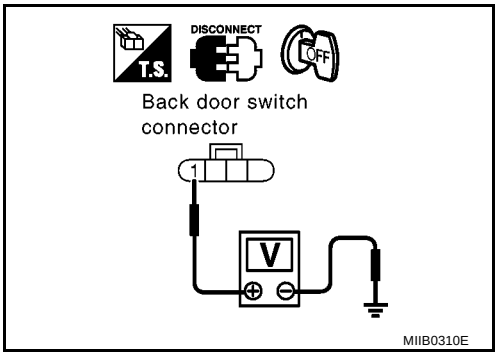
OK or NG

OK >> Back door switch circuit is OK.
NG >> GO TO 2

2. CHECK BACK DOOR SWITCH HARNESS

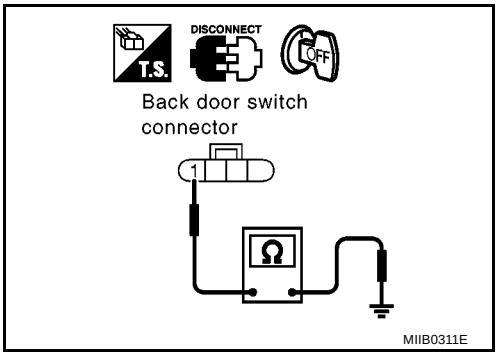
1. Disconnect back door switch connector.
2. Check voltage between back door switch connector B55 terminal 1 and ground. (Check harness for open.)

1 (OR) – Ground : Battery voltage



3. Disconnect BCM connector.
4. Check continuity between back door switch connector B55 terminal 1 and ground. (Check harness for short.)

1 (OR) – Ground : Continuity should not exist.



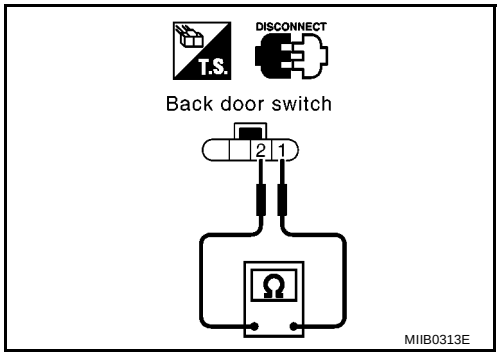
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness.

3. CHECK BACK DOOR SWITCH

Check continuity between back door switch terminal 1 and 2.

Terminal	Rear door condition	Continuity
1 - 2	Closed	No
	Opened	Yes



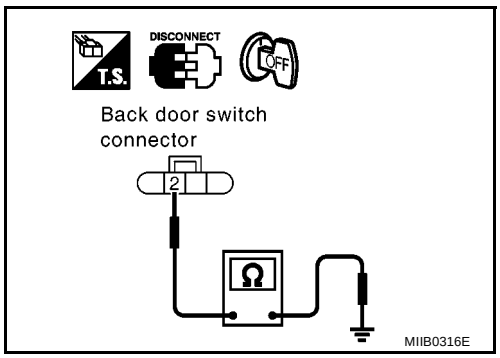
OK or NG

OK >> GO TO 4.
NG >> Replace back door release actuator (back door switch).

4. CHECK BACK DOOR SWITCH GROUND HARNESS

Check continuity between back door switch connector B55 terminal 2 and ground.

2 (B) – Ground : Continuity should not exist.



OK or NG

OK >> Check harness connection.
NG >> Replace back door switch.

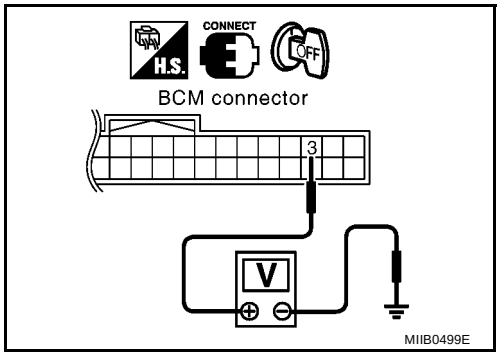
Key Switch Check

EIS0054Z

1. CHECK KEY SWITCH INPUT SIGNAL

Check voltage between BCM connector M48 terminal 3 and ground.

Terminals		Key switch condition	Voltage (V) Approx.
(+)	(–)		
3 (OR)	Ground	Key is inserted in IGN key cylinder (key switch is “ON”.)	Battery voltage
		Key is removed from IGN key cylinder (Key switch is “OFF”.)	0



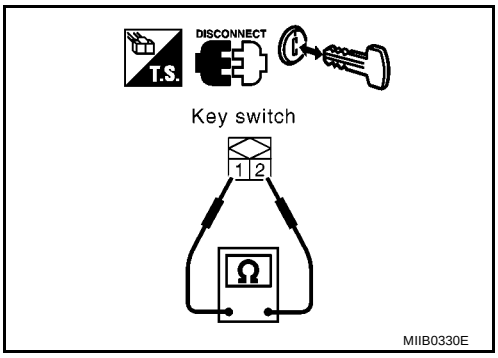
OK or NG

OK >> Key switch circuit is OK.
NG >> GO TO 2

2. CHECK KEY SWITCH (INSERT)

1. Disconnect key switch connector.
2. Check continuity between key switch terminals 1 and 2.

Terminals	Key switch condition	Continuity
1 – 2	Key is inserted in IGN key cylinder (Key switch is “ON”.)	Yes
	Key is removed from IGN key cylinder (Key switch is “OFF”.)	No



OK or NG

OK >> Check the following.
- 10A fuse [No. 6, located in fuse block (J/B)]
- Harness for open or short between key switch and fuse
- Harness for open or short between BCM and key switch

NG >> Replace key switch.

Hazard Reminder Check

EIS004YL

1. CHECK HAZARD WARNING LAMP

Check if hazard warning lamp flashes with hazard switch.

Does hazard warning lamp operate?

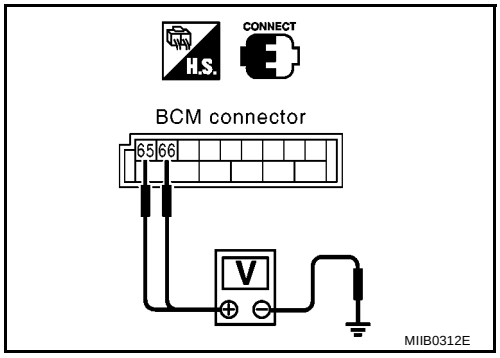
Yes >> GO TO 2

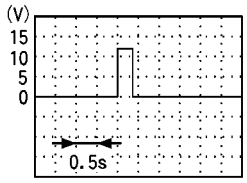
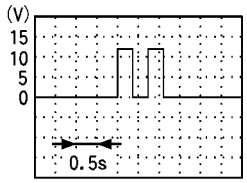
No >> Check hazard warning lamp circuit. Refer to LT-121, "TURN SIGNAL AND HAZARD WARNING LAMPS" .

2. CHECK HAZARD REMINDER OPERATION

Check the following at when push the remote controller switch.

Check voltage between smart entrance control unit harness connector M43 terminal 65, 66 and ground.



Remote controller	Voltage (V) Approx.
Pushing LOCK button	 PIIA2486J
Pushing UNLOCK button	 PIIA2487J

OK or NG

OK >> Check harness for open between BCM and hazard switch.

NG >> Check harness for short between BCM and hazard switch. If check result is “OK”, replace BCM. If check result is “NG”, repair or replace harness.

Remote Controller Battery Replacement

EIS004YN

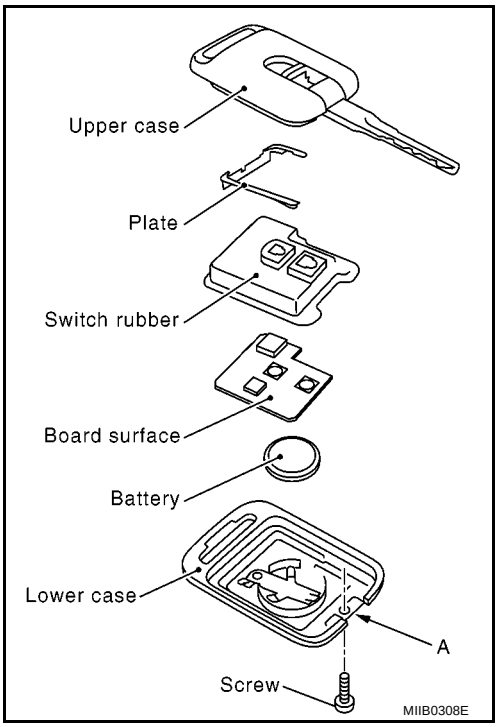
1. Remove installation screw on the rear of remote controller.
2. Place the key with the lower case facing up. Set a screwdriver wrapped with tape into section A of the lower case and separate the lower case from the upper case.
3. When replacing the circuit board assembly, remove circuit board assembly from the upper case.
   (Circuit board assembly: Switch rubber + Board surface)

   CAUTION:
   Be careful not to touch the printed circuits directly.
4. When replacing the battery
   Remove battery from the lower case and replace it.

   Battery replacement : Coin-type lithium battery (CR1620)

   CAUTION:
   When replacing battery, be sure to keep dirt, grease and other foreign materials off the electrode contact area.
5. After replacement, fit the lower and upper cases together, part and tighten with the screw.

   CAUTION:
   After replacing the battery, be sure to check that door locking operates normally using the remote controller.

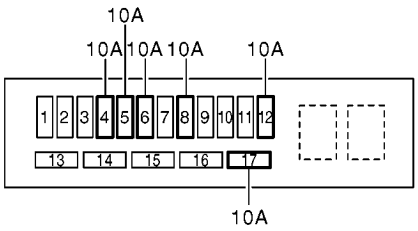


INTELLIGENT KEY SYSTEM

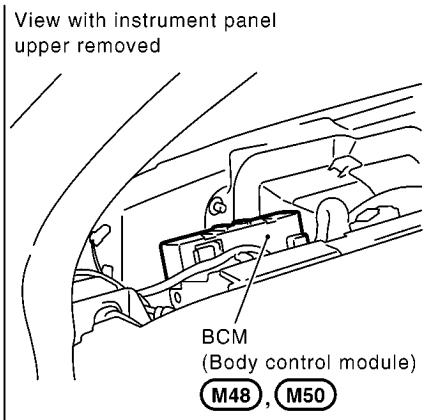
PFP:285e2

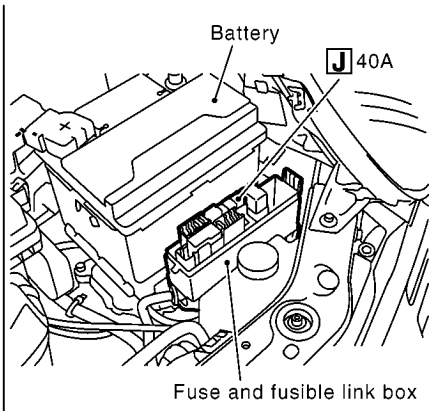
Component Parts and Harness Connector Location

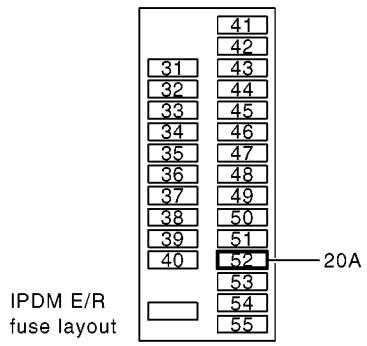
EIS00563

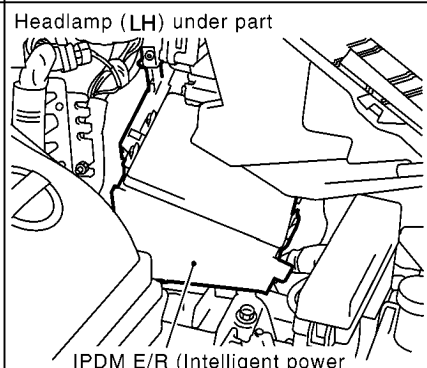


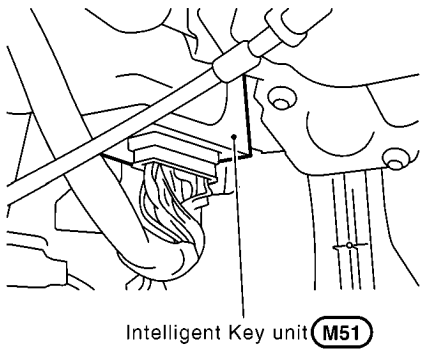
Fuse block (J/B) fuse layout

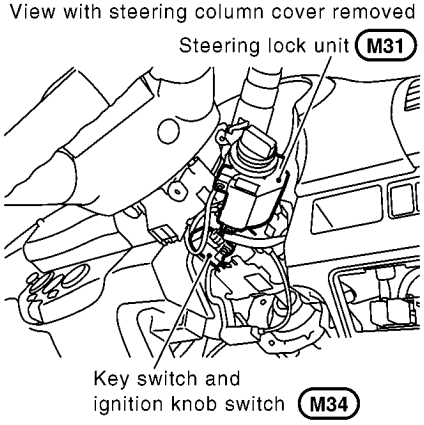


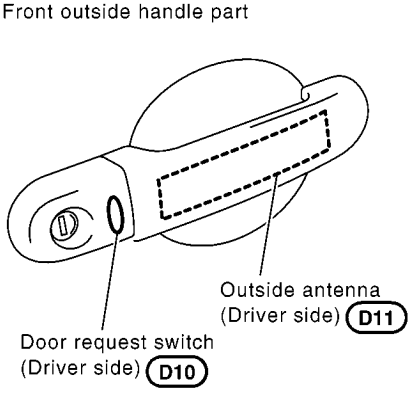


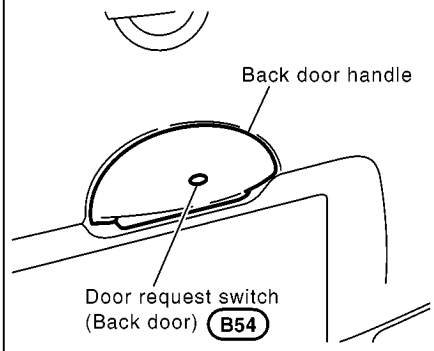


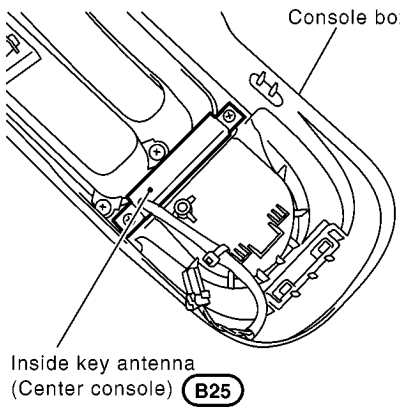


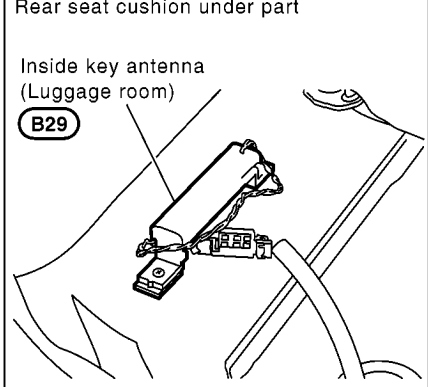


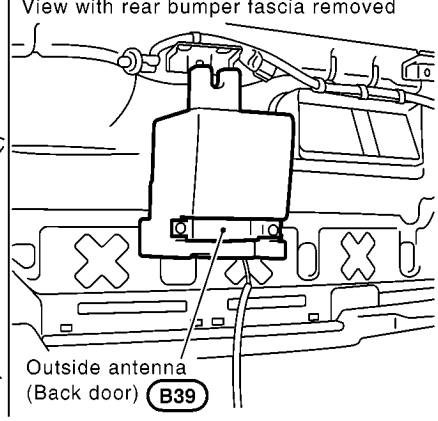












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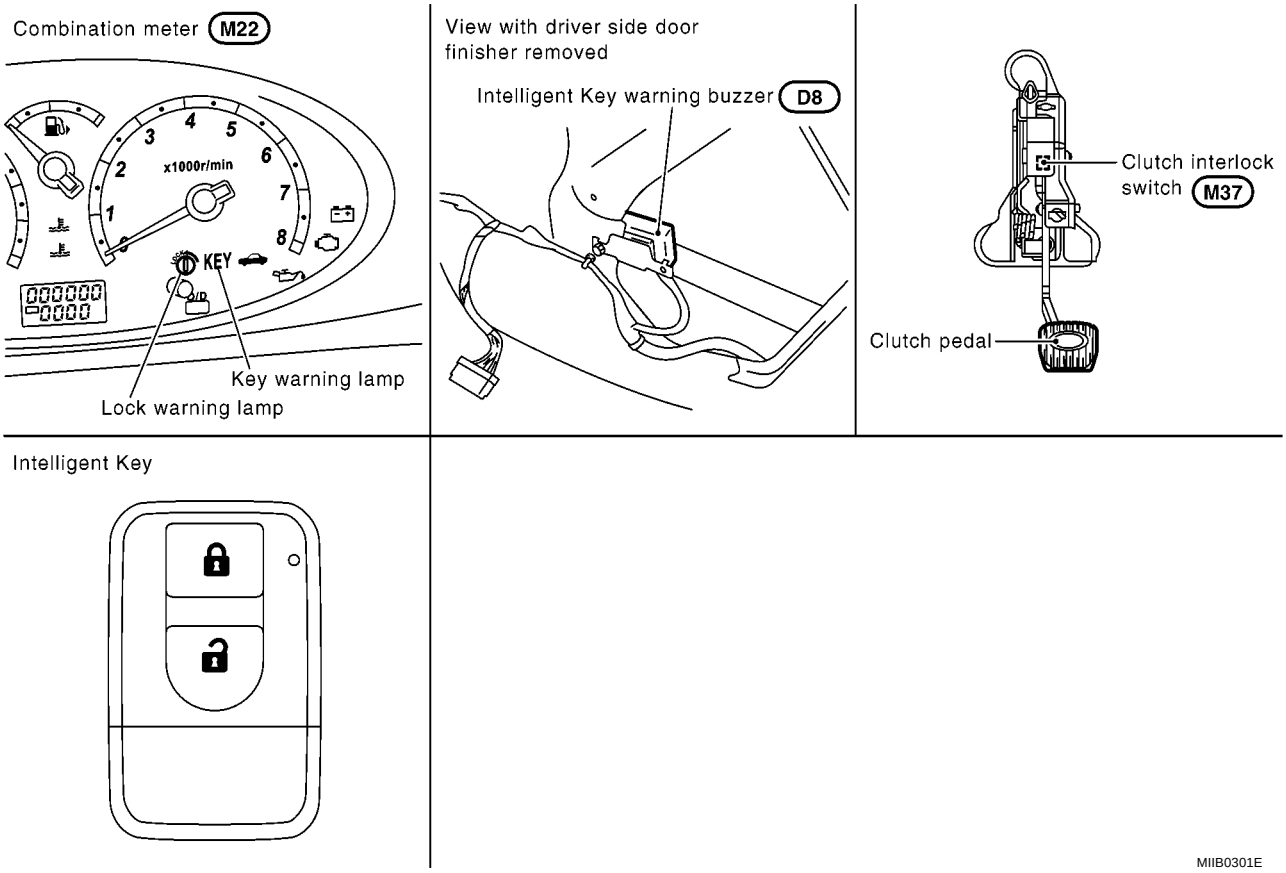


MIIB0301E

System Description

EIS004MH

- The Intelligent Key system is a system that makes it possible to lock and unlock the door locks (door lock function) and start the engine (engine start function) by carrying around the Intelligent Key, which operates based on the results of electrical key-ID verification using two-way communications between the Intelligent Key and the vehicle
- Operation of the remote control buttons on the Intelligent Key also provides the same functions as the remote control entry system. (Remote control entry functions)
- As an ignition key warning function, when a door lock is locked or unlocked with entry switch or remote controller button operation, the hazard lamps flash and the Intelligent Key warning buzzer sounds.
- Even if the vehicle or Intelligent Key battery runs down, the door locks can be locked and unlocked and the engine started with the mechanical key built into the Intelligent Key.
- If an Intelligent Key is lost, a new Intelligent Key can be registered. A maximum of 4 Intelligent Keys can be registered.
- It has been made possible to diagnose the system, change the function setting and register an Intelligent Key with the CONSULT-II.

DOOR LOCK FUNCTION

Operation Description

- When the driver door, passenger door, or back door request switch is pressed, Intelligent Key unit sends a request signal from the transmission antenna corresponding to the pressed door request switch, key-ID verification is performed using two-way communication with Intelligent Key, and if ID is successfully verified, a door lock/unlock request signal is sent to BCM (Body Control Module) using CAN communication to lock/unlock the door lock.
- When door is locking, door is unlocked, when door is unlocking, door is locked.
- When door lock is locked/unlocked by door request switch operation, hazard lamps flash and Intelligent Key warning buzzer sounds.
- With the locking operation of door request switch, door lock actuators of all door are locked.

Driver side door request switch operation

- When door request switch (driver side) is pushed (unlock), driver side door lock actuator is unlocked.

- When door request switch (driver side) is pushed (unlock) for the second time within 5 seconds after the first operation, door lock actuators on passenger's and other's doors are unlocked.
- Unlock mode can be changed using “WORK SUPPORT” mode in “DOOR LOCK-UNLOCK SET”. Refer to BL-185, "CONSULT-II Function (INTELLIGENT KEY)" .

Passenger side door request switch operation

- When door request switch (passenger side) is pushed (unlock), passenger side door lock actuator is unlocked.
- When door request switch (passenger side) is pushed (unlock) for the second time with in 5 seconds after the first operation, door lock actuators on driver's and other's doors are unlocked.
- Unlock mode can be changed using “WORK SUPPORT” mode in “DOOR LOCK-UNLOCK SET”. Refer to BL-185, "CONSULT-II Function (INTELLIGENT KEY)" .

Operation Condition

Request switch operation	Operating conditions (When all the conditions below are met)
Door request switch (Driver side) Door request switch (passenger side) Door request switch (back door)	● Closing all doors (door switch: OFF) ● Key switch OFF (key removed) ● Ignition knob switch: OFF (ignition knob switch not pressed) ● The Intelligent Key is in the antenna detection area for the door for which the door request switch was operated.

Operation Range

The antenna detection area for each door is about 80 cm (31.50 in) from the handle of each door (driver door, passenger door and back door). However, this operating range depends on the ambient conditions.

Auto Door Lock Function

After the door request switch in the driver or passenger or back door is operated and the vehicle door locks are unlocked, all the doors are automatically locked unless the mechanical key is inserted into the ignition knob, the ignition knob is pressed, any one of the doors is opened, or an Intelligent Key remote control button is operated within 30 seconds.

Key Reminder Function

Number of times the hazard lamps are flashed and the Intelligent Key warning buzzer buzzed when the door lock is locked or unlocked by door request switch operation.

Vehicle operation	Hazard lamp	Intelligent Key warning buzzer
Door unlock operation	Twice	Twice
Door lock operation	Once	Once

Intelligent Key Lock-in Prevention Function

When Intelligent Key is in vehicle, a door is open, and doors are locked using door lock and unlock switch, driver door lock knob, or door request switch, Intelligent Key unit sends door unlock request signal to BCM via CAN communication to unlock all doors to prevent Intelligent Key from becoming locked in vehicle.

CAUTION:

The above function operates when the Intelligent Key is inside the vehicle. However, there may be times when Intelligent Key cannot be detected and this function will not operate when Intelligent Key is on the instrument panel, rear parcel shelf, or in the glove box. Also, this system some times does not operate if the Intelligent Key is in the door pocket for the open door.

REMOTE CONTROL ENTRY FUNCTIONS

Door Lock Function

- Operating a remote controller button on the Intelligent Key sends the Intelligent Key-ID to the Intelligent Key unit. Intelligent Key unit conducts a verification of the received key-ID, and if the verification is accepted, a door lock or door unlock request signal is sent to BCM via CAN communication to lock/unlock the door lock.
- When door lock/unlock is performed using Intelligent Key remote controller button operation, operation confirmation is conducted by making hazard lamps flash and Intelligent Key warning buzzer sound.

OPERATION CONDITION

Remote control operation	Operation condition
Door lock operation	● All doors closed ● Key switch OFF (key removed) ● Ignition knob switch: OFF (ignition knob not pressed)
Door unlock operation	● Key switch OFF (key removed) ● Ignition knob switch: OFF (ignition knob not pressed)

Map Lamp And Keyhole Illumination Function

When the following conditions come:

- condition of map lamp switch is DOOR position;
- door switch OFF (when all the doors are closed);

Remote keyless entry system turns on interior lamp (for 30 seconds) with input of UNLOCK signal from Intelligent Key.
For detailed description, refer to LT-200, "INTERIOR ROOM LAMP" .

Key Reminder Function

As an operation verification function, when door locks are locked or unlocked using Intelligent Key remote controller button operation, hazard lamps flash and Intelligent Key warning buzzer sounds.

Vehicle operation	Hazard lamp	Intelligent Key warning buzzer
Door unlocking operation	Twice	Twice
Door locking operation	Once	Once

Operation Range

The range for reliable remote control operation is about 80 cm (31.50 in) from each door handle (driver, passenger, and back door). However, this operating range depends on the ambient conditions.

ENGINE STARTUP FUNCTION

Operation Description

- When ignition knob is pressed, Intelligent Key unit sends request signal from inside key antenna, key-ID verification is conducted with Intelligent Key using two-way communication, and if verification is successful, an ignition rotation prohibition latch release signal is sent to steering lock unit. Steering lock unit releases ignition knob rotation prohibition latch. (Ignition knob can now be turned.)
- When it becomes possible to rotate the ignition knob, “KEY” warning lamp in combination meter lights up green to notify driver that ignition knob can be turned.

  NOTE:
  When it becomes impossible to rotate the ignition knob, “KEY” warning lamp in combination meter lights up red.
- When key-ID verification is successful and ignition knob switch is in the ON state, Intelligent Key unit uses CAN communication to send engine start permission signal to BCM.
- When BCM receives engine start permission signal, it uses CAN communication to sent starter request signal to IPDM E/R so that the engine will start when ignition knob is rotated to START position.

Operation Range

Engine can be started when Intelligent Key is in vehicle. However, sometimes engine might not start when Intelligent Key is on instrument panel, rear parcel shelf, or in glove box.

NOTE:
luggage room is not within the operation range, but sometimes it is possible to start the engine from there.

Active Check Function

Confirm whether or not ignition knob can be rotated by checking the color of warning lamp in combination meter.

Condition	Operation
Ignition knob rotation possible	“KEY” warning lamp in combination meter is lit up green.
Ignition knob rotation not possible	“KEY” warning lamp in combination meter is lit up red.

WARNING AND ALARM FUNCTION

Operation Description

The warnings and alarms are as follows and are given to the user as warning information and warnings using combinations of Intelligent Key warning buzzer (in driver door), inside vehicle buzzer (in combination meter), and warning lamps “KEY” and “LOCK.”

- Ignition switch return forgotten warning
  With the ignition in OFF or ACC position, if the driver door is opened, this warning is issued.
- Key left in ignition warning (when mechanical key used)
  With the mechanical key in the ignition knob and the ignition switch is in the OFF, ACC, or LOCK position, if the driver door is opened, this warning is issued.
- Ignition switch OFF position warning (for inside car: when door closed)
  This warning is issued when the user forgets to return the ignition knob to the LOCK position.
- Ignition switch OFF position warning (for outside car: when door opened/closed)
  This warning is issued when the user leaves the car without returning the ignition knob to the LOCK position.
- Warning for removal of Intelligent Key to outside the car (when door open/closed)
  This warning is issued if the Intelligent Key is taken outside the car while the engine is running.
- Warning for removal of Intelligent Key to outside the car (from window)
  This warning is issued if the Intelligent Key is taken outside the car through a window while the engine is running.
- Door lock non-operation warning
  This warning is issued if the door lock (lock) operation by a door request switch is not effected.
- Intelligent Key low battery warning
  This warning is issued when it is detected that the battery in the Intelligent Key has been used up.

Operation Condition

Warning and alarm names	Operating conditions (when all the conditions below are met)
Ignition knob return forgotten warning	● The ignition switch is in the ACC, OFF, or LOCK position (knob pressed) ● The driver door is opened.
Ignition key warning (When mechanical key used)	● The mechanical key is inserted in the ignition knob (key switch: ON) ● The ignition switch is in the ACC, OFF, or LOCK position. ● Driver door closed → open
Ignition knob OFF position warning (for inside car: when door closed)	● The ignition switch is in the OFF or LOCK position (knob pressed) ● In the above state, when the ACC switch is changed from ON to OFF and 1 second passes. (However, this warning is not issued if the mechanical key is inserted in the ignition knob.)
Ignition knob OFF position warning (for outside car: when door opened/closed)	● The ignition switch is in the OFF or LOCK position (knob pressed) ● In the above state, when the ACC switch is changed from ON to OFF and 1 second passes. (However, this warning is not issued if the mechanical key is inserted in the ignition knob.) ● Driver door open → closed
Warning for take out of Intelligent Key to outside the car (when door open/closed)	When Any of the Following Conditions Are Met ● When the ignition knob is pressed in so that it can be rotated (or has been rotated), if any of the doors has been opened, when all the doors are closed, the Intelligent Key unit compares the key-ID with that of the Intelligent Key using the inside key antenna (center console), if the results of the comparison are NG (the Intelligent Key is not found) ● When the ignition knob is pressed in so that it can be rotated (or has been rotated), if any of the doors is open, the Intelligent Key unit compares the key-ID with that of the Intelligent Key every 5 seconds using the inside key antenna (center console), if the results of the comparison are NG (the Intelligent Key is not found) **NOTE:** However, this warning is not issued if the mechanical key is inserted in the ignition knob.

Warning and alarm names	Operating conditions (when all the conditions below are met)
Warning for take out of Intelligent Key to outside the car (from window)	When the ignition knob is pressed in so that it can be rotated (or has been rotated), if the vehicle speed is no greater than 5 km per hour, the Intelligent Key unit compares the key-ID with that of the Intelligent Key every 30 seconds using the inside key antenna (center console), if the results of the comparison are NG (the Intelligent Key is not found) Note: The factory setting for this function is OFF.
Door lock non-operation warning	When any of the following conditions are met Intelligent Key Lock-in Prevention Warning ● When the Intelligent Key is inside the car and the ignition knob is not pressed, when an attempt is made to lock a door lock with a door request switch **NOTE:** This warning is issued even if the Intelligent Key is not in the door antenna detection area corresponding to the door request switch was operated. Knob Return Forgotten Warning ● When the ignition knob is pressed, when an attempt is made to lock a door lock with a door request switch **NOTE:** This warning is only issued if the Intelligent Key is in the door antenna detection area corresponding to the door request switch was operated. Door Ajar Alarm ● When any of the doors is open, when an attempt is made to lock a door lock with a door request switch **NOTE:** This warning is only issued if the Intelligent Key is in the door antenna detection area corresponding to the door request switch was operated.
Intelligent Key low battery prewarning	This warning is issued when it is detected that the battery in the Intelligent Key has been used up.

Warning Procedure

Warning and alarm names	Buzzer		Warning lamp	
	Inside car	Outside car	“KEY”	“LOCK”
Ignition switch return forgotten warning	Buzzer: Continuous	—	—	—
Ignition key warning (When mechanical key used)	Buzzer: Continuous	—	—	—
Ignition switch OFF position warning (for inside car: when door closed)	Buzzer (twice)	—	—	Illuminate
Ignition switch OFF position warning (for outside car: when door opened/closed)	—	Buzzer (3 seconds)	—	Illuminate
Warning for removal of Intelligent Key to outside the car (when door open/closed)	—	Buzzer (3 seconds)	Red illuminate	—
Warning for removal of Intelligent Key to outside the car (from window)	Buzzer (3 seconds)	—	Red illuminate	—
Door lock non-operation warning	—	Buzzer (2 seconds)	—	—
Intelligent Key low battery prewarning	—	—	Green illuminate (30 seconds after ignition switch comes ON)	—

CHANGE SETTINGS FUNCTION

The settings for each function can be changed with the CONSULT-II or Intelligent Key and door request switch operation.

Changing Settings With the Intelligent Key and Door Request Switches

Intelligent Key remote controller button and door request switch operations change the engine startup function settings (startup enabled/disabled) for each Intelligent Key independently.

Settings Change Procedure

1. With the ignition switch is in the LOCK position (ignition knob not pressed), hold down both the LOCK and UNLOCK remote control buttons on the Intelligent Key at the same time for at least 10 seconds (The yard-stick is that the Intelligent Key LED flashes 20 times.)
2. Within 5 seconds of releasing the Intelligent Key remote controller buttons, press the driver door request switch.
3. The KEY warning lamp in combination meter lights up for 3 seconds (engine starting enabled → starting disabled: lights up red, engine starting disabled → flashes green). This completes the settings change.

Changing Settings Using CONSULT-II

The settings for the Intelligent Key system functions can be changed using CONSULT-II (WORK SUPPORT).

NOTE:
Once a function setting is changed, it will remain effective even if the battery is disconnected.

INTELLIGENT KEY REGISTRATION

Intelligent Key-ID registration is executed using the CONSULT-II. Up to 4 can be registered.

CAUTION:

- **After a new Intelligent Key-ID is registered, be sure to check the function.**
- **When registering an additional Intelligent Key-ID, take any Intelligent Keys already registered and Intelligent Keys for any other vehicles out of the vehicle before starting.**

CONSULT-II can be used to check and delete Intelligent Key-IDs.
For future information, see the CONSULT-II Operation Manual NATS.

STEERING LOCK UNIT REGISTRATION

Steering Lock Unit ID Registration

CAUTION:

- **The method for registering a steering lock unit ID depends on the status of the steering lock unit and Intelligent Key unit (new or old unit).**
- **After registration is completed, press ignition knob with a portable unit in the vehicle so that it can be rotated, and confirm that it cannot be rotated even when ignition switch is pressed without a portable unit in the vehicle.**

For future information, see the CONSULT-II Operation Manual NATS.

CAN Communication

EIS00AOS

SYSTEM DESCRIPTION

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

CAN Communication Unit

EIS00AOT

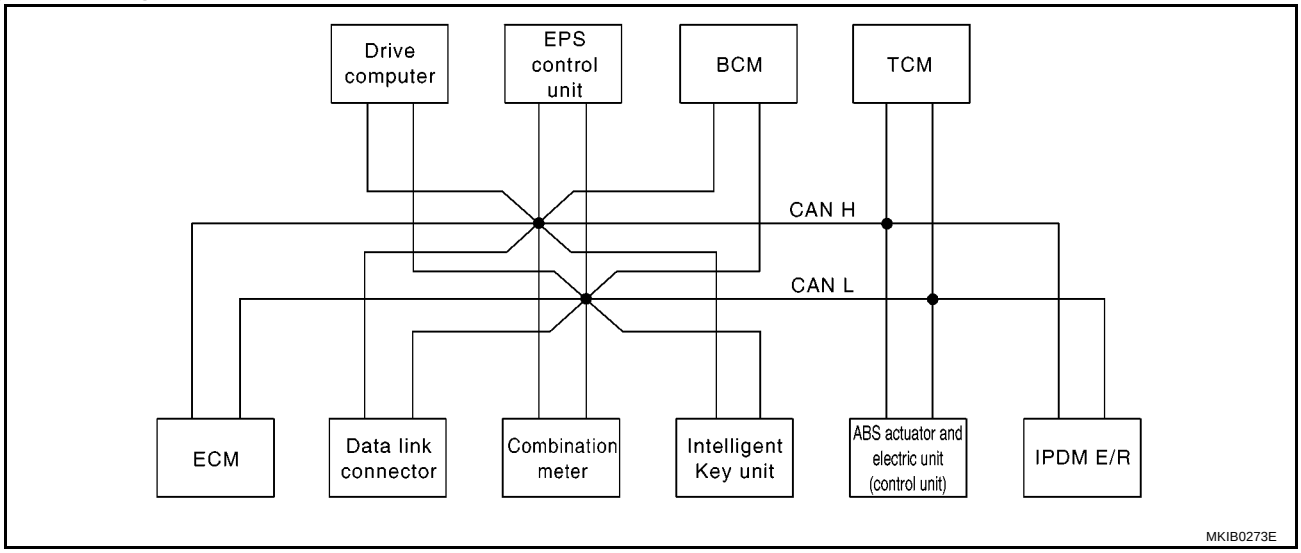
Go to CAN system, when selecting your car model from the following table.

Body type	3door/5door									
Axle	2WD									
Engine	CR10DE/CR12DE/CR14DE				CR12DE/CR14DE				K9K	
Handle	LHD/RHD									
Brake control	ABS system				ESP system				ABS	
Transmission	A/T		M/T		A/T		M/T		M/T	
Intelligent Key system	Applicable									
CAN communication unit										
ECM	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×	×	×	×	×	×	×	×	×
Drive computer	×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×
TCM	×	×			×	×				
IPDM E/R	×	×	×	×	×	×	×	×	×	×
CAN communication type	BL-160, "TYPE 1"		BL-162, "TYPE 3"		BL-164, "TYPE 5"		BL-167, "TYPE 7"		BL-169, "TYPE 9"	

×: Applicable

TYPE 1

System diagram



Input/output signal chart

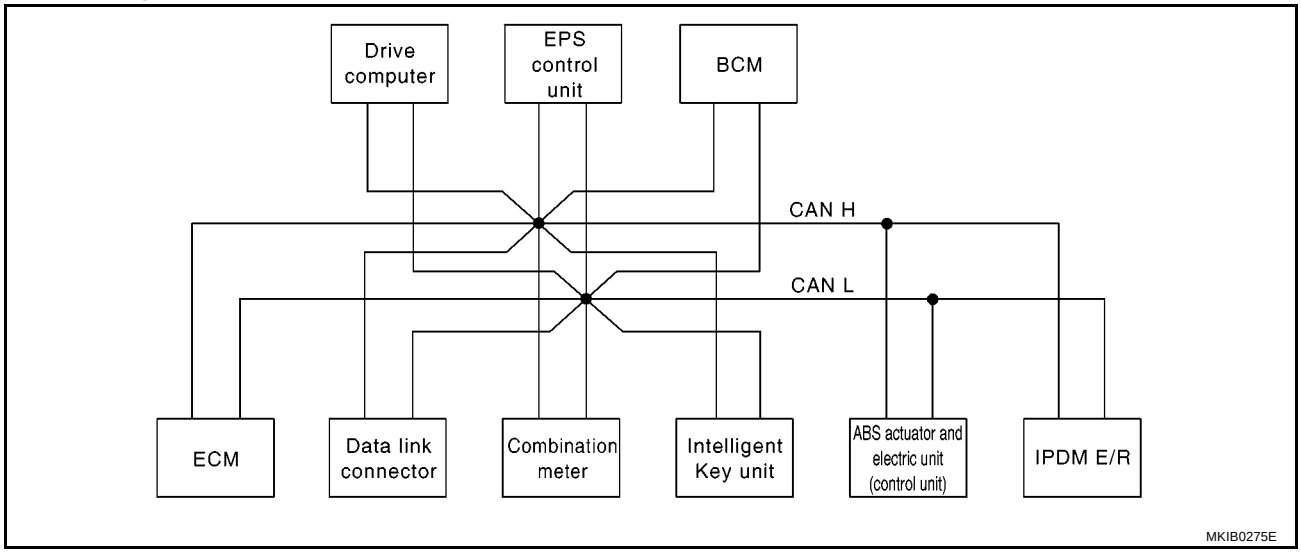
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

TYPE 3

System diagram



Input/output signal chart

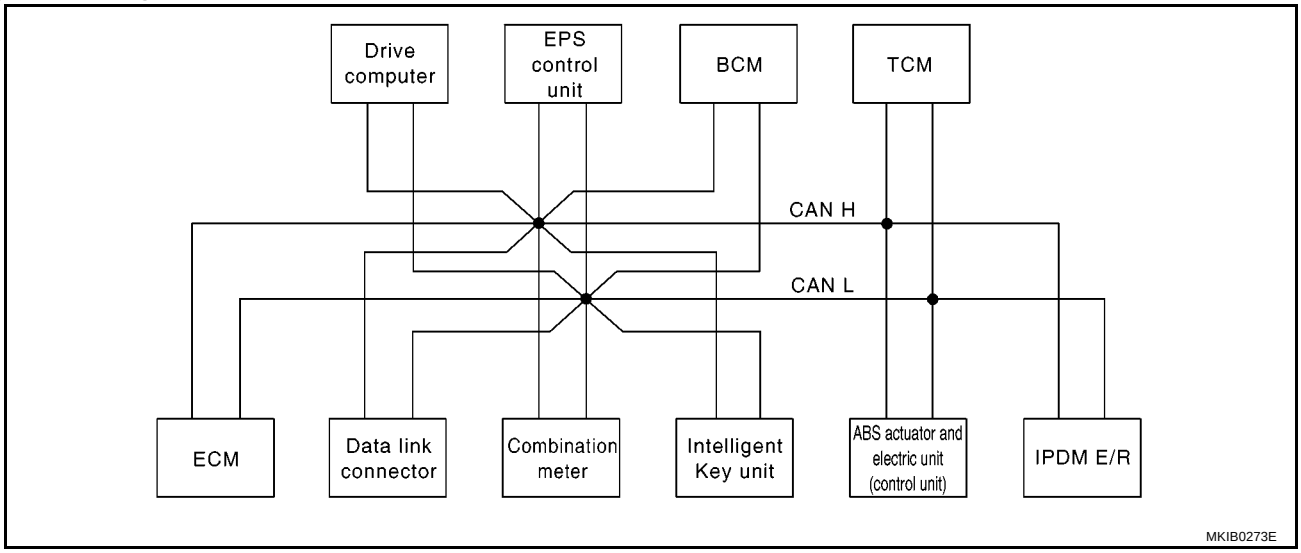
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

TYPE 5

System diagram



Input/output signal chart

T: Transmit R: Receive

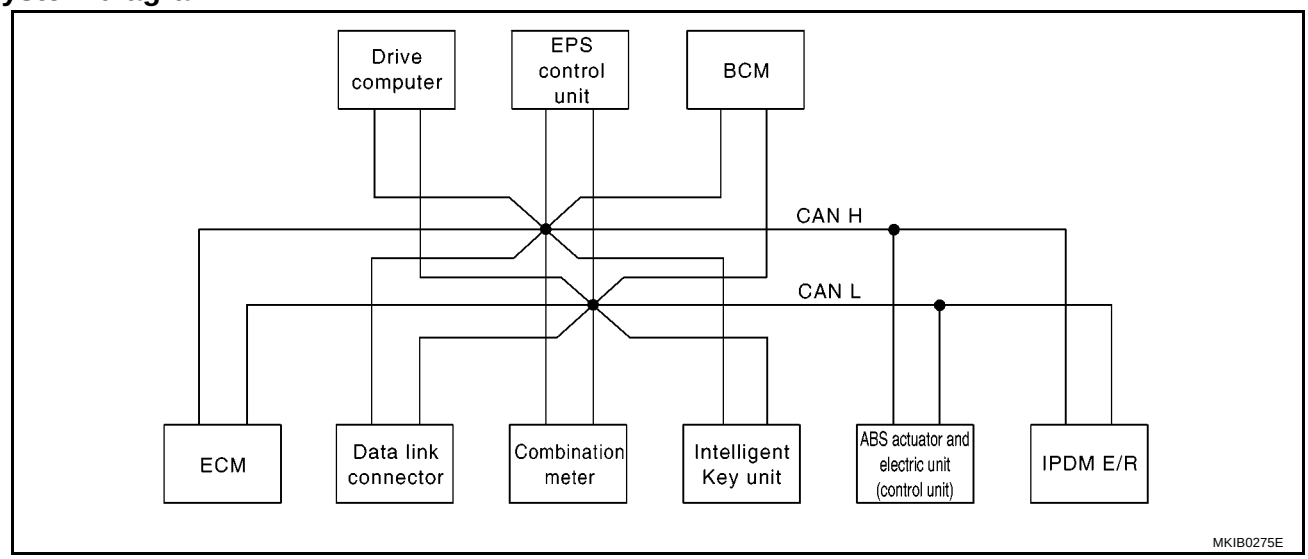
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

TYPE 7

System diagram



Input/output signal chart

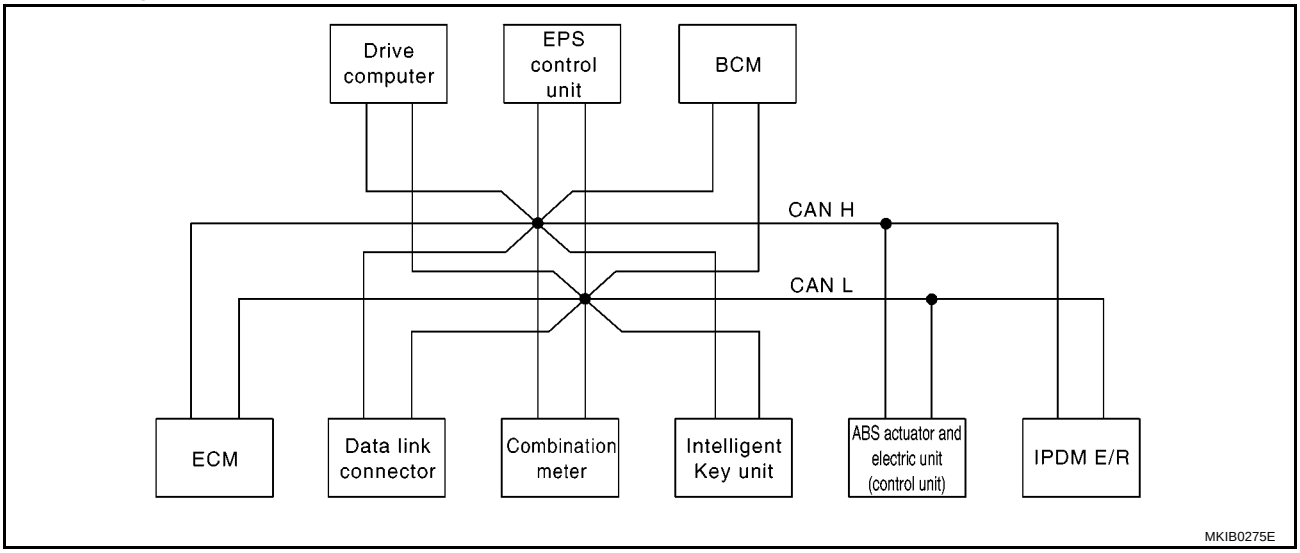
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

TYPE 9

System diagram



Input/output signal chart

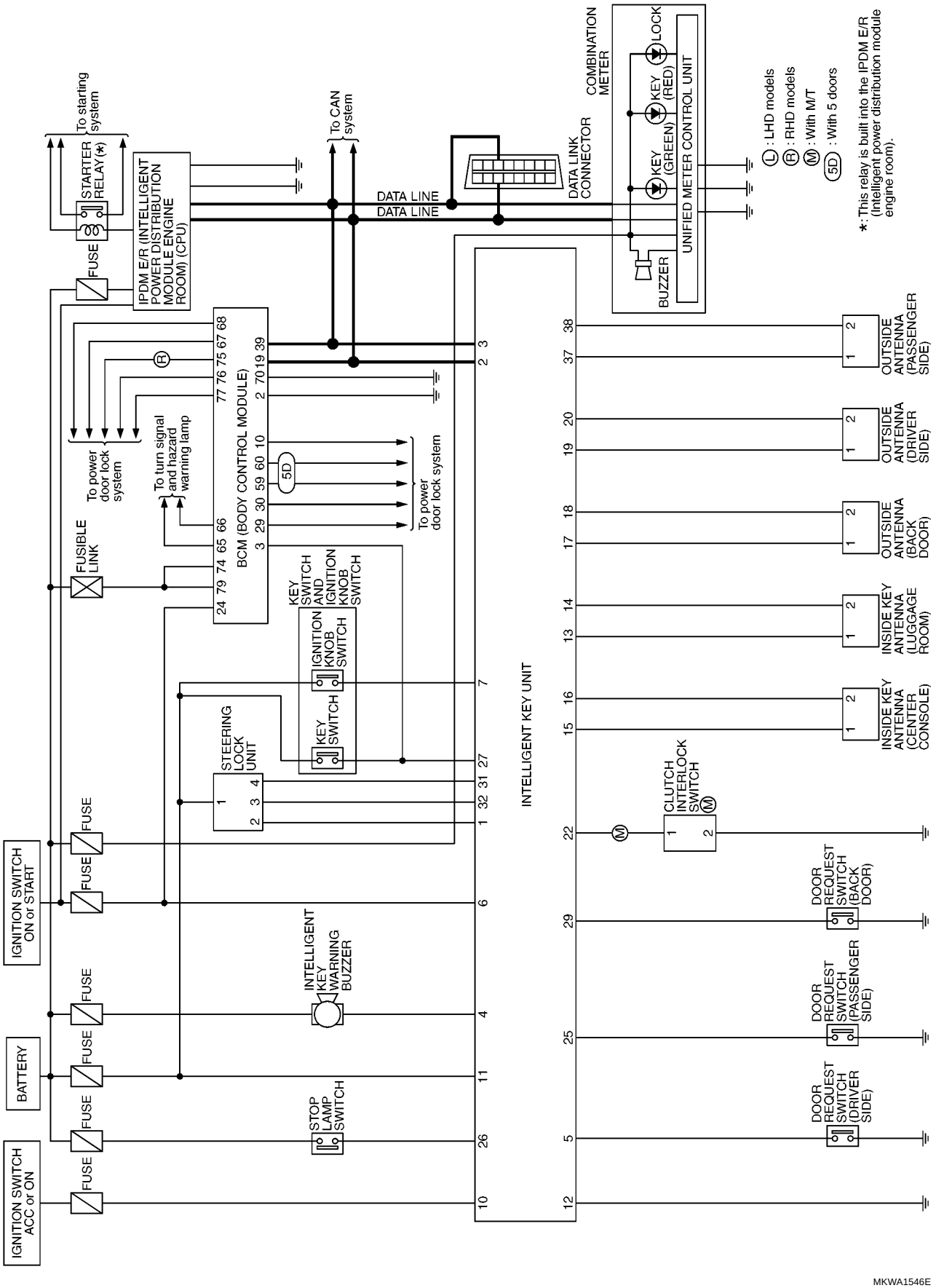
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic —I/KEY—

EIS004MK

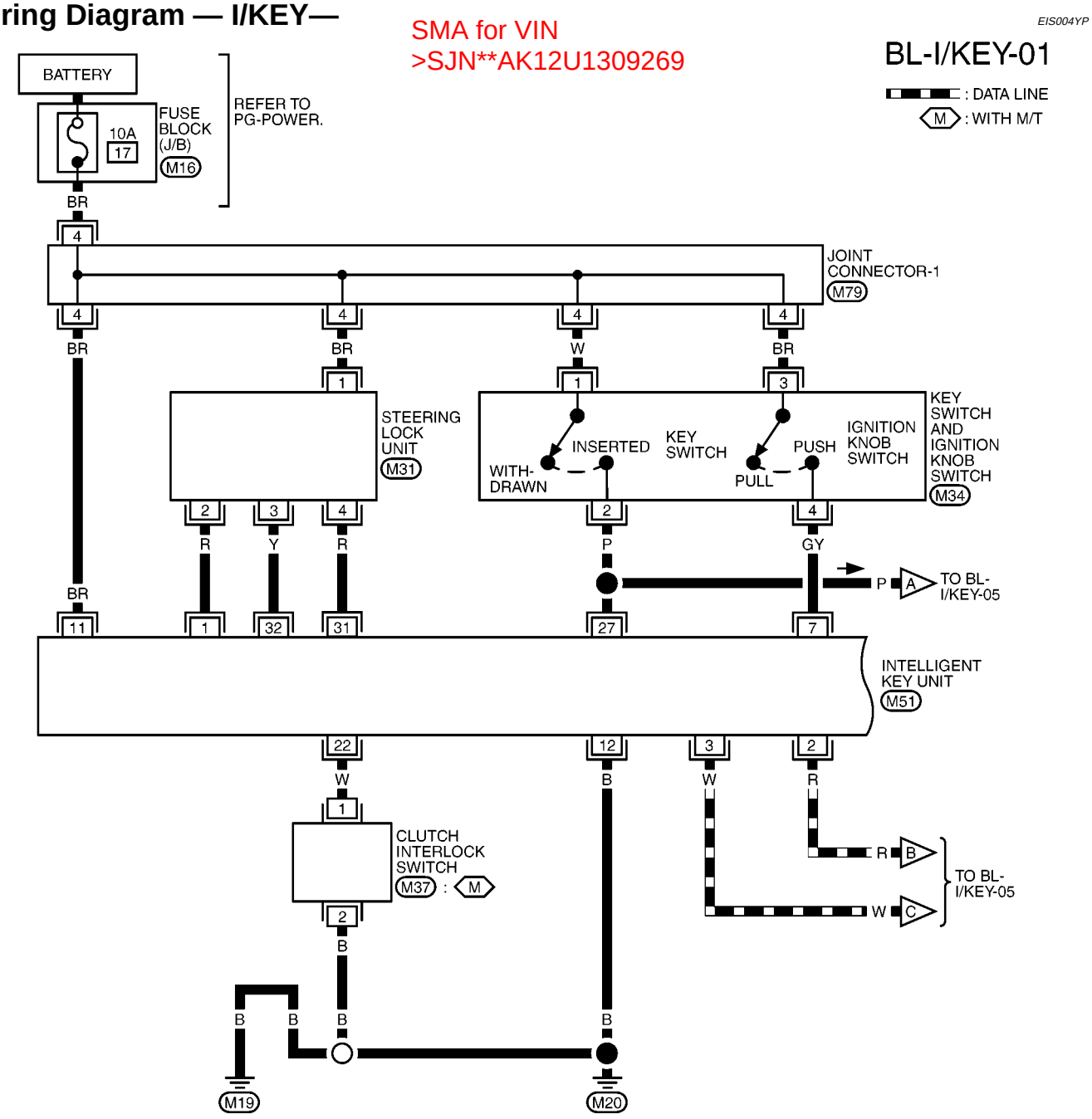


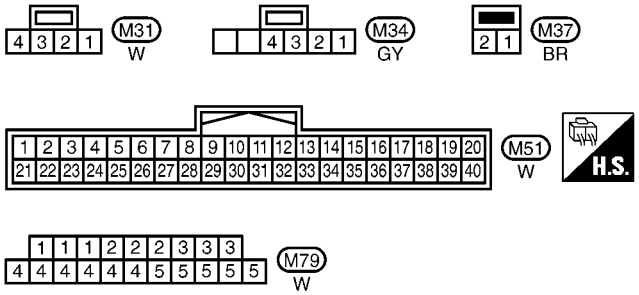
MKWA1546E

Wiring Diagram — I/KEY—

SMA for VIN
>SJN**AK12U1309269

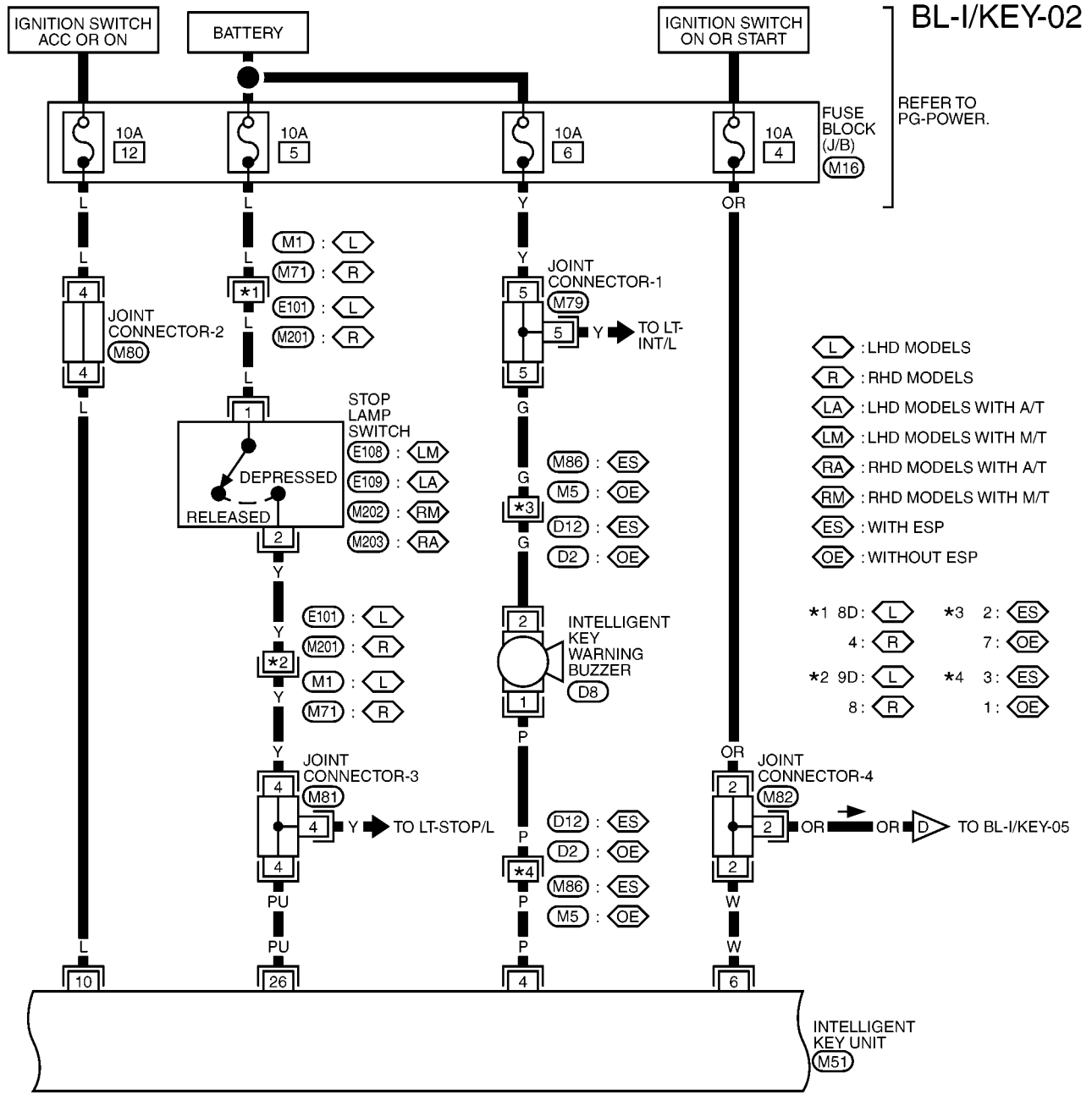
EIS004YP

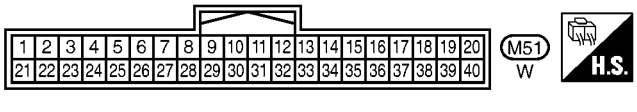


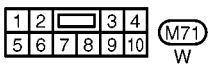


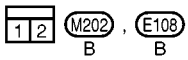
REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)

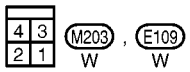
MKWA1406E

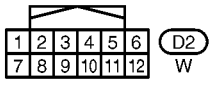


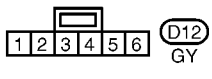








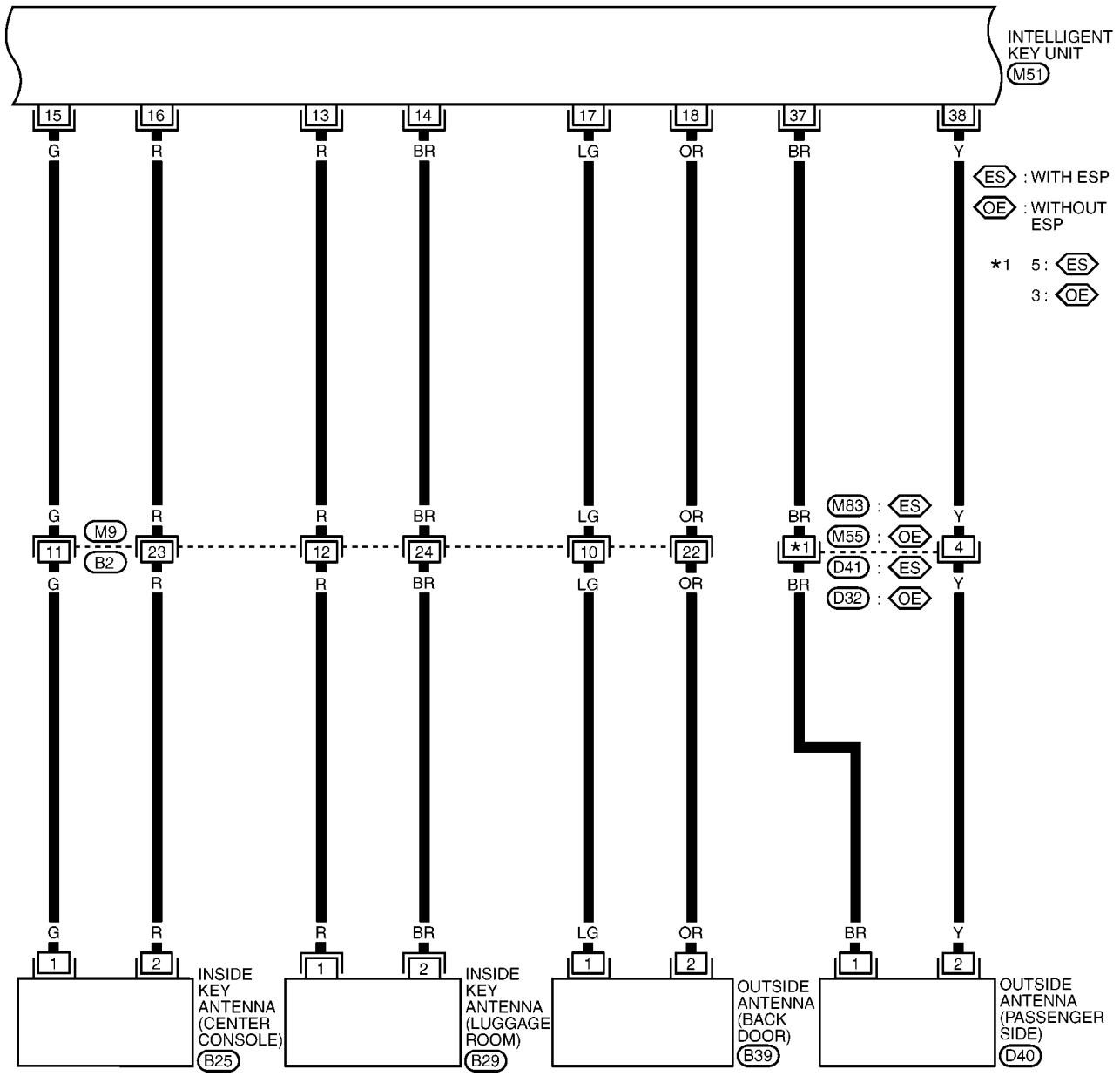




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M79, M80, M81, M82 -JOINT CONNECTOR (J/C)

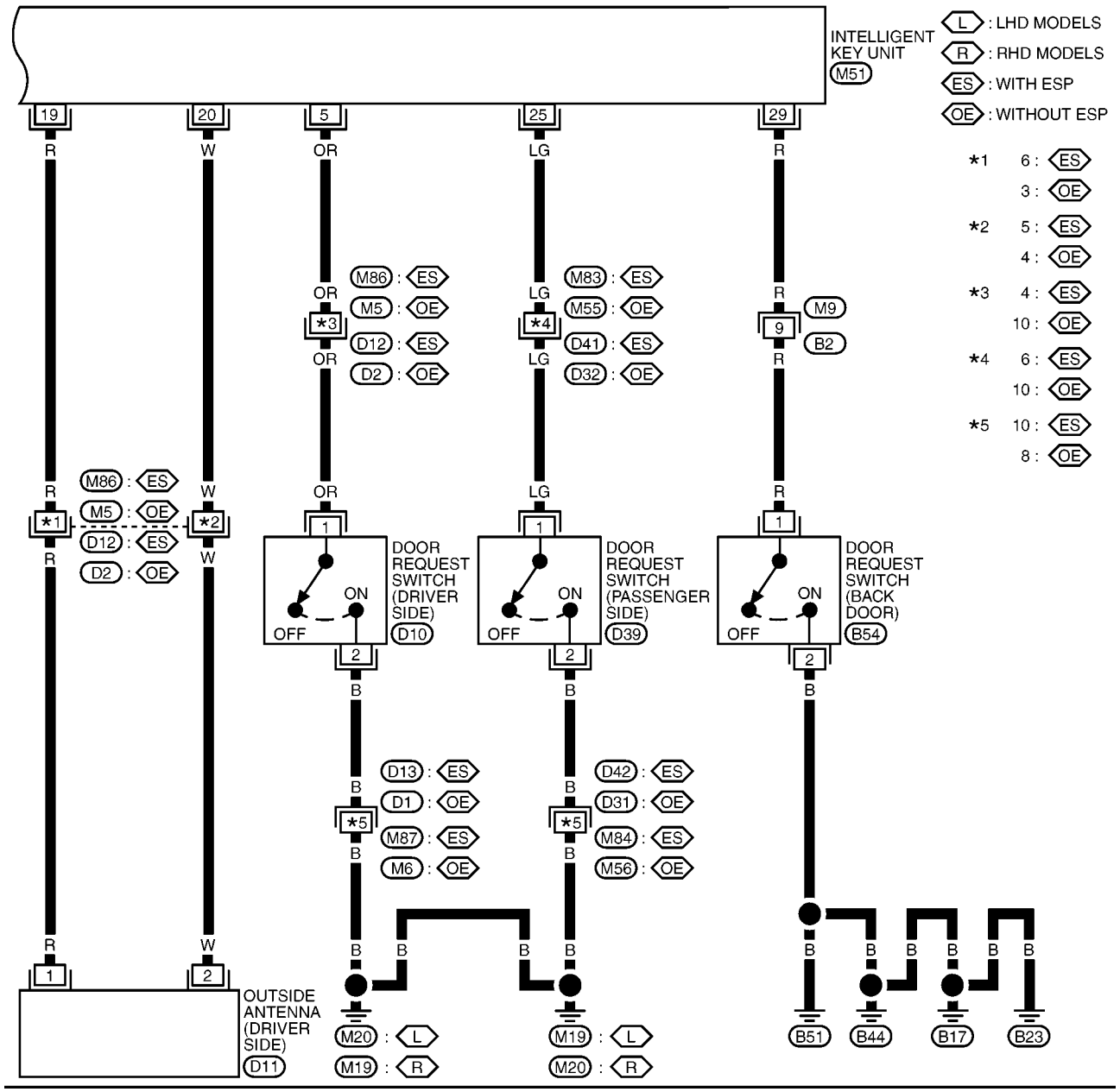
MKWA1793E

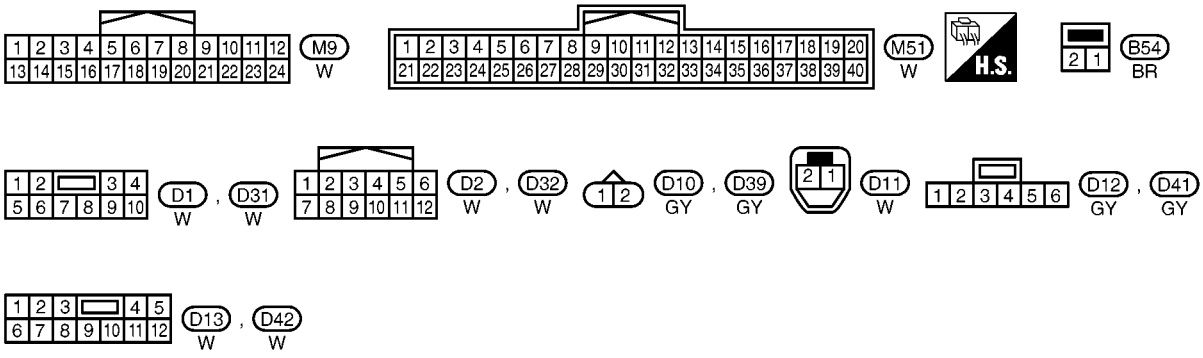
BL-I/KEY-03



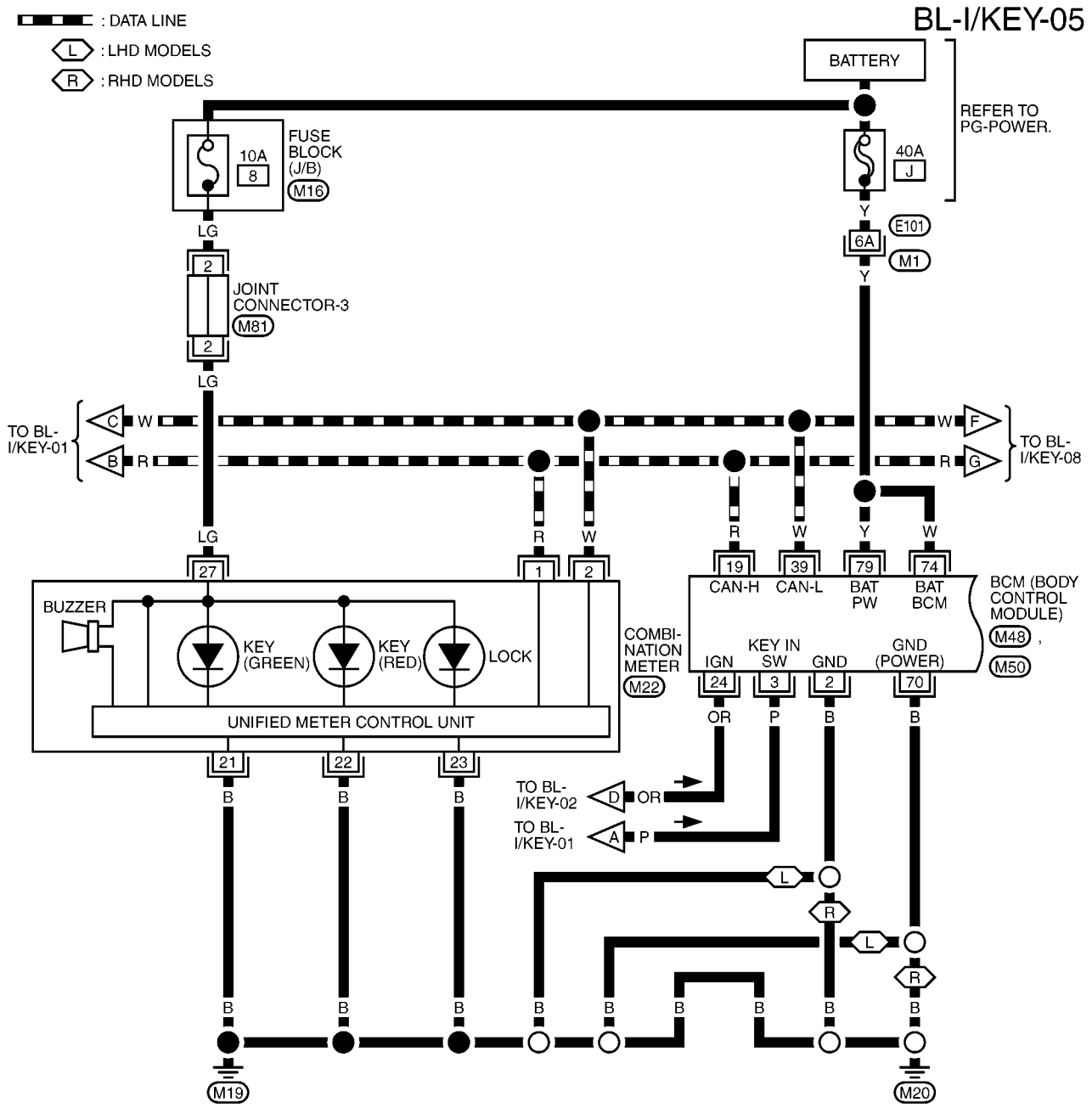
MKWA1794E

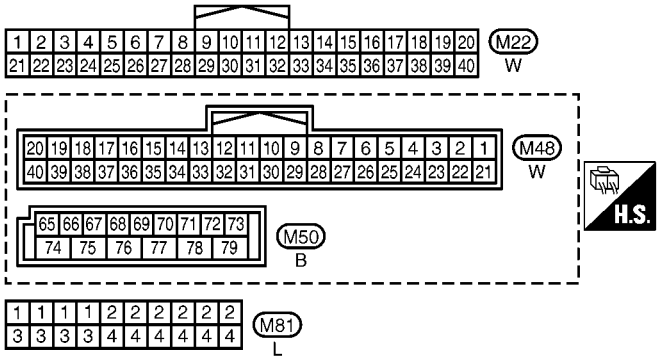
BL-I/KEY-04





MKWA1795E



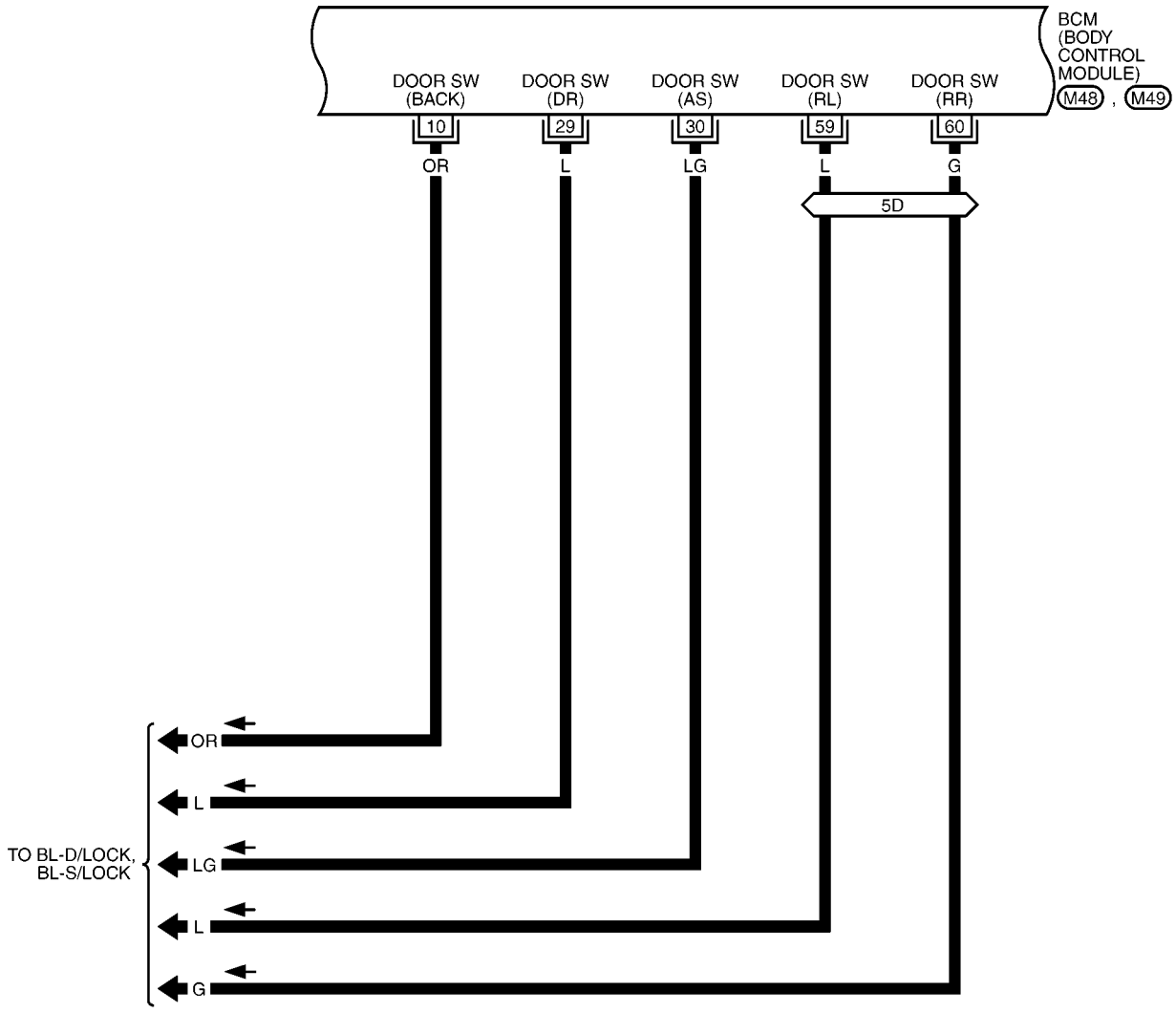


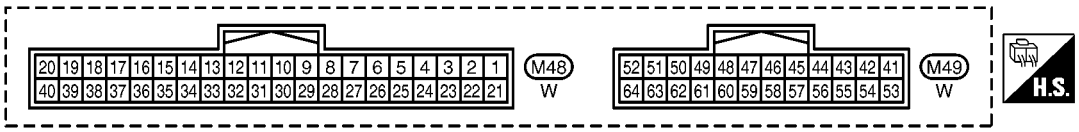
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1796E

BL-I/KEY-06

5D : WITH 5 DOORS

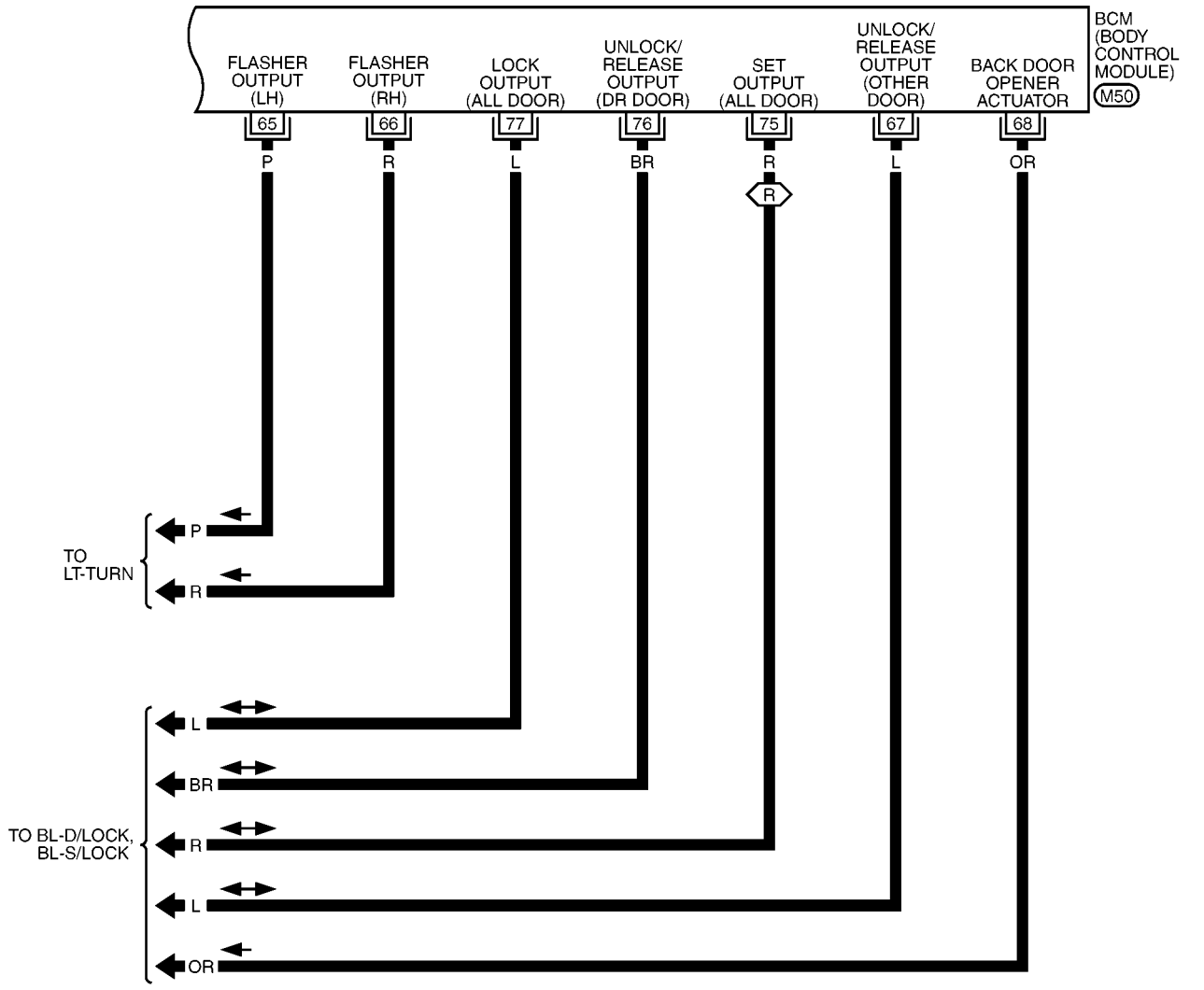


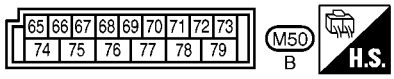


MKWA1412E

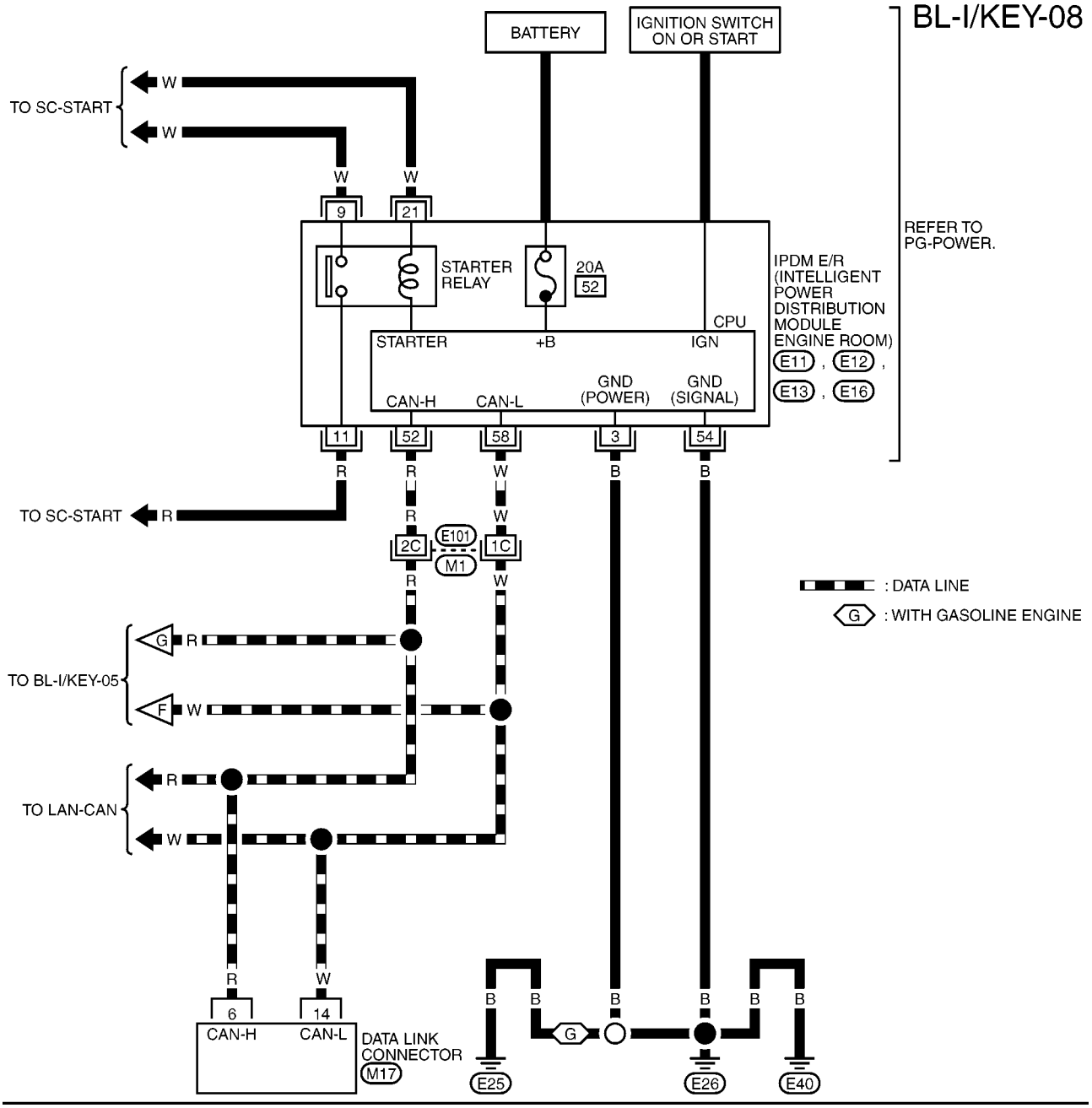
BL-I/KEY-07

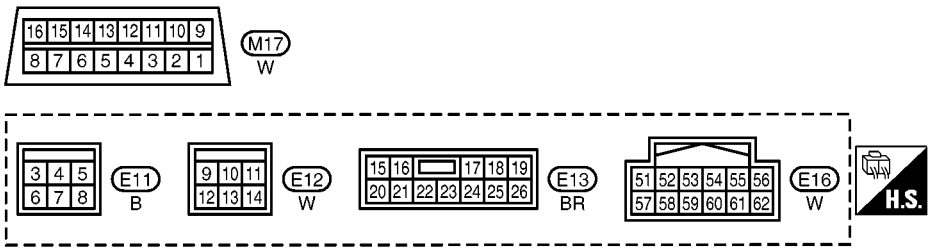
R : RHD MODELS





MKWA1413E



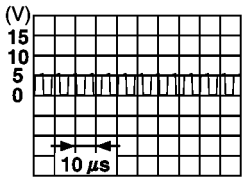
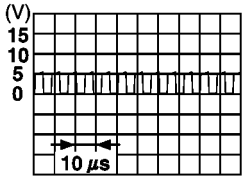
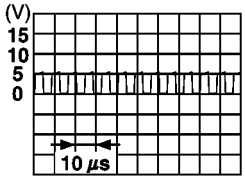
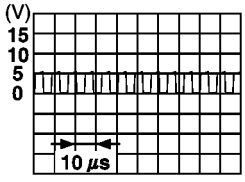


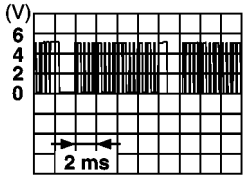
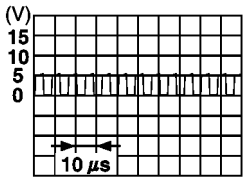
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1414E

Terminals and Reference Value for INTELLIGENT KEY UNIT

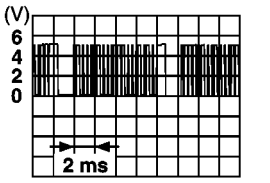
EIS004ML

Terminal No.	Wire color	ITEM	Measuring condition			Standard (V) Approx.
			Ignition knob position	Operation or conditions		
1	R	Steering lock unit power supply	LOCK	—		5
2	R	CAN-H	—	—		—
3	W	CAN-L	—	—		—
4	P	Intelligent Key warning buzzer	LOCK	Operate remote controller button or door request switch.	Buzzer OFF	Battery voltage
					Sound buzzer	0
5	OR	Door request switch (driver side)	—	Door request switch operation: Press (ON).		0
				Other than the above (OFF)		5
6	W	Ignition power supply	ON	—		Battery voltage
7	GY	Ignition knob switch	—	Press ignition knob.		Battery voltage
				Return ignition knob to LOCK position.		0
10	L	ACC power supply	ACC	—		Battery voltage
11	BR	Battery power supply	—	—		Battery voltage
12	B	GND	—	—		0
13	R	Inside key antenna (+) (Luggage room)	LOCK	Any door open → all doors shut (Door switch: ON → OFF)		 SIIA1910J
14	BR	Inside key antenna (-) (Luggage room)				
15	G	Inside key antenna (+) (Center console)	LOCK	Any door open → Close (Door switch: ON → OFF) Ignition knob switch: ON (press ignition knob.)		 SIIA1910J
16	R	Inside key antenna (-) (Center console)				
17	LG	Out side antenna (+)	LOCK	Back door request switch operation (Switch: ON)		 SIIA1910J
18	OR	Back door antenna (-)				
19	R	Outside antenna (driver side) (+)	LOCK	Driver door request signal operation (Switch: ON)		 SIIA1910J
20	W	Outside antenna (driver side) (-)				
22	W	Clutch inter lock switch	—	Clutch pedal depressed (ON)		0
				Clutch pedal not depressed (OFF)		5

Terminal No.	Wire color	ITEM	Measuring condition		Standard (V) Approx.
			Ignition knob position	Operation or conditions	
25	LG	Door request switch (passenger side)	—	Door request switch operation: Press (ON)	0
				Other than the above (OFF)	5
26	PU	Stop lamp switch	—	Brake pedal depressed (ON)	5
				Brake pedal not depressed (OFF)	0
27	P	Key switch	LOCK	Insert mechanical key into ignition key cylinder.	Battery voltage
				Remove mechanical key from ignition key cylinder.	0
29	R	Door request switch (back door)	—	Back door request switch operation: Press (ON)	0
				Other than the above (OFF)	5
31	R	Steering lock unit ground	—	—	0
32	Y	Steering lock unit communication signal	LOCK	Press ignition knob with Intelligent Key inside vehicle.	 SIIA1911J
				Other than the above	5
37	BR	Outside antenna (passenger side) (+)	LOCK	Passenger door request switch operation (Switch: ON)	 SIIA1910J
38	Y	Outside antenna (passenger side) (-)			

Terminals and Reference Value for Steering Lock unit

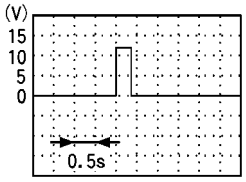
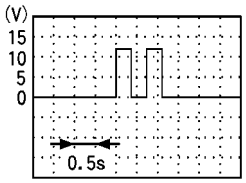
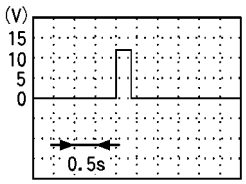
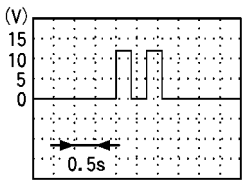
EIS004MM

Terminal number	Wire color	ITEM	Measuring condition		Standard (V) Approx.
			Ignition knob position	Operation or conditions	
1	BR	Battery power supply	LOCK	—	Battery voltage
2	R	Steering lock unit power supply	LOCK	—	5
3	Y	Steering lock unit communication signal	LOCK	Press ignition knob with Intelligent Key inside vehicle.	 SIIA1911J
				Other than the above	5
4	R	Steering lock unit ground	—	—	0

Terminal and Reference Value for BCM

EIS00569

TERMINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) Approx.
2	B	Ground	—	0
3	P	Key switch	Mechanical key is removed from ignition knob (OFF) → Mechanical key is inserted in ignition knob (ON)	0 → Battery voltage
10	OR	Back door switch	Back door open (ON) → Back door close (OFF)	0 → Battery voltage
19	R	CAN-H	—	—
24	OR	IGN power supply	Ignition knob ON or START position	Battery voltage
29	L	Front door switch LH (LHD models)	Door open (ON) → Door close (OFF)	0 → Battery voltage
		Front door switch RH (RHD models)		
30	LG	Front door switch RH (LHD models)	Door open (ON) → Door close (OFF)	0 → Battery voltage
		Front door switch LH (RHD models)		
39	W	CAN-L	—	—
59	L	Rear door switch LH	Door open (ON) → Door close (OFF)	0 → Battery voltage
60	G	Rear door switch RH	Door open (ON) → Door close (OFF)	0 → Battery voltage

TER-MINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) Approx.
65	P	Answer back (Turn signal lamp LH)	When door lock operated using remote controller*1	 PIIA2486J
			When door unlock operated using remote controller*1	 PIIA2487J
66	R	Answer back (Turn signal lamp RH)	When door lock operated using remote controller*1	 PIIA2486J
			When door unlock operated using remote controller*1	 PIIA2487J
67	L	Door lock actuator unlock (ALL Door) (Except driver side)	Door lock/unlock switch UNLOCK operation	0 → Battery voltage
68	OR	Back door opener actuator	Power window main switch (Back door release switch) OPEN operation	Battery voltage → 0
70	B	Ground	—	0
74	W	BAT power supply (fusible link) (BCM)	—	Battery voltage
75*2	R	Super lock set output (All door)	Super lock operation (Set)	0 → Battery voltage
76	BR	Door lock actuator unlock (Driver side)	Door lock/unlock switch Unlock operation	0 → Battery voltage
77	L	Door lock actuator lock (ALL Door)	Door lock/unlock switch LOCK operation	0 → Battery voltage
79	Y	BAT power supply (fusible link) (Power window)	—	Battery voltage

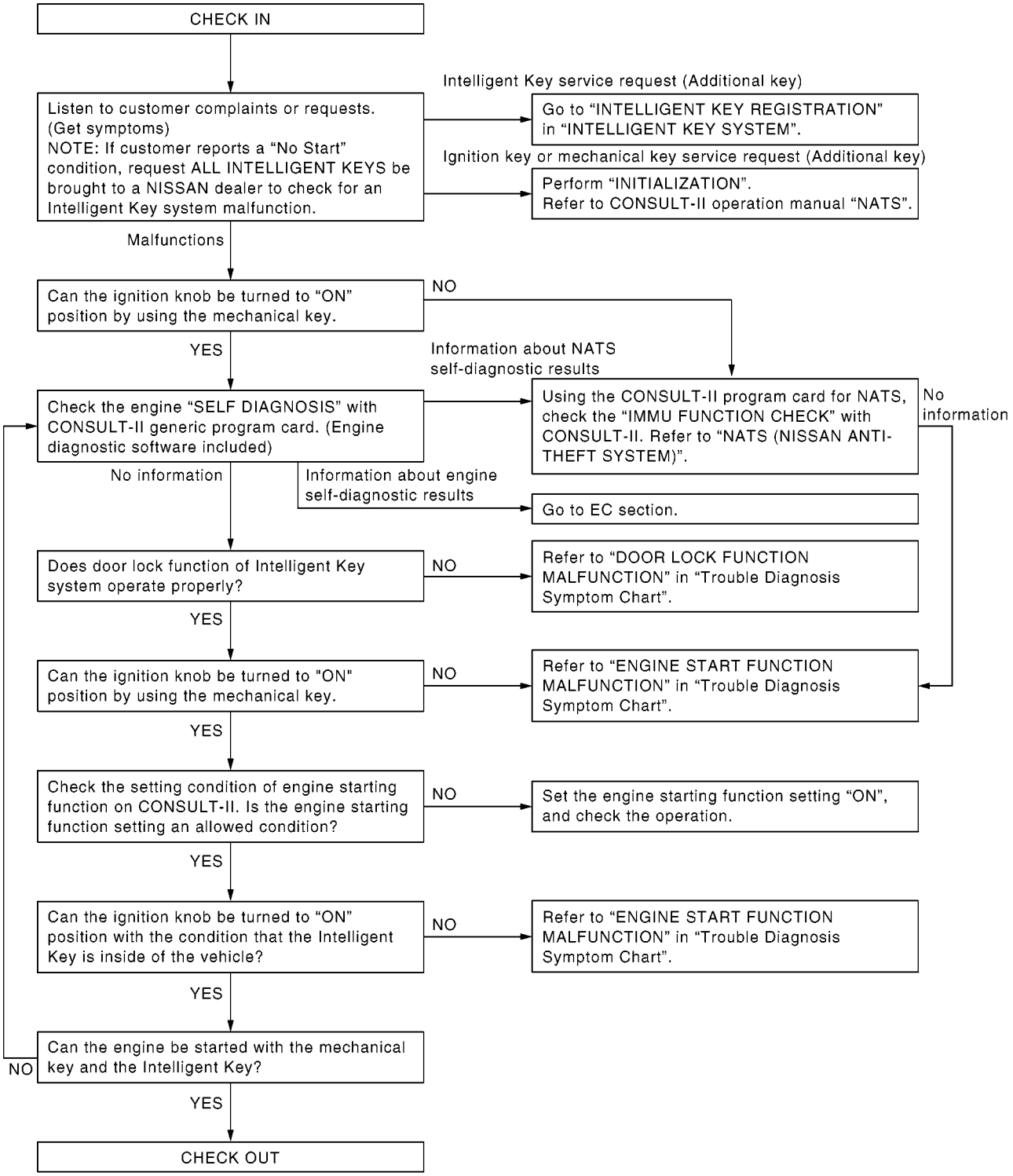
*1 : In the state that answer back operates

*2 : Only the model equipped with super lock system (RHD Models)

Diagnosis Procedure

EIS004MN

WORK FLOW



MIIB0488E

CONSULT-II Function (INTELLIGENT KEY)

EIS004MP

- CONSULT-II has display and inspection functions for work support, self-diagnosis, data monitor, and control unit part number by combining data reception and command transmission via communication lines from the Intelligent Key unit.

Part to be diagnosed	Inspection Item, Diagnosis Mode	Description
Intelligent Key	WORK SUPPORT	● Performs Intelligent Key-ID registration, check, and deletion. ● Performs steering lock unit ID registration. ● Changes settings for each function (ON/OFF).
	SELF-DIAG RESULTS	Intelligent Key unit performs CAN communication diagnosis.
	DATA MONITOR	Displays Intelligent Key unit input data in real time.
	CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
	ACTIVE TEST	Sends drive signals door lock actuator, buzzer or combination meter to perform operation check.
	ECC PART NUMBER	Displays Intelligent Key unit part No.

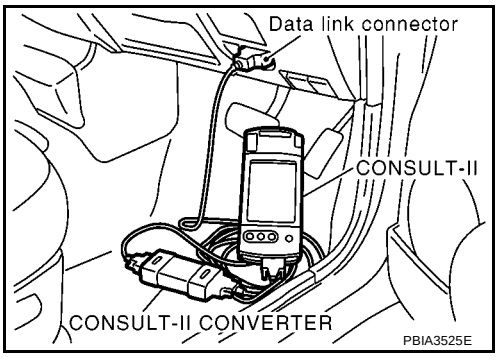
CONSULT-II Inspection Procedure

EIS00564

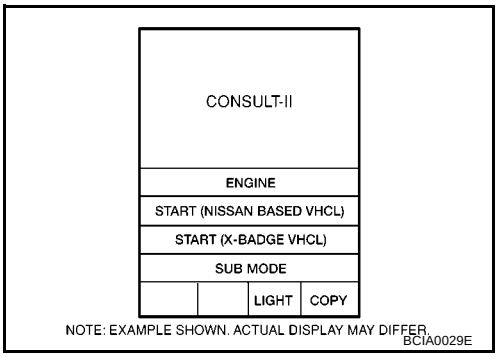
BASIC OPERATION

1. Turn ignition knob to LOCK position.
2. Connect CONSULT-II CONVERTER and CONSULT-II to data link connector.

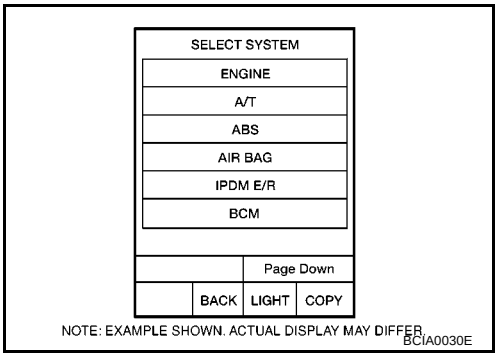
   CAUTION:
   When CONSULT-II is used without connecting CONSULT-II CONVERTER, a malfunction may be detected by self-diagnosis in control modules that use CAN Communication.



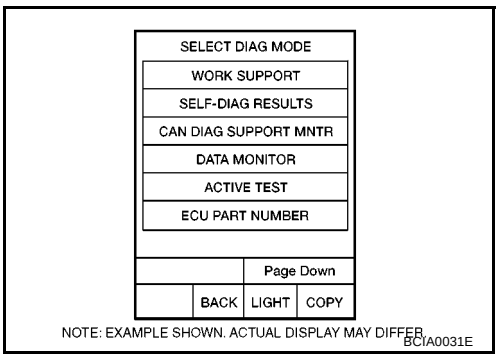
3. Use mechanical key to turn ignition switch to ON.
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “INTELLIGENT KEY” on “SELECT SYSTEM” screen.
   - If “INTELLIGENT KEY” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Select diagnosis mode. “WORK SUPPORT”, “SELF-DIAG RESULTS”, “DATA MONITOR”, “CAN DIAG SUPPRT MNTR”, “ACTIVE TEST” and “ECU PART NUMBER” are available.



CONSULT-II Application Items

EIS00565

SELF-DIAGNOSTIC RESULTS

In the Intelligent Key unit, the CONSULT-II self-diagnostic results can be used to check for malfunctions in CAN communications.

DATA MONITOR

MAIN SIGNALS Display Item

Monitor item [OPERATION]		Description
PUSH SWITCH	[ON/OFF]	Displays status (Ignition knob switch ON/ignition knob switch OFF) as judged from ignition knob switch signal.
KEY ROT SW	[ON/OFF]	Displays status (Ignition switch ON position: ON/Ignition switch OFF position: OFF) as judged from key rotation detection switch signal.
KEY SW	[ON/OFF]	Displays status (Key inserted: ON/Key removed: OFF) as judged by key switch.
DR REQ SW	[ON/OFF]	Displays status (Operable: ON/Non-operable: OFF) as judged from door request switch (driver side) signal.
AS REQ SW	[ON/OFF]	Displays status (Operable: ON/Non-operable: OFF) as judged from door request switch (passenger side) signal.
BD/TR REQ SW	[ON/OFF]	Displays status (Operable: ON/Non-operable: OFF) as judged from door request switch (back door) signal.
IGN SW	[ON/OFF]	Displays status (Ignition knob ON position: ON/Ignition knob OFF position: OFF) as judged from ignition switch signal.
ACC SW	[ON/OFF]	Displays status (Ignition switch ACC position: ON/Ignition switch OFF position: OFF) as judged from ignition switch signal.
STOP LAMP SW	[ON/OFF]	Displays status (Brake pedal depress: ON/brake pedal not depress: OFF) as judged from stop lamp switch signal.
P RANGE SW*	[ON/OFF]	Displays status from park/neutral position switch ON/OFF condition.
BD OPEN SW	[ON/OFF]	Displays status (Back door open: ON/Back door closed: OFF) as judged from back door opener switch signal.

*: With A/T models only.

ACTIVE TEST

Monitor item	Description
DOOR LOCK/UNLOCK	This test is able to check all door lock actuators lock operation. These actuators lock when “ON” on CONSULT-II screen is touched.
OUTSIDE BUZZER	This test is able to check Intelligent Key warning buzzer operation. The buzzer will be activated on when “ON” on CONSULT-II screen is touched.
INSLDE BUZZER	This test is able to check buzzer (bultin combination meter) operation. The buzzer will be activated on when “ON” on CONSULT-II screen is touched.
INDICATOR	This test is able to check warning lamp operation. The lamp will be turned on when “ON” on CONSULT-II screen is touched.

WORK SUPPORT

Monitor item	Description
INTELLI KEY WARNING	The condition of warning system can be changed.
LOW BATTERY WARNING	The condition of low battery warning system can be changed.
INTELLI KEY FUNCTION	The all of Intelligent Key system functions can be changed.
SELSCTIVE UNLOCK	The condition of select unlock function can be changed.
ANTIKEY LOCK IN	The condition of Intelligent Key lock-in prevention function can be changed.
FLASH WITH REMOTE AND KEY	The condition of ignition key warning function can be changed.
ANSWER BACK WITH I-KEY LOCK	The condition of ignition key warning function (LOCK) can be changed.
ANSWER BAKE WITH I-KEY UNLOCK	The condition of ignition key warning function (UNLOCK) can be changed.
AUTO RELOCK TIMER	Auto locking function mode can be changed in this mode. The function mode will be changed when.
ENG START BY I-KEY	The condition of engine start function can be changed.
LOCK/UNLOCK BY I-KEY	The condition of door lock function can be changed.
FOR TAKE OUT WARN TRIGGER	The condition of Intelligent Key take out warn trigger can be changed.

List of Operation Related Parts

EIS004MQ

Parts marked with × are the parts related to operation.

Will not operate if there is a malfunction in the area where there is a ×.	Intelligent Key	key switch	Ignition knob switch	ACC switch	Ignition switch	Door switch	Door request switch	Inside key antenna	Door antenna	Intelligent Key unit	CAN system	BCM	Combination meter	Stop lamp switch
Door lock/unlock operation using Intelligent Key remote controller button operation	×	×	×			×				×	×	×		
Door lock/unlock operation using door request switch operation	×	×	×			×	×	×	×	×	×	×		
Door lock/unlock operation using mechanical key												×		
Ignition knob rotation permission using Intelligent Key	×	×	×					×		×			×	
Engine start using Intelligent Key	×				×			×		×	×	×		×
Engine start using mechanical key				×	×						×	×		×
Ignition switch return forgotten warning			×	×	×	×				×		×	×	
Ignition key warning (when using mechanical key)		×									×	×	×	
Ignition switch OFF position warning (for inside car: when door closed)			×	×	×					×	×		×	
Ignition switch OFF position warning (for outside car: when door opened/closed)	×		×	×	×	×				×	×	×		
Warning for removal of Intelligent Key to outside the car (when door open/closed)	×		×			×		×		×	×	×	×	
Warning for removal of Intelligent Key to outside the car (from window)	×		×			×		×		×	×		×	
Door lock non-operation warning	×		×			×	×	×		×	×	×		
Intelligent key low battery warning	×				×					×	×		×	

Trouble Diagnosis Symptom Chart

EIS004MR

ALL FUNCTIONS OF THE INTELLIGENT KEY ARE NOT OPERATING

Symptom	Diagnoses service procedure	Refer to page
"KEY" and "LOCK" warning lamps in combination meter do not light up at all.	1. Check Intelligent Key unit power supply and ground circuit	BL-191
	2. Check CAN communication	BL-191
	3. Replace Intelligent Key unit.	—
"KEY" and "LOCK" warning lamps in combination meter turn on, but doors cannot be locked/ unlocked or the engine starter using Intelligent Key.	1. Use CONSULT-II to check if the Intelligent Key has been registered.	BL-158
	2. Use CONSULT-II setting change function to check if Intelligent Key system has been cancelled.	BL-158
	3. Intelligent Key inspection	BL-202
	4. Replace Intelligent Key unit.	BL-202

REMOTE CONTROL ENTRY FUNCTION MALFUNCTION

Symptom	Diagnoses service procedure	Refer to page
Door lock/unlock does not operate (other functions normal) when Intelligent Key remote controller button is operated.	1. Intelligent Key inspection	BL-202
	2. Check key switch	BL-191
	3. Check ignition knob switch	BL-193
	4. Check door switch	BL-143
	5. Replace Intelligent Key unit.	—

DOOR LOCK FUNCTION MALFUNCTION

Before conducting the diagnosis in the following table, check all power door lock system function. Refer to BL-15, "POWER DOOR LOCK SYSTEM" .

Symptom	Diagnoses service procedure	Refer to page
Door lock/unlock does not operate when door request switch operation is used (operates when Intelligent Key remote controller button is operated).	1. Check door request switch	BL-194
	2. Check outside antenna	BL-197
	3. Intelligent Key inspection	BL-202
	4. Replace Intelligent Key unit.	BL-202
Door lock/unlock do not operate using door request switch and Intelligent Key remote controller button operation (power door lock system is normal).	1. Check door switch	BL-143
	2. Check key switch	BL-191
	3. Check ignition knob switch	BL-193
	4. Replace Intelligent Key unit.	BL-202
Hazard lamps do not flash during door lock operation using door request switch and Intelligent Key remote controller button operation. (Turn signal lamp operation is normal.)	Replace Intelligent Key unit.	BL-202
Hazard lamps do not flash during door lock operation using door request switch and Intelligent Key remote controller button operation. (Turn signal lamps do not operate.)	Conduct turn signal lamp inspection.	LT-121
Intelligent Key warning buzzer does not sound during door lock/unlock operation using Intelligent Key (regardless of whether Intelligent Key remote controller button or request switch operation is used).	1. Check if the operation confirmation Intelligent Key warning buzzer was cancelled by the CONSULT-II settings change function.	BL-158
	2. Check Intelligent Key warning buzzer	BL-196
	3. Replace Intelligent Key unit.	BL-202
Door lock/unlock operation confirmation Intelligent Key warning buzzer sounds, but door lock actuator does not operate. (And hazard lamps do not flash.)	1. Check CAN communication	BL-191
	2. Replace Intelligent Key unit.	BL-202

ENGINE START FUNCTION MALFUNCTION

Intelligent Key Operation Inspection

Symptom		Diagnoses service procedure	Refer to page
Ignition knob can not turn	This lights up KEY warning lamp on combination meter in red when ignition knob is pressed. (door lock functions normal)	1. Intelligent Key inspection.	BL-202
		2. Check inside key antenna	BL-198
		3. Replace Intelligent Key unit.	BL-202
	This lights up KEY warning lamp on combination meter in green when ignition knob is pressed.	1. Ignition knob switch system	BL-193
		2. Steering lock unit system	BL-199
		3. Intelligent Key unit power supply and ground circuit system	BL-191
		4. Replace Intelligent Key unit.	BL-202
	Ignition knob turns even without both Intelligent Key and mechanical key.	Replace steering lock unit.	—
	Security indicator will still flash when ignition knob is pressed.	1. Check key switch	BL-191
		2. Replace Intelligent Key unit.	BL-202
	Security indicator does not flash with ignition knob released at LOCK position. (push switch OFF)	1. CAN communication system	BL-191
		2. Ignition knob switch system	BL-193
		3. Intelligent Key unit power supply and ground circuit system	BL-191
		4. Inspect combination meter (warning lamp).	BL-235

Mechanical Key Operation Inspection

Symptom		Diagnoses service procedure	Refer to page
Ignition knob can not turn	Security indicator remains flashing with mechanical key inserted.	1. Check key switch.	BL-191
		2. Replace Intelligent Key unit.	BL-202
	KEY indicator and security indicator does not flashing with mechanical key inserted.	1. Check stop lamp switch	BL-201
		2. Replace Intelligent Key unit	BL-202

WARNING CHIME FUNCTION MALFUNCTION

Before conducting the diagnosis in the following table, check “key reminder function” with power door lock system.

Symptom	Diagnoses service procedure	Refer to page
Ignition knob OFF position warning chime (for inside vehicle) does not sound. (Ignition key warning chime operates)	1. Check CAN communication	BL-191
	2. Check ignition knob switch	BL-193
	3. Check key switch	BL-191
	4. Replace Intelligent Key unit.	BL-202
Ignition key warning chime is inoperative. (When mechanical key used)	1. Check CAN communication	BL-191
	2. Check key switch	BL-191
	3. Check door switch	BL-143
	4. Inspect combination meter (warning).	DI-25
	5. Replace Intelligent Key unit	BL-202

Symptom	Diagnoses service procedure	Refer to page
Ignition knob OFF position warning chime (for outside vehicle: after door open/closed) does not sound.	1. Check CAN communication	BL-191
	2. Check ignition knob switch	BL-193
	3. Check door switch system	BL-143
	4. Check Intelligent Key warning buzzer	BL-196
	5. Replace Intelligent Key unit.	BL-202
Intelligent Key take out warning chime (when door open/closed) does not sound.	1. Check CAN communication	BL-191
	2. Intelligent Key inspection	BL-202
	3. Check ignition knob switch	BL-193
	4. Check door switch system	BL-143
	5. Check Intelligent Key warning buzzer	BL-196
	6. Replace Intelligent Key unit.	BL-202
Intelligent Key take out warning chime (when door opened/closed) sounds even though Intelligent Key is in vehicle.	1. Check inside key antenna	BL-198
	2. Intelligent Key inspection	BL-202
	3. Replace Intelligent Key unit.	BL-202
Intelligent Key take out warning chime (through window) does not sound	1. Check if Intelligent Key removal warning (take out from window) was canceled by CONSULT-II settings change function.	BL-158
	2. Check CAN communication	BL-191
	3. Intelligent Key inspection	BL-202
	4. Check ignition knob switch	BL-193
	5. Replace Intelligent Key unit.	BL-202
Intelligent Key take out warning chime (through window) sounds even though Intelligent Key is in vehicle.	1. Check inside key antenna	BL-198
	2. Intelligent Key inspection	BL-202
	3. Replace Intelligent Key unit.	BL-202
Door lock non-operation warning does not sound.	**Intelligent Key warning chime does not sound**	
	1. Intelligent Key inspection	BL-202
	2. Check door request switch	BL-194
	3. Check inside key antenna	BL-198
	4. Check Intelligent Key warning buzzer	BL-196
	5. Replace Intelligent Key unit.	BL-202
	Ignition knob OFF position warning chime does not sound	
	1. Intelligent Key inspection	BL-202
	2. Check door request switch	BL-194
	3. Check outside antenna	BL-197
	4. Check Intelligent Key warning buzzer	BL-196
	5. Check ignition knob switch	BL-193
	6. Replace Intelligent Key unit.	BL-202
	Door ajar alarm	
	1. Check CAN communications	BL-191
	2. Check door request switch	BL-194
	3. Check outside antenna	BL-197
	4. Check Intelligent Key warning buzzer	BL-196
	5. Check door switch	BL-143
	6. Intelligent Key inspection	BL-202
	7. Replace Intelligent Key unit.	BL-202

Check CAN Communication System

EIS004MS

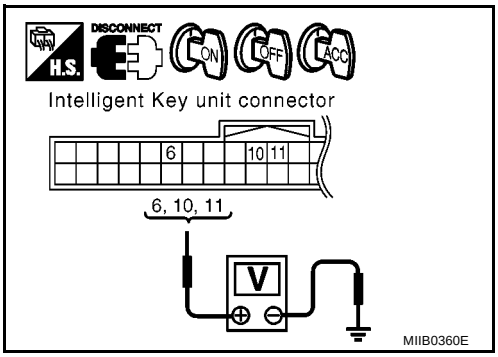
Go to LAN-4, "Precautions When Using CONSULT-II" .

Check Intelligent Key Unit Power Supply and Ground Circuit

EIS004MT

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition knob OFF position.
2. Disconnect Intelligent Key unit connector M51 and measure the connector terminal (+) and ground (-) shown in the following table.



Terminal (wire color)	Signal Designation	Ignition switch	Standard voltage (V)
6 (W)	Ignition power supply	ON	Battery voltage
10 (L)	ACC power supply	ACC	Battery voltage
11 (BR)	Battery power supply	OFF	Battery voltage

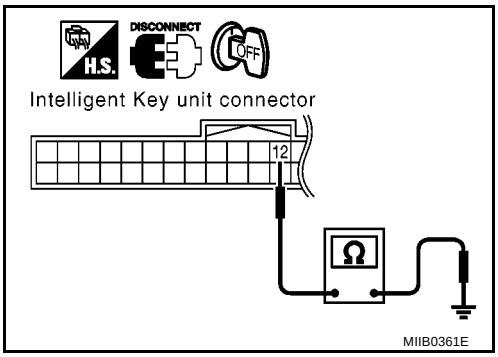
OK or NG

OK >> GO TO 2.
NG >> Repair or replace Intelligent Key power supply circuit.

2. CHECK GROUND CIRCUIT

Check continuity between Intelligent Key unit connector M51 terminal 12 and ground.

12 (B) - Ground : Continuity should exist.



OK or NG

OK >> Power supply and ground circuits are normal.
NG >> Repair or replace the Intelligent Key unit ground circuit.

Check Key Switch

EIS004MV

1. KEY SWITCH INSPECTION

With CONSULT-II

Display “KEY SW” on DATA MONITOR screen, and check if ON-OFF display is linked to insertion of mechanical key in ignition knob.

When key is inserted in ignition knob : ON
When key is removed in ignition knob : OFF

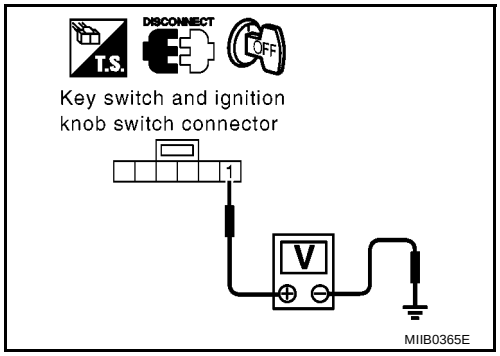
OK or NG

OK >> Key switch is OK.
NG >> GO TO 2.

2. KEY SWITCH POWER SUPPLY CIRCUIT INSPECTION

1. Remove mechanical key from ignition knob.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch connector M34 terminal 1 and ground.

1 (W) - Ground : Approx. 12V



OK or NG

OK >> GO TO 3.
NG >> Repair or replace key switch power supply circuit.

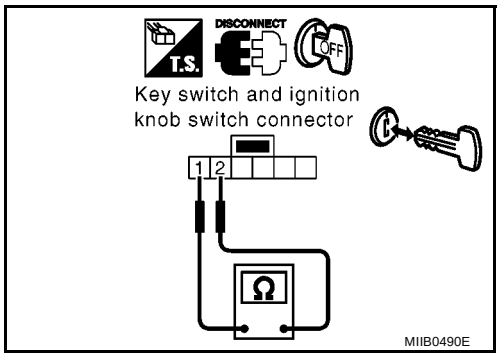
3. KEY SWITCH OPERATION INSPECTION

1. Insert mechanical key into ignition knob.
2. Check continuity between key switch and ignition knob switch connector M34 terminal 1 and 2.

1 - 2

Insert mechanical key into ignition knob. : Continuity should exist.

Remove mechanical key from ignition knob. : Continuity should not exist.



OK or NG

OK >> GO TO 4.
NG >> Replace key switch.

4. KEY SWITCH CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminal 27 and key switch and ignition knob switch connector M34 terminal 2.

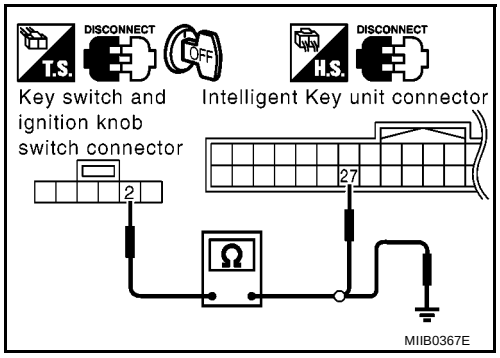
27 (P) - 2 (P) : Continuity should exist.

3. Check continuity between key switch connector M34 terminal 2 and ground.

2 (P) - Ground : Continuity should exist.

OK or NG

OK >> Key switch is OK.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.



Check Ignition Knob Switch

EIS004MX

1. IGNITION KNOB SWITCH INSPECTION

With CONSULT-II

Display “PUSH SW” on DATA MONITOR screen, and check if ON/OFF display is linked to ignition knob operation.

Press ignition knob.	**: ON**
Return ignition knob (remove hands).	**: OFF**

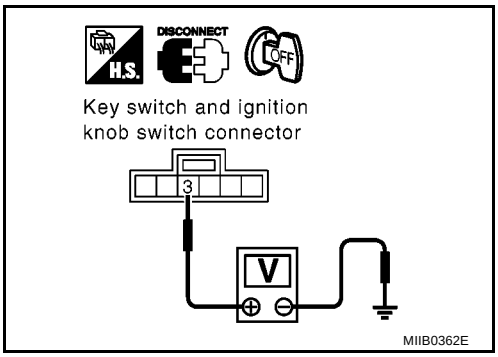
OK or NG

OK >> Ignition knob switch is OK.
NG >> GO TO 2.

2. IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT INSPECTION

1. Turn ignition knob LOCK position.
2. Disconnect key switch and ignition knob switch connector.
3. Check voltage between key switch and ignition knob switch connector M34 terminal 3 and ground.

3 (BR) - Ground : Approx. 12V



OK or NG

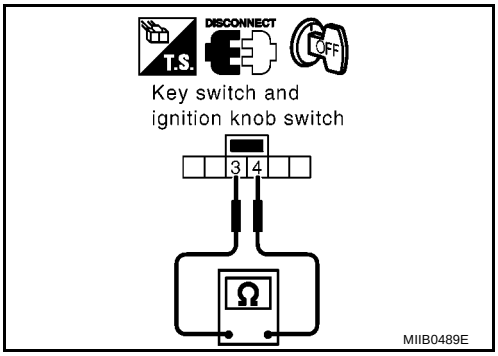
OK >> GO TO 3.
NG >> Repair or replace key switch and ignition knob switch power supply circuit.

3. IGNITION KNOB SWITCH OPERATION INSPECTION

Check continuity between key switch and ignition knob switch connector M34 terminal 3 and 4.

3- 4

Press ignition knob.	**: Continuity should exist.**
Return ignition knob (remove hands).	**: Continuity should not exist.**



OK or NG

OK >> GO TO 4.
NG >> Replace key switch and ignition knob switch.

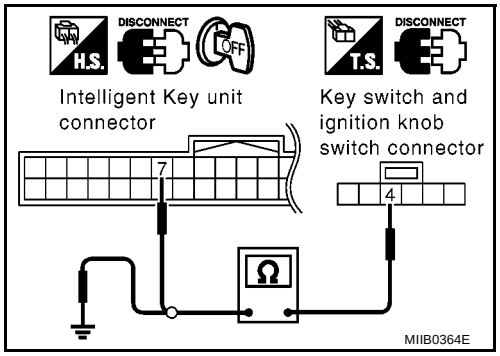
4. IGNITION KNOB SWITCH CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminal 7 and key switch and ignition knob switch connector M34 terminal 4.

7 (GY) - 4 (GY) : Continuity should exist.

3. Check continuity between key switch and ignition knob switch connector terminal 4 and ground.

4 (GY) - Ground : Continuity should not exist.



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair or replace harness between Intelligent Key unit and key switch and ignition knob switch.

Check Door Request Switch

EIS004MY

1. DOOR REQUEST SWITCH INSPECTION

With CONSULT-II

Display “DR REQ SW” (driver door), “AS REQ SW” (passenger door) and “BD/TR REQ SW” (back door) on DATA MONITOR screen, and check if ON-OFF display is linked to door request switch operation.

Press door request switch. : ON
Release door request switch. : OFF

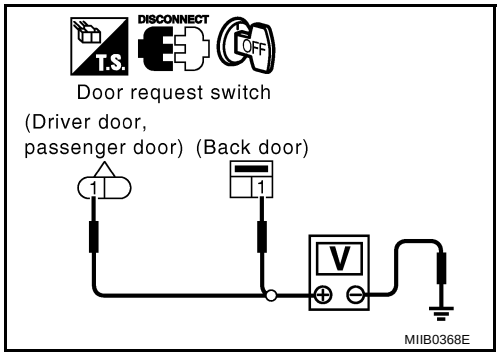
OK or NG

OK >> Door request switch is OK.
NG >> GO TO 2.

2. DOOR REQUEST SWITCH SIGNAL INSPECTION

1. Turn ignition knob LOCK position.
2. Disconnect door request switch connector.
3. Check voltage between door request switch connector D10 (driver door), D39 (passenger door), B54 (back door) terminal 1 and ground.

Driver 1 (OR) - Ground : Approx. 5V
Passenger 1 (LG) - Ground : Approx. 5V
Back door 1 (R) - Ground : Approx. 5V



OK or NG

OK >> GO TO 3.
NG >> GO TO 5.

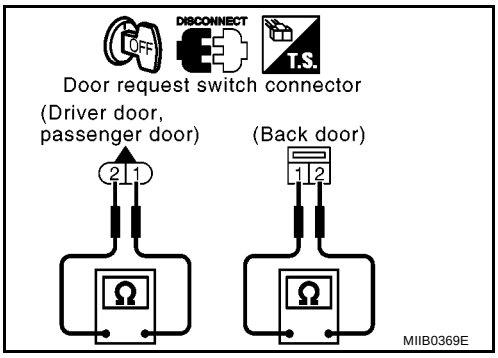
3. DOOR REQUEST SWITCH OPERATION INSPECTION

Check continuity between door request switch connector D10 (driver door), D39 (passenger door), B54 (back door) terminal 1 and 2.

1 - 2

Press door request switch. : **Continuity should exist.**

Return door request switch. : **Continuity should not exist.**



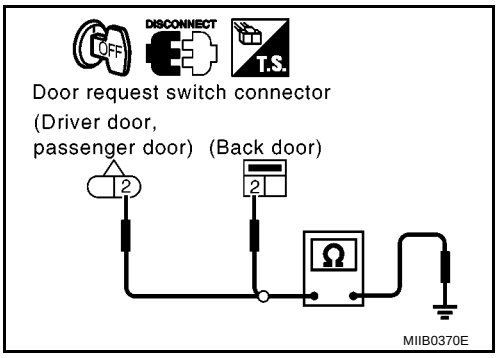
OK or NG

OK >> GO TO 4.
NG >> Replace door request switch.

4. DOOR REQUEST SWITCH GROUND CIRCUIT INSPECTION

Check continuity between door request switch connector 2 and ground.

2 (B) - Ground : **Continuity should exist.**



OK or NG

OK >> GO TO 5.
NG >> Repair or replace door request switch ground circuit.

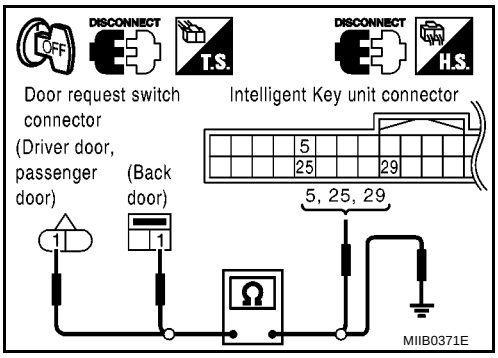
5. DOOR REQUEST SWITCH CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminals 5 (driver door), 25 (passenger door), and 29 (back door) and door request switch connector D10 (driver door), D39 (passenger door), B54 (back door) terminal 1.

Driver **5 (OR) - 1 (OR)** : **Continuity should exist.**
Passenger **25 (LG) - 1 (LG)** : **Continuity should exist.**
Back door **29 (R) - 1 (R)** : **Continuity should exist.**

3. Check continuity between door request switch connector D10 (driver door), D39 (passenger door), B54 (back door) terminal 1 and ground.

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



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair or replace harness between Intelligent Key unit and door request switch.

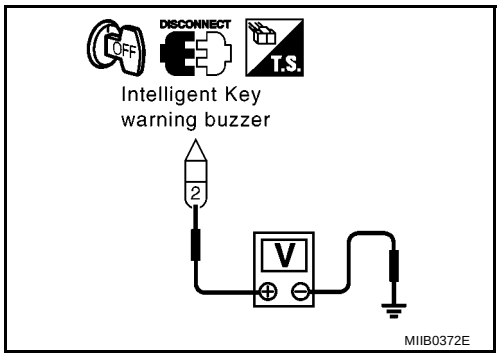
Check Intelligent Key Warning Buzzer

EIS004N1

1. INTELLIGENT KEY WARNING BUZZER POWER SUPPLY CIRCUIT INSPECTION

1. Turn ignition knob LOCK position.
2. Remove Intelligent Key warning buzzer connector.
3. Check voltage between Intelligent Key warning buzzer connector D8 terminal 2 and ground.

2 (G) - Ground : Approx. 12V



OK or NG

OK >> GO TO 2.
NG >> Repair or replace Intelligent Key warning buzzer power supply circuit.

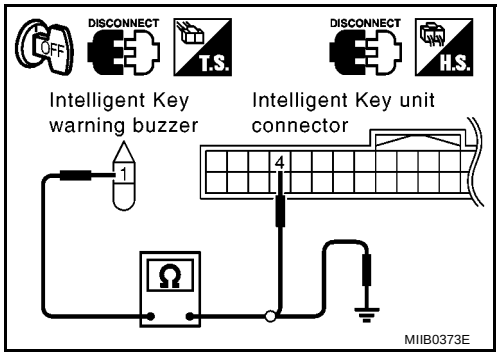
2. INTELLIGENT KEY WARNING BUZZER CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between Intelligent Key unit connector M51 terminal 4 and Intelligent Key warning buzzer connector D8 terminal 1.

4 (P) - 1 (P) : Continuity should exist.

3. Check continuity between Intelligent Key warning buzzer connector D8 terminal 1 and ground.

1 (P) - Ground : Continuity should not exist.



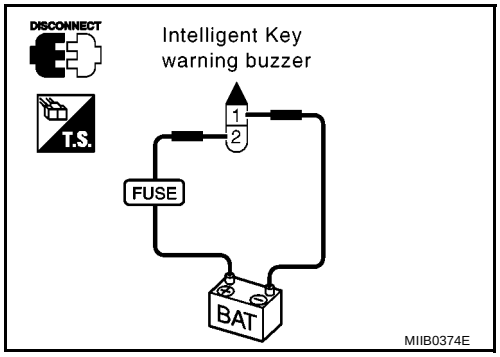
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness between Intelligent Key warning buzzer and Intelligent Key unit.

3. INTELLIGENT KEY WARNING BUZZER OPERATION INSPECTION

Connect battery power supply to Intelligent Key warning buzzer connector D8 terminals 1 and 2, and check the operation.

2 (BAT+) - 1 (BAT-) : the buzzer sounds



OK or NG

OK >> Intelligent Key warning buzzer is OK.
NG >> Replace Intelligent Key warning buzzer

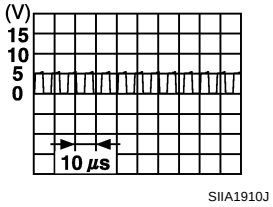
Check Outside Antenna

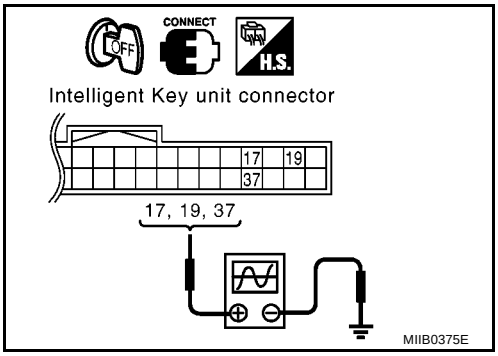
EIS004N2

SMA for VIN >SJN**AK12U1309269

1. OUTSIDE ANTENNA POWER SUPPLY INSPECTION

Operate each door request switch (push), and use an oscilloscope to check voltage waveform of harness between Intelligent Key unit connector M51 terminals 17 (back door), 19 (driver door), and 37 (passenger door) and ground.

Push each door request switch.	
Back door: 17 (LG) - Ground	 SIIA1910J
Driver: 19 (R) - Ground	
Passenger: 37 (BR) - Ground	



MIIB0375E

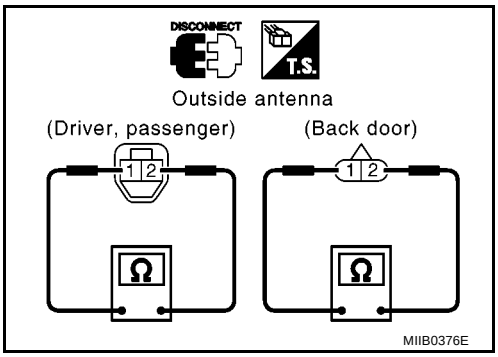
OK or NG

OK >> Outside antenna circuit is OK.
NG >> GO TO 2.

2. OUTSIDE ANTENNA OPERATION INSPECTION

1. Disconnect each door antenna connector.
2. Check continuity between each door antenna connector D11 (driver door), B39 (back door), D40 (passenger door) terminals 1 and 2.

1 - 2 : Continuity should exist.



MIIB0376E

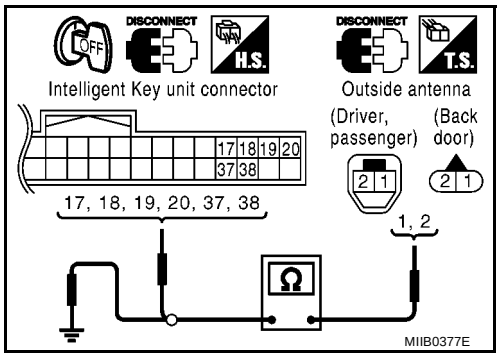
OK or NG

OK >> GO TO 3.
NG >> Replace outside antenna.

3. OUTSIDE ANTENNA CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between each outside antenna connector D11 (driver door), B39 (back door), D40 (passenger door) terminals 1 and 2 and Intelligent Key unit connector M51 terminals 17, 18, 19, 20, 37, and 38.

Back door	**1 (LG) - 17 (LG): Continuity should exist.**
	2 (OR) - 18 (OR): Continuity should exist.
Driver door	**1 (R) - 19 (R): Continuity should exist.**
	2 (W) - 20 (W): Continuity should exist.
Passenger door	**1 (BR) - 37 (BR): Continuity should exist.**
	2 (Y) - 38 (Y): Continuity should exist.



3. Check continuity between each door antenna connector terminals 1 and 2 and ground.

1 - Ground : Continuity should not exist.
2 - Ground : Continuity should not exist.

OK or NG

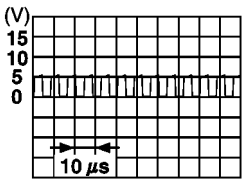
OK >> Replace Intelligent Key unit.
NG >> Replace harness between door antenna and Intelligent Key unit.

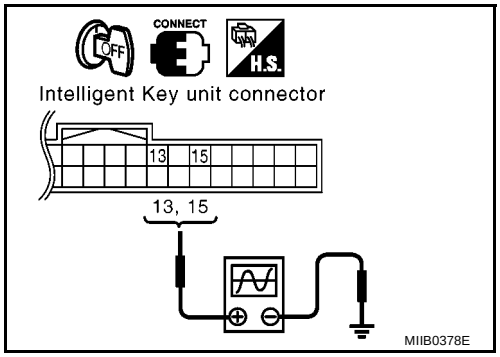
Check Inside Key Antenna

EIS004N3

1. INSIDE KEY ANTENNA POWER SUPPLY CIRCUIT INSPECTION

Operate ignition knob and use an oscilloscope to check voltage waveform between Intelligent Key unit connector M51 terminals 13 (luggage room), 15 (center console) and ground.

Press ignition knob.	
luggage room: 13 (R) - Ground	 SIIA1910J
Center console: 15 (G) - Ground	



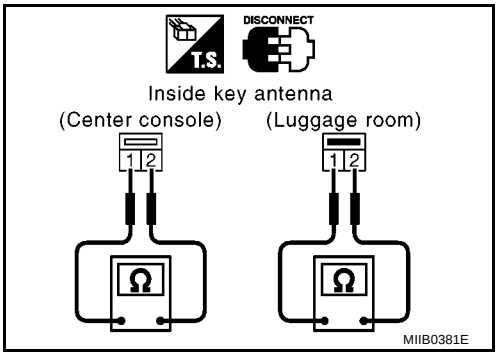
OK or NG

OK >> Inside key antenna circuit is OK.
NG >> GO TO 2.

2. INSIDE KEY ANTENNA OPERATION INSPECTION

1. Disconnect inside key antenna connector.
2. Check continuity between inside key antenna connector B25 (center console), B29 (luggage room) terminals 1 and 2.

1 - 2 : Continuity should exist.



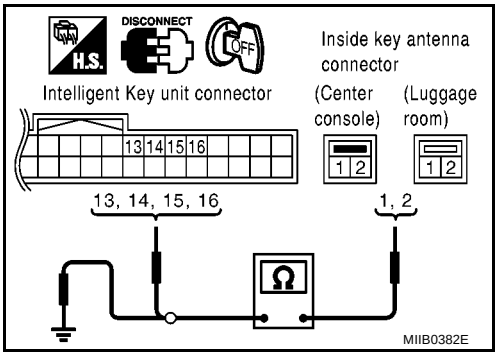
OK or NG

OK >> GO TO 3.
NG >> Replace malfunctioning inside key antenna.

3. INSIDE KEY ANTENNA INSPECTION

1. Disconnect Intelligent Key unit connector.
2. Check continuity between inside key antenna connector B25 (center console), B29 (luggage room) terminals 1 and 2 and Intelligent Key unit connector terminals 13, 14, 15, and 16.

Inside key antenna (luggage room)	**1 (R) - 13 (R): Continuity should exist.**
	2 (BR) - 14 (BR): Continuity should exist.
Inside key antenna (center console)	**1 (G) - 15 (G): Continuity should exist.**
	2 (R) - 16 (R): Continuity should exist.



3. Check continuity between inside key antenna connector B25 (center console), B29 (luggage room) terminals 1 and 2 and ground.

1 (G or R) - Ground : Continuity should not exist.
2 (R or BR) - Ground : Continuity should not exist.

OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair or replace harness between inside key antenna and Intelligent Key unit.

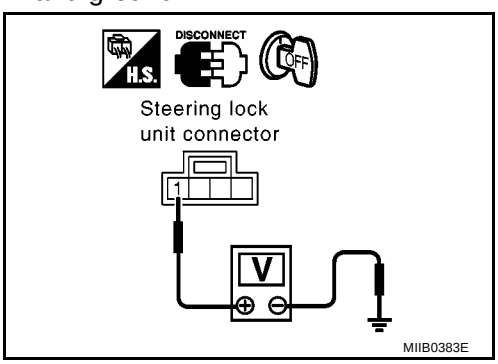
Check Steering Lock Unit

EIS004N4

1. STEERING LOCK UNIT POWER SUPPLY INSPECTION

1. Turn ignition knob LOCK position.
2. Disconnect steering lock unit connector.
3. Check voltage between steering lock unit connector M31 terminal 1 and ground.

1 (BR) - Ground : Approx. 12V



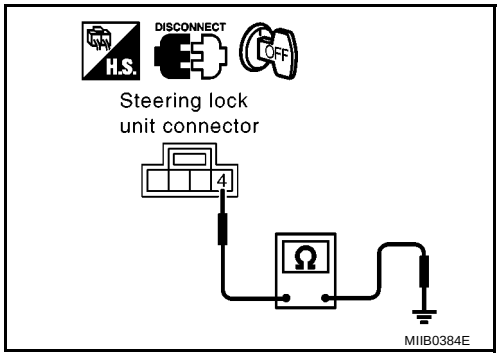
OK or NG

OK >> GO TO 2.
NG >> Repair or replace steering lock unit power supply circuit.

2. STEERING LOCK UNIT GROUND CIRCUIT INSPECTION

Check continuity between steering lock unit connector M31 terminal 4 and ground.

4 (R) - Ground : Continuity should exist.



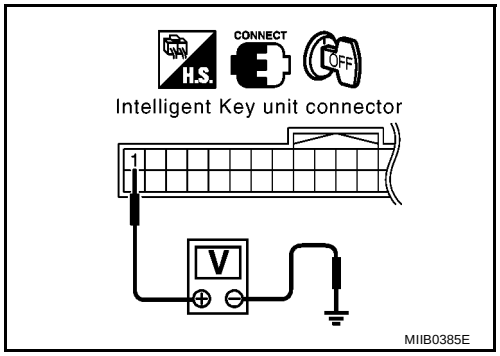
OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

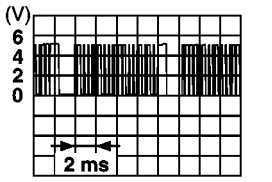
3. STEERING LOCK COMMUNICATION CIRCUIT INSPECTION

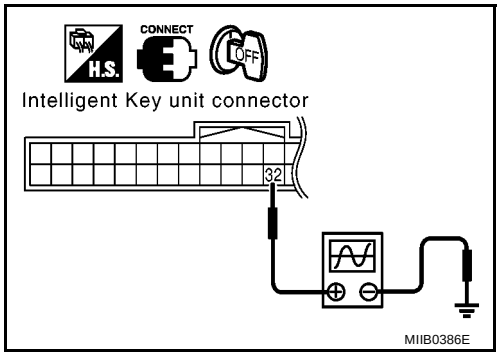
1. Connect steering lock unit connector.
2. Check voltage between Intelligent Key unit connector M51 terminal 1 and ground.

1 (R) - Ground : Approx. 5V



3. Immediately after operating (pushing) ignition knob, use an oscilloscope to check voltage waveform between Intelligent Key unit connector M51 terminal 32 and ground.

Immediately after ignition knob operation (pushing).	
32 (Y) - Ground	



OK or NG

OK >> GO TO 4.
NG >> Replace Intelligent Key unit.

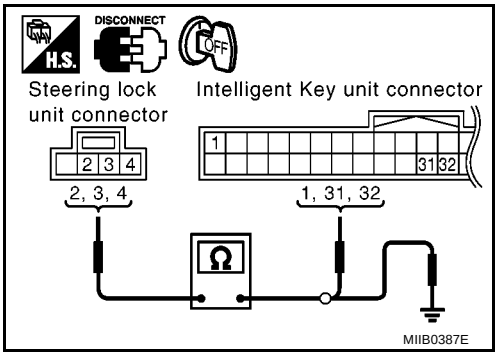
4. STEERING LOCK UNIT COMMUNICATION CIRCUIT INSPECTION

1. Disconnect Intelligent Key unit and steering lock unit connectors.
2. Check continuity between Intelligent Key unit connector M51 terminals 1, 31, and 32 and steering lock unit connector M31 terminals 2, 3, and 4.

1 (R) - 2 (R) : Continuity should exist.
31 (R) - 4 (R) : Continuity should exist.
32 (Y) - 3 (Y) : Continuity should exist.

3. Check continuity between steering lock unit connector M31 terminals 2, 3, 4 and ground.

2 (R) - Ground : Continuity should not exist.
3 (Y) - Ground : Continuity should not exist.
4 (R) - Ground : Continuity should not exist.



OK or NG

OK >> Replace steering lock unit.
- After replacing steering lock unit, Refer to BL-158, "STEERING LOCK UNIT REGISTRATION" .

NG >> Repair or replace harness between steering lock unit and Intelligent Key unit.

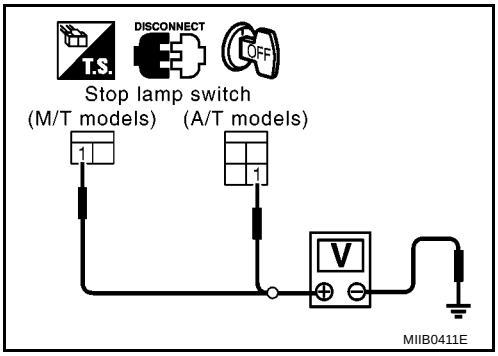
Check Stop Lamp Switch

EIS0055H

1. STOP LAMP SWITCH POWER SUPPLY CIRCIT INAPECTION

1. Check stop lamp switch connector.
2. Check voltage between stop lamp switch connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T), M203 (RHD models with A/T) terminal 1 and ground.

1 and ground : Approx. 12V



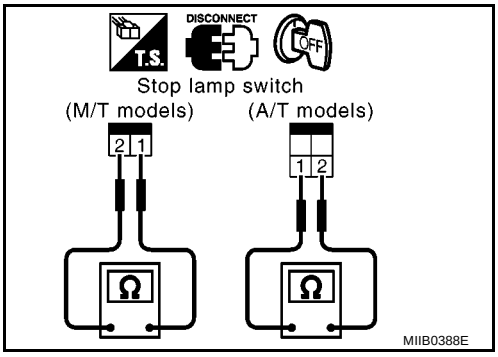
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness between Intelligent Key unit and stop lamp switch.

2. STOP LAMP SWITCH OPERATION INSPECTION

Check continuity between stop lamp switch connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T), M203 (RHD models with A/T) terminal 1 and 2.

1 - 2
Brake pedal depressed : Continuity should exist.
Brake pedal not depressed : Continuity should not exist.



OK or NG

OK >> GO TO 3.
NG >> Replace stop lamp switch.

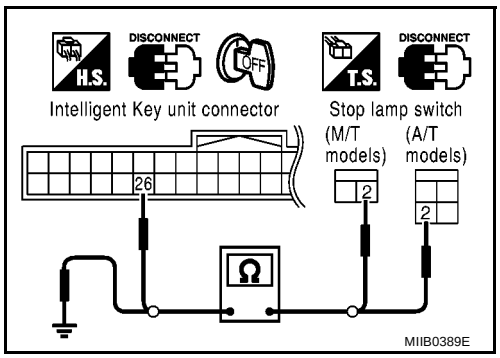
3. STOP LAMP SWITCH GROUND CIRCIT INSPECTION

1. Check continuity between stop lamp switch connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T), M203 (RHD models with A/T) terminal 2 and Intelligent Key unit connector M51 terminal 26.

2 (Y) - 26 (PU) : Continuity should exist.

2. Check continuity between stop lamp switch connectorE108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T), M203 (RHD models with A/T) terminal 2 and ground.

2 (Y) - Ground : Continuity should not exist.



OK or NG

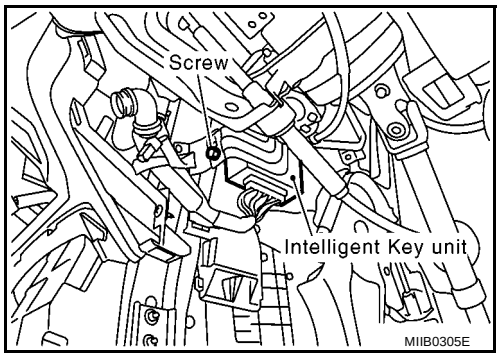
OK >> Stop lamp switch is OK.
NG >> Repair or replace harness.

Removal and Installation of Intelligent key unit

EIS0055J

REMOVAL

1. Remove the instrument lower driver panel. Refer to IP-5, "Removal and Installation" .
2. Disconnect the Intelligent Key unit connector, remove the screw and Intelligent Key unit.



INSTALLATION

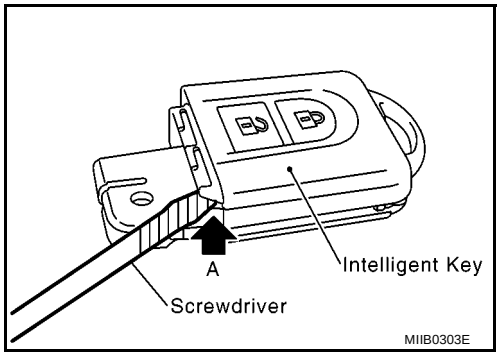
Install in the reverse order of removal.

Intelligent Key Inspection

EIS004N5

INTELLIGENT KEY DISASSEMBLY AND ASSEMBLY

1. Remove Intelligent Key cover.
2. Insert a thin screwdriver wrapped with tape into Area A and then separate lower and upper cases while twisting screwdriver.



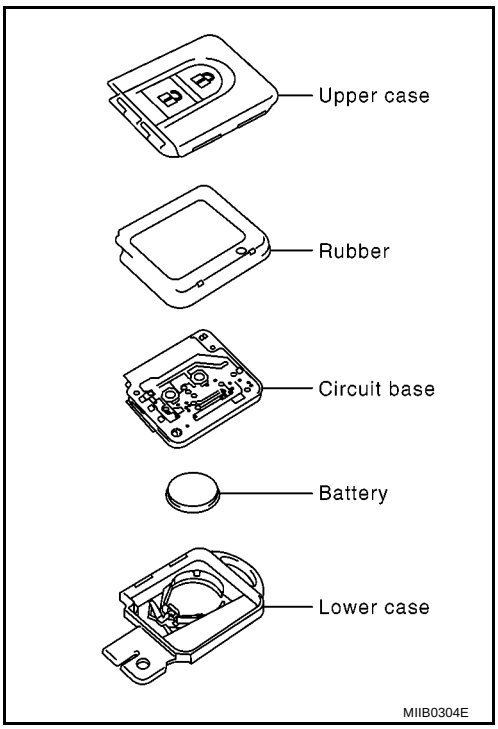
3. When replacing the circuit board or rubber
   - Remove the circuit board assembly from the upper case. (Substrate assembly: circuit board + rubber)
   - Gently press the rubber and remove the circuit board.

   CAUTION:
   Be careful not to touch the printed circuits directly.
4. When replacing the battery
   - Remove the battery from the lower case and replace it.

   Battery replacement : Coin-shaped lithium battery 3V (CR2032)

   CAUTION:
   When replacing battery, be sure to keep dirt, grease, and other foreign materials off the electrode contact area.
5. After replacement, assemble the upper and lower cases by engaging the hooks on their circumference while being careful not to pinch the rubber, etc.

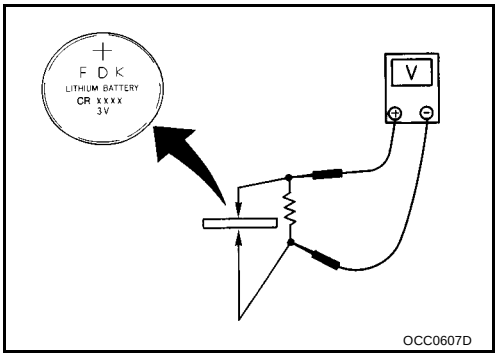
   CAUTION:
   After replacing the battery, check to make sure all Intelligent Key functions work normally.



REMOTE CONTROLLER BATTERY INSPECTION

Check by connecting a resistance (approximately 300Ω) so that the current value becomes about 10 mA.

Standard : Approx. 2.5V - 3.0V

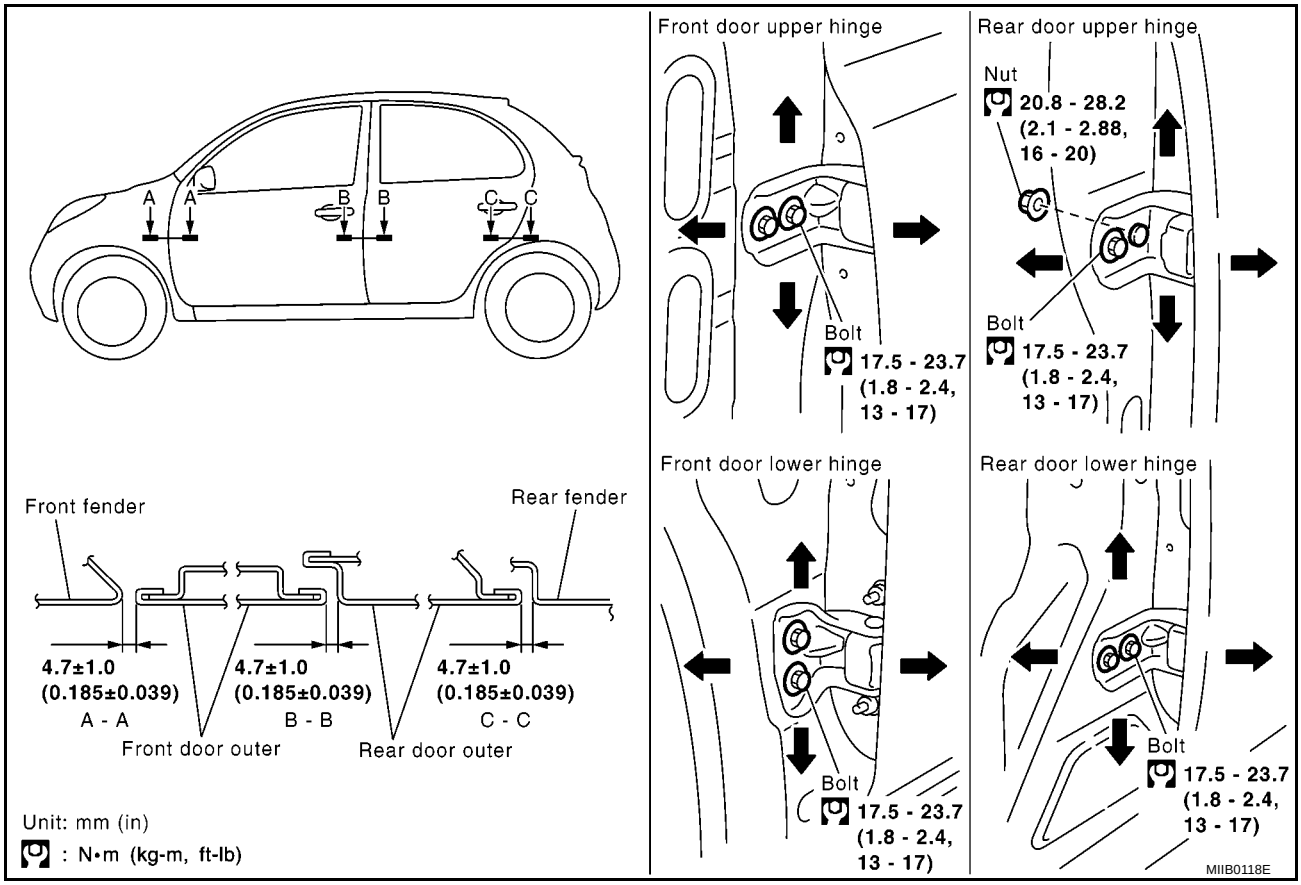


DOOR

PFP:80100

Fitting Adjustment (5-Door Vehicles)

EIS004N6



FRONT DOOR

Longitudinal Gap and Front End Height Difference Adjustment

1. Remove front fender. Refer to BL-14, "Removal and Installation" .
2. Loosen the hinge bolts on body, then lift the rear end of front door to adjust the clearance and surface difference properly.

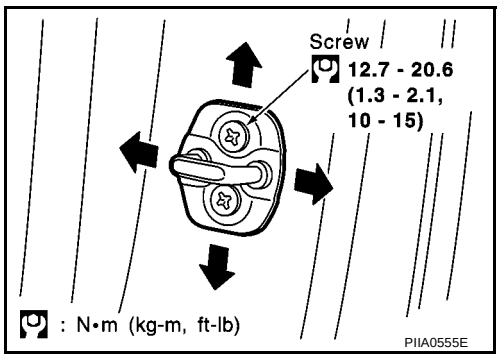
REAR DOOR

Longitudinal Gap and Front End Height Difference Adjustment

1. Remove center pillar upper garnish and center pillar lower garnish. Refer to EI-19, "Removal and Installation (5-Door)" .
2. Working from inside and outside vehicle, loosen bolts and nuts, and then open rear door, and adjust while raising rear door by rear edge.

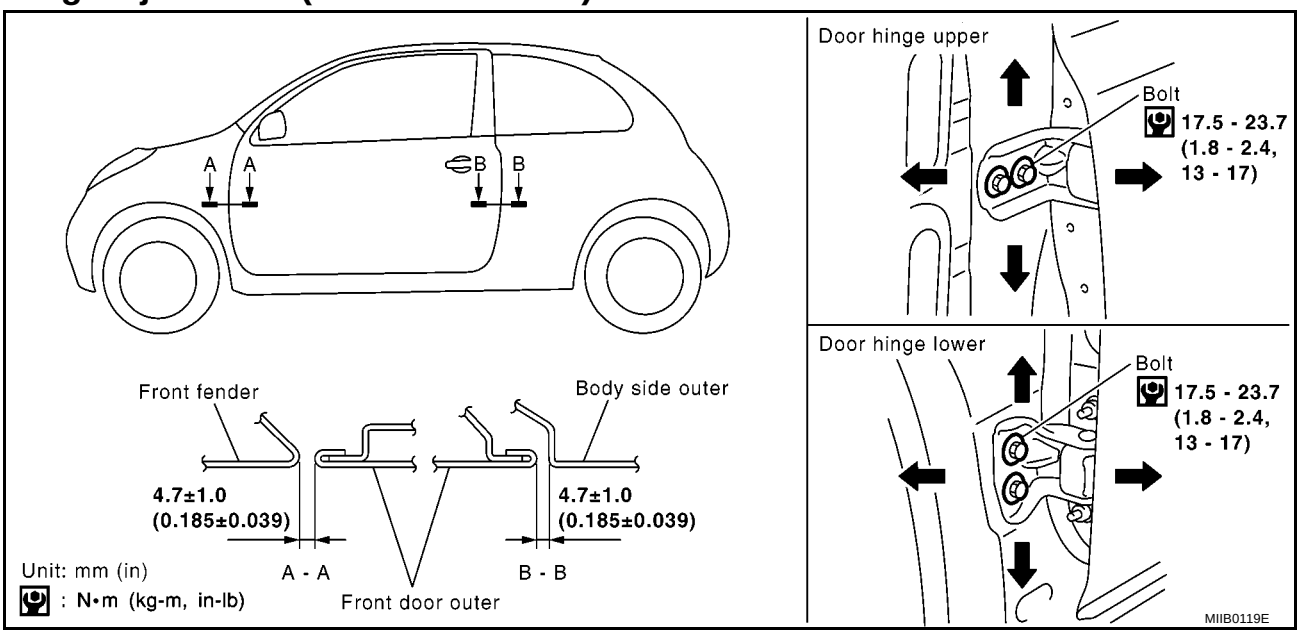
STRIKER ADJUSTMENT

Adjust the striker so that it becomes parallel with the lock inserting direction.



Fitting Adjustment (3-Door Vehicles)

EIS004N7



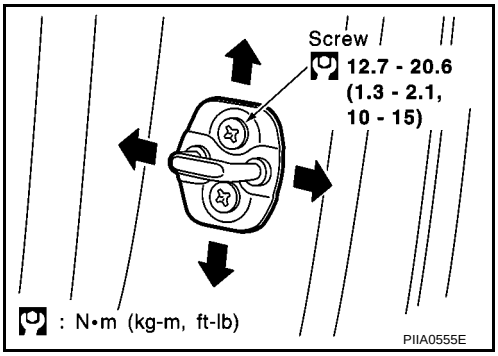
FRONT DOOR

Longitudinal Gap and Front End Height Difference Adjustment

1. Remove front fender. Refer to BL-14, "Removal and Installation" .
2. Loosen the hinge bolts on body, then lift the rear end of front door to adjust the clearance and surface difference properly.

STRIKER ADJUSTMENT

Adjust the striker so that it becomes parallel with the lock inserting direction.



Removal and Installation

EIS004N8

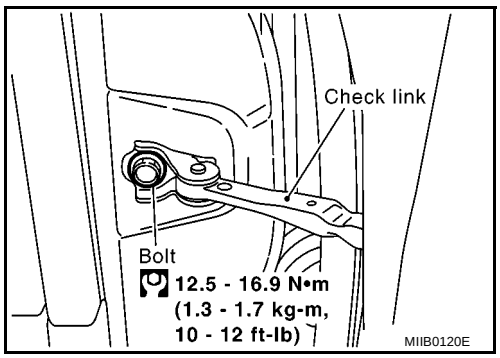
CAUTION:

- **During removal and installation of the door assembly, use a jack to support the door. Place a shop cloth or other suitable material onto the jack plate to protect the door and body from damage.**
- **After removal and installation of the door assembly, always adjust the fit.**
- **Check hinge rotating part for poor lubrication. If necessary, apply “Body Grease”.**

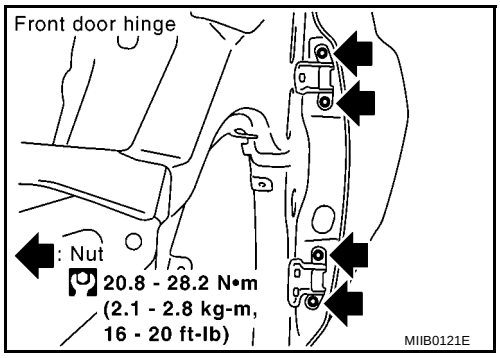
FRONT DOOR

1. Remove front door finisher. Refer to EI-16, "Removal and Installation" .
2. Remove door window. Refer to GW-69, "Removal and Installation" .
3. Remove connectors and harness clamps in front door, and then pull out harness from front door.

4. Remove check link bolts.

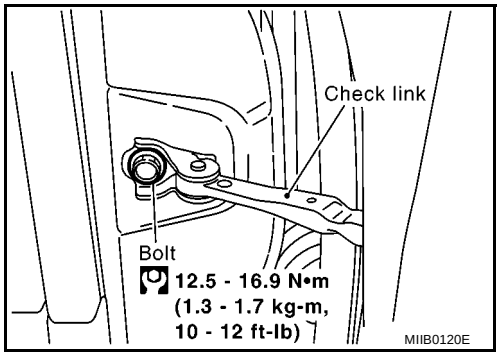


5. Remove hinge nuts on the door and then the door assembly. Install in the reverse order of removal.

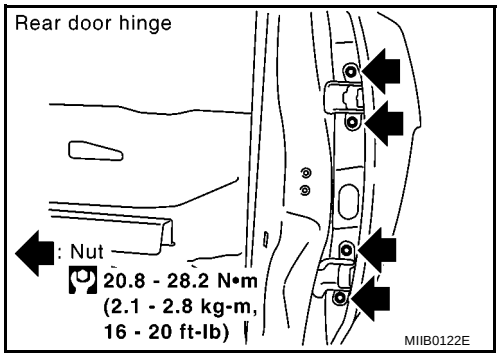


REAR DOOR

1. Remove rear door finisher. Refer to EI-16, "Removal and Installation" .
2. Remove door window. Refer to GW-72, "Removal and Installation" .
3. Remove connectors and harness clamps from rear door and then pull out harness from rear door.
4. Remove check link bolts.



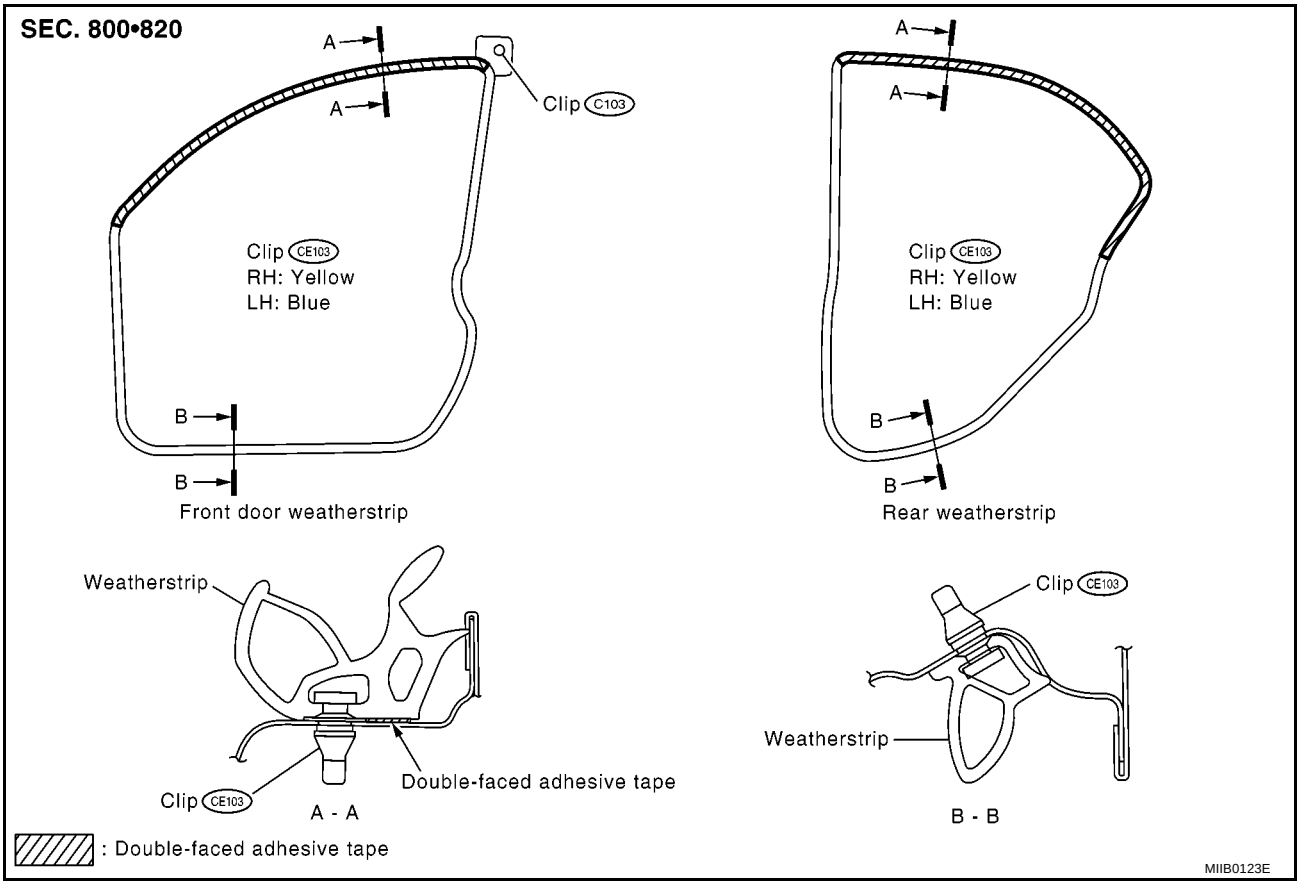
5. Remove hinge nuts on the door and then the door assembly. Install in the reverse order of removal.



Door Weatherstrip

EIS004N9

5 DOORS

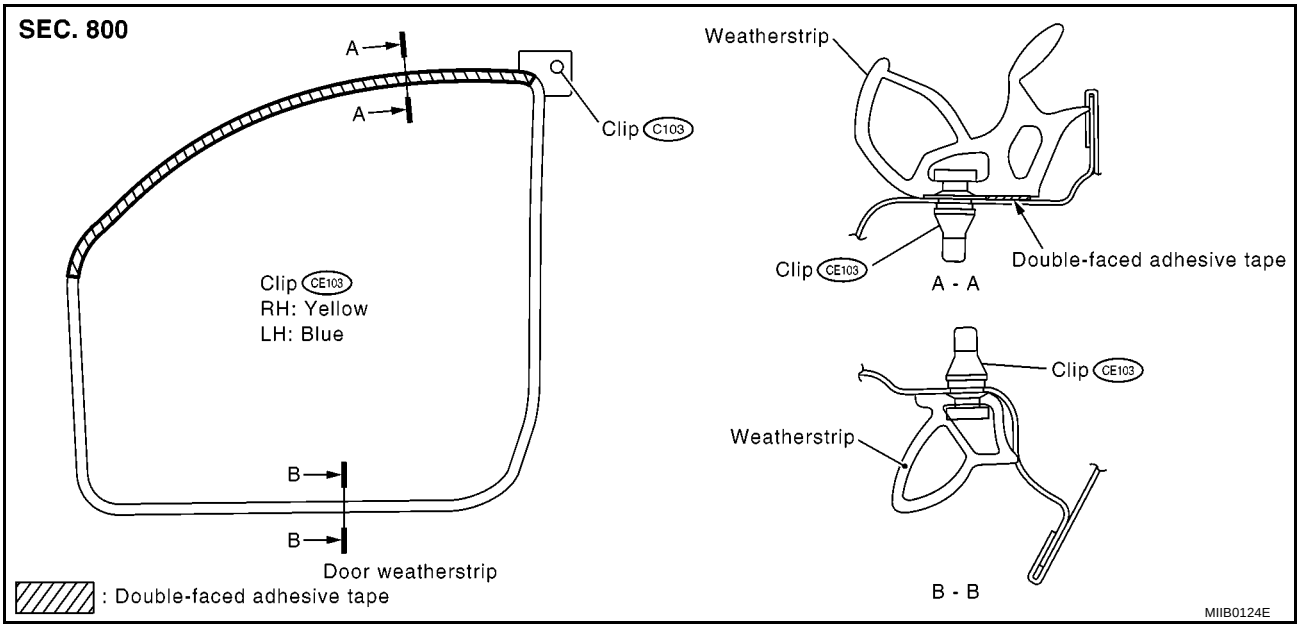


Double-sided tape (0.8 mm thick, 7 mm wide) : Product equivalent to Sumitomo 3M No. 5561

CAUTION:

During removal, if peeling off the double-sided tape is difficult, apply remover (product equivalent to Sumitomo 3M Cleaner 30) and then remove the double-sided tape. When using remover, keep it way from open flame and work in a sufficiently ventilated area.

3 DOORS



Double-sided tape (0.8 mm thick, 7 mm wide) : Product equivalent to Sumitomo 3M No. 5561

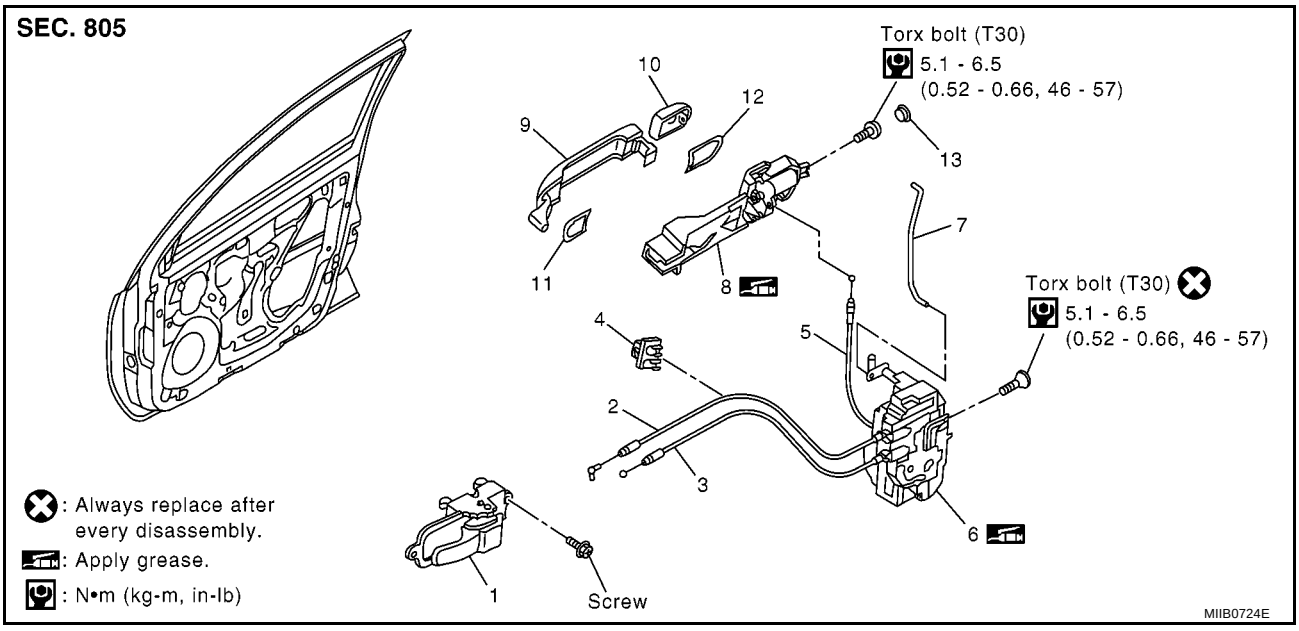
CAUTION:
During removal, if peeling off the double-sided tape is difficult, apply remover (product equivalent to Sumitomo 3M Cleaner 30) and then remove the double-sided tape. When using remover, keep it way from open flame and work in a sufficiently ventilated area.

FRONT DOOR LOCK

PFP:80502

Component Parts Location

EIS004NA



1. Inside handle
2. Lock knob cable
3. Inside handle cable
4. Holder
5. Outside handle cable
6. Door lock assembly
7. Key cylinder connecting rod
8. Outside handle bracket
9. Outside handle
10. *Door key cylinder assembly
11. Front gasket
12. Rear gasket
13. Grommet

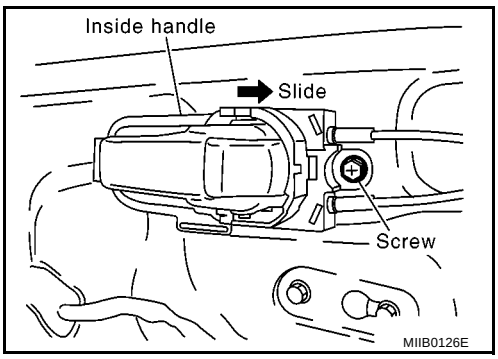
*: Outside handle escutcheon for vehicles with passenger door key cylinders.

Removal and Installation

EIS004NB

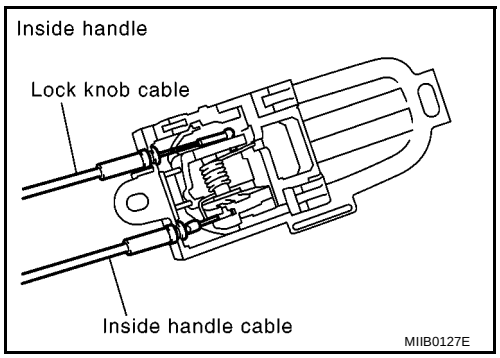
REMOVAL

1. Remove front door finisher. Refer to EI-16, "Removal and Installation" .
2. Fully close front door window.
3. Remove front door lower sash (rear). Refer to GW-69, "Removal and Installation" .
4. Remove inside handle cable and lock knob cable from holder.
5. Remove inside handle screws, slide handle toward rear of vehicle, disengage handle from door panel, and remove inside handle.

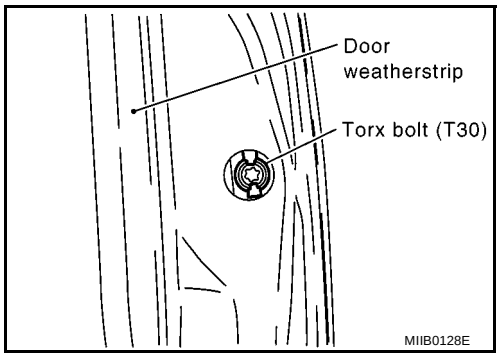


6. Disconnect inside handle cable and lock knob cable from inside handle.

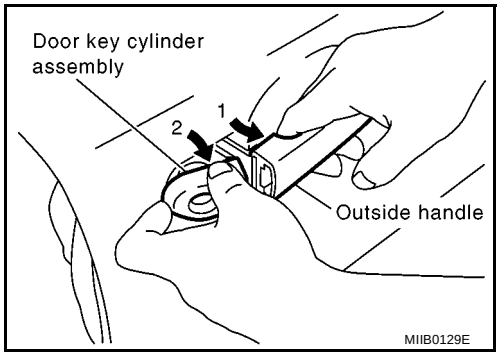
CAUTION:
During removal and installation, work so as not to bend the ends of the lock knob cable and inside handle cable.



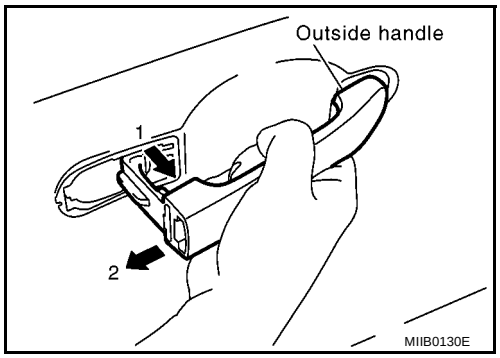
7. Remove door side grommets, and then remove door key cylinder assembly (escutcheon) bolts (Torx T30) from the grommet holes.
8. Remove key cylinder connecting rod (key cylinder side).: If there is no door key cylinder, GO TO 9.
9. Disconnect door antenna and door request switch connector and remove harness clamp. (Vehicle with intelligent key systems only)



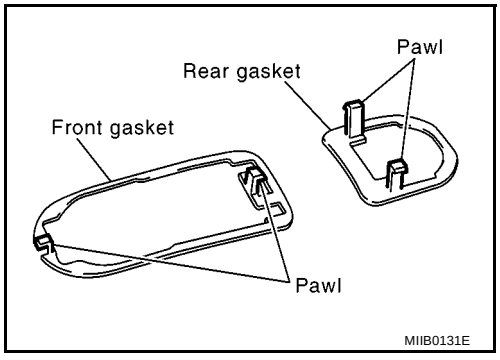
10. Remove door cylinder assembly while pulling outside handle forward.



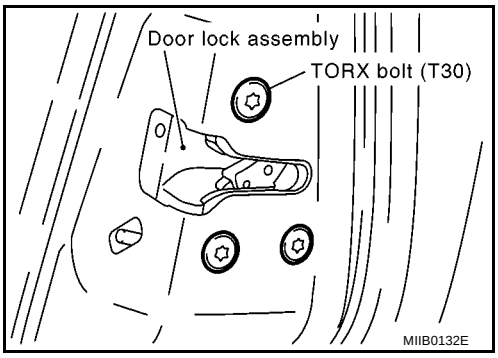
11. Pull outside door handle forward and then slide it toward vehicle rear to remove.



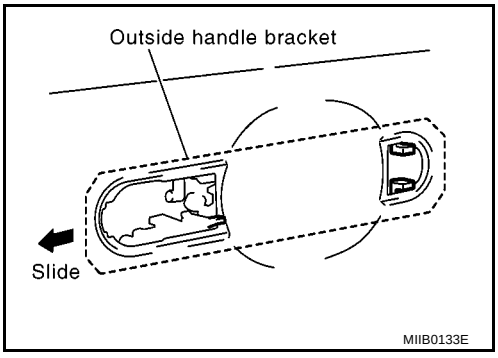
12. Remove front and rear gaskets.



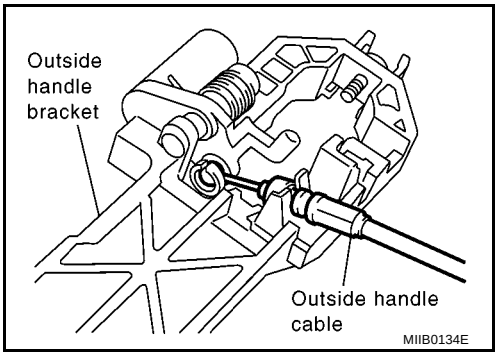
13. Remove door lock assembly bolts (Torx T30).



14. Slide outside handle bracket toward rear of vehicle, and then remove outside handle bracket and door lock assembly.
15. Disconnect door lock assembly connector.



16. Disconnect outside handle cable from outside handle bracket.



Install in the reverse order of removal.

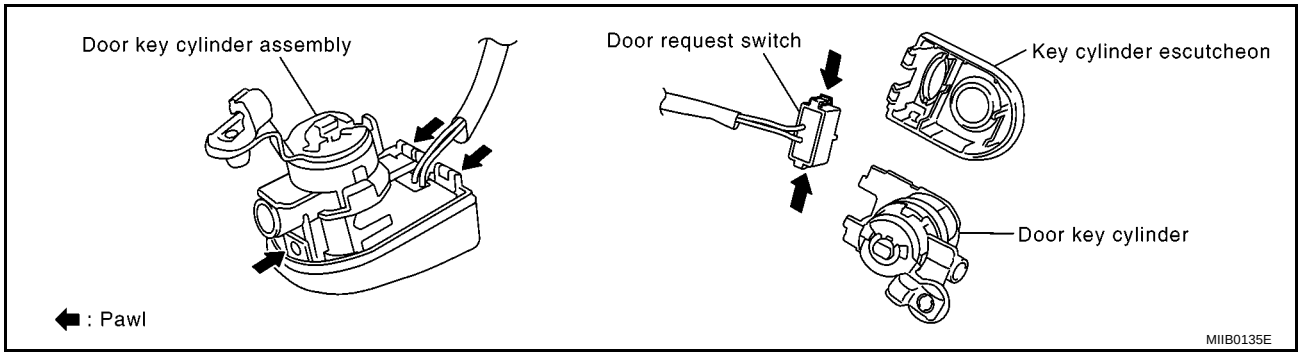
CAUTION:

- **Before installing door lock assembly, apply “anti-corrosion wax M-97 super” onto mounting seat on the body.**
- **Install each rod by rotating the rod holder until it engages with a tactile feel.**

Disassembly and Assembly

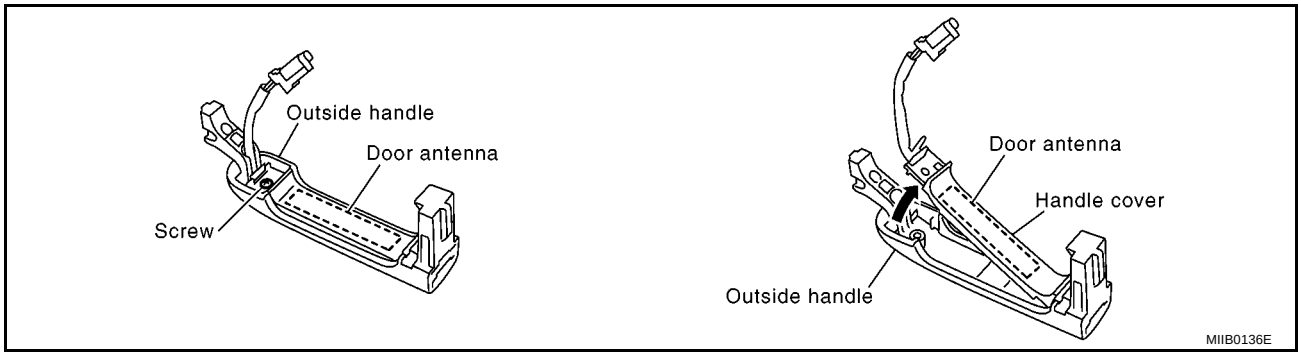
EIS004NC

DOOR KEY CYLINDER ASSEMBLY



1. Remove key cylinder escutcheon engagement (3 locations), and then remove door key cylinder.
2. Remove hook (2 locations) engagements, and then remove door request switch from key cylinder escutcheon. (Vehicles with intelligent key systems only)

OUTSIDE HANDLE



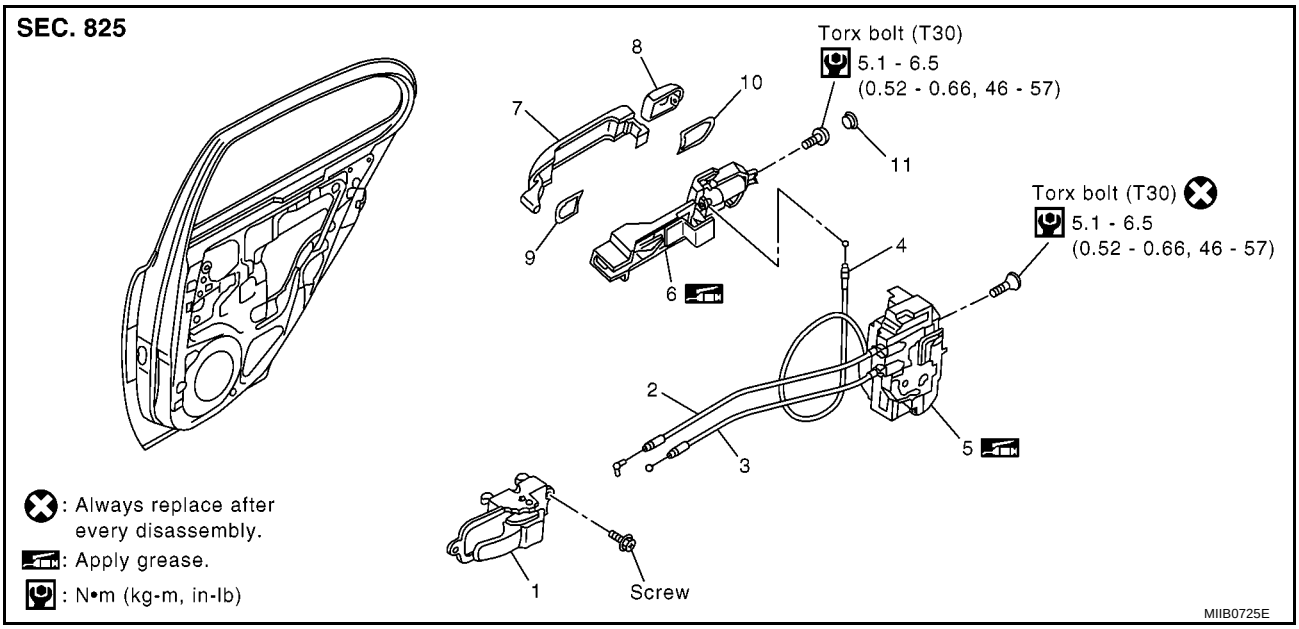
1. Remove handle cover screws.
2. Remove handle cover, and then remove door antenna. (Vehicles with intelligent key systems only)

REAR DOOR LOCK

PFP:82502

Component Parts Location

EIS004ND



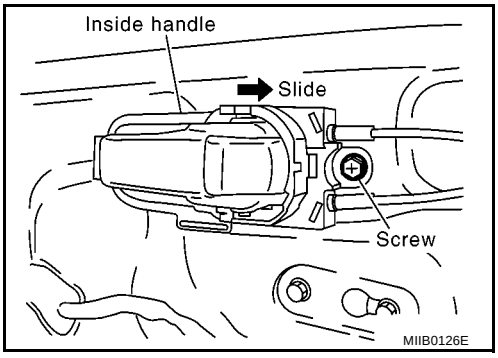
1. Inside handle
2. Lock knob cable
3. Inside handle cable
4. Outside handle cable
5. Door lock assembly
6. Outside handle bracket
7. Outside handle
8. Outside handle escutcheon
9. Front gasket
10. Rear gasket
11. Grommet

Removal and Installation

EIS004NE

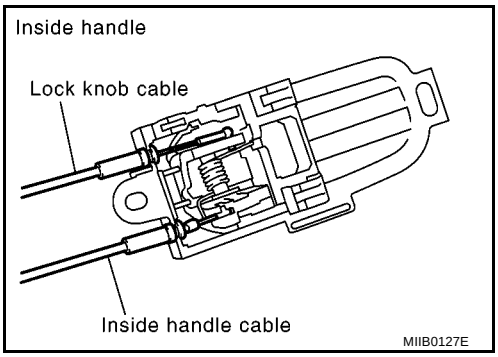
REMOVAL

1. Remove rear door finisher. Refer to EI-16, "Removal and Installation" .
2. Remove partition sash. Refer to GW-72, "Removal and Installation" .
3. Support door glass while lifting it up to the door window completely closed position.
4. Remove inside handle bolts, slide handle toward rear of vehicle, remove engagement with door panel, and remove inside handle.

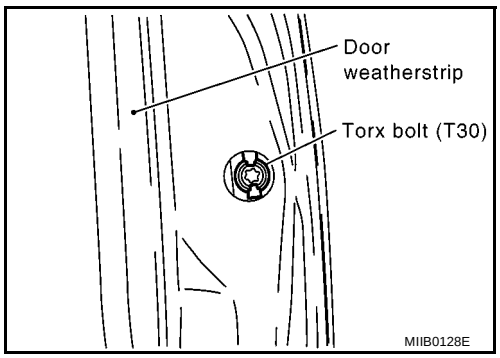


5. Disconnect inside handle cable and lock knob cable from inside handle.

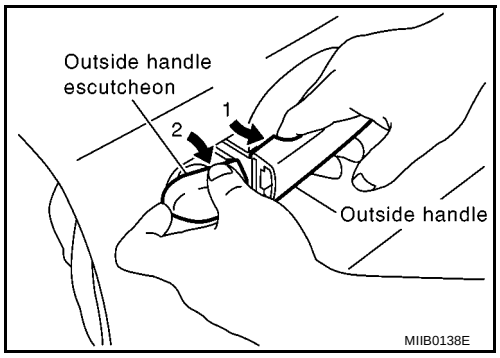
CAUTION:
During removal and installation, work so as not to bend the ends of the lock knob cable and inside handle cable.



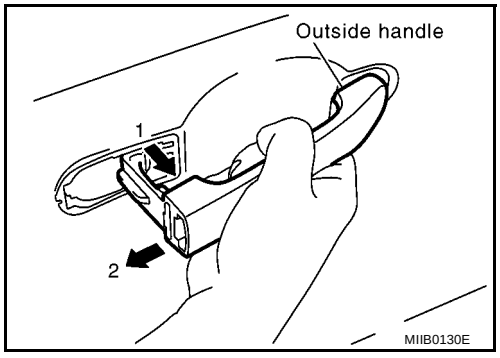
6. Remove door side grommets, and then remove outside handle escutcheon screws (Torx T30) from grommet holes.



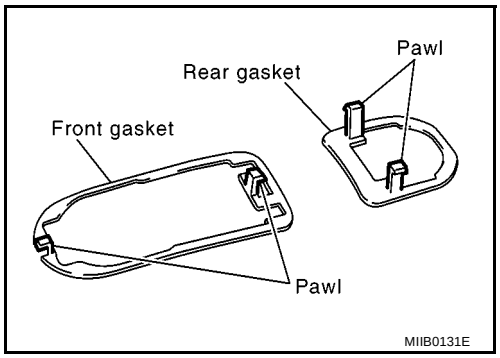
7. Pull outside handle forward while removing outside handle escutcheon.



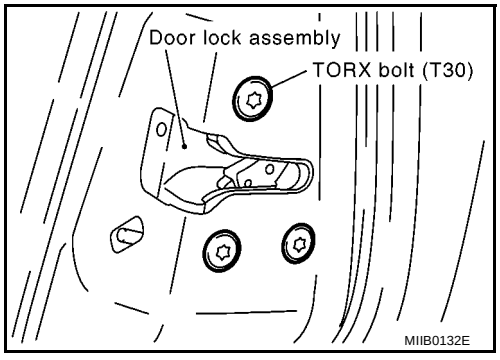
8. Pull outside door handle forward and then slide it toward vehicle rear to remove.



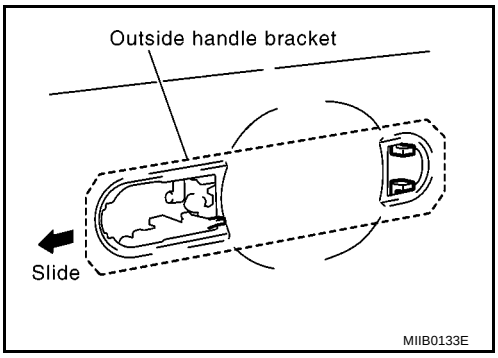
9. Remove front and rear gaskets.



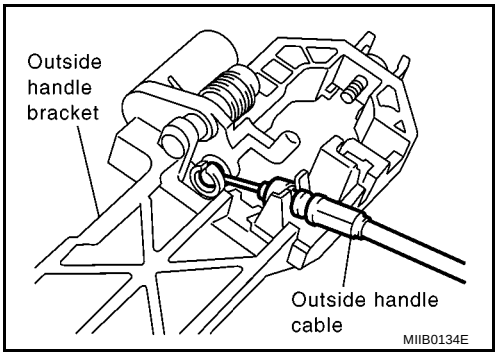
10. Remove door lock assembly screws (Torx T30).



11. Slide outside handle bracket toward rear of vehicle, and then remove outside handle bracket and door lock assembly.
12. Disconnect door lock assembly connector.



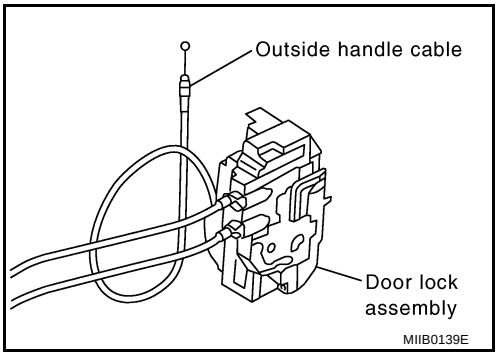
13. Disconnect outside handle cable from outside handle bracket.



Install in the reverse order of removal.

CAUTION:

- **Before installing door lock assembly, apply “anti-corrosion wax M-97 super” onto mounting seat on the body.**
- **When installing door lock assembly, be careful when rotating the outside handle cable as shown in the figure.**
  - **Place the outside handle bracket cable on the outside of door lock assembly before installing.**

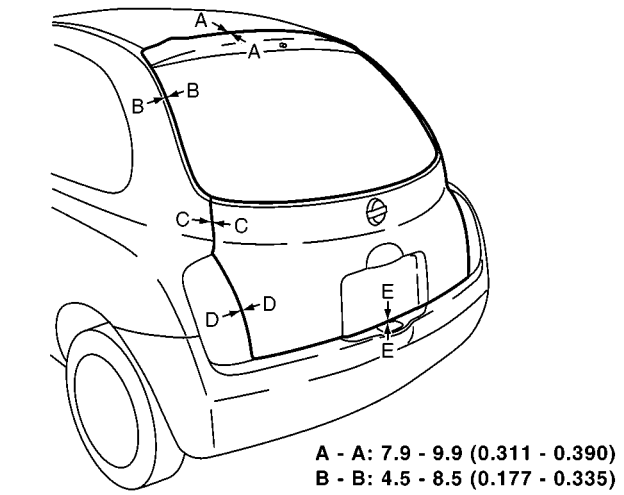


BACK DOOR

PFP:90100

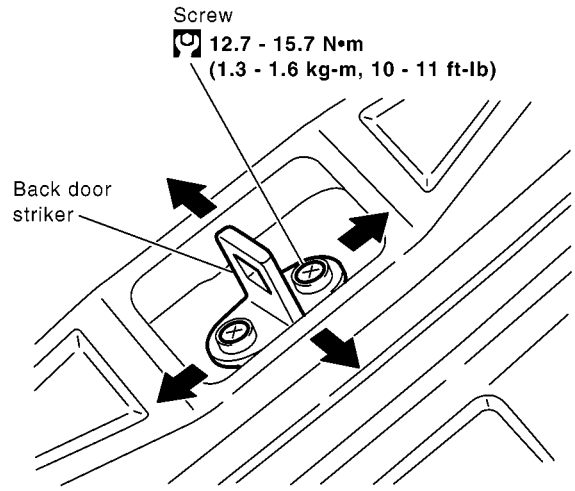
Fitting Adjustment

EIS004NF



A - A: 7.9 - 9.9 (0.311 - 0.390)
B - B: 4.5 - 8.5 (0.177 - 0.335)
C - C: 4.5 - 6.9 (0.177 - 0.272)
D - D: 4.0 - 8.0 (0.157 - 0.315)
E - E: 5.9 - 9.9 (0.232 - 0.390)

Unit: mm (in)



MIIB0140E

VERTICAL/LATERAL CLEARANCE (SURFACE DIFFERENCE) ADJUSTMENT

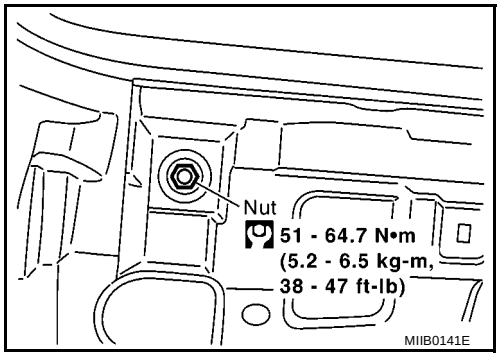
1. Remove luggage rear plate. Refer to EI-26, "Removal and Installation" .
2. Loosen back door striker screws.
3. Use a rubber hammer, etc., to strike back door striker to make the gap on the right and left and with the rear bumper even, and then tighten striker screws to specified torque.

CAUTION:

Adjust gap between back door and other areas to attain the right and left dimensional difference shown below.

Back door glass (B) - Body side outer (B)	**: 2.0 mm or less**
Back door outer (C) - Body side outer (C)	**: 1.5 mm or less**
Back door outer (D) - Rear combination lamp (D)	**: 2.0 mm or less**

4. If following the steps above does not result in fine adjustment, remove headliner and loosen the hinge nuts on vehicle for further adjustment.
   For removing headliner, refer to EI-24, "Removal and Installation" .



MIIB0141E

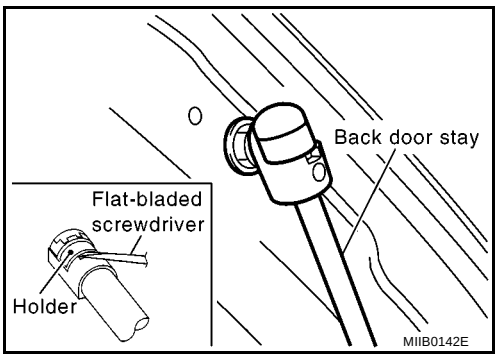
Back Door Assembly

EIS004NG

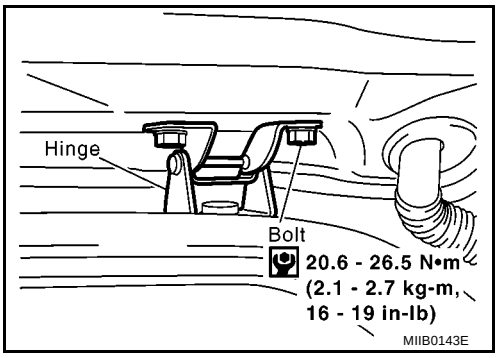
REMOVAL

1. Remove back door finisher. Refer to EI-18, "Removal and Installation" .
2. Disconnect connectors in back door and unclamp harness. Pull out harness from back door.

3. After supporting the back door lock to keep it from falling, use a screwdriver, etc., to remove the back door stay (glass stay) door side hooks, and then pull out back door stay from stud pole.

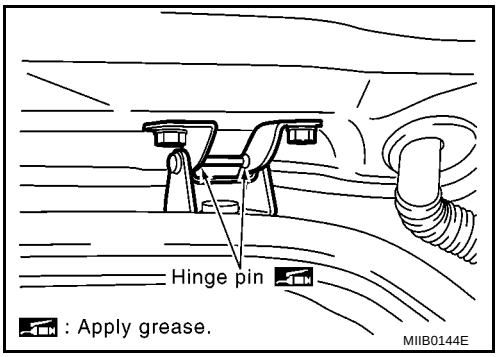


4. Remove back door hinge bolts, and then remove back door assembly.



INSPECTION

1. Check hinges for the following:
   - Unusual noise or door closing and opening effort
   - Component wear or damage
2. Apply body grease to the rotating part of the hinge.

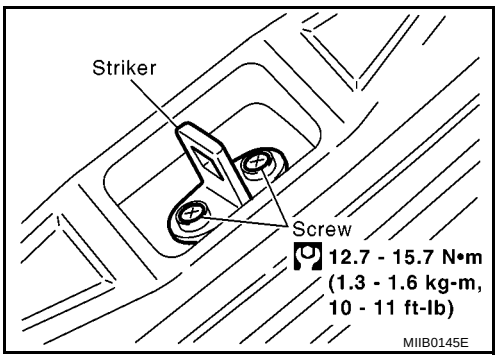


Back Door Striker

EIS004NH

REMOVAL

1. Remove luggage rear plate. Refer to EI-26, "Removal and Installation" .
2. Remove screws and back door striker.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

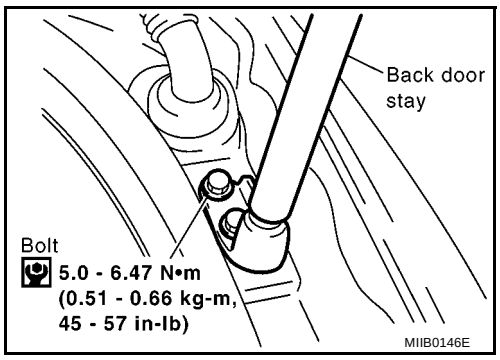
- **After finishing work, confirm proper operation.**
- **After finishing work, adjust fitting. Refer to BL-216, "Fitting Adjustment" .**

Back Door Stay Assembly

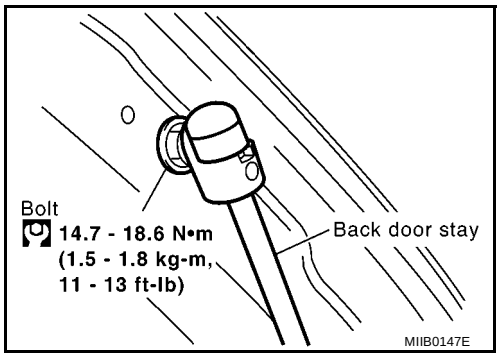
EIS004NI

REMOVAL

1. Support back door lock to prevent it from falling.
2. Remove back door stay assembly (gas stay) vehicle side bracket bolts.



3. Remove back door stud balls, and then remove back door stay assembly from back door.



INSTALLATION

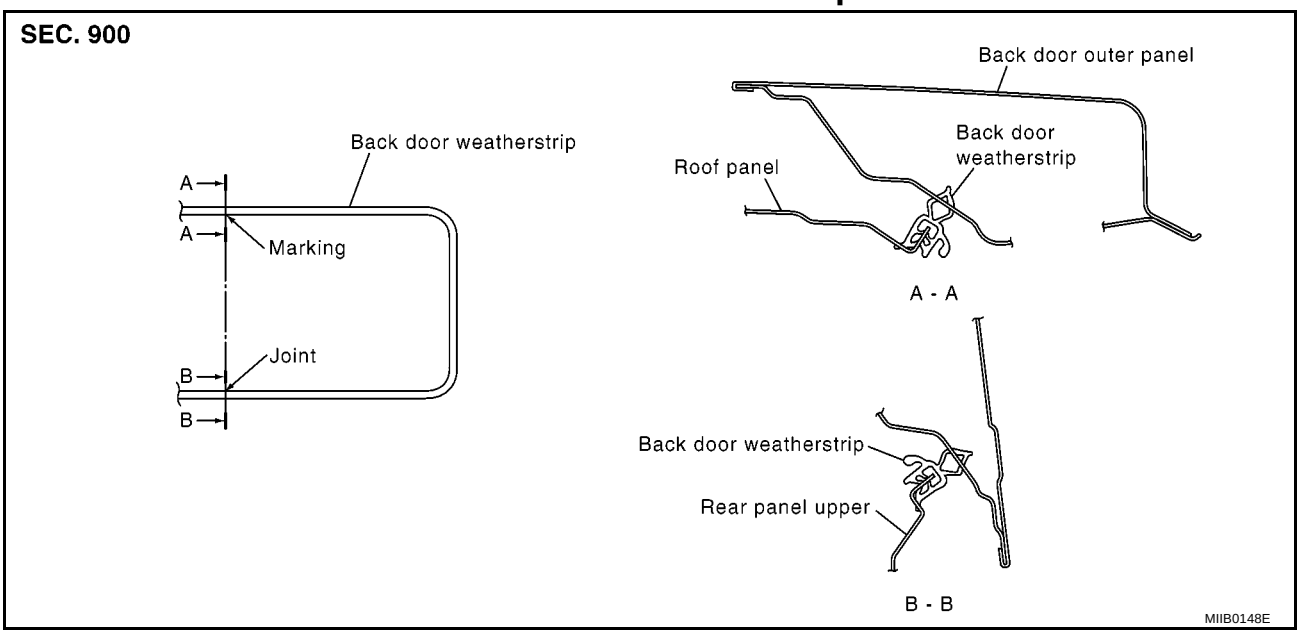
Install in the reverse order of removal.

CAUTION:

- **After finishing work, confirm proper operation.**

Removal and Installation of Back Door Weatherstrip

EIS004NJ



REMOVAL

Pull up and remove engagement with body from weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weatherstrip.

INSTALLATION

Install in the reverse order of removal.

- Working from the upper section, align weatherstrip mark with vehicle center position mark and install weatherstrip onto the back door.
- For the lower section, align the weatherstrip seam with center of the striker.
- After finishing work, pull weatherstrip lightly to check for looseness.
- Make sure the weatherstrip is fit tightly at each corner and luggage rear plate.

BACK DOOR LOCK

PFP:90504

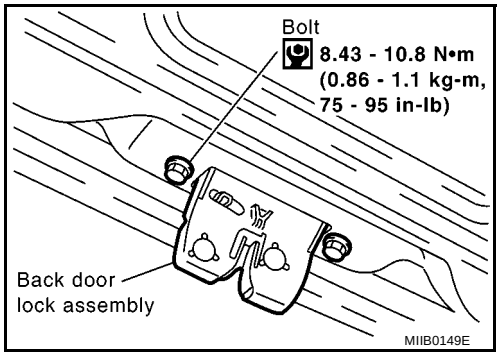
Removal and Installation

EIS004NK

BACK DOOR LOCK ASSEMBLY

Removal

1. Remove back door finisher. Refer to EI-18, "Removal and Installation" .
2. Disconnect back door lock assembly connector.
3. Remove bolts to remove back door lock assembly from inside back door panel.



Installation

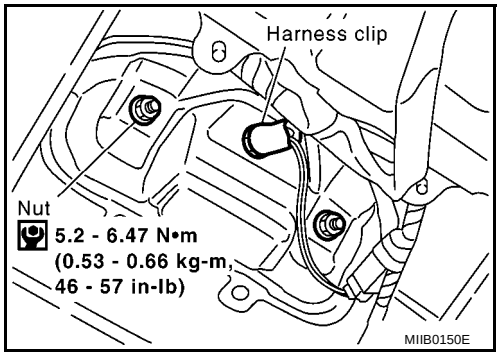
Install in the reverse order of removal.

- If greasing condition in each sliding section on back door assembly is poor, apply “BODY GREASE”.
- After finishing work, confirm proper operation.

BACK DOOR HANDLE ASSEMBLY

Removal

1. Remove back door finisher. Refer to EI-18, "Removal and Installation" .
2. Remove back door request switch (vehicles with intelligent key systems) and back door open switch harness fastening clips and connectors.
3. Remove back door handle assembly nuts, and then remove back door handle assembly.



Installation

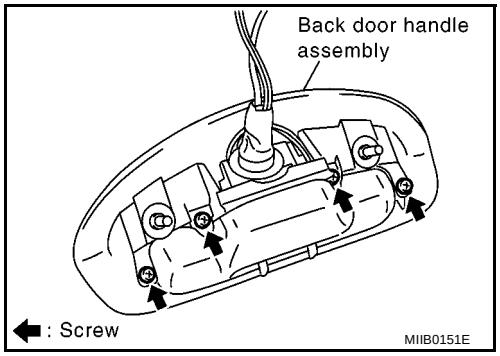
Install in the reverse order of removal.

CAUTION:

After finishing work, confirm proper operation.

Disassembly and Assembly

Remove screws, and then remove back door request switch (vehicles with intelligent key systems) and back door open switch.

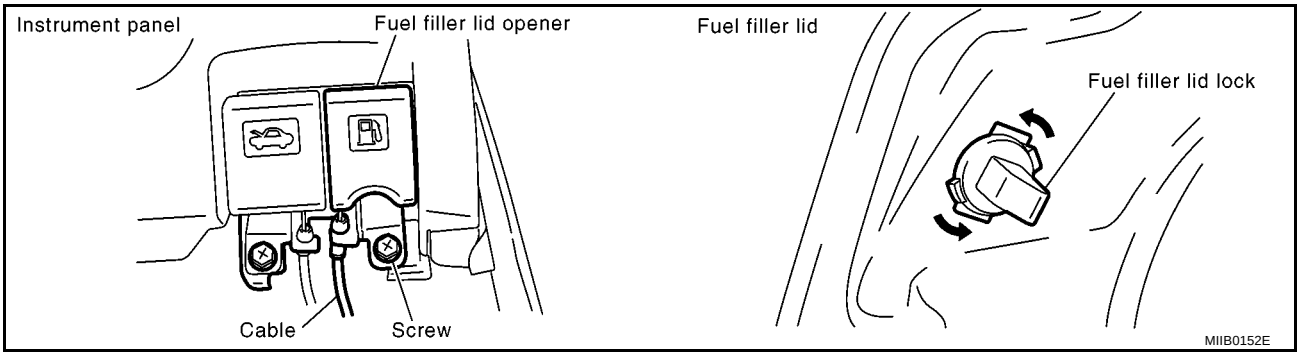


FUEL FILLER LID OPENER

PFP:78820

Component Parts Location

EIS004NL

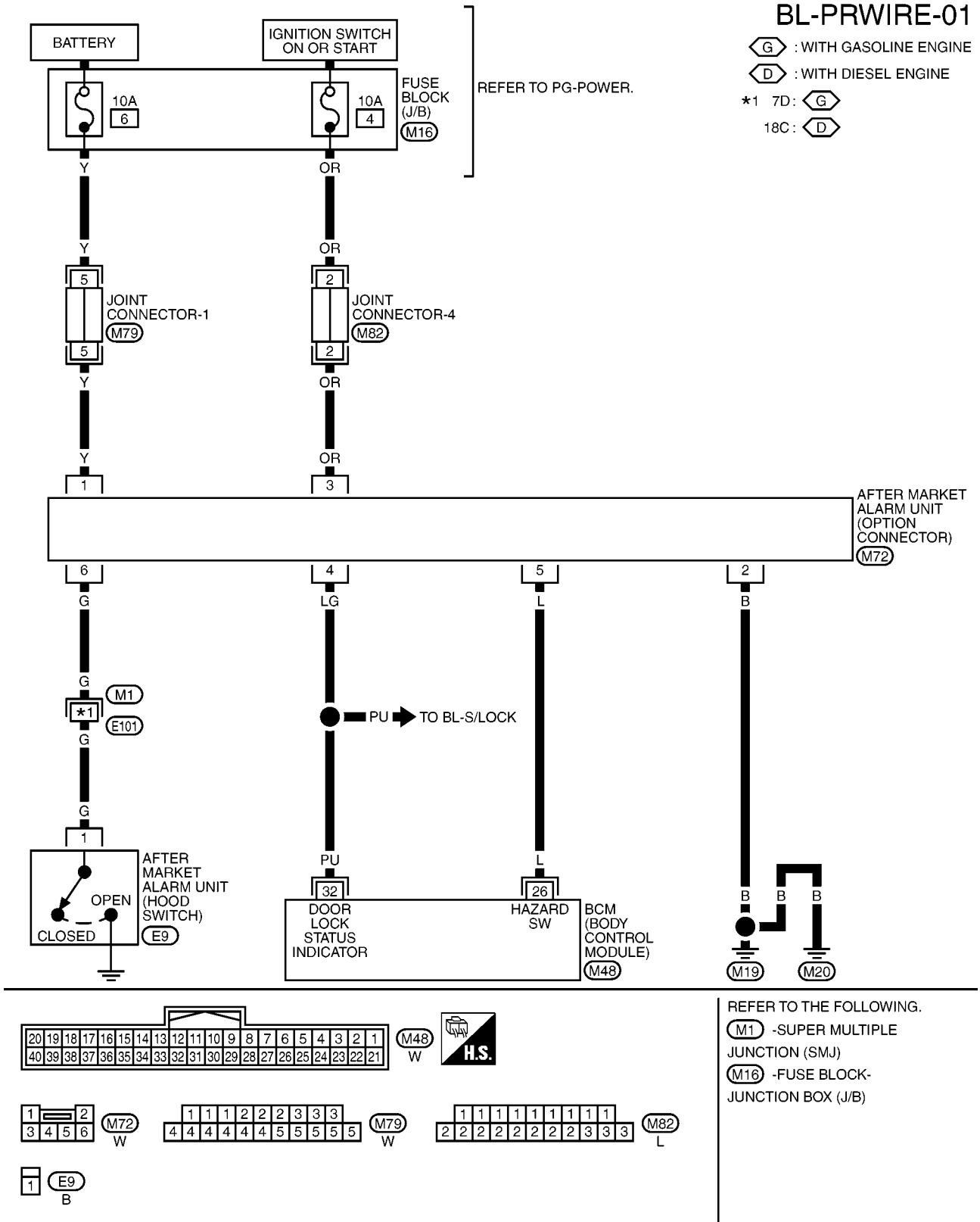


THEFT WARNING SYSTEM

PFP:25362

Wiring Diagram — THEFT —/PRWIRE

EIS0055I



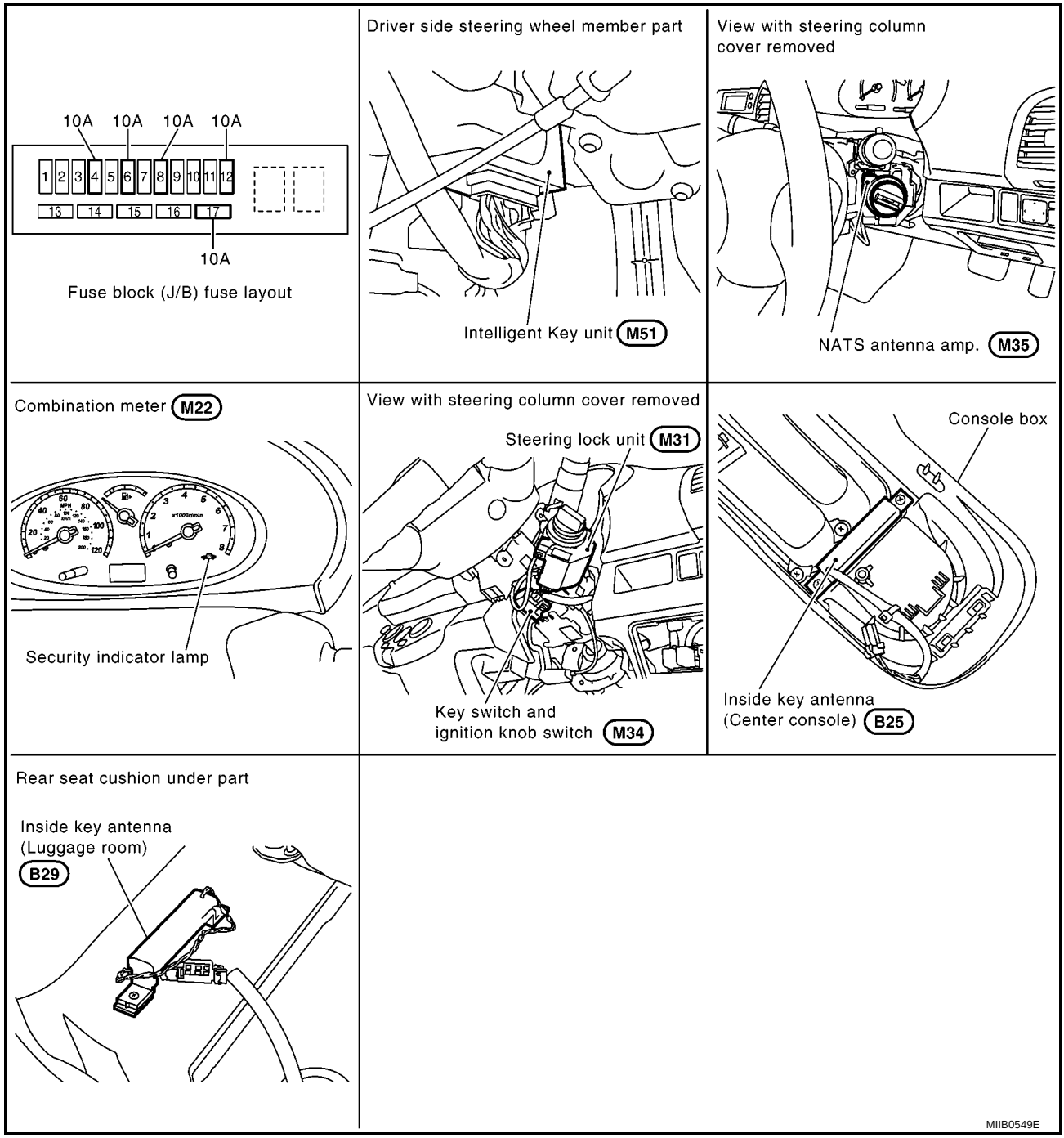
MKWA1797E

NATS(NISSAN ANTI-THEFT SYSTEM)

PFP:28591

Component Parts and Harness Connector Location

EIS004Q1



NOTE:
If customer reports a “NO START” condition, request ALL ignition key (without intelligent key system) or mechanical key (with intelligent key system) to be brought to the dealer to check for a NATS malfunction.

System Description

EIS004Q2

DESCRIPSTION

NATS (Nissan Anti-Theft System) has the following immobilizer functions:

- Engine immobilizer shows high anti-theft performance to prevent engine start by other than the owner (registered key: ignition key, mechanical key and Intelligent Key).

- Only a key with key ID registered in BCM (without Intelligent Key system) or Intelligent Key unit (with Intelligent Key system) and ECM can start engine, and shows high anti-theft performance to prevent key from being copied or stolen.
- In the vehicle without Intelligent Key system, security indicator always flashes with other than ignition switch ON or START position.
- In the vehicle with Intelligent Key system, security indicator always flashes with mechanical key removed condition (key switch OFF) and ignition knob released condition on LOCK position (ignition knob switch OFF).
- Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system.
- If system detects malfunction, it turns on security indicator in ignition switch ON position.
- If the owner requires, mechanical key ID can be registered for up to 5 keys.
- During trouble diagnosis or when the following parts have been replaced, and if ignition key or mechanical key is added, registration* is required.
  *: All keys kept by the owner of the vehicle should be registered with ignition key or mechanical key.

– ECM
– BCM (models without Intelligent Key system)
– Intelligent Key unit (models with Intelligent Key system)
– Ignition key (models without Intelligent Key system)
– Mechanical key (models with Intelligent Key system)

- NATS trouble diagnoses, system initialization and additional registration of other ignition key or mechanical key IDs must be carried out using CONSULT-II hardware and CONSULT-II NATS software. When NATS initialization has been completed, the ID of the inserted ignition key or mechanical key is automatically registered. Then, if necessary, additional registration of other ignition key or mechanical key IDs can be carried out. Regarding the procedures of NATS initialization and ignition key or mechanical key ID registration, refer to CONSULT-II operation manual, NATS.

SECURITY INDICATOR

- Warns that the vehicle has NATS (Nissan Anti-Theft System).
- In the vehicle without Intelligent Key system, security indicator always flashes with other than ignition switch ON or START position. In the vehicle with Intelligent Key system, security indicator always flashes with mechanical key removed condition (key switch OFF) and ignition knob released condition on LOCK position (ignition knob switch OFF).

  NOTE:
  Because security indicator is highly efficient, the battery is barely affected.

Condition of Security Indicator (Normal)

WITHOUT INTELLIGENT KEY SYSTEM

Security indicator condition	Ignition key	Operation or condition of ignition key			
		Ignition switch: ON position	Ignition switch: ACC position	Ignition switch: OFF position (Key is inserted.)	Ignition switch: OFF position (Remove key.)
	Register key	OFF	Flashing	Flashing	Flashing
	Ignition key not registered	ON	Flashing	Flashing	Flashing

WITH INTELLIGENT KEY SYSTEM

- In ignition knob operation with Intelligent Key, it always turns on with pushing ignition knob, and always flashes with ignition knob released (ignition knob switch OFF) condition on ignition knob “LOCK” position.
- In ignition knob operation with mechanical key, it turns off on the condition that mechanical key is inserted in key cylinder, and always flashes with ignition knob released (ignition knob switch OFF) condition on mechanical key removed condition.

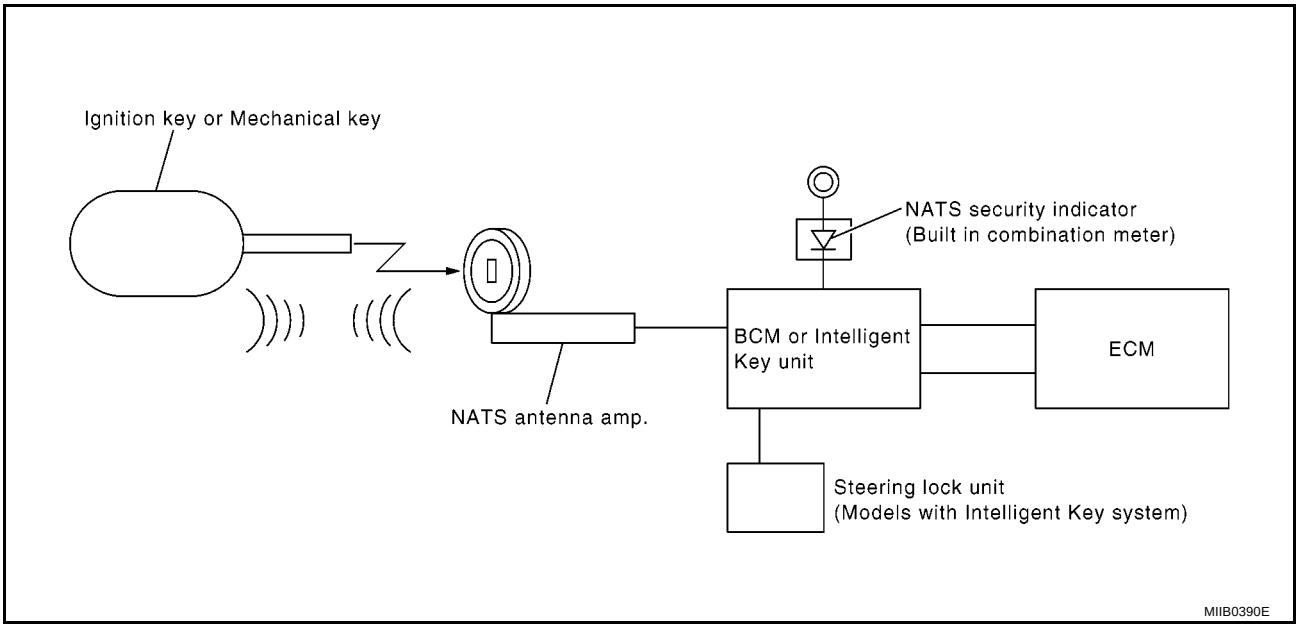
System Composition

EIS004Q3

The immobilizer function of the NATS consists of the following:

- Ignition key (models without Intelligent Key system)
- Mechanical key (models with Intelligent Key system)
- NATS antenna amp.
- Steering lock unit. (models with Intelligent Key system)
- BCM (models without Intelligent Key system)
- Intelligent Key unit (models with Intelligent Key system)
- Engine control module (ECM)
- Security indicator (built-in combination meter)

NOTE:
The communication between ECM and BCM/Intelligent Key unit uses the CAN communication system.



ECM Re-communicating Function

EIS004Q4

Performing following procedure can automatically perform re-communication of ECM and BCM or Intelligent Key unit, but only when the ECM has been replaced with a new one (*1).
*1: New one means a virgin ECM which has never been energized on-board.
(In this step, initialization procedure by CONSULT-II is not necessary)

NOTE:

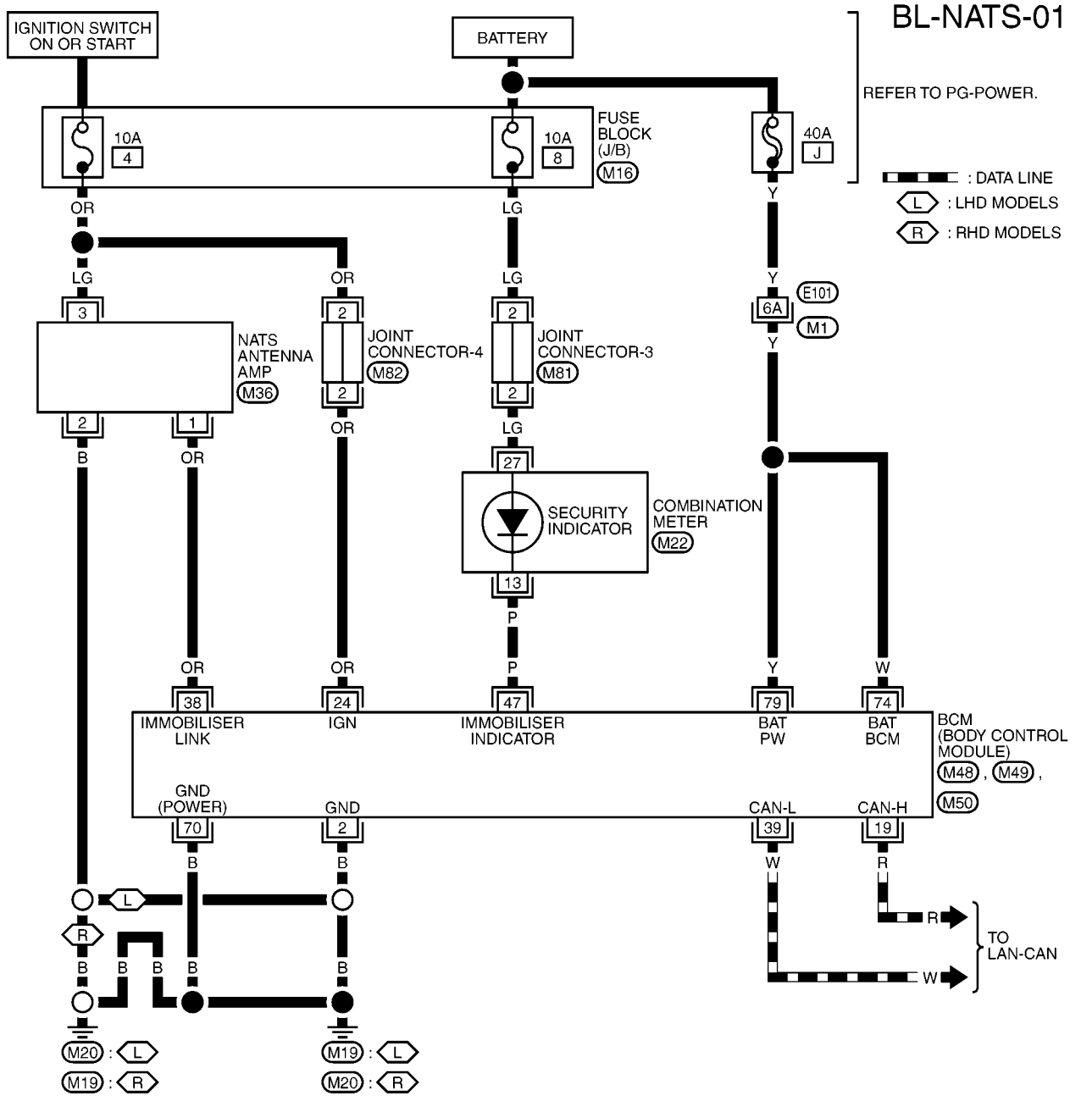
- **When registering new Key IDs or replacing the ECM other than brand new, refer to CONSULT-II Operation Manual NATS.**
- **If multiple keys are attached to the key holder, separate them before work.**
- **Distinguish keys with unregistered key ID from those with registered ID.**

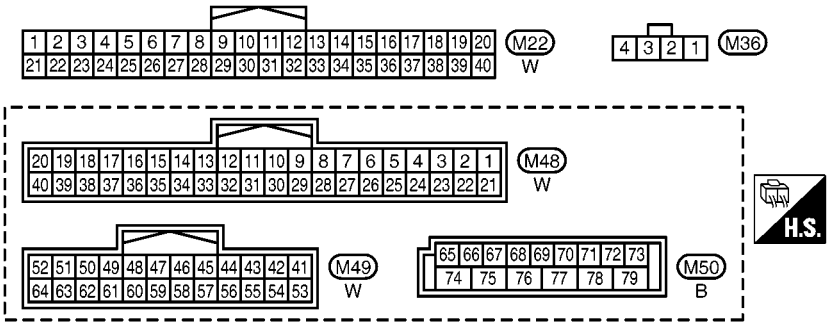
1. Install ECM.
2. Using a registered key (*2), turn ignition switch to “ON”.
   *2: To perform this step, use the key that has been used before performing ECM replacement.
3. Maintain ignition switch in “ON” position for at least 5 seconds.
4. Turn ignition switch to “OFF”.
5. Start engine.
   If engine can be started, procedure is completed.
   If engine cannot be started, refer to CONSULT-II Operation Manual NATS and initialize control unit.

Wiring Diagram —NATS—

EIS004Q6

WITHOUT INTELLIGENT KEY SYSTEM

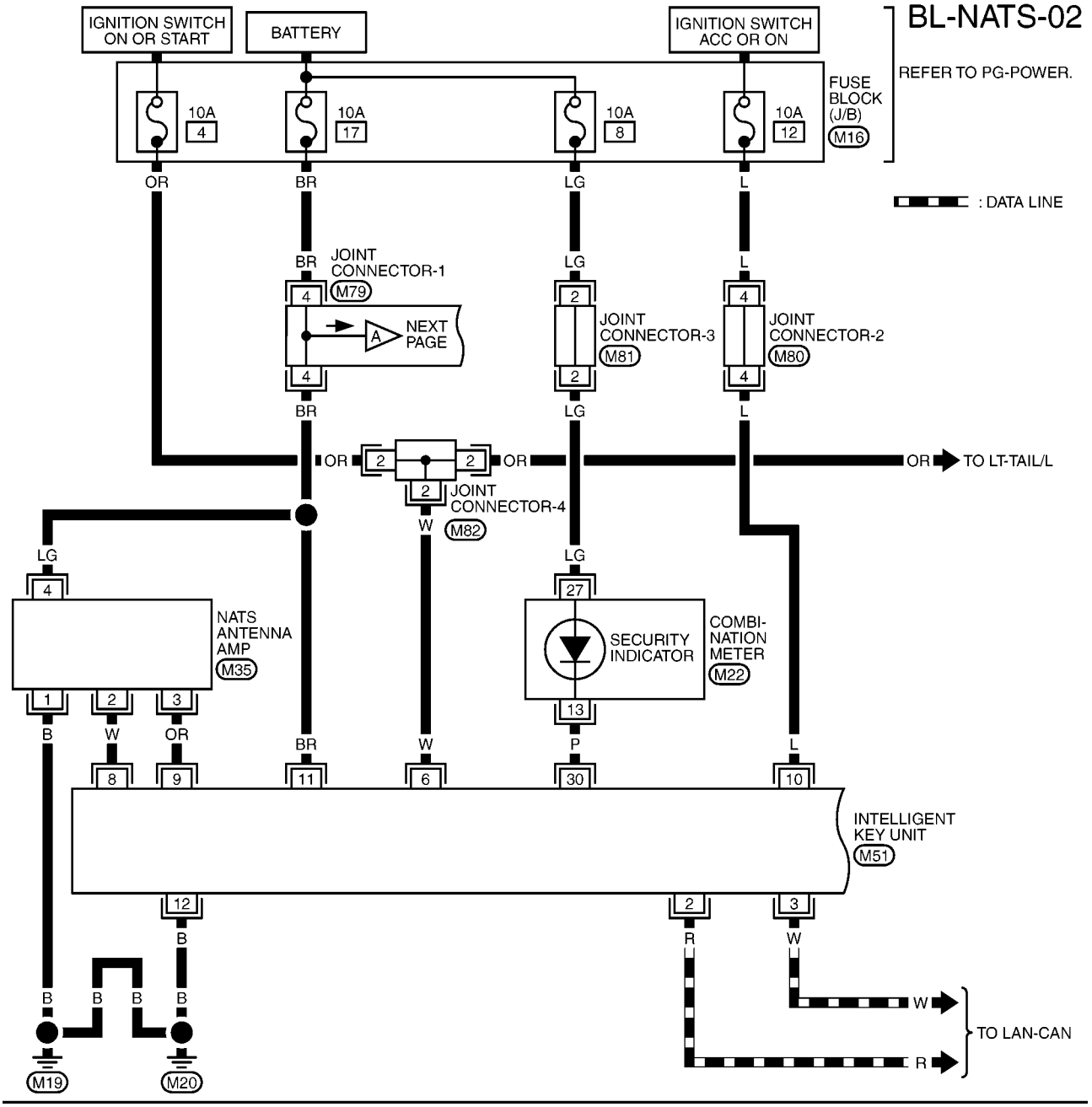


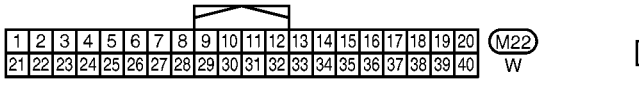


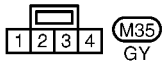
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M81, M82 -JOINT CONNECTOR (J/C)

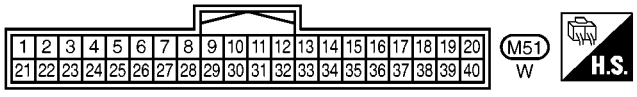
MKWA1415E

WITH INTELLIGENT KEY SYSTEM





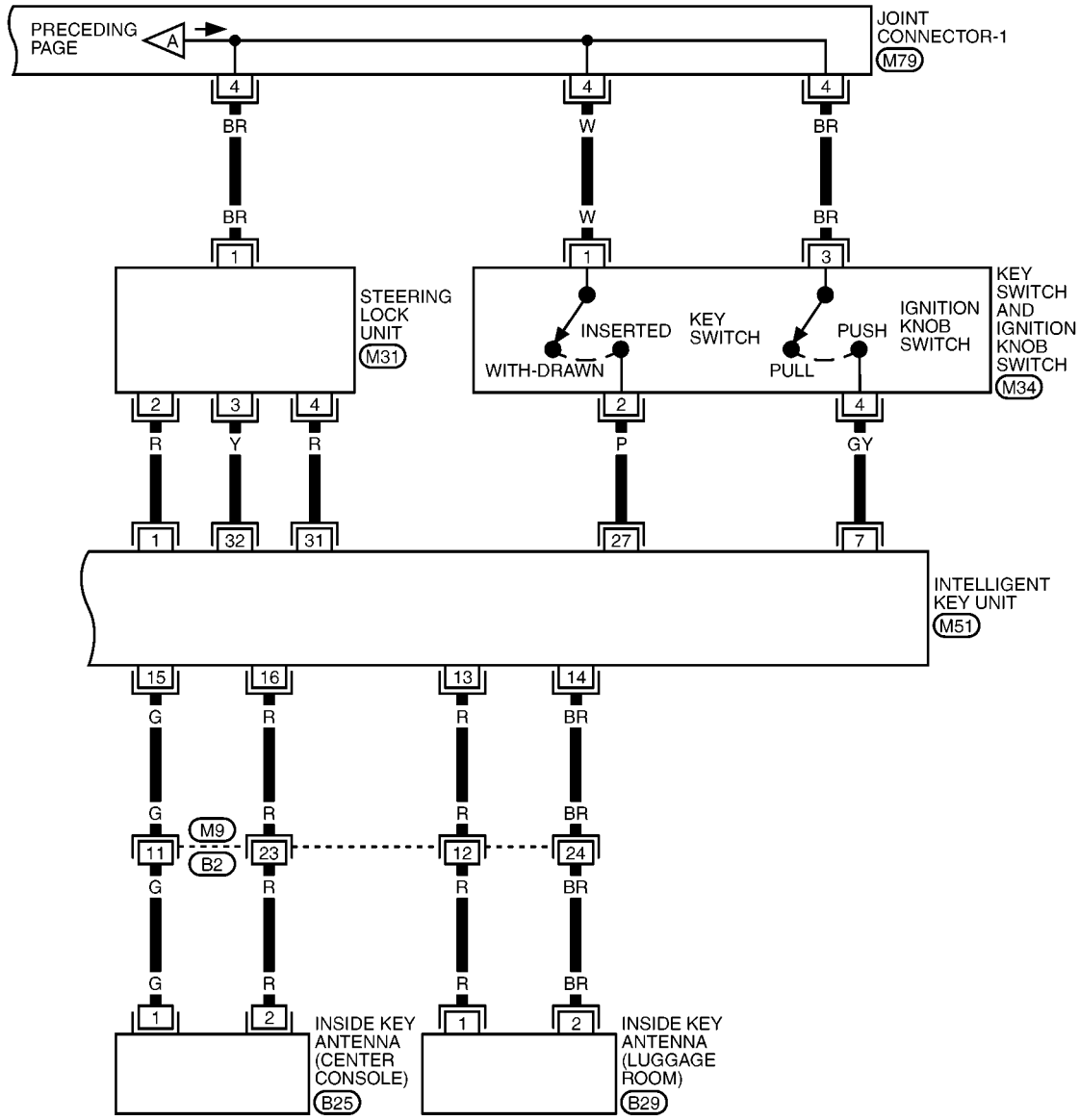


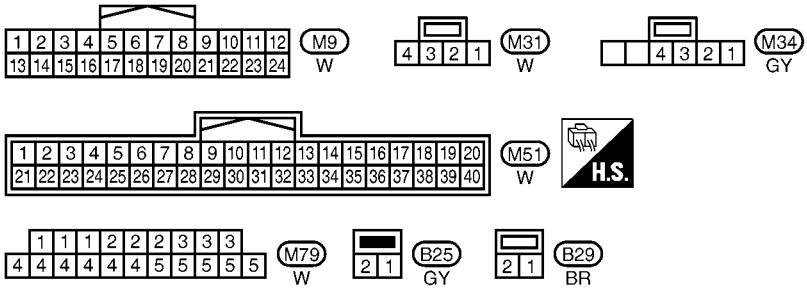


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)
M79, M80, M81, M82
-JOINT CONNECTOR (J/C)

MKWA1798E

BL-NATS-03

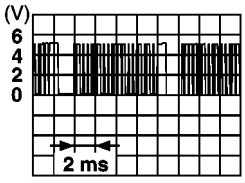




MKWA1799E

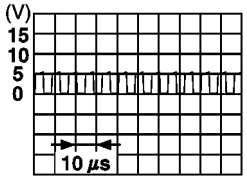
Terminals and Reference Value for Steering Lock Unit/with Intelligent Key System

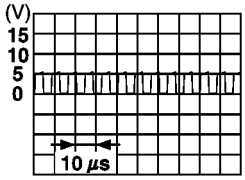
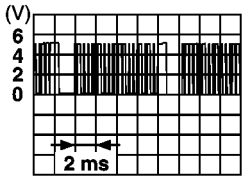
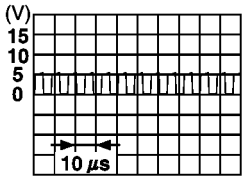
EIS004Q7

Terminal number	Wire color	Signal Designation	Measuring condition		Voltage (V)
			Ignition knob position	Operation or conditions	
1	BR	Battery power supply	LOCK	—	Approx. 12
2	R	Steering wheel lock unit power supply	LOCK	—	Approx. 5
3	Y	Steering wheel lock unit communication signal	LOCK	Press ignition knob with Intelligent Key inside vehicle.	 SIIA1911J
				Other than the above	Approx. 5
4	R	Steering wheel lock unit ground	—	—	Approx. 0

Terminals and Reference Value for Intelligent Key Unit/with Intelligent Key System

EIS004Q8

Terminal No.	Wire color	Signal designation	Measuring condition		Voltage (V)
			Ignition knob position	Operation or conditions	
1	R	Steering wheel lock unit power supply	LOCK	—	Approx. 5
2	R	CAN communication H	—	—	—
3	W	CAN communication L	—	—	—
6	W	Ignition power supply	ON	—	Approx. 12
7	GY	Ignition knob switch	—	Press ignition knob.	Approx. 12
				Return ignition knob to LOCK position.	Approx. 0
8	W	NATS antenna amp.	—	Ignition knob OFF → ON position	Just after turning ignition switch “ON” pointer tester
9	OR	NATS antenna amp.	—	Ignition knob OFF → ON position	Should move, Just after turning ignition switch “ON” pointer tester
10	L	ACC power supply	ACC	—	Approx. 12
11	BR	Battery power supply	—	—	Approx. 12
12	B	GND	—	—	Approx. 0
13	R	Inside key antenna (+) (Luggage room)	LOCK	Any door open → all doors shut (Door switch: ON → OFF)	 SIIA1910J
14	BR	Inside key antenna (-) (Luggage room)			

Terminal No.	Wire color	Signal designation	Measuring condition		Voltage (V)
			Ignition knob position	Operation or conditions	
15	G	Inside key antenna (+) signal (Center console)	LOCK	Any door open → Close (Door switch: ON → OFF) Ignition knob switch: ON (press ignition knob.)	 SIIA1910J
16	R	Inside key antenna (-) signal (Center console)			
27	P	Key switch signal	LOCK	Insert mechanical key into ignition key cylinder.	Approx. 12
				Remove mechanical key from ignition key cylinder.	Approx. 0
30	P	Security indicator lamp	LOCK	Goes OFF → illuminates (Every 2.4 seconds)	Approx. 12 → 0
31	R	Steering wheel lock unit ground	—	—	Approx. 0
32	Y	Steering wheel lock unit communication signal	LOCK	Press ignition knob with Intelligent Key inside vehicle.	 SIIA1911J
				Other than the above	Approx. 5
37	BR	Outside antenna (passenger side) (+) signal	LOCK	Passenger door request switch operation (Switch: ON)	 SIIA1910J
38	Y	Outside antenna (passenger side) (-) signal			

Terminals and Reference Value for BCM/without Intelligent Key System

EIS004YO

Terminal No.	Wire color	Signal designation	Measuring condition		Voltage (V)
			Ignition knob position	Operation or conditions	
2	B	GND	—	—	Approx. 0
19	R	CAN communication H	—	—	—
24	OP	Ignition power supply	ON	—	Approx. 12
38	OR	NATS antenna amp.	—	Ignition knob OFF → ON position	Should move, Just after turning ignition switch “ON” pointer tester
39	W	CAN communication L	—	—	—
47	P	Security indicator lamp	LOCK	Goes OFF → illuminates (Every 2.4 seconds)	Approx. 12 → 0
70	B	GND	—	—	Approx. 0
74	W	Battery power supply	—	—	Approx. 12
79	Y	Battery power supply	—	—	Approx. 12

CONSULT-II

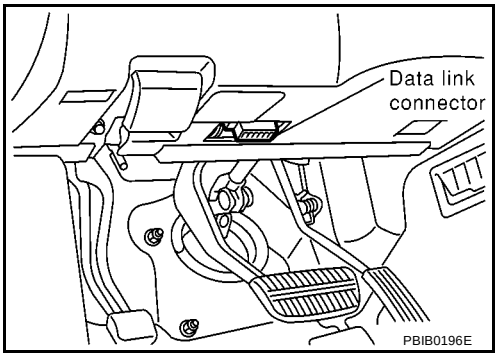
EIS004Q9

CONSULT-II INSPECTION PROCEDURE

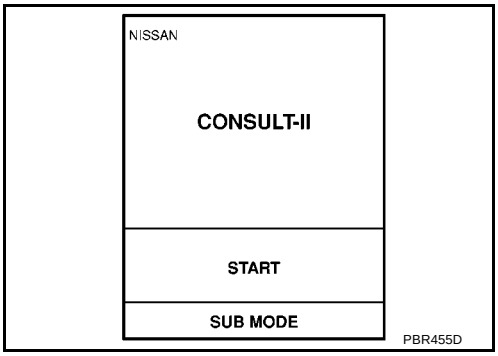
1. Turn ignition switch OFF.
2. Insert NATS program card into CONSULT-II.

Program card : NATS (AEN02C)

3. Connect CONSULT-II and “CONSULT-II CONVERTER” to data link connector.

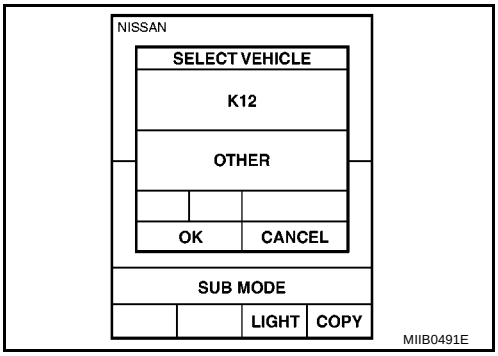


4. Turn ignition switch ON position.
5. Touch “START”.



6. Select “K12”
7. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual, NATS.



CONSULT-II DIAGNOSTIC TEST MODE FUNCTION

CONSULT- II DIAGNOSTIC TEST MODE	Description
IMMU INITIALIZE	When replacing any of the following three components, C/U initialization is necessary. [Ignition key or mechanical key/BCM or Intelligent Key unit]
IMMU FUNCTION CHECK	Detected items (screen terms) are as shown in the chart.

NOTE:
When any initialization is performed, all ID numbers previously registered will be erased and all ignition keys or mechanical key must be registered again. The engine cannot be started with an unregistered key. The system will show “DIFFERENCE OF KEY” as a IMMU FUNCTION CHECK on the CONSULT-II screen.

NATS IMMU FUNCTION CHECK RESULT ITEM CHART

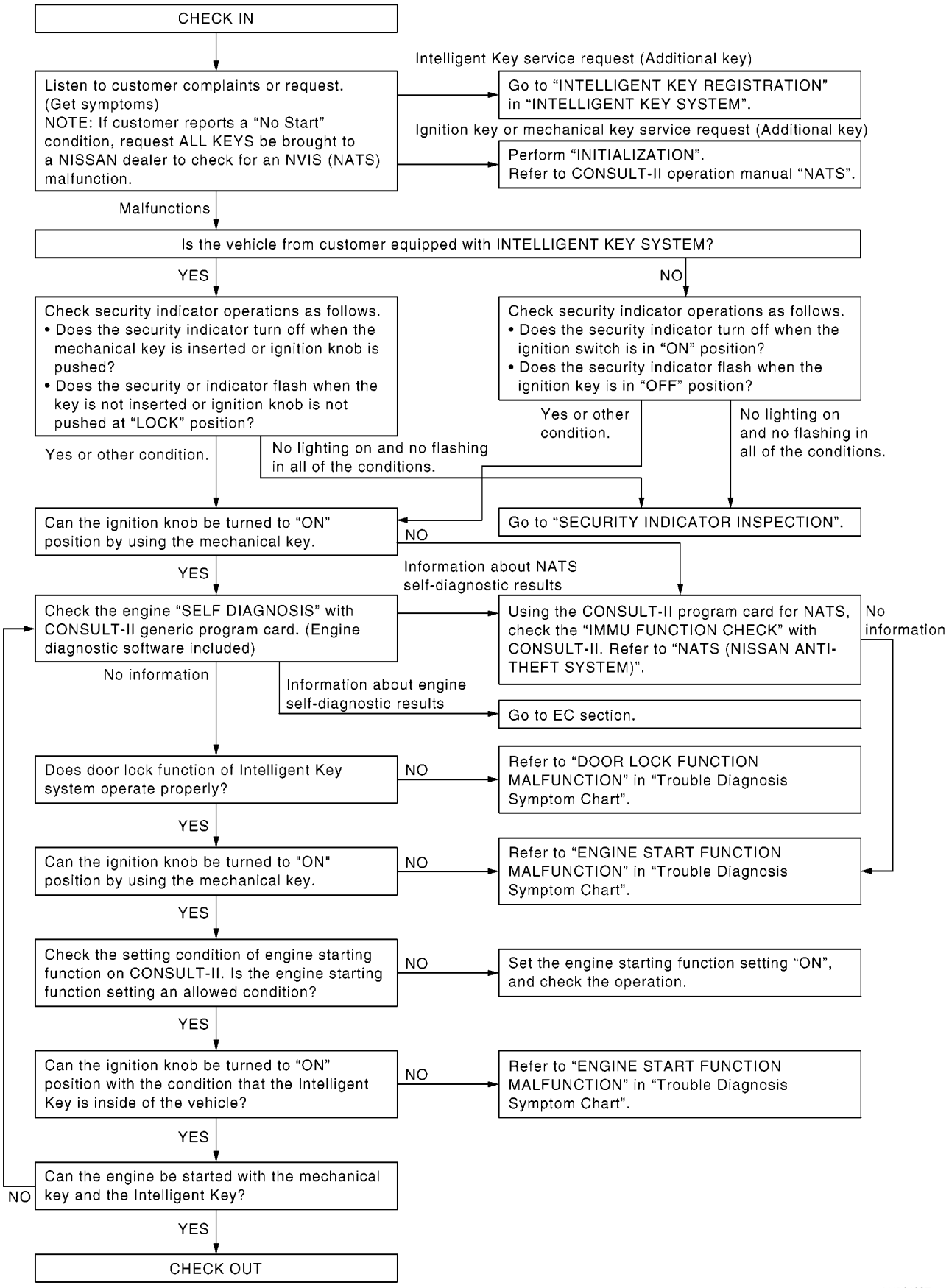
Detected items (Screen terms)	Description
UNREGISTERED BCM*	ID is not registered in BCM
CHAIN OF IMMU-KEY	NATS IMMU cannot receive the key ID signal.
DIFFERENCE OF KEY	BCM or Intelligent Key unit can receive the key ID signal but the result of ID verification between key ID and BCM or Intelligent Key is NG
CHAIN OF IPDM-IMMU*	The communication with IPDM E/R is malfunction.
ID DISCORD IPDM-IMMU	BCM or Intelligent Key unit can receive from IPDM E/R signal but the result of ID verification is NG.
CHAIN OF METER-IMMU*	The communication with combination meter is malfunction.
ID DISCORD METER-IMMU	BCM or Intelligent Key unit can receive from combination meter ID signal but the result of ID verification is NG.
CHAIN OF EPS-IMMU*	The communication with EPS is malfunction.
ID DISCORD EPS-IMMU	BCM or Intelligent Key unit can receive from EPS ID signal but the result of ID verification is NG.
UNREGISTERED ECM	ID is not registered in ECM.
ID DISCORD ECM-IMMU	The result of ID verification between BCM and ECM is NG. System initialization is required.

*: Applied for models without Intelligent Key system.

Diagnosis Procedure

EIS004QA

WORK FLOW



MIIB0492E

Trouble Diagnosis Symptom Chart

EIS004QB

MODELS WITHOUT INTELLIGENT KEY SYSTEM

NOTE:

Perform “Diagnostic Procedure 7”, when “P1610” is displayed by the “SELF-DIAG RESULTS” of the ENGINE. Refer to “CONSULT-II Operation Manual NATS”.

SYMPTOM	Displayed “IMMU FUNCTION CHECK” results on CONSULT-II screen.	Diagnoses service procedure	DIAGNOSTIC PROCEDURE
● Security indicator lighting up* ● Engine hard to start	UNREGISTERED BCM	Replace BCM	Refer to BL-236, "Diagnostic Procedure 1" .
	CHAIN OF IMMU-KEY	1. Check the following parts ● Open or short circuit between BCM and NATS antenna amp. ● Malfunction of key ID chip ● NATS antenna amp.	Refer to BL-236, "Diagnostic Procedure 2" .
		2. If the above system are “OK”, replace BCM	
	DIFFERENCE OF KEY	1. Perform registration key	Refer to BL-240, "Diagnostic Procedure 3" .
		2. If the above system is “OK”, replace BCM	Refer to BCS-31, "Removal and Installation of BCM" .
	CHAIN OF IPDM-IMMU	1. Check CAN communication system	Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .
		2. If CAN communication is “OK”, replace IPDM E/R	Refer to PG-52, "Removal and Installation of IPDM E/R" .
	ID DISCORD IPDM-IMMU	Replace IPDM E/R	Refer to PG-52, "Removal and Installation of IPDM E/R" .
	CHAIN OF METER-IMMU	1. Check CAN communication system	Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .
		2. If CAN communication is “OK”, replace combination meter	Refer to DI-34, "Removal and Installation for Combination Meter" .
	ID DISCORD METER-IMMU	Replace combination meter	Refer to DI-34, "Removal and Installation for Combination Meter" .
	CHAIN OF EPS-IMMU	1. Check CAN communication system	Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .
		2. If CAN communication is “OK”, replace EPS	Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .
	ID DISCORD EPS-IMMU	Replace EPS	Refer to PS-7, "STEERING COLUMN" .
	UNREGISTERED ECM	Replace ECM	Refer to BL-240, "Diagnostic Procedure 4" .
	ID DISCORD ECM-IMMU	Replace ECM	Refer toBL-241, "Diagnostic Procedure 5" .

*: When NATS detects trouble, the security indicator lights up while ignition key is in the “ON” position.

MODELS WITH INTELLIGENT KEY SYSTEM

NOTE:

Perform “Diagnostic Procedure 7”, when “P1610” is displayed by the “SELF-DIAG RESULTS” of the ENGINE. Refer to “CONSULT-II Operation Manual NATS”.

SYMPTOM	Displayed “IMMU FUNCTION CHECK” results on CONSULT-II screen.	Diagnoses service procedure	DIAGNOSTIC PROCEDURE
● Security indicator lighting up* ● Engine hard to start	CHAIN OF IMMU-KEY	1. Check the following parts ● Open or short circuit between BCM and NATS antenna amp. ● Malfunction of key ID chip ● NATS antenna amp.	Refer to BL-236, "Diagnostic Procedure 2" .
		2. If the above system are “OK”, replace Intelligent Key unit	Refer to BL-202, "Removal and Installation of Intelligent key unit" .
	DIFFERENCE OF KEY	1. Perform registration key	Refer to BL-240, "Diagnostic Procedure 3" .
		2. If the above system is “OK”, replace Intelligent Key unit	Refer to BL-202, "Removal and Installation of Intelligent key unit" .
	ID DISCORD IPDM-IMMU	1. Check CAN communication system	Refer to BL-191, "Check CAN Communication System" .
		2. If CAN communication system is “OK”, replace IPDM E/R	Refer to PG-52, "Removal and Installation of IPDM E/R" .
	ID DISCORD METER-IMMU	1. Check CAN communication system	Refer to BL-191, "Check CAN Communication System" .
		2. If CAN communication system is “OK”, replace combination meter	Refer to DI-34, "Removal and Installation for Combination Meter" .
	ID DISCORD EPS-IMMU	1. Check CAN communication system	Refer to BL-191, "Check CAN Communication System" .
		2. If CAN communication system is “OK”, replace EPS	Refer to PS-7, "STEERING COLUMN" .
	ID DISCORD ECM-IMMU	Replace ECM	Refer to BL-241, "Diagnostic Procedure 5" .

*: When NATS detects trouble, the security indicator lights up while mechanical key is inserted.

Security Indicator Inspection

EIS004QC

SYMPTOM	SYSTEM (Malfunctioning part or mode)	DIAGNOSTIC PROCEDURE
Security indicator does not operate*	Security indicator	Refer toBL-241, "Diagnostic Procedure 6" .
	Open circuit between Fuse and NATS IMMU (BCM or Intelligent Key unit)	
	Continuation of initialization mode	
	BCM (models without Intelligent Key system)	
	Intelligent Key unit (models with Intelligent Key system)	

*: CONSULT-II “IMMU FUNCTION CHECK” results display screen “no malfunction is detected”.

Diagnostic Procedure 1

EIS004QE

IMMU FUNCTION CHECK results:
“UNREGISTERD BCM” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “UNREGISTERD BCM” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

YES >>
- BCM is malfunctioning.
- Replace BCM.
- Perform initialization with CONSULT-II.
  - For initialization, refer to “CONSULT-II Operation Manual NATS”.

NO >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

Diagnostic Procedure 2

EIS004QF

MODELS WITHOUT INTELLIGENT KEY SYSTEM

IMMU FUNCTION CHECK results:
“CHAIN OF IMMU-KEY” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “CHAIN OF IMMU-KEY” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

Yes >> GO TO 2.
No >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

2. CHECK NATS ANTENNA AMP. INSTALLATION

Check NATS antenna amp. installation. Refer to BL-244, "Removal and Installation NATS Antenna Amp." .

OK or NG

OK >> GO TO 3.
NG >> Reinstall NATS antenna amp. correctly.

3. CHECK IGNITION KEY ID CHIP

Start engine with another registered ignition key.

Does the engine start?

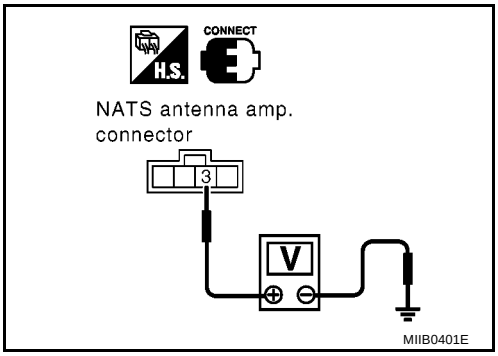
Yes >>
- Ignition key ID chip is malfunctioning.
- Replace the ignition key.
- Perform initialization with CONSULT-II.
  For initialization, refer to “CONSULT-II Operation Manual NATS”.

No >> GO TO 4.

4. CHECK POWER SUPPLY FOR NATS ANTENNA AMP.

1. Turn ignition switch “ON”.
2. Check voltage between NATS antenna amp. connector M36 terminal 3 (LG) and ground with CONSULT-II or tester.

Battery voltage should exist.



OK or NG

OK >> GO TO 5.
NG >> Check harness for open or short between NATS antenna amp. and fuse.

5. CHECK NATS ANTENNA AMP. SIGNAL LINE

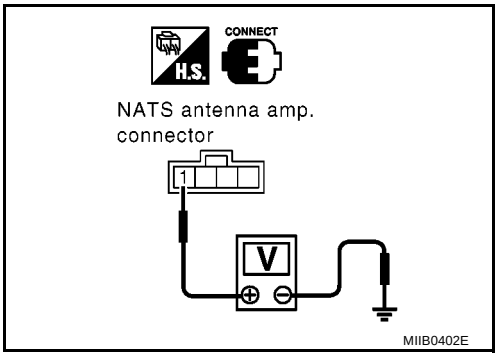
Check voltage between NATS antenna amp. connector M36 terminal 1 (OR) and ground with analogue tester.

Before turning ignition switch “ON”

Voltage: 0V

Just after turning ignition switch “ON”

: Pointer of tester should move.



OK or NG

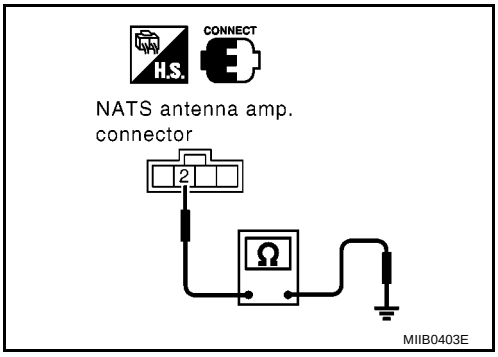
OK >> GO TO 6.
NG >> ● Check harness for open or short between NATS antenna amp. and BCM.

NOTE:
If harness is OK, replace new* BCM, perform initialization with CONSULT-II. For initialization, refer to “CONSULT-II Operation Manual NATS”.
*: New one means virgin control unit that has never been energized on-board.

6. CHECK NATS ANTENNA AMP. GROUND LINE CIRCUIT

1. Turn ignition switch “OFF”.
2. Check continuity between NATS antenna amp. connector M36 terminal 2 (B) and ground.

Continuity should exist.



OK or NG

OK >> NATS antenna amp. is malfunctioning.
NG >> ● Check harness for open or short between NATS antenna amp. and ground.

NOTE:
If harness is OK, replace new* BCM, perform initialization with CONSULT-II. For initialization, refer to “CONSULT-II Operation Manual NATS”.
*: New one means virgin control unit that has never been energized on-board.

MODELS WITH INTELLIGENT KEY SYSTEM

IMMU FUNCTION CHECK results:
“CHAIN OF IMMU-KEY” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “CHAIN OF IMMU-KEY” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

Yes >> GO TO 2.
No >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

2. CHECK NATS ANTENNA AMP. INSTALLATION

Check NATS antenna amp. installation. Refer to BL-244, "Removal and Installation NATS Antenna Amp." .

OK or NG

OK >> GO TO 3.
NG >> Reinstall NATS antenna amp. correctly.

3. CHECK MECHANICAL KEY ID CHIP

Start engine with another registered mechanical key.

Does the engine start?

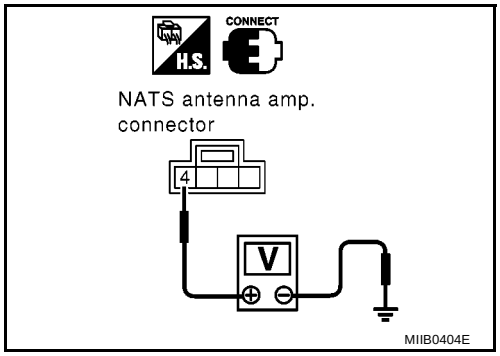
Yes >>
- Mechanical key ID chip is malfunctioning.
- Replace the mechanical key.
- Perform initialization with CONSULT-II.
  For initialization, refer to “CONSULT-II Operation Manual NATS”.

No >> GO TO 4.

4. CHECK POWER SUPPLY FOR NATS ANTENNA AMP.

1. Turn ignition switch “ON”.
2. Check voltage between NATS antenna amp. connector M35 terminal 4 (LG) and ground with CONSULT-II or tester.

Battery voltage should exist.



OK or NG

OK >> GO TO 5.
NG >> Check harness for open or short between NATS antenna amp. and fuse.

5. CHECK NATS ANTENNA AMP. SIGNAL LINE- 1

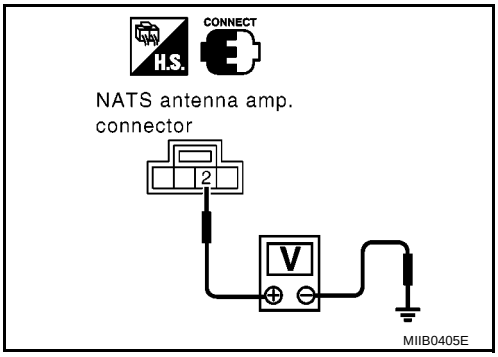
Check voltage between NATS antenna amp. connector M35 terminal 2 (W) and ground with analogue tester.

Before inserting mechanical key in ignition knob

Voltage: 0V

Just after inserting mechanical key in ignition knob

: Pointer of tester should move.



OK or NG

OK >> GO TO 6.

NG >> ● Check harness for open or short between NATS antenna amp. and Intelligent Key unit.

NOTE:

If harness is OK, replace new* Intelligent Key unit, perform initialization with CONSULT-II. For initialization, refer to “CONSULT-II Operation Manual NATS”.

*: New one means virgin control unit that has never been energized on-board.

6. CHECK NATS ANTENNA AMP. SIGNAL LINE- 2

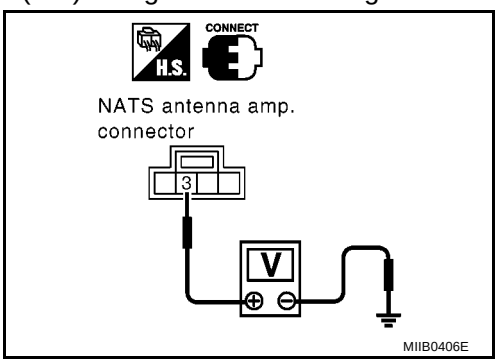
Check voltage between NATS antenna amp. connector M35 terminal 3 (OR) and ground with analogue tester.

Before inserting mechanical key in ignition knob

Voltage: 0V

Just after inserting mechanical key in ignition knob

: Pointer of tester should move.



OK or NG

OK >> GO TO 7.

NG >> ● Check harness for open or short between NATS antenna amp. and Intelligent Key unit.

NOTE:

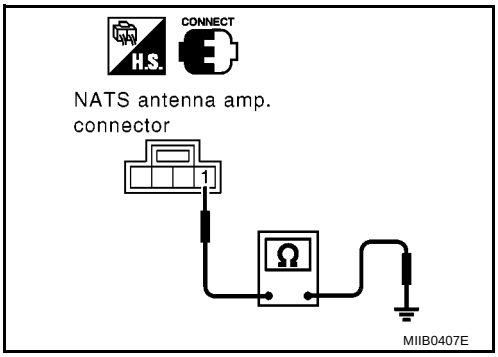
If harness is OK, replace new* Intelligent Key unit, perform initialization with CONSULT-II. For initialization, refer to “CONSULT-II Operation Manual NATS”.

*: New one means virgin control unit that has never been energized on-board.

7. CHECK NATS ANTENNA AMP. GROUND LINE CIRCUIT

1. Turn ignition switch “OFF”.
2. Check continuity between NATS antenna amp. connector M35 terminal 1 (B) and ground.

Continuity should exist.



OK or NG

OK >> NATS antenna amp. is malfunctioning.

NG >> ● Check harness for open or short between NATS antenna amp. and ground.

NOTE:

If harness is OK, replace new* Intelligent Key unit, perform initialization with CONSULT-II. For initialization, refer to “CONSULT-II Operation Manual NATS”.

*: New one means virgin control unit that has never been energized on-board.

Diagnostic Procedure 3

EIS004QG

IMMU FUNCTION CHECK results:
“DIFFERENCE OF KEY” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “DIFFERENCE OF KEY” displayed on CONSULT-II screen.

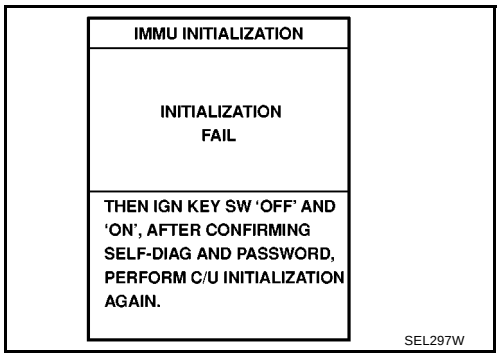
Is CONSULT-II screen displayed as above?

Yes >> GO TO 2.
No >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

2. PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II. Re-register all NATS ignition key IDs.
For initialization and registration of NATS ignition key IDs, refer to “CONSULT-II Operation Manual NATS”.

NOTE:
If the initialization is not completed or malfunctions, CONSULT-II shows message on the screen.



Can the system be initialized and can the engine be started with re-registered NATS ignition key?

Yes >>
- Ignition key ID was unregistered.

No >>
- BCM is malfunctioning. (models without Intelligent Key system)
  - Replace new* BCM.
- Intelligent Key unit is malfunctioning. (models with Intelligent Key system)
  - Replace new* Intelligent Key unit.
- Perform initialization with CONSULT-II.
- For initialization, refer to “CONSULT-II Operation Manual NATS”.

*: New one means virgin control unit that has never been energized on-board.

Diagnostic Procedure 4

EIS0056B

IMMU FUNCTION CHECK results:
“UNREGISTERD ECM” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “UNREGISTERD ECM” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

YES >>
- ECM is malfunctioning.
- Replace ECM.
- Perform initialization or re-communicating function.
  - For initialization, refer to BL-225, "ECM Re-communicating Function" .

NO >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

Diagnostic Procedure 5

EIS0056C

IMMU FUNCTION CHECK results:
“ID DISCORD ECM-IMMU” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “UNREGISTERD ECM” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

YES >>
- ECM is malfunctioning.
- Replace ECM.
- Perform initialization or re-communicating function.
  - For initialization, refer to “CONSULT-II Operation Manual NATS”.

NO >> GO TO BL-234, "Trouble Diagnosis Symptom Chart" .

Diagnostic Procedure 6

EIS0056G

MODELS WITHOUT INTELLIGENT KEY SYSTEM
“Security indicator does not light up”

1. CHECK FUSE

Check 10A fuse [No. 8, located in the fuse block (J/B)]

OK or NG

OK >> GO TO 2.
NG >> Replace fuse.

2. CHECK SECURITY INDICATOR LAMP

1. Install 10A fuse.
2. Start engine and turn ignition switch OFF.
3. Check the security indicator lamp lights up.

Security indicator lamp should light up.

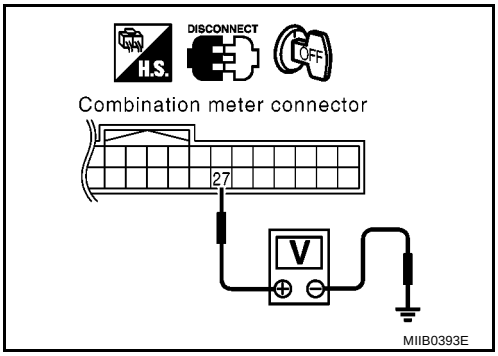
OK or NG

OK >> Inspection END.
NG >> GO TO 3.

3. CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT

1. Disconnect combination meter (security indicator lamp) connector.
2. Check voltage between security indicator lamp connector M22 terminal 27 (LG) and ground.

Battery voltage should exist.

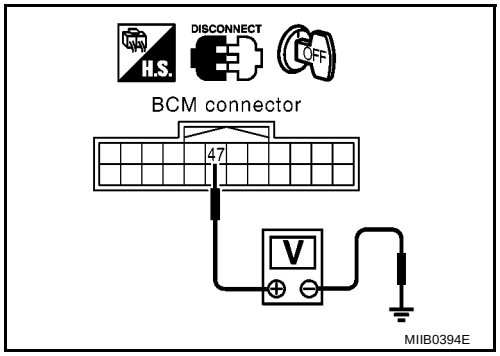


OK or NG

OK >> GO TO 4.
NG >> Check harness for open or short between fuse and security indicator lamp.

4. CHECK BCM FUNCTION

1. Connect combination meter (security indicator lamp) connector.
2. Disconnect BCM connector M3.
3. Check voltage between BCM connector M49 terminal 47 (P) and ground.



Battery voltage should exist.

OK or NG

OK >> BCM is malfunctioning.
- Replace BCM.
- Perform initialization with CONSULT-II.
- For initialization, refer to “CONSULT-II Operation Manual NATS”.

NG >> Check the following.
- Harness for open or short between security indicator lamp and BCM.
- Indicator lamp condition

MODELS WITH INTELLIGENT KEY SYSTEM
“Security indicator does not light up”

1. CHECK FUSE

Check 10A fuse [No. 8, located in the fuse block (J/B)]

OK or NG

OK >> GO TO 2.
NG >> Replace fuse.

2. CHECK SECURITY INDICATOR LAMP

1. Install 10A fuse.
2. Start engine and turn ignition knob OFF position.
3. Check the security indicator lamp lights up.

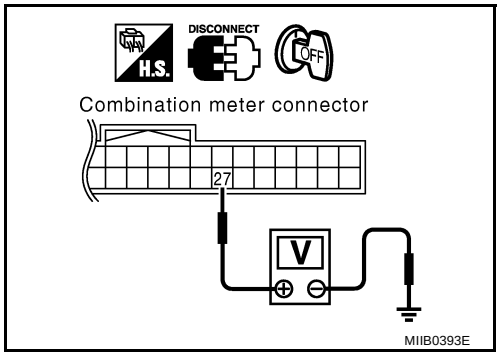
Security indicator lamp should light up.

OK or NG

OK >> Inspection END.
NG >> GO TO 3.

3. CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT

1. Disconnect combination meter (security indicator lamp) connector.
2. Check voltage between security indicator lamp connector M22 terminal 27 (LG) and ground.



Battery voltage should exist.

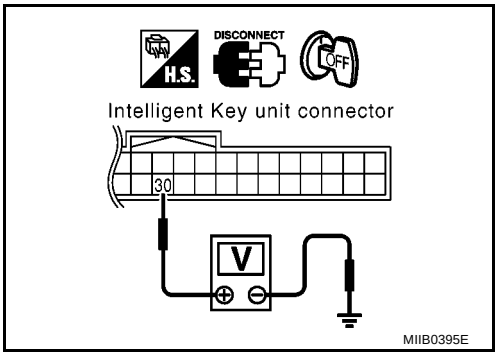
OK or NG

OK >> GO TO 4.
NG >> Check harness for open or short between fuse and security indicator lamp.

4. CHECK INTELLIGENT KEY UNIT FUNCTION

1. Connect combination meter (security indicator lamp) connector.
2. Disconnect Intelligent Key unit connector M51.
3. Check voltage between Intelligent Key unit connector M51 terminal 30 (P) and ground.

Battery voltage should exist.



OK or NG

OK >> Intelligent Key is malfunctioning.
- Replace Intelligent Key unit.
- Perform initialization with CONSULT-II.
- For initialization, refer to “CONSULT-II Operation Manual NATS”.

NG >> Check the following.
- Harness for open or short between security indicator lamp and Intelligent Key unit.
- Indicator lamp condition

Diagnostic Procedure 7

EIS0056H

IMMU FUNCTION CHECK results:
“P1610” displayed on CONSULT-II screen

1. CONFIRM IMMU FUNCTION CHECK

Confirm “IMMU FUNCTION CHECK” results “P1610” (LOCK MODE) is displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as above?

Yes >> GO TO 2.
No >> GO TO BL-233, "WORK FLOW" .

2. ESCAPE FROM LOCK MODE

1. Turn ignition switch OFF.
2. Turn ignition switch ON with registered key. (Do not start engine.) Wait 5 seconds.
3. Return the key to OFF position. Wait 5 seconds.
4. Repeat steps 2 and 3 twice (total of three cycles).
5. Start the engine.

Does engine start?

Yes >> System is OK (Now system is escaped from “LOCK MODE”).
No >> Perform “IMMU FUNCTION CHECK”, and repair the diagnosis result on the display.

Removal and Installation NATS Antenna Amp.

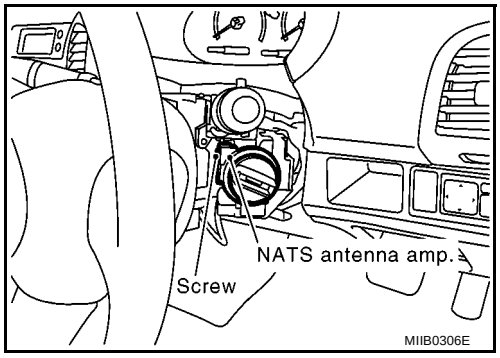
EIS004QK

REMOVAL

CAUTION:

Before servicing SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.

1. Remove the spiral cable. Refer to SRS-38, "Removal and Installation" .
2. Disconnect the NATS antenna amp. connect, remove the screw and NATS antenna amp.



INSTALLATION

Install in the reverse order of removal.

SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for Brake System 3
PREPARATION 4
Special Service Tools 4
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 5
NVH Troubleshooting Chart 5
BRAKE PEDAL 6
Inspection and Adjustment 6
PLAY AND CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR PANEL WITH PEDAL DEPRESSED. 6
Removal and Installation 7
COMPONENTS 7
REMOVAL 7
INSPECTION AFTER REMOVAL 8
INSTALLATION 8
BRAKE FLUID 9
Level Inspection 9
Checking Brake Line 9
Drain and Refill 9
Bleeding Brake System 10
BRAKE PIPING AND HOSE 11
Hydraulic Circuit 11
Removal and Installation of Front Brake Piping and Brake Hose 11
REMOVAL 11
INSTALLATION 12
Removal and Installation of Rear Brake Piping and Brake Hose 12
REMOVAL 12
INSTALLATION 12
Inspection 13
BRAKE MASTER CYLINDER 14
Removal and Installation 14
REMOVAL 14
INSTALLATION 14
Disassembly and Assembly 14
DISASSEMBLY 15
INSPECTION AFTER DISASSEMBLY 15
ASSEMBLY 15
BRAKE BOOSTER 17
On-Vehicle Service 17
OPERATING CHECK 17
AIRTIGHTNESS INSPECTION 17
Removal and Installation 17
COMPONENTS 17
REMOVAL 17
INSTALLATION 18
VACUUM LINES 19
Components 19
Removal and Installation 19
VACUUM HOSE 19
VACUUM PUMP 19
Inspection 20
VISUAL INSPECTION 20
CHECK VALVE INSPECTION 20
FRONT DISC BRAKE 21
On board Inspection 21
PAD WEAR INSPECTION 21
Components 21
Removal and Installation of Brake Pad 22
REMOVAL 22
INSTALLATION 22
Removal and Installation of Brake Caliper Assembly 23
REMOVAL 23
INSTALLATION 23
Disassembly and Assembly of Brake Caliper Assembly 23
DISASSEMBLY 23
BRAKE CALIPER INSPECTION 24

ASSEMBLY 24
Removal and Installation of Disc Rotor 25
REMOVAL 25
INSTALLATION 25
DISC ROTOR INSPECTION 25
BRAKE BURNISHING PROCEDURE 26
REAR DRUM BRAKE 27
Components 27
Removal and Installation of Drum Brake Assembly... 28
REMOVAL 28
INSPECTION AFTER REMOVAL 28
INSTALLATION 29
Removal and Installation of Wheel Cylinder 30
REMOVAL 30
INSTALLATION 30
Disassembly and Assembly of Wheel Cylinder 30
DISASSEMBLY 30
ASSEMBLY 30
Wheel Cylinder Inspection 31
SERVICE DATA AND SPECIFICATIONS (SDS) 32
General Specifications 32
Brake Pedal 32
Brake Booster 32
Check Valve 32
Front Disc Brake 33
Rear Drum Brake 33

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EFS002FV

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

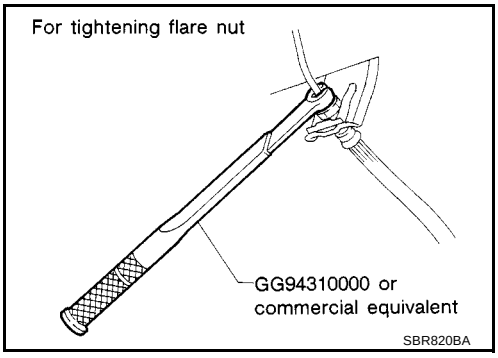
WARNING:

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

Precautions for Brake System

EFS002FW

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- Always tighten brake lines to the specified torque when installing.
- Before working, turn the ignition switch OFF and disconnect the connectors for the control unit or the battery terminals.
- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage.
  Refer to BR-26, "BRAKE BURNISHING PROCEDURE" .



WARNING:

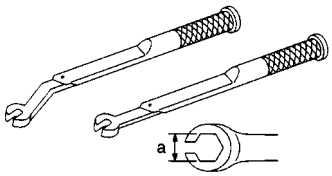
- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

PREPARATION

PFP:00002

Special Service Tools

EFS002G1

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)	 NT406	Removing and installing each brake piping

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EFS002IV

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

			Reference page	BR-21, BR-28	BR-21, BR-28	—	—	BR-25, BR-29	BR-25	—	—	—	BR-26	NVH in FAX, RAX and FSU, RSU section	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in PS section
			Possible cause and SUSPECTED PARTS	Pads or linings - damaged	Pads or linings - uneven wear	Return spring damaged	Rotor or drum imbalance	Rotor or drum damage	Rotor runout	Rotor or drum deformation	Rotor or drum deflection	Rotor or drum rust	Rotor thickness variation	AXLE AND SUSPENSION	TYRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise		×	×	×								×	×	×	×	×
		Shake					×							×	×	×	×	×
		Shimmy, Judder					×	×	×	×	×	×	×	×	×	×		×

X: Applicable

BRAKE PEDAL

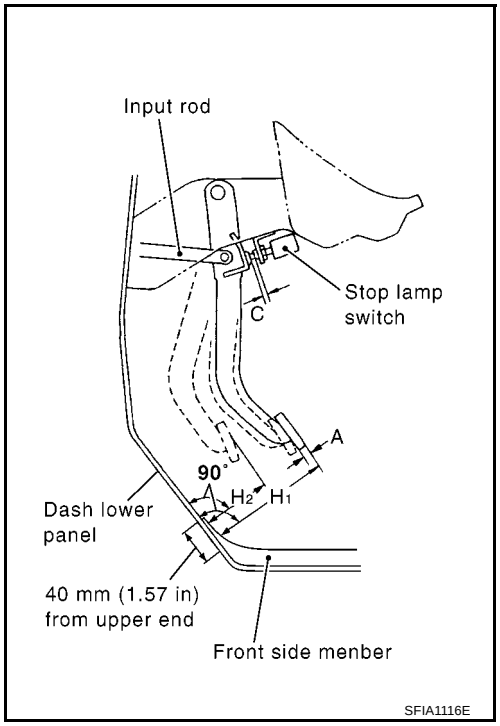
PFP:46501

Inspection and Adjustment

EFS002G6

PLAY AND CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR PANEL WITH PEDAL DEPRESSED.

- Check the pedal play.
- Check the brake pedal free height from the dash floor panel.
- If value is outside the standard, make an adjustment to the following dimension.

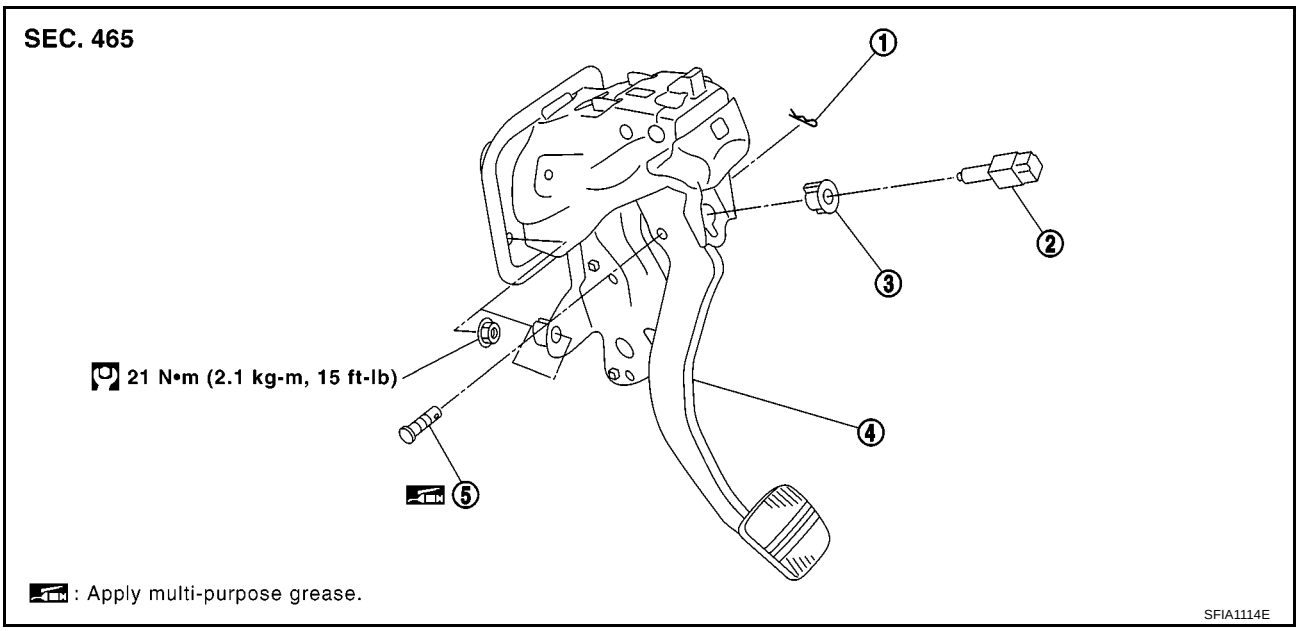


H_1	Brake pedal height	LHD	M/T models	161 - 171 mm (6.34 - 6.73 in)
			A/T models	171 - 181 mm (6.73 - 7.13 in)
		RHD	M/T models	156 - 166 mm (6.14 - 6.54 in)
			A/T models	166 - 176 mm (6.54 - 6.93 in)
H_2	Depressed pedal height [under a force of 490 N (50 kg, 110 lb) with the engine running]		M/T models	80 mm (3.15 in) or more
			A/T models	85 mm (3.35 in) or more
C	Clearance between the stopper rubber and the threaded end of stop lamp switch.			0.74 - 1.96 mm (0.029 - 0.077 in)
A	Pedal play			3 - 11 mm (0.12 - 0.43 in)

Removal and Installation

EFS002G7

COMPONENTS



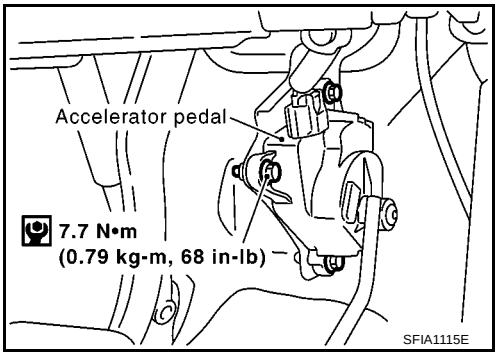
1. Snap pin
2. Stop lamp switch
3. Clip
4. Brake pedal assembly
5. Clevis pin

CAUTION:

- **Be careful not to deform brake tube.**
- **Do not strike the brake pedal assembly against anything during removal and installation.**

REMOVAL

1. Remove instrument lower driver panel. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove accelerator pedal harness clip and connector.
3. Disconnect stop lamp switch harness connector and remove stop lamp switch from the pedal assembly. (Remove it by rotating the switch by 45°)
4. Remove snap pin and clevis pin from the brake booster clevis.
5. Remove pedal assembly mounting nut and then remove pedal assembly from the vehicle while moving the master cylinder and brake booster to the engine room side while being careful not to deform the brake tube.
6. Remove accelerator pedal from the brake pedal.



INSPECTION AFTER REMOVAL

- Check brake pedal for bend, damage, and cracks on the welded parts. Replace applicable part if any non-standard condition is detected.

INSTALLATION

- For information regarding the tightening torque, refer to BR-7, "COMPONENTS" . Install in the reverse order of removal.
- After installing brake pedal assembly to the vehicle, adjust brake pedal.

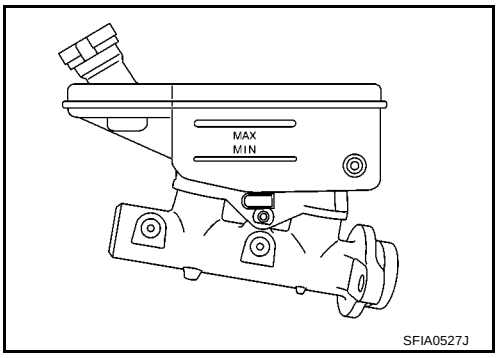
BRAKE FLUID

PFP:KN100

Level Inspection

EFS002G8

- Make sure the fluid level in the reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around the reservoir tank for fluid leaks.
- If fluid level is excessively low, check brake system for leaks.
- If warning lamp remains illuminated after parking lever is released, check brake system for fluid leakage.



SFIA0527J

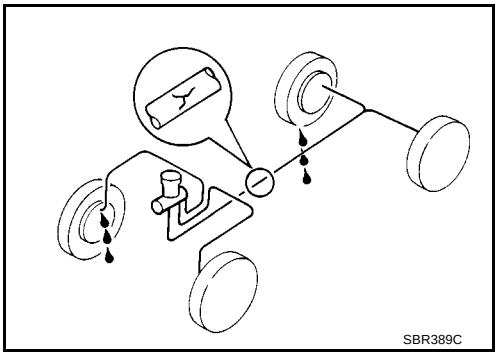
Checking Brake Line

EFS002G9

CAUTION:

If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

1. Check brake line (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for oil leakage by fully depressing brake pedal while engine is running.


SBR389C

Drain and Refill

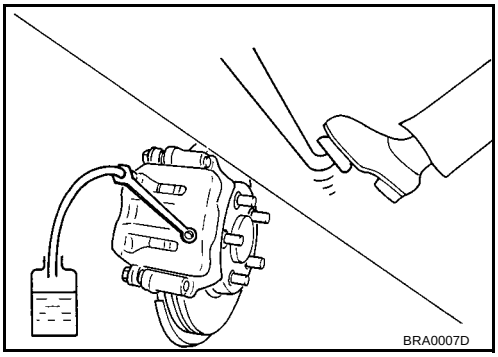
SMA for VIN >SJN**AK12U1000000

EFS002GA

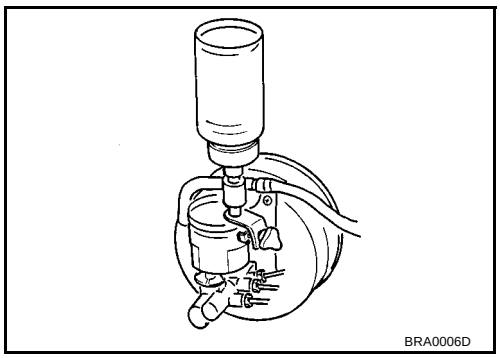
CAUTION:

- **Refill with new brake fluid “DOT 3” or “DOT 4”.**
- **Do not mix different types of brake fluid (DOT 3, DOT 4).**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**

1. Turn ignition switch OFF, and remove ABS actuator connector.
2. Connect a vinyl tube to the air bleeder.
3. Drain brake fluid gradually from the air bleeder of each wheel while depressing the brake pedal.


BRA0007D

4. Make sure that there is no foreign material in the reservoir tank, and refill with new brake fluid.
5. Rest foot on brake pedal. Loosen air bleeder. Slowly depress pedal until it stops. Tighten air bleeder. Release brake pedal. Repeat this process a few times, then pause to add new brake fluid to master cylinder. Continue until new brake fluid flows out. For information regarding air bleeding work, refer to BR-10, "Bleeding Brake System" .


BRA0006D

Bleeding Brake System

EFS002GB

CAUTION:

- **While bleeding, pay attention to master cylinder fluid level.**
- **Fill reservoir with new brake fluid “DOT 3” or “DOT 4”**
- **Do not mix different types of brake fluid (DOT 3, DOT 4)**

1. Turn ignition switch OFF, and remove ABS actuator connector.
2. Connect a vinyl tube to the rear left wheel air bleeder.
3. Fully depress brake pedal 4 to 5 times.
4. With brake pedal depressed, loosen air bleeder and bleed air, and then quickly tighten the air bleeder.
5. Repeat steps 3 - 4 until all of the air is out of the brake line.
6. Tighten the air bleeder to the specified torque.

Tightening torque : 10 N·m (1.0 kg-m, 7 ft-lb)

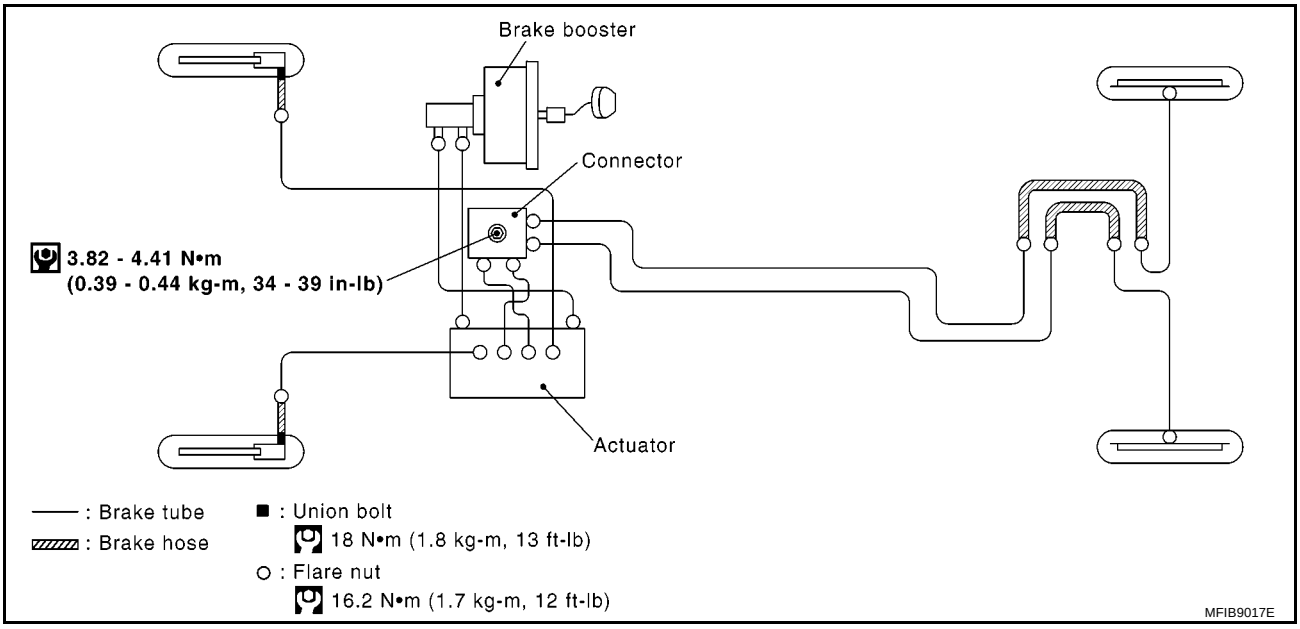
7. Repeat steps 2 to 6. Occasionally refill master cylinder reservoir tank with brake fluid in order to keep it at least half-full. Bleed air in the following order: front RH wheel, RH rear wheel, and front LH wheel.

BRAKE PIPING AND HOSE

PFP:46210

Hydraulic Circuit

EFS002GC



Removal and Installation of Front Brake Piping and Brake Hose

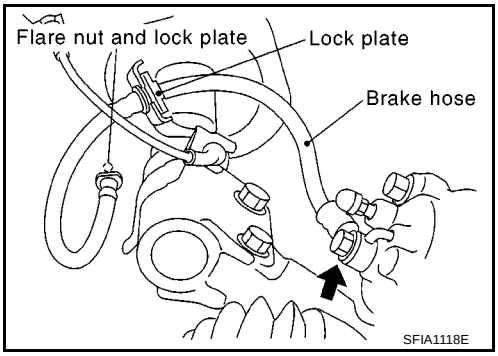
EFS002GD

REMOVAL

CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **All hose must be free from excessive bending, twisting and pulling.**
- **Cover brake fluid line connections to prevent dust and other foreign material from entering.**

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Using a flare nut wrench, remove the flare nuts of the brake tube and disconnect the brake tube from the brake hose.
3. Remove brake caliper union bolts and disconnect caliper assembly from brake hose.
4. First remove the lock plate from the mounting positions of brake tubes and struts, and then brake hose.



INSTALLATION

CAUTION:

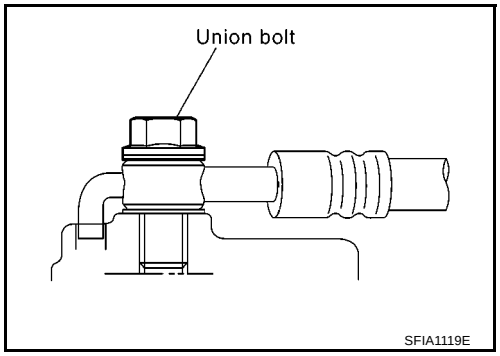
- **Refill with new brake fluid “DOT 3” or “DOT 4”.**
- **Do not mix different types of brake fluid (DOT3, DOT4).**
- **Never reuse the drained brake fluid.**

1. Install the brake hose to the caliper assembly and tighten union bolts to the specified torque.

   Tightening torque : 18 N·m (1.8 kg-m, 13 ft-lb)

   CAUTION:
   - **Install brake hose securely by inserting the hose fitting protrusion into the caliper hole.**
   - **Do not reuse the copper washer for union bolts.**
2. Connect brake hose to the strut and fix with lock plate.
3. Connect brake hose to brake tube. Temporarily tighten flare nuts by hand as far as they will go. Secure them with the lock plate.
4. Using a flare nut torque wrench, tighten to the specified torque.

   Tightening torque : 16.2 N·m (1.7 kg-m, 12 ft-lb)
5. Add new brake fluid. Refer to BR-9, "Drain and Refill" .
6. Bleed the air. Refer to BR-10, "Bleeding Brake System" .



Removal and Installation of Rear Brake Piping and Brake Hose

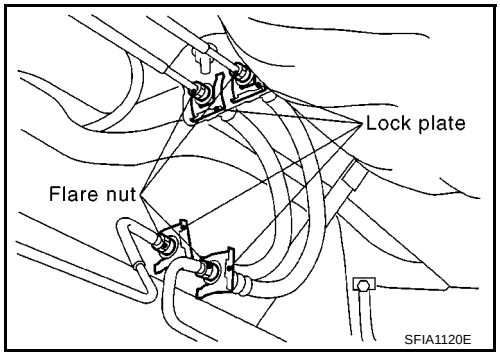
EFS002GE

REMOVAL

CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **All hose must be free from excessive bending, twisting and pulling.**
- **Cover brake fluid line connections to prevent dust and other foreign material from entering.**

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Using a flare nut wrench, remove the flare nuts of the brake tube and disconnect the brake tube from the brake hose.
3. Remove the lock plate and remove the brake hose from the vehicle.



INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3” or “DOT 4”.**
- **Do not mix different types of brake fluid (DOT3, DOT4).**
- **Never reuse the drained brake fluid.**

1. Connect brake hose to the brake tube. Temporarily tighten flare nut by hand as far as it will go.
2. Secure brake hose with the lock plate, and then use a flare nut wrench to tighten the flare nuts to the specified torque.

   Tightening torque : 16.2 N·m (1.7 kg-m, 12 ft-lb)
3. Add new brake fluid. Refer to BR-9, "Drain and Refill" .
4. Bleed the air. Refer to BR-10, "Bleeding Brake System" .

Inspection

EFS002GF

CAUTION:

If leak is detected at the connections, retighten it or replace the damaged part if necessary.

1. Check hose, tube, and connections for fluid leaks, damage, twist, deformation, contact with other parts, and loose connections.
2. While depressing brake pedal with engine running for approximately 5 seconds, check for fluid leak from each part.

BRAKE MASTER CYLINDER

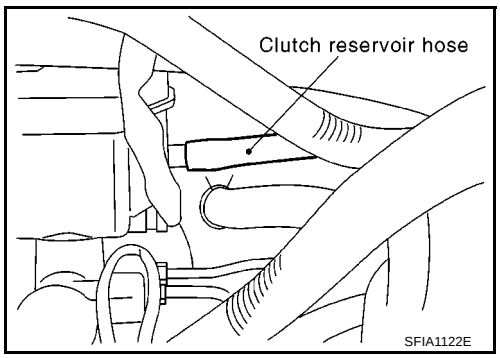
PFP:46010

Removal and Installation

EFS002GG

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Remove harness connector of fluid level sensor.
3. Remove clutch reservoir hose. (M/T models)
4. Using a flare nut wrench, disconnect master cylinder assembly and brake tube.
5. First remove nuts on master cylinder assembly, and then master cylinder assembly from brake booster assembly.



INSTALLATION

1. Install brake tube to the master cylinder assembly and temporarily tighten the flare nuts by hand.
2. Install the master cylinder assembly to the brake booster assembly and tighten mounting nuts to the specified torque.

   Tightening torque : 14 N·m (1.4 kg-m, 10 ft-lb)

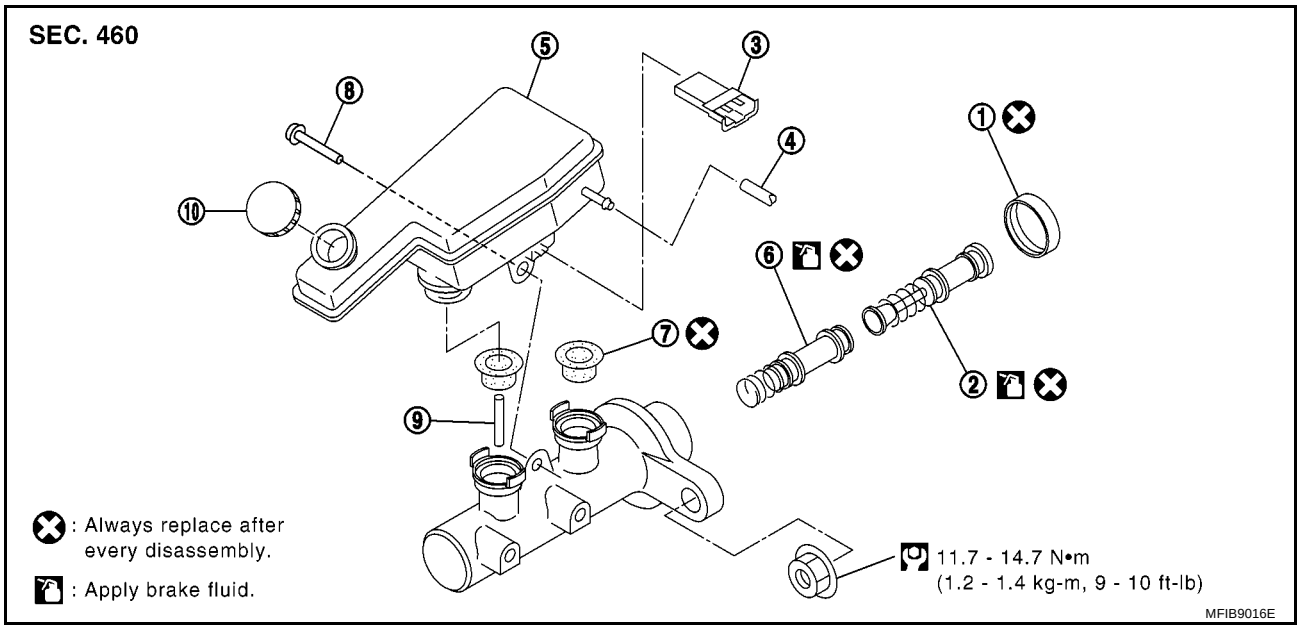
3. Tighten flare nuts of the brake tube to the specified torque.

   Tightening torque : 16.2 N·m (1.7 kg-m, 12 ft-lb)

4. Install the clutch reservoir hose. (M/T models)
5. Add new brake fluid. Refer to BR-9, "Drain and Refill" .
6. Bleed the air. Refer to BR-10, "Bleeding Brake System" .

Disassembly and Assembly

EFS002GH



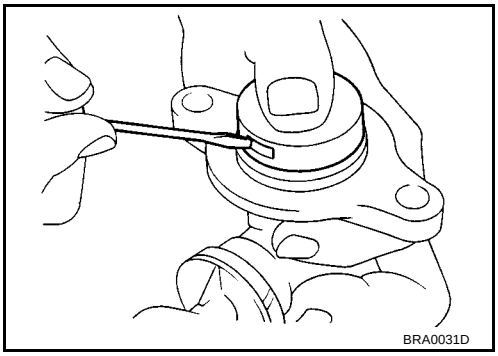
1. Stopper cap
2. Primary piston assembly
3. Fluid level sensor harness connector
4. Clutch reservoir hose (M/T models)
5. Reservoir tank
6. Secondary piston assembly
7. Grommet
8. Screw
9. Piston stopper
10. Reservoir tank cap

DISASSEMBLY

CAUTION:

Remove master cylinder reservoir tank only when necessary.

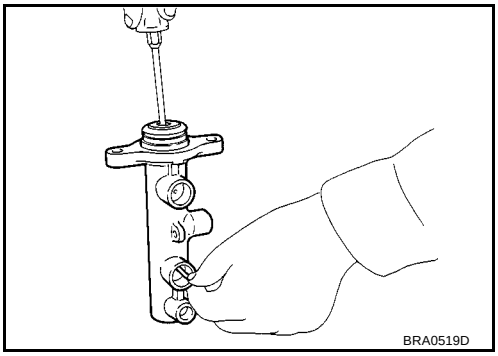
1. As shown in the figure, use a screwdriver to lift up the stopper cap hooks and remove the stopper cap from the master cylinder.



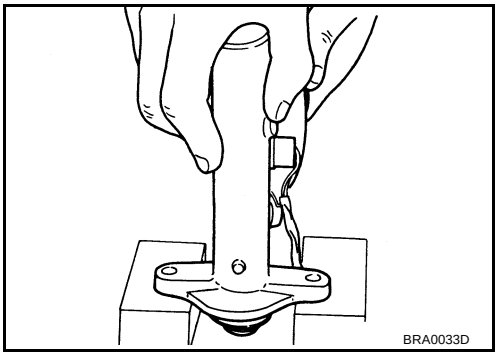
2. Remove reservoir tank mounting screw from cylinder body.
3. Remove reservoir tank and grommet from cylinder body.
4. Using a flat-bladed screwdriver, press and hold piston as shown in the figure. Remove piston stopper from secondary tank boss hole in the cylinder body.

   CAUTION:

   Be careful not to damage the inner wall of the cylinder.
5. Carefully pull the primary piston assembly straight out to prevent cylinder inner wall from being damaged.



6. Tap the flange against a soft block such as wood, and carefully pull the secondary piston assembly straight out to prevent cylinder inner wall from damage.



INSPECTION AFTER DISASSEMBLY

- Check inner wall of master cylinder for damage, wear, corrosion, and pinholes. Replace cylinder if any non-standard condition is detected.

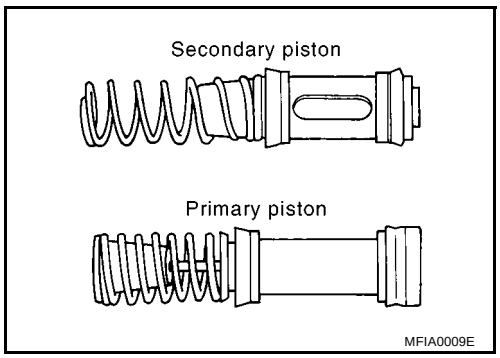
ASSEMBLY

CAUTION:

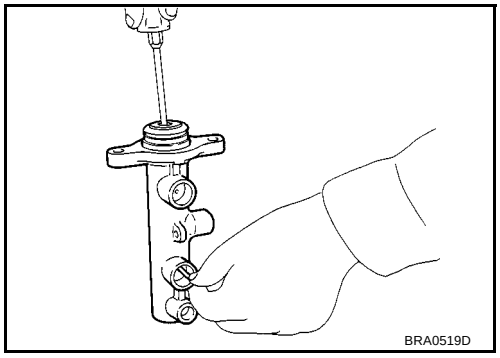
- **Never use mineral oils such as kerosene or gasoline during the cleaning and assembly processes.**
- **Make sure there is no foreign material such as dirt and dust on cylinder inner wall, piston, and cup seal. Be careful not to damage the parts with a service tool when assembling.**
- **Do not drop the parts. Do not use any dropped parts.**

1. Apply brake fluid to the cylinder inner wall body and contact surface of the piston assembly.
2. Insert the secondary piston assembly and primary piston assembly into the cylinder body in this order.

   CAUTION:
   - **Do not reuse primary and secondary piston assemblies.**
   - **Pay attention to direction of piston cups, and insert straight to prevent the cup from being caught by the inner wall of the cylinder.**
   - **Do not disassemble the new part inner kit. Always replace it as a complete assembly.**



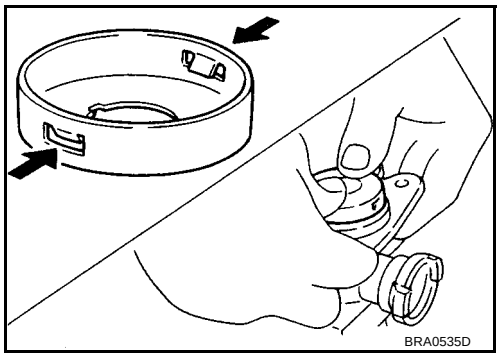
3. Visually check secondary piston slit position through cylinder body secondary tank boss hole and install piston stopper.



4. While holding the piston with the stopper cap, press the stopper cap fully until its tabs are engaged with the groove on the cylinder body to install.

   CAUTION:
   Do not reuse the stopper cap.
5. Apply brake fluid to a grommet, and press it into cylinder body.

   CAUTION:
   Do not reuse the grommet.
6. Install reservoir tank and reservoir tank mounting screw to cylinder body.



BRAKE BOOSTER

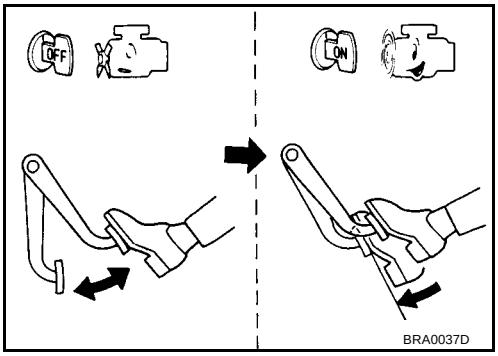
PFP:47200

On-Vehicle Service

EFS002GI

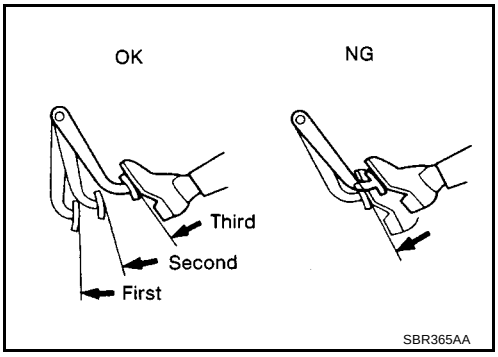
OPERATING CHECK

- Depress brake pedal several times with engine off, and check that there is no change in pedal stroke.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.



AIRTIGHTNESS INSPECTION

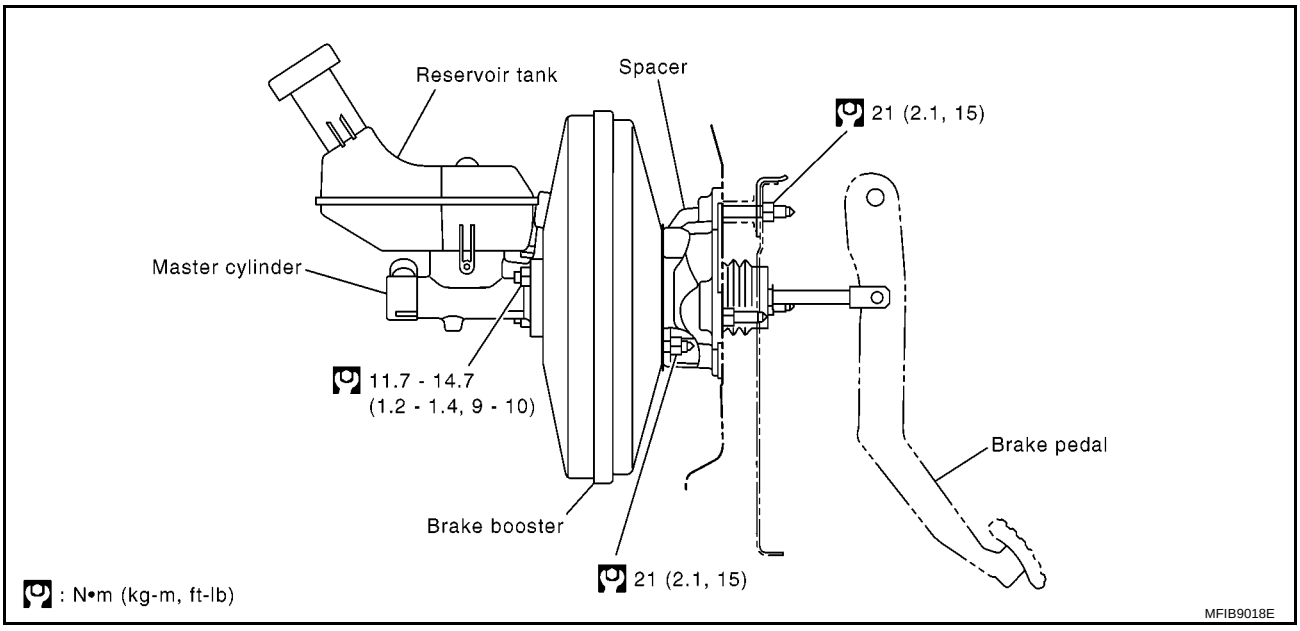
- Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. If pedal goes further down the first time and gradually rises after second or third time, booster is air-tight.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. If there is no change in pedal stroke after holding pedal down 30 seconds, brake booster is airtight.



Removal and Installation

EFS002GJ

COMPONENTS



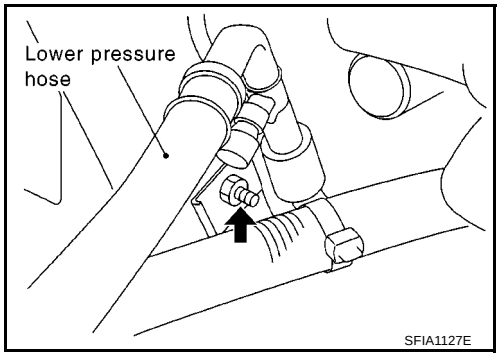
REMOVAL

CAUTION:

- **Be careful not to deform or bend brake piping while removing and installing the brake booster.**
- **Replace clevis pin if it is damaged.**
- **Be careful not to damage brake booster stud bolt threads. If brake booster is tilted or inclined during installation, the dash panel may damage the threads.**
- **Be sure to install check valve in the correct orientation.**

1. Remove the vacuum hose from the brake booster.

2. Remove brake master cylinder. Refer to BR-14, "Removal and Installation" .
3. Remove snap pin and clevis pin from the brake pedal mounting area via the vehicle cabin.
4. Remove brake booster and brake pedal assembly nuts.
5. Remove clutch master cylinder from the panel and pull it out through the engine room side and place it where it will not be in the way. Refer to CL-8, "Removal and Installation" (M/T models).
6. Remove the air conditioner lower pressure hose holding bracket.
7. Remove cowl top cover. Refer to EI-10, "Removal and Installation" .
8. Remove booster assembly from engine room.



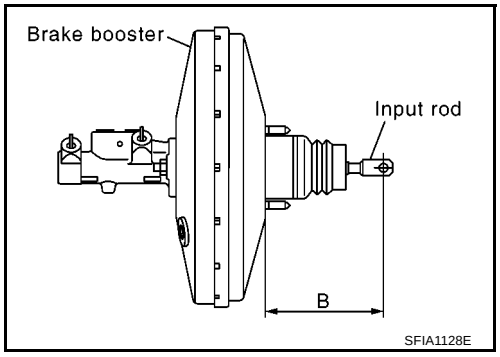
INSTALLATION

1. Check input rod length so that length B (in the figure) satisfies the specified value.

Length B standard

LHD models : 158.25 mm (6.23 in)

RHD models : 115.35 mm (4.54 in)



2. Install booster assembly in the vehicle.

CAUTION:

Be sure to install the gasket between the booster assembly and the vehicle.

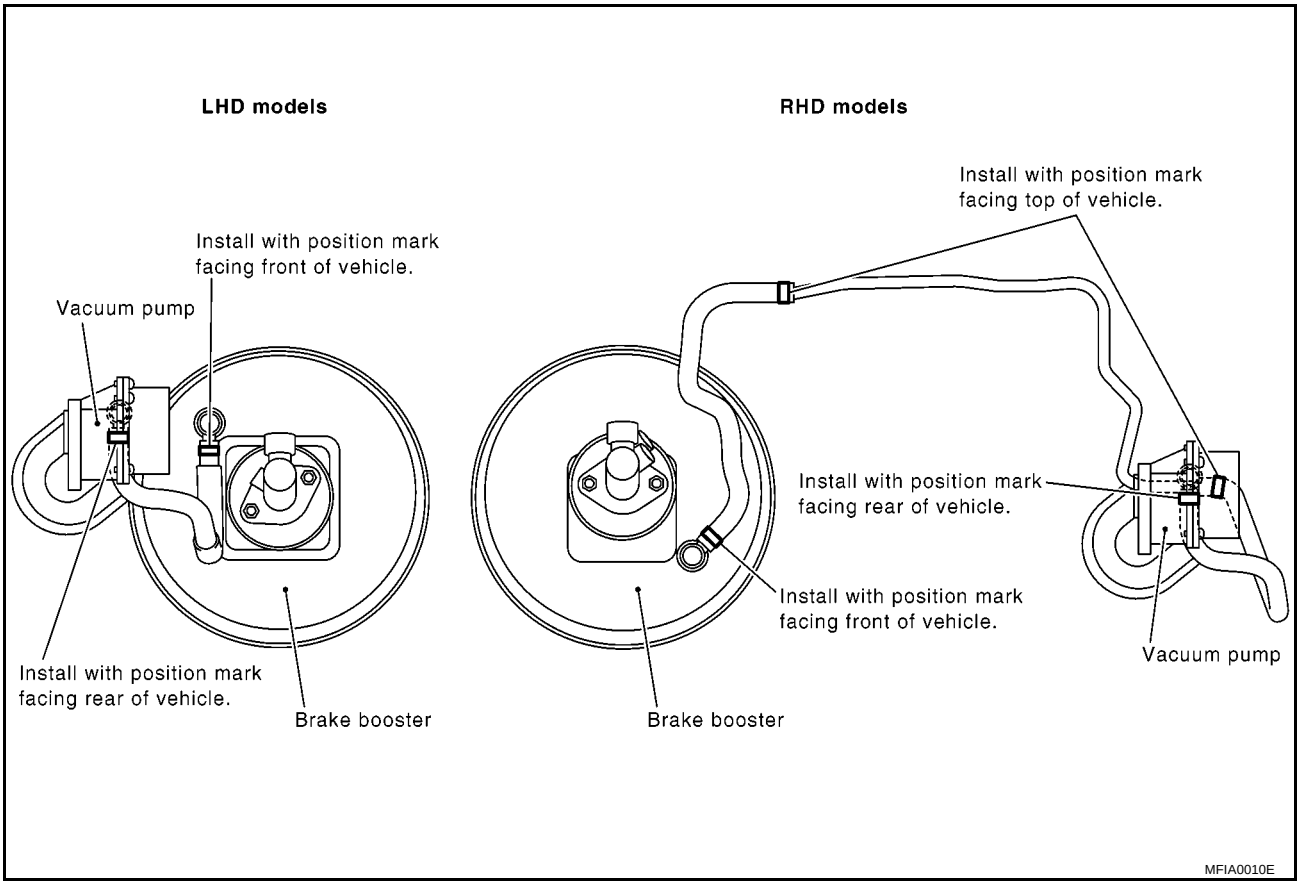
3. Connect the brake pedal with the clevis of the input rod.
4. Install nuts to booster assembly and tighten to the specified torque.
5. Install brake master cylinder to the booster assembly. Refer to BR-14, "Removal and Installation" .
6. Install the clutch master cylinder. Refer to CL-8, "Removal and Installation" (M/T models).
7. Install the air conditioner lower pressure hose holding bracket.
8. Install cowl top cover. Refer to EI-10, "Removal and Installation" .
9. Bleed air. Refer to BR-10, "Bleeding Brake System" .

VACUUM LINES

PFP:41920

Components

EFS005VX



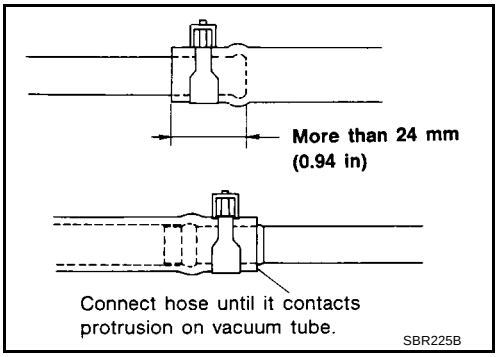
Removal and Installation

EFS002G4

VACUUM HOSE

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct orientation. Refer to the stamp or label to confirm correct installation. The brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert the vacuum hose for at least 24 mm (0.94 in).**
- **Never use lubricating oil during assembly.**



VACUUM PUMP

For information regarding vacuum pump removal and installation, refer to EM-137, "VACUUM PUMP" .

Inspection

EFS002G5

VISUAL INSPECTION

Check for improper assembly, damage and aging.

CHECK VALVE INSPECTION

Airtightness Inspection

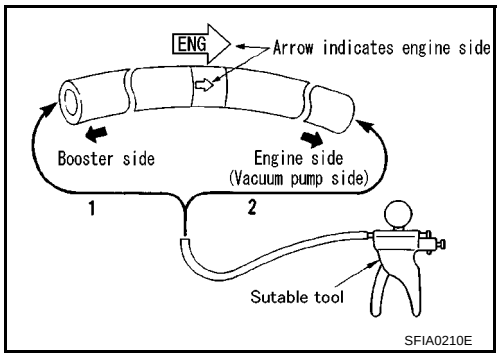
Use a hand-held vacuum pump to check.

When connected to booster side (1):

Vacuum decrease should be within 1.3 kPa (10 mmHg, 0.39 inHg) for 15 seconds under a vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg)

When connected to engine side (2):

Vacuum should not exist.



FRONT DISC BRAKE

PFP:41000

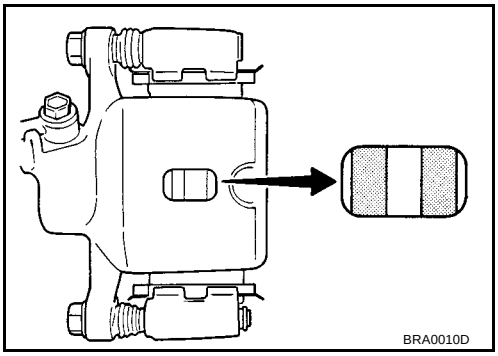
On board Inspection

EFS002GK

PAD WEAR INSPECTION

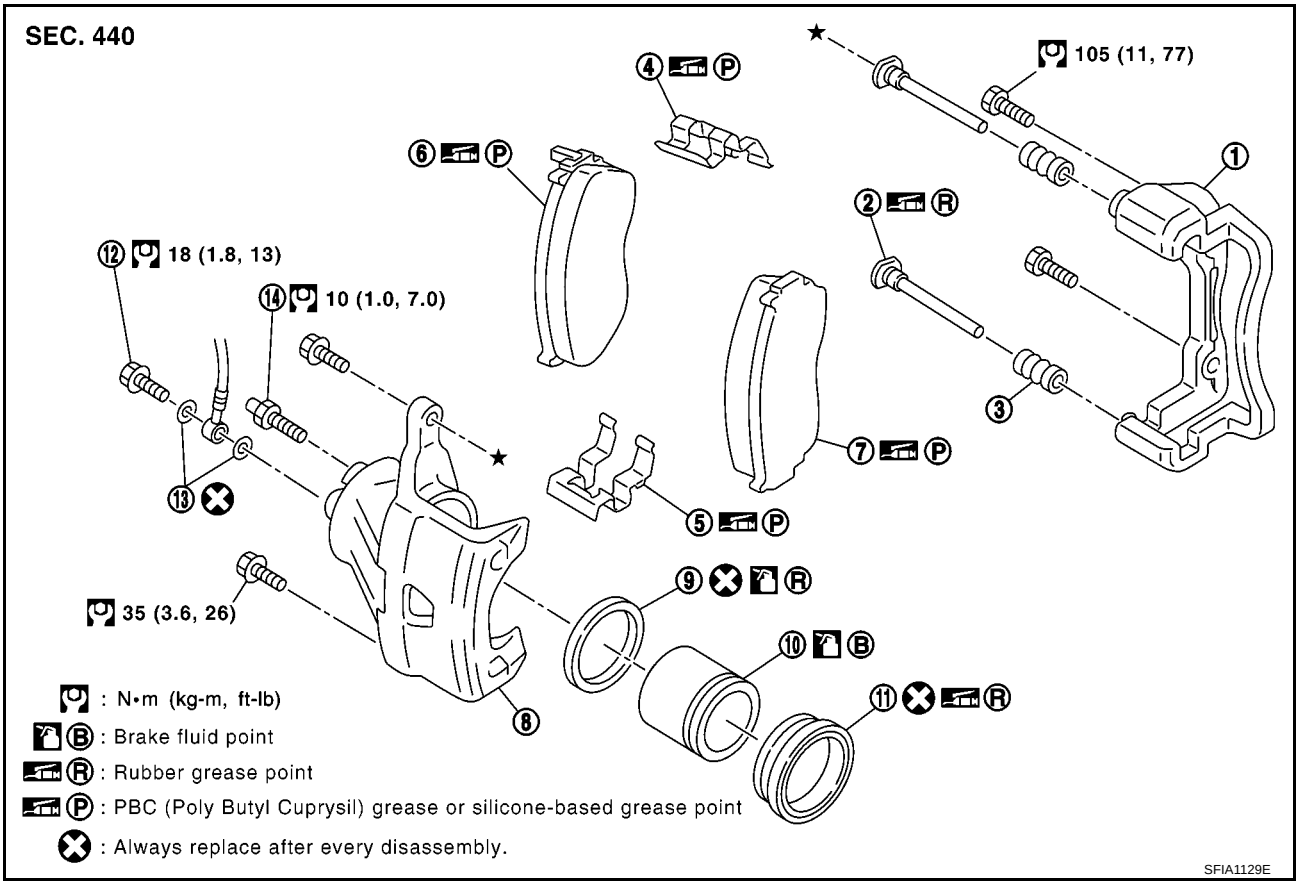
- Inspect the thickness of pad through cylinder body inspection hole. Use a scale for inspection if necessary.

Standard thickness : 12.4 mm (0.488 in)
Wear limit thickness : 2.0 mm (0.079 in)



Components

EFS002GL



1. Torque member	2. Sliding pin	3. Pin boot
4. Pad retainer (upper)	5. Pad retainer (lower)	6. Inner pad
7. Outer pad	8. Cylinder body	9. Piston seal
10. Piston	11. Piston boots	12. Union bolt
13. Copper washer	14. Air bleeder	

CAUTION:

- **Clean dust on the caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.**
- **While removing the cylinder body, do not depress the brake pedal because the piston will pop out.**
- **Do not remove brake hose and torque member bolts unless disassembling or replacing caliper assembly. Hang cylinder body with a wire so that brake hose is not under tension.**
- **Be careful not to damage the piston boot. Do not allow brake fluid to get on the rotor.**

Removal and Installation of Brake Pad

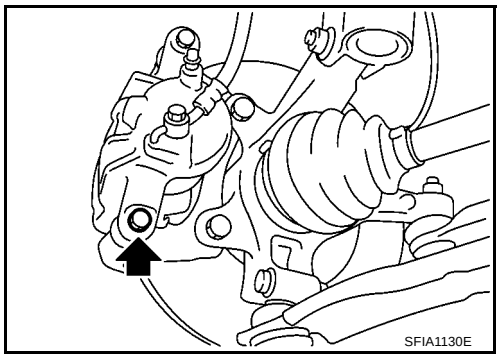
EFS002GM

REMOVAL

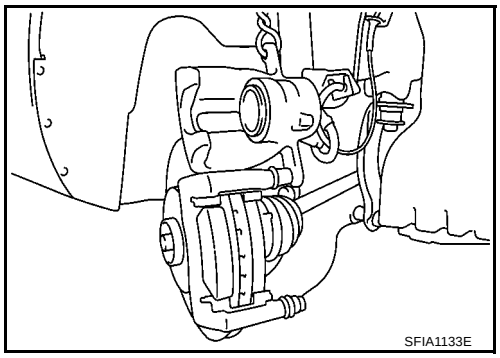
CAUTION:

Always replace the inner cover and outer shim as a set when replacing the brake pads.

1. Remove tyre from vehicle.
2. Remove brake master cylinder reservoir tank cap.
3. Remove lower sliding pin bolt.



4. Hang cylinder body with a wire, and remove pads and pad retainers from torque member.



INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or silicone-based grease on inner pad (rear surface) and outer pad (rear surface).
2. Apply PBC (Poly Butyl Cuprysil) or silicone-based grease to pad contact surface on pad retainer. Install pad retainers and pads to the torque member.
3. Install cylinder body to torque member.

   CAUTION:

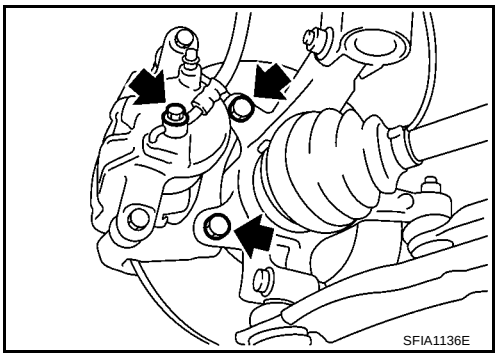
   When replacing pads with new ones, press in piston until pads can be installed. In this case, carefully monitor brake fluid level in the reservoir tank because brake fluid will return to the reservoir tank of master cylinder.
4. Insert the lower sliding pin bolt to tighten to the specified torque.
5. Check brake for drag.

Removal and Installation of Brake Caliper Assembly

EFS002GN

REMOVAL

1. Remove tyre from vehicle.
2. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
3. Remove union bolts and torque member bolts, and remove brake caliper assembly.



INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3” or “DOT 4”.**
- **Do not mix different types of brake fluid (DOT 3, DOT 4).**
- **Never reuse the drained brake fluid.**

1. Install brake caliper assembly to the vehicle, and tighten bolts on torque member to the specified torque.

   CAUTION:

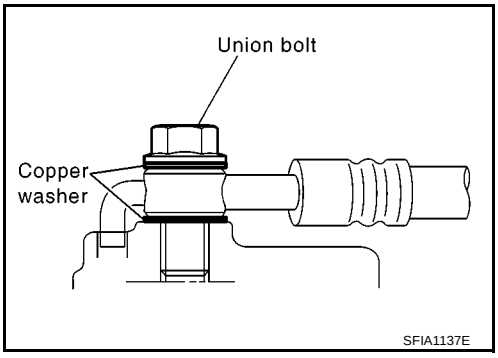
   Before installing brake caliper assembly, wipe off oil and grease on the nut washer seats and brake caliper assembly mounting surface.

2. Install brake hose to the brake caliper assembly, and tighten union bolts to the specified torque.

   CAUTION:

   - **Do not reuse the copper washer for union bolts.**
   - **Assemble brake hose securely to the cylinder body mounting hole.**

3. Add new brake fluid. Refer to BR-9, "Drain and Refill" .
4. Bleed air. Refer to BR-10, "Bleeding Brake System" .



Disassembly and Assembly of Brake Caliper Assembly

EFS002GO

DISASSEMBLY

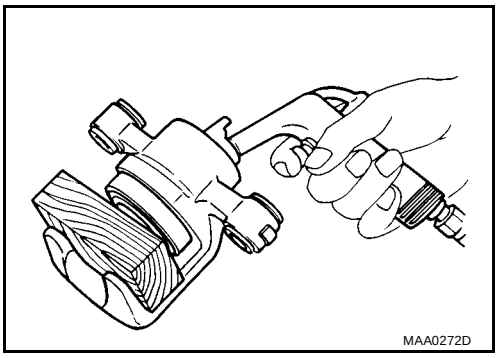
WARNING:

Be careful not to pinch your fingers in the piston.

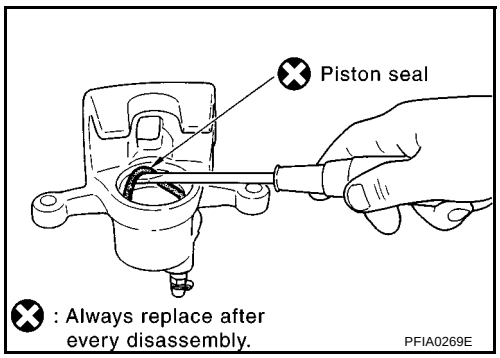
CAUTION:

Be careful not to damage cylinder inner wall.

1. Place a wooden block as shown in the figure, and blow air from the union bolt mounting hole to remove piston and piston boots.



2. Using a flat-bladed screwdriver, remove piston seals.



BRAKE CALIPER INSPECTION

Cylinder Body

CAUTION:

Use new brake fluid to clean. Do not use mineral oils such as gasoline or kerosene.

Check the inner wall of the cylinder for wear or damage. If any non-standard condition is detected, replace the cylinder.

Torque Member

Check for wear, cracks, and damage. If any non-standard condition is detected, replace the applicable part.

Piston

CAUTION:

Piston sliding surface is plated. Do not polish with sandpaper.

Check piston surface for corrosion, wear, and damage. If any non-standard condition is detected, replace applicable part.

Sliding Pin and Pin Boots

Check sliding pin and pin boot for wear, damage, and cracks. If damage or deformation is present, replace the affected part.

ASSEMBLY

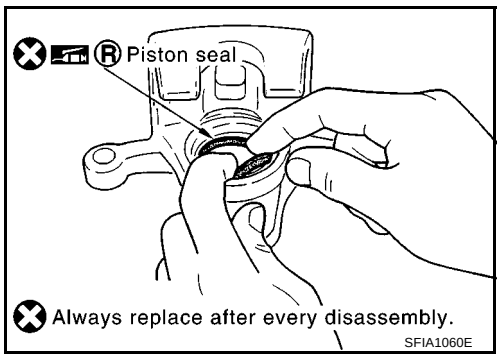
CAUTION:

Do not use rubber grease during assembly.

1. Apply NISSAN rubber lubricant (KRE1200030) or equivalent to the piston seals, and install them to the cylinder body.

   CAUTION:

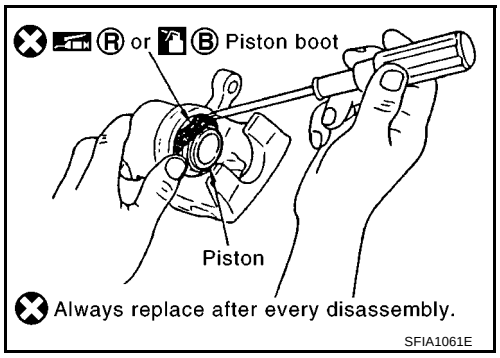
   Do not reuse the piston seals.



2. Apply brake fluid, NISSAN rubber lubricant (KRE1200030) or equivalent to the piston boot, cover the end of the piston with the piston boot, evenly insert the piston boot into the cylinder side, and make sure it is in the cylinder body groove.

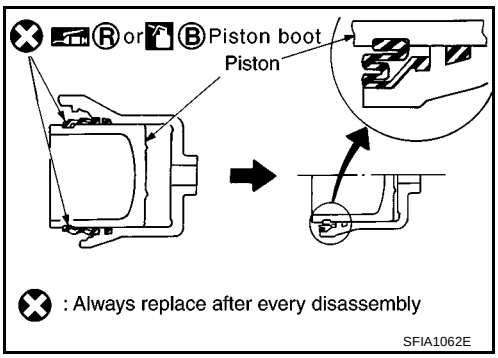
   CAUTION:

   Do not reuse the piston boot.



3. Apply brake fluid, NISSAN rubber lubricant or equivalent to piston. Press piston into cylinder body by hand. Assemble piston side lip on piston boot properly into groove on piston.

CAUTION:
Press the piston evenly and change the pressing point to prevent the inner wall of the cylinder from being rubbed.



Removal and Installation of Disc Rotor

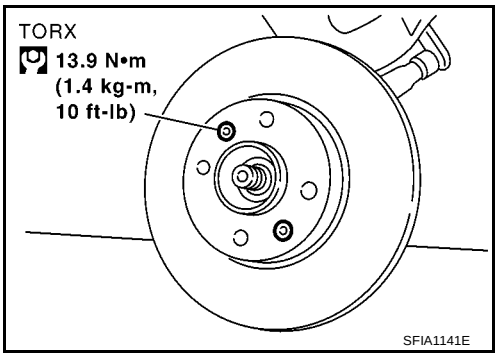
EFS002GP

REMOVAL

1. Remove tyre from vehicle.
2. Remove brake caliper assembly. Refer to BR-23, "REMOVAL" .

CAUTION:
- **Brake hose need not be disconnected brake caliper.**
- **Suspend brake caliper with wire so as not to stretch brake hose.**
- **Be careful not to depress brake pedal, or caliper piston will pop out.**
- **Make sure brake hose is not twisted.**

3. Remove disc rotor mounting screw (torx), then remove disc rotor from front axle.



INSTALLATION

- Install in the reverse order of removal. Tighten the mounting screw (torx) to the specified torque.

CAUTION:
Do not use any disc rotors that have once dropped.

DISC ROTOR INSPECTION

Visual Inspection

Check surface of the disc rotor for uneven wear, cracks, and serious damage. If any non-standard condition is detected, replace applicable part.

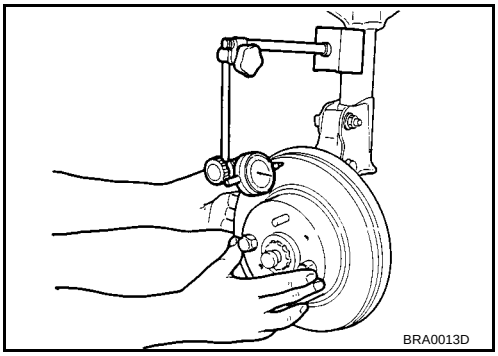
Runout Inspection

1. Using wheel bolts, fix disc rotor to the wheel hub. (2 or more positions)
2. Using a dial indicator, check the runout.

Measurement position
: At a point 10 mm (0.39 in) from outer edge of the disc
Runout limit: 0.058 mm (0.0023 in) or less

NOTE:
Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to FAX-6, "FRONT WHEEL BEARING" .

3. If the runout is outside the limit, find the minimum runout point by shifting the mounting positions of the disc rotor and wheel hub by one hole.

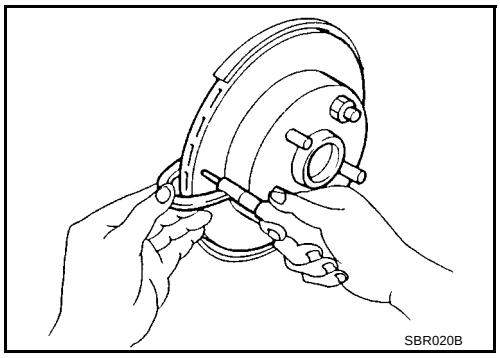


4. If the runout is still out of specification, turn rotor with on-car brake lathe (“MAD DL-8700”, “AMMCO 700 and 705” or equivalent).

Thickness Inspection

Using a micrometer, check thickness of the disc rotor. If thickness is outside the standard, replace disc rotor.

Standard thickness	**: 22.0 mm (0.87 in)**
Wear limit	**: 20.0 mm (0.79 in)**
Maximum uneven wear (measured at 8 positions)	**: 0.03 mm (0.0012 in) or less**



BRAKE BURNISHING PROCEDURE

Burnish the brake contact surfaces according to the following procedure after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage.

CAUTION:

Only perform this procedure under safe road and traffic conditions. Use extreme caution.

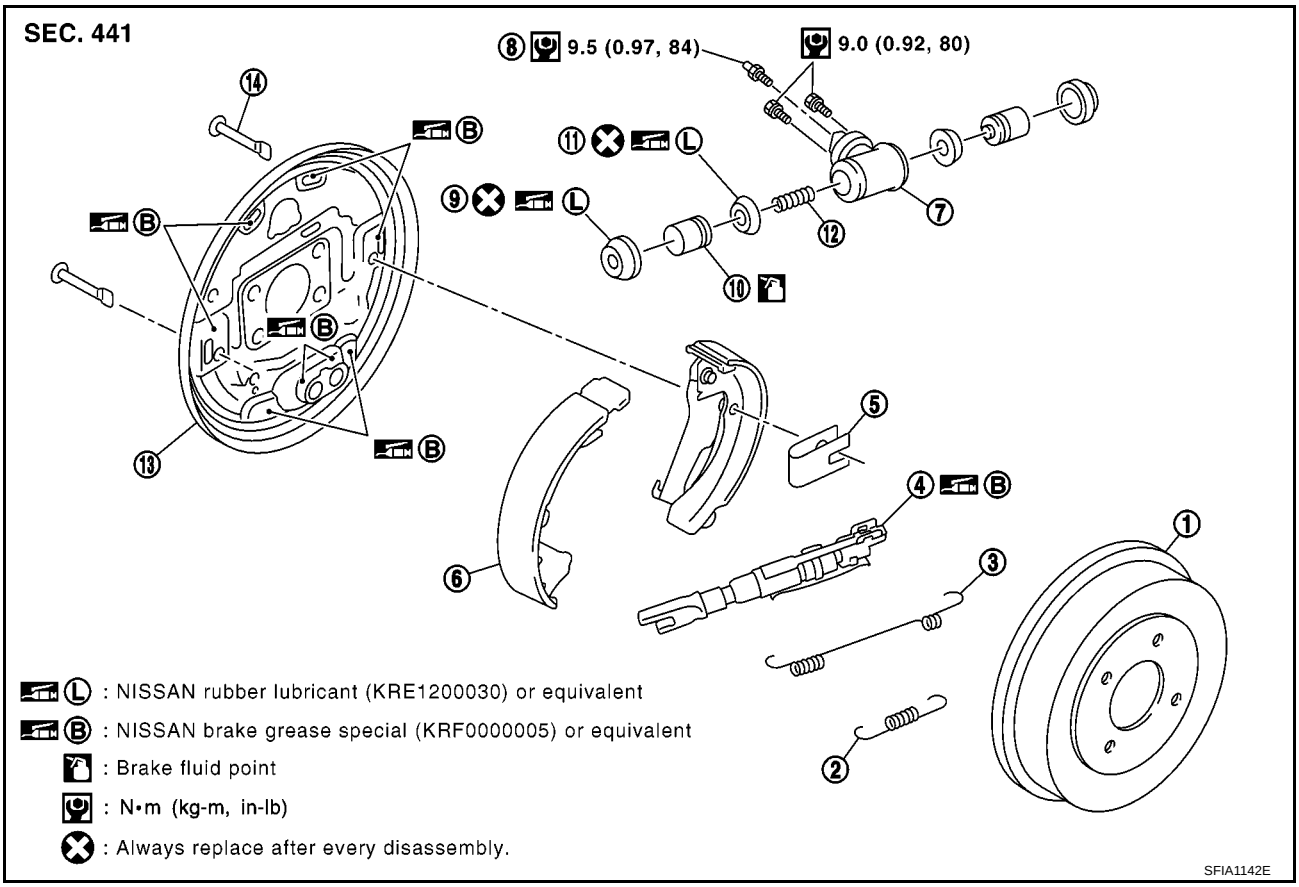
1. **Drive the vehicle on a straight smooth road at 50 km/h (31MPH).**
2. **Use medium brake pedal/foot effort to bring the vehicle to a complete stop from 50 km/h (31 MPH). Adjust brake pedal/foot pressure such that vehicle stopping time equals 3 to 5 seconds.**
3. **To cool the brake system, drive the vehicle at 50 km/h (31 MPH) for 1 minute without stopping.**
4. **Repeat steps 1 to 3, 10 times or more to complete the burnishing procedure.**

REAR DRUM BRAKE

PFP:43206

Components

EFS002GQ



1.	Drum	2.	Return spring (lower)	3.	Return spring (upper)
4.	Adjuster	5.	Retaining clip	6.	Shoe
7.	Cylinder body	8.	Air bleeder	9.	Boots
10.	Piston	11.	Piston cup	12.	Spring
13.	Back plate	14.	Shoe hold pin		

WARNING:

Clean dust on drum and back plate with a vacuum dust collector. Do not blow with compressed air.

CAUTION:

- **While removing drum, never depress brake pedal because the piston will pop out.**
- **Make sure parking brake lever is released completely.**

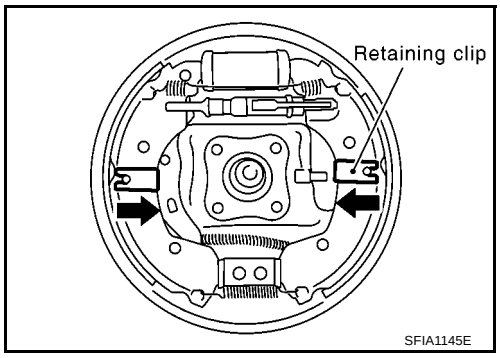
Removal and Installation of Drum Brake Assembly

EFS002GR

REMOVAL

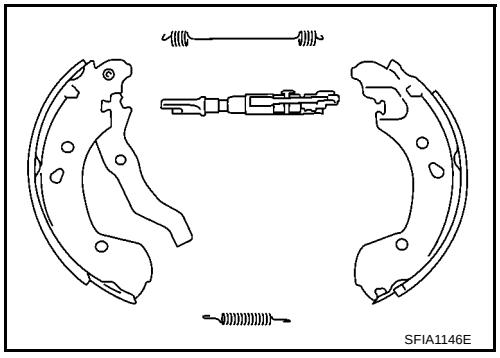
1. Remove tyre from vehicle.
2. With the parking brake lever released, remove the brake drum. Refer to RAX-5, "Removal and Installation" .
3. While pushing and rotating the retainer, pull out shoe hold pin, and remove shoe assembly.

   CAUTION:
   Do not damage the wheel cylinder piston boot.



4. Remove the parking brake cable from the operating lever.

   CAUTION:
   Do not bend the parking brake cable.
5. Disassemble the shoe assembly (shoe, springs, spacer, adjuster).

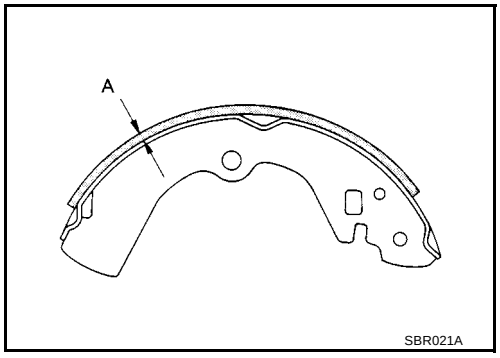


INSPECTION AFTER REMOVAL

Lining Thickness Inspection

Check lining thickness.

Standard thickness	**: 4.5 mm (0.177 in)**
Wear limit of thickness (A)	**: 1.5 mm (0.059 in)**

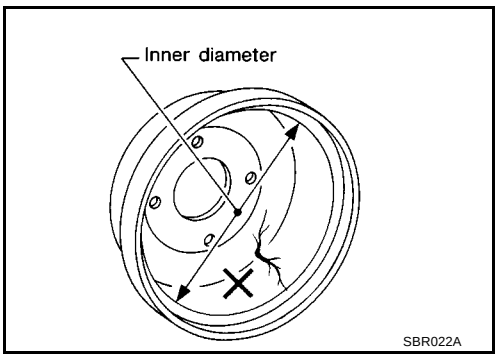


Drum Inner Diameter Inspection

Check the drum inside diameter.

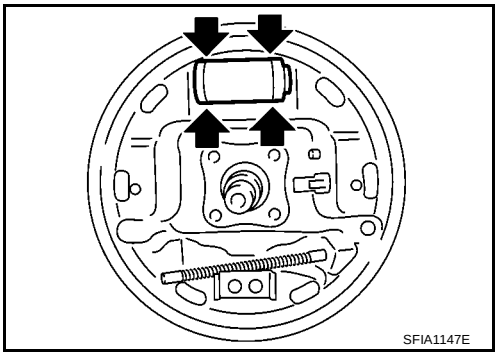
Measurement area: lining contact surface (center)

Standard inner diameter : 202 mm (7.95 in) dia.
Wear limit of inner diameter : 203.2 mm (8.0 in) dia.



Wheel Cylinder Leakage Inspection

- Check wheel cylinder for brake fluid leakage.
- Check for wear, damage, and looseness. If any non-standard condition is found, replace it.

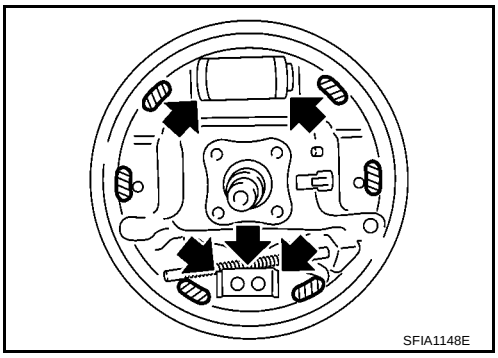


Other Inspections

- Check inside of the drum for excessive wear, damage, and cracks.
- Check lining for excessive wear, damage, and peeling.
- Check shoe sliding surface for excessive wear and damage.
- Check return spring for sagging.
- Check back plate for damage, cracks, and deformation.
- Check bolts on the back plate for looseness.

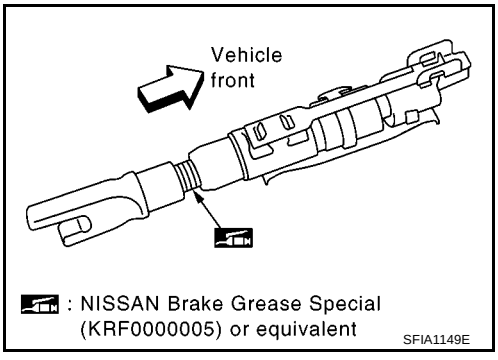
INSTALLATION

1. Apply Nissan brake grease special (KRF0000005) or equivalent to brake shoes sliding surfaces (the shaded areas) and other parts on the back plate as indicated by arrows in the figure.



2. Shorten adjuster by rotating it.

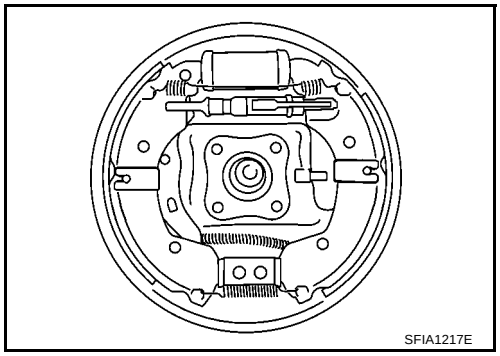
Wheel	Screw
Left	Left-hand thread
Right	Right-hand thread



3. Assemble the shoe, springs, adjuster and spacer to form the shoe assembly.

4. Connect the parking brake cable to the operating lever.
5. Install the shoe assembly. After assembly, be sure that each part is installed properly.

   CAUTION:
   Do not damage the wheel cylinder piston boot.
6. Install the brake drum. Refer to RAX-5, "Removal and Installation" .


SFIA1217E

7. When installing a new wheel cylinder or overhauling wheel cylinder, bleed air. Refer to BR-10, "Bleeding Brake System" .
8. Adjust the parking brake. Refer to PB-3, "Adjustment" .

Removal and Installation of Wheel Cylinder

EFS002GS

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Remove the rear brake shoe assembly.
3. Remove the brake tube from the wheel cylinder.
4. Remove bolts on the wheel cylinder, and then remove wheel cylinder from the back plate.

INSTALLATION

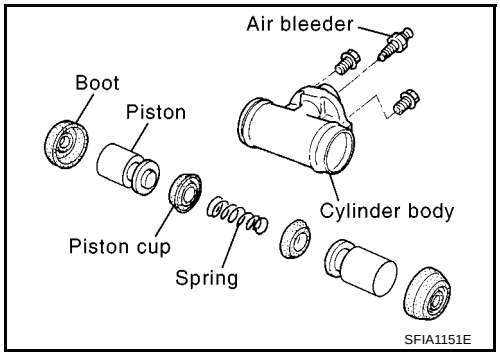
- Install in the reverse order of removal. Tighten bolts to the specified torque. Refer to BR-27, "Components" .
- Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .

Disassembly and Assembly of Wheel Cylinder

EFS002GT

DISASSEMBLY

1. Remove dust boots at the right and left of the wheel cylinder, and pull out the pistons from cylinder.
2. Remove the piston cups from the pistons.

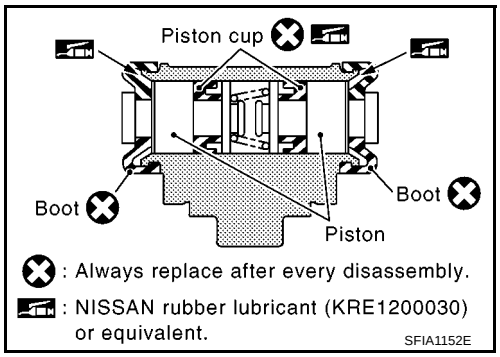


SFIA1151E

ASSEMBLY

CAUTION:
Do not use rubber grease during assembly.

1. Apply brake fluid to the piston sliding surface on the wheel cylinder.
2. Apply NISSAN rubber lubricant (KRE1200030) or equivalent to the cups and boots and assemble as shown in the figure.



SFIA1152E

Wheel Cylinder Inspection

EFS002GU

Check the pistons, piston cups, and inner wall of the cylinder for wear, corrosion, and damage. If a failure is detected, replace the applicable part.

CAUTION:

When inserting the piston, be careful not to scratch the cylinder.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EFS002FH

Unit: mm (in)

Front brake	Brake model	CL22
	Rotor outer diameter × thickness	260 × 22.0 (10.24 × 0.87)
	Pad (thickness)	12.4 (0.488)
	Piston diameter	53.95 (2.124)
Rear brake	Brake model	LT20
	Drum inner diameter	203.2 (8.0)
	Lining Length × width × thickness	195 × 38 × 4.5 (7.68 × 1.50 × 0.177)
	Cylinder bore diameter	19.05 (3/4)
Master cylinder	Cylinder bore diameter	23.81 (0.94)
Control valve	Valve model	Linkage type load sensing valve
Brake booster	Booster model	T52/ 5/ 255
	Diaphragm diameter	254 (10)
Recommended brake fluid		DOT 3 or DOT 4

Brake Pedal

EFS002FI

Brake pedal height (from dash panel top surface)	LHD	M/T models	161 - 171 mm (6.34 - 6.73 in)
		A/T models	171 - 181 mm (6.73 - 7.13 in)
	RHD	M/T models	156 - 166 mm (6.14 - 6.54 in)
		A/T models	166 - 176 mm (6.54 - 6.93 in)
Depressed pedal height [under a force of 490 N (50 kg, 110 lb) with the engine running]		M/T models	More than 80 mm (3.15 in)
		A/T models	More than 85 mm (3.35 in)
Clearance between the stopper rubber and the threaded end of stop lamp switch.			0.74 - 1.96 mm (0.029 - 0.077 in)
Pedal play			3 - 11 mm (0.12 - 0.43 in)

Brake Booster

EFS002FJ

Vacuum type

Vacuum leakage [at vacuum of – 66.7 kPa (– 500 mmHg, –19.69 inHg)]		Within 3.3 kPa (25 mmHg, 0.98 inHg) of vacuum for 15 seconds
Input rod installation standard dimension	LHD models	158.25 mm (6.23 in)
	RHD models	115.35 mm (4.54 in)

Check Valve

EFS002FK

Vacuum leakage [at vacuum of – 66.7 kPa(– 500 mmHg, – 19.69 inHg)]	within 1.3 kPa (10 mmHg, 0.39 inHg) of vacuum for 15 seconds

Front Disc Brake

EFS002FL

Brake model		CL22
Brake pad	Standard thickness (new)	12.4 mm (0.488 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	22.0 mm (0.87 in)
	Repair limit thickness	20 mm (0.79 in)
	Maximum uneven wear (measured at 8 positions)	0.03 mm (0.0012 in) or less
	Runout limit (with it attached to the vehicle)	0.058 mm (0.0023 in) or less

Rear Drum Brake

EFS002FM

Brake model		LT20
Lining	Standard thickness (new)	4.5 mm (0.177 in)
	Repair limit thickness	1.5 mm (0.059 in)
Drum	Standard inner diameter (new)	202 mm (7.95 in)
	Repair limit inner diameter	203.2 mm (8.0 in)

SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

ABS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for Brake System 3
Precautions for Brake Control 3
Precaution for Harness Repair 4
CAN SYSTEM 4
PREPARATION 5
Special Service Tools 5
SYSTEM DESCRIPTION 6
System Diagram 6
System Components 6
ABS Function 7
EBD Function 7
Fail-Safe Function 7
Hydraulic Circuit Diagram 7
TROUBLE DIAGNOSIS 8
Diagnosis Procedure 8
BASIC CONCEPT 8
DIAGNOSIS FLOW 9
QUESTIONNAIRE 10
EXAMPLE OF DIAGNOSIS SHEET 10
Component Parts Location 11
Schematic 12
Wiring Diagram — ABS — Models with CR Engine 13
Wiring Diagram — ABS — Models with K9K Engine 16
Control Unit Input/Output Signal Standard 19
STANDARDS BY CONSULT-II 19
CONSULT-II Functions 20
CONSULT-II FUNCTION APPLICATION TABLE 20
CONSULT-II BASIC OPERATION PROCEDURE 21
SELF-DIAGNOSIS 22
DATA MONITOR 24
ACTIVE TEST 25
CAN Communication 27
SYSTEM DESCRIPTION 27
CAN Communication Unit 27
TYPE 1/TYPE 2 28
TYPE 3/TYPE 4 31
TYPE 9/TYPE 10 33
For Fast and Accurate Diagnosis 35
PRECAUTIONS FOR TROUBLE DIAGNOSIS 35
Basic Inspection 35
BASIC INSPECTION 1: BRAKE FLUID LEVEL, LEAK AND BRAKE PAD INSPECTION 35
BASIC INSPECTION 2: INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY 35
BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION 35
Inspection 1 Wheel Sensor System 37
INSPECTION PROCEDURE 37
Inspection 2 ABS Actuator and Electric Unit Power and Ground System 38
INSPECTION PROCEDURE 38
Inspection 3 ABS Control Unit System 39
Inspection 4 ABS Actuator Relay or ABS Motor Relay Power System 39
Inspection 5 CAN Communication System 40
INSPECTION PROCEDURE 40
Inspection 6 Stop Lamp Switch System 41
INSPECTION PROCEDURE 41
Symptom 1 ABS Works Frequently. 41
Symptom 2 Unexpected Pedal Reaction 42
Symptom 3 Longer Stopping Distance 43
Symptom 4 ABS Does Not Work 43
Symptom 5 Pedal Vibration and ABS Operation Noise 43
WHEEL SENSORS 44
Removal and Installation 44
REMOVAL 44
INSTALLATION 44
SENSOR ROTOR 45
Removal and Installation 45
FRONT 45
REAR 45

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)... 46
Removal and Installation 46
REMOVAL 46
INSTALLATION 46

ESP/TCS/ABS

PRECAUTIONS 47
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 47
Precautions for Brake System 47
Precautions for Brake Control 47
Diagnosis Precaution 48
CAN SYSTEM 48
Precaution for Harness Repair 48
CAN SYSTEM 48
PREPARATION 49
Special Service Tools 49
ON-VEHICLE SERVICE 50
Adjustment of Steering Angle Sensor Neutral Position 50
OPERATION PROCEDURE 50
SYSTEM DESCRIPTION 51
System Diagram 51
ESP Function 51
TCS Function 51
ABS Function 51
EBD Function 52
Fail-Safe Function 52
ESP / TCS SYSTEM 52
ABS, EBD SYSTEM 52
Hydraulic Circuit Diagram 53
CAN COMMUNICATION 54
System Description 54
CAN Communication Unit 54
TYPE 5/TYPE 6 55
TYPE 7/TYPE 8 58
TROUBLE DIAGNOSIS 61
How to Proceed With Diagnosis 61
BASIC CONCEPT 61
DIAGNOSIS FLOWCHART 62
ASKING COMPLAINTS 63
EXAMPLE OF DIAGNOSIS SHEET 63
Component Installation Location 64
Schematic 65
Wiring Diagram — ESP — 66
Control Unit Input/Output Signal Standard 71
REFERENCE VALUE FROM CONSULT-II 71
CONSULT-II Functions 74
CONSULT-II FUNCTION APPLICATION TABLE (MAIN ITEMS) 74
CONSULT-II BASIC OPERATION PROCEDURE ... 75
SELF-DIAGNOSIS 75
DATA MONITOR 77
ACTIVE TEST 81
For Fast and Accurate Diagnosis 83
PRECAUTIONS FOR DIAGNOSIS 83
Basic Inspection 84
BASIC INSPECTION 1: BRAKE FLUID AMOUNT, LEAKS, AND BRAKE PADS INSPECTION 84
BASIC INSPECTION 2: POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION 84
BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP AND SLIP INDICATOR LAMP INSPECTION 85
Inspection 1: Wheel Sensor System 85
Inspection 2: Engine System 88
Inspection 3: ESP/TCS/ABS Control Unit System... 89
Inspection 4: Steering Angle Sensor System 89
Inspection 5: Yaw Rate/Side G-Sensor System 90
Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System 92
Inspection 7: Stop Lamp Switch System 94
Inspection 8: Brake Fluid Level Switch System 96
Inspection 9: CAN Communication System 96
Component Inspection 97
ESP OFF SWITCH 97
Symptom 1: Excessive ABS Function Operation Frequency 97
Symptom 2: Unexpected Pedal Reaction 98
Symptom 3: The Braking Distance Is Long 98
Symptom 4: The ABS Function Does Not Operate... 99
Symptom 5: Pedal Vibration or ABS Operation Sound Occurs 99
Symptom 6: Vehicle Jerks During ESP/TCS/ABS Control 99
WHEEL SENSORS 101
Removal and Installation 101
REMOVAL 101
INSTALLATION 101
SENSOR ROTOR 102
Removal and Installation 102
FRONT 102
REAR 102
ACTUATOR AND ELECTRIC UNIT (ASSEMBLY) . 103
Removal and Installation 103
REMOVAL 103
INSTALLATION 103
YAW RATE/SIDE G SENSOR 104
Removal and Installation 104
REMOVAL 104
INSTALLATION 104
STEERING ANGLE SENSOR 105
Removal and Installation 105

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EFS004LN

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

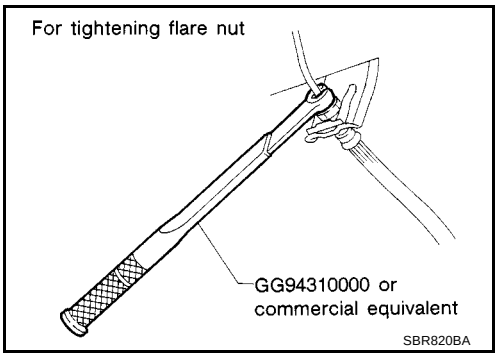
WARNING:

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

Precautions for Brake System

EFS004LO

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Do not reuse the drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble malfunctioning parts. If any malfunctioning part is found, replace the part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors for ABS actuator and electric unit or battery terminals.
- When installing brake piping, be sure to check tightening torque.



Precautions for Brake Control

EFS004LP

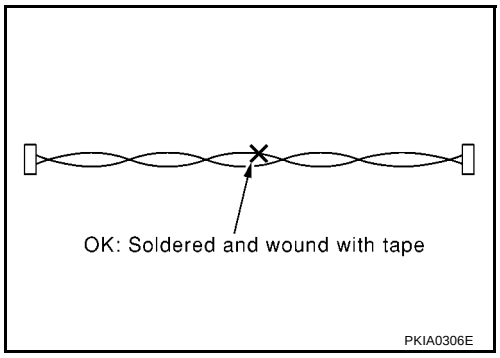
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and oil leaks.
- If tyre size and type are used in an improper combination, or brake pads are not Genuine Nissan parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near the control unit, ABS system may malfunction or return an error.
- If aftermarket parts (e.g. car stereo equipment, CD player) have been installed, check electrical harnesses for pinches, open, and improper wiring.

Precaution for Harness Repair

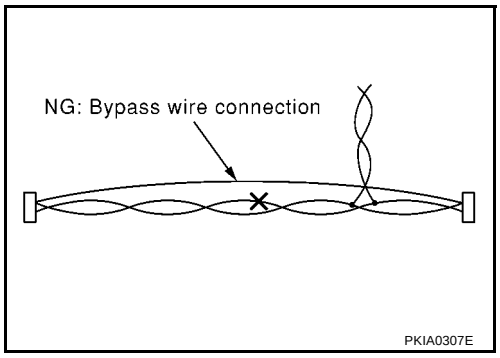
EFS005VW

CAN SYSTEM

- Area to be repaired shall be soldered, and wrapped with a tape (be sure that fraying of twisted wire shall be within 110 mm 4.33 in)).



- Do not make a bypass connection to repaired area. (If it is done, branch part will be removed and characteristics of twisted wire will be lost.)

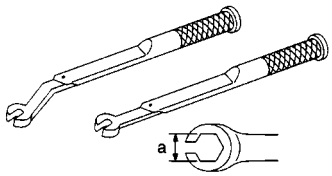


PREPARATION

PFP:00002

Special Service Tools

EFS004LQ

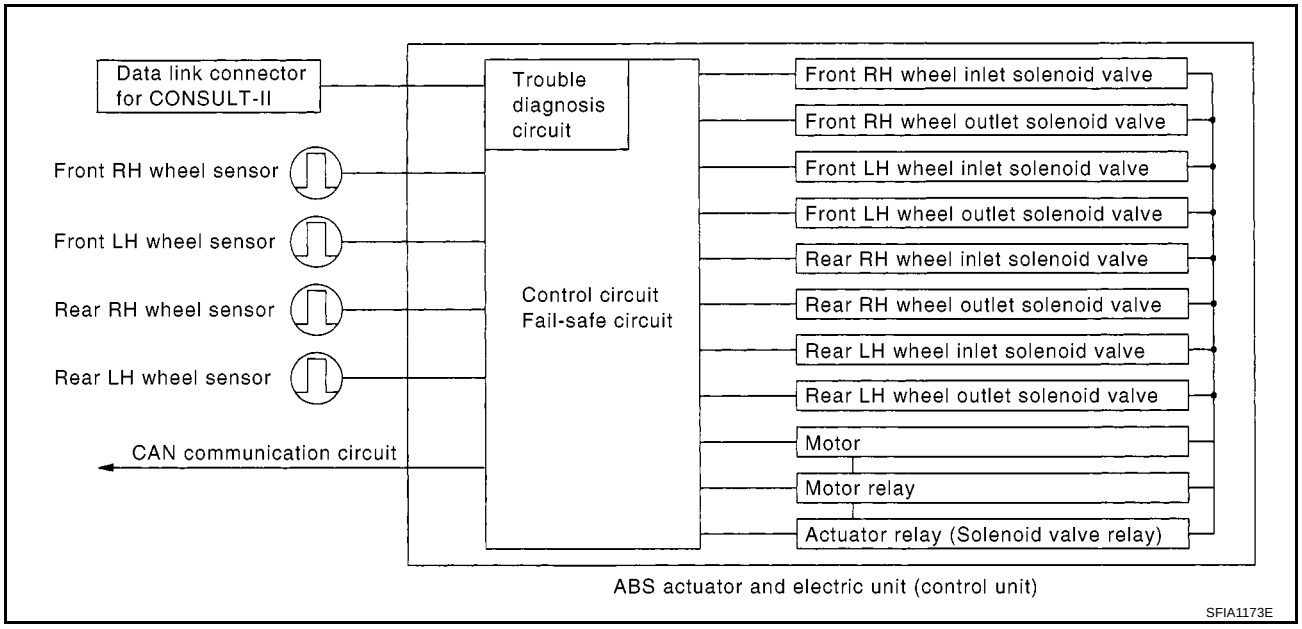
Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)	 NT406	Removing and installing each brake piping

SYSTEM DESCRIPTION

PFP:00000

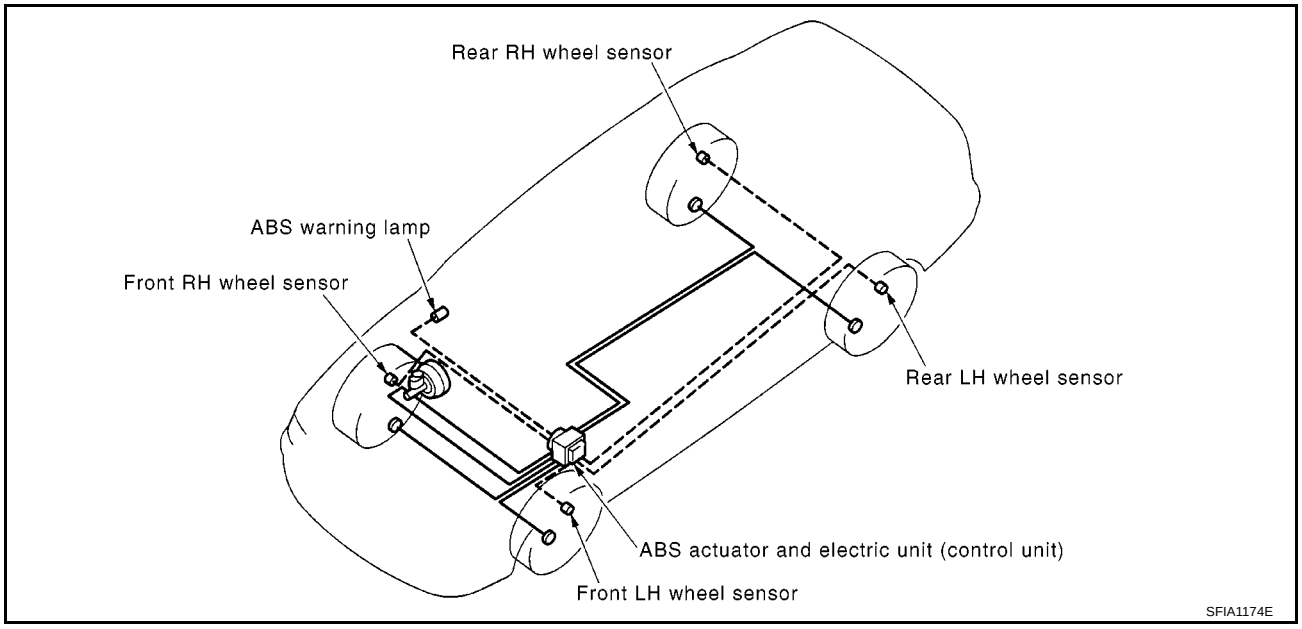
System Diagram

EFS004LR



System Components

EFS004LS



ABS Function

EFS004LT

- Anti-lock Brake System monitors wheel rotation in braking and electronically controls braking force (brake fluid pressure) to prevent wheel locking. Thus, it improves vehicle stability in abrupt braking and allows driver to clear obstacles more easily.
- In the event of an electric system malfunction, the fail-safe function will operate, the vehicle will enter the ABS non-operation state, and ABS warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

EBD Function

EFS004LU

- The electronically controlled braking force distribution unit detects the minute slips that occur in front and rear wheels during braking and uses electronic control to control rear wheel braking force (brake hydraulic pressure) to suppress rear wheel slipping as much as possible to improve stability during braking.
- In the event an electrical system malfunction occurs, the fail-safe function will operate and EBD and ABS will enter non-operational states, and ABS warning lamp and brake warning lamp will come on.
- CONSULT-II can be used to diagnose the electrical system.

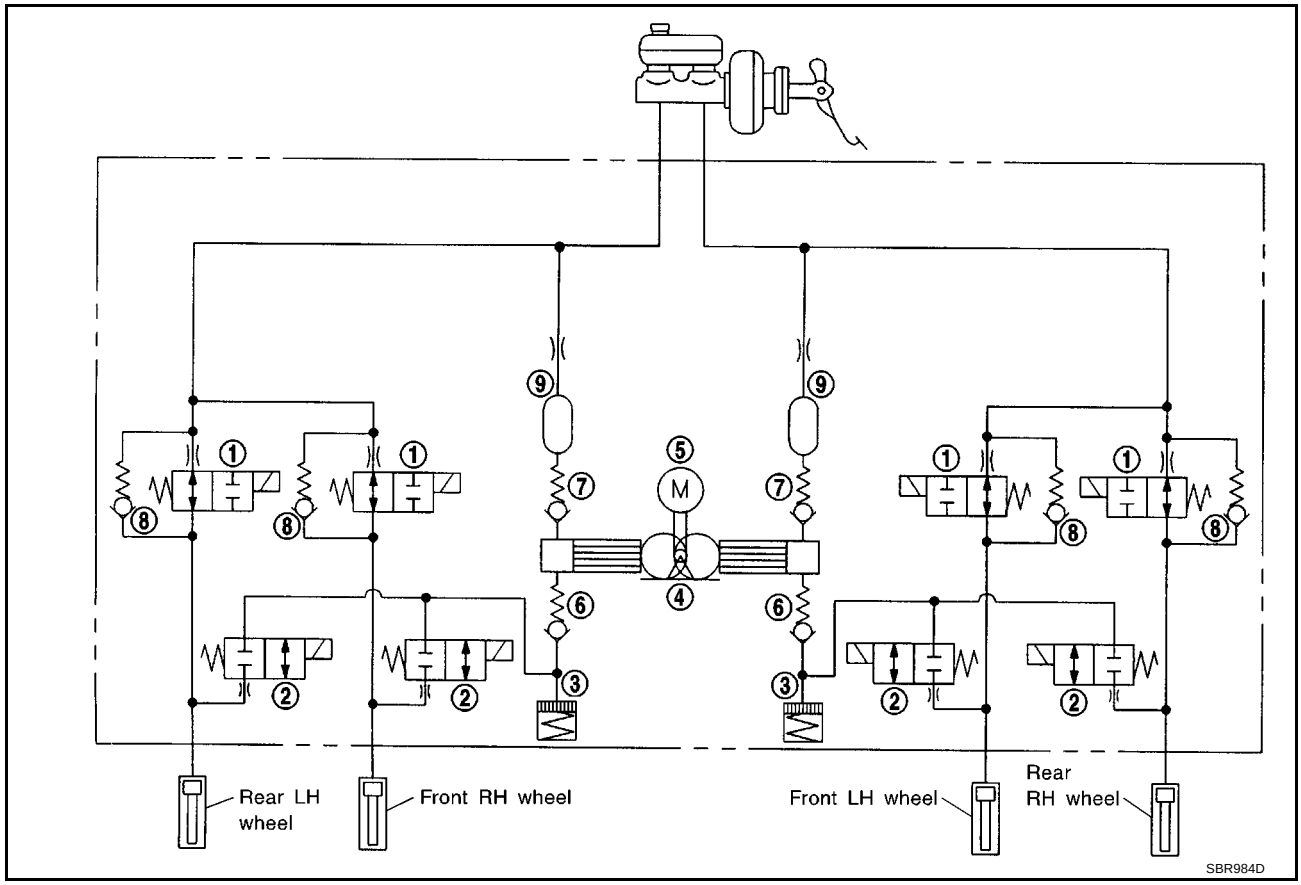
Fail-Safe Function

EFS004LV

- If a malfunction occurs in ABS system, “ABS warning lamp” turns ON.
- If a malfunction occurs in EBD, brake warning lamp and ABS warning lamp turn ON.

Hydraulic Circuit Diagram

EFS004LW



1. Inlet solenoid valve
2. Outlet solenoid valve
3. Reservoir
4. Pump
5. Motor
6. Inlet valve
7. Outlet valve
8. Bypass check valve
9. Damper

TROUBLE DIAGNOSIS

PFP:00004

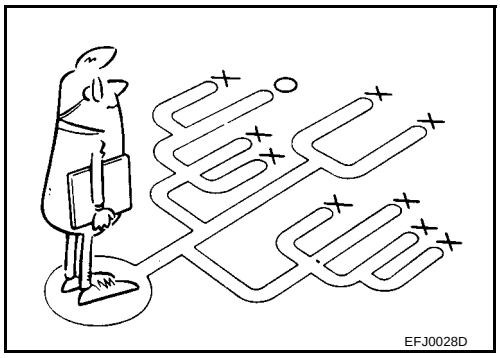
Diagnosis Procedure

EFS004LX

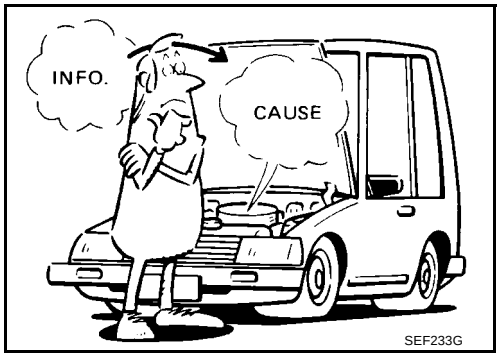
BASIC CONCEPT

- The most important point in performing trouble diagnosis is to thoroughly understand the vehicle systems (both control and mechanical).
- It is also important to clarify customer concerns before starting the inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

  CAUTION:
  Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.


EFJ0028D

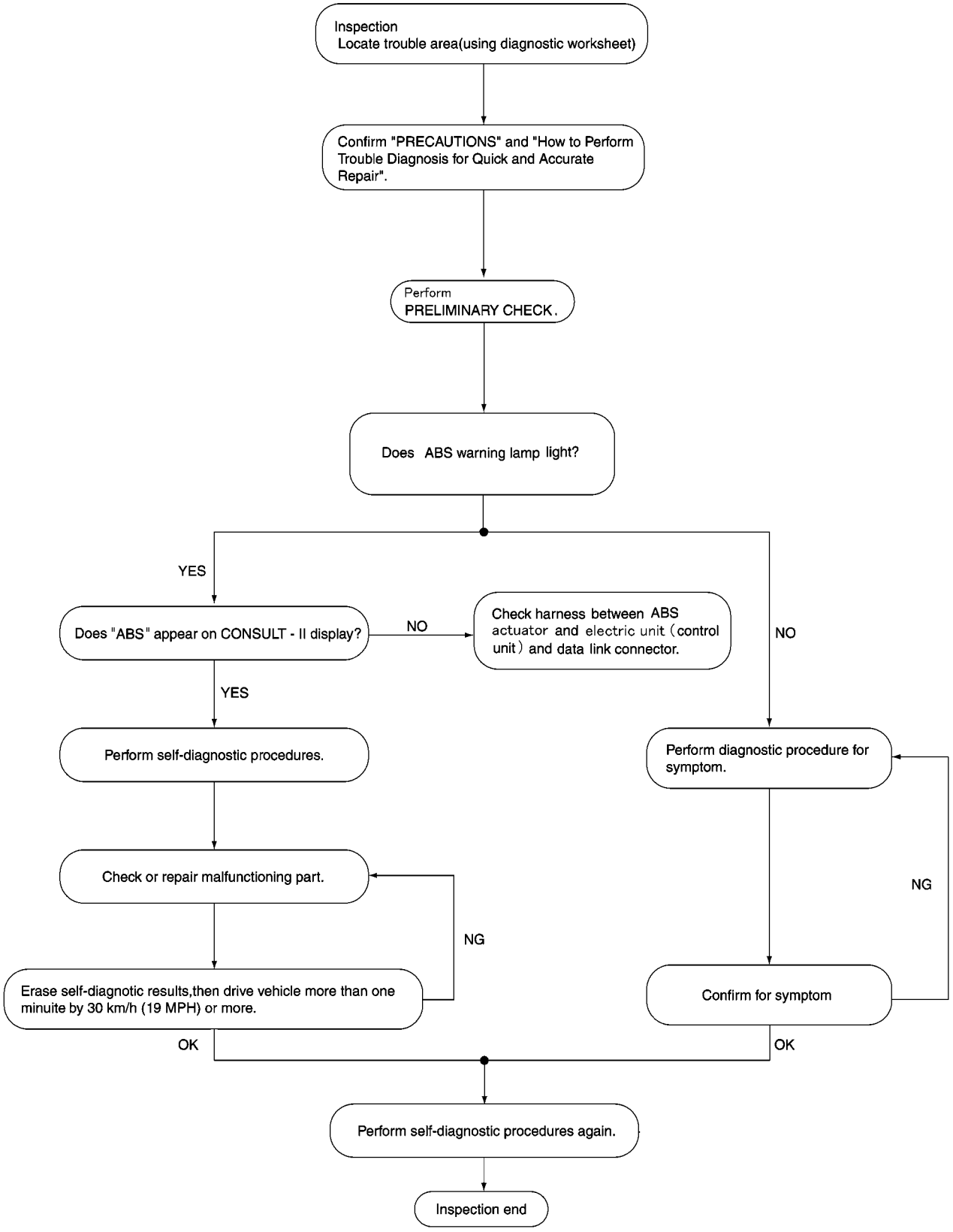
- It is essential to check symptoms right from the beginning in order to repair a error completely.
  For an intermittent error, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent errors are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any symptom diagnosis, no one can judge if the error has actually been eliminated.
- After completing trouble diagnosis, be sure to perform “erase memory”. Refer to BRC-22, "SELF-DIAGNOSIS" .
- For an intermittent error, move the harness or harness connector by hand to check for poor contact or false open circuit.



SEF233G

- Always read the GI section to be aware of the general precautions. Refer to GI-4, "General Precautions" .

DIAGNOSIS FLOW



SFIA0953E

QUESTIONNAIRE

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present and under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet so as not to miss the information.

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

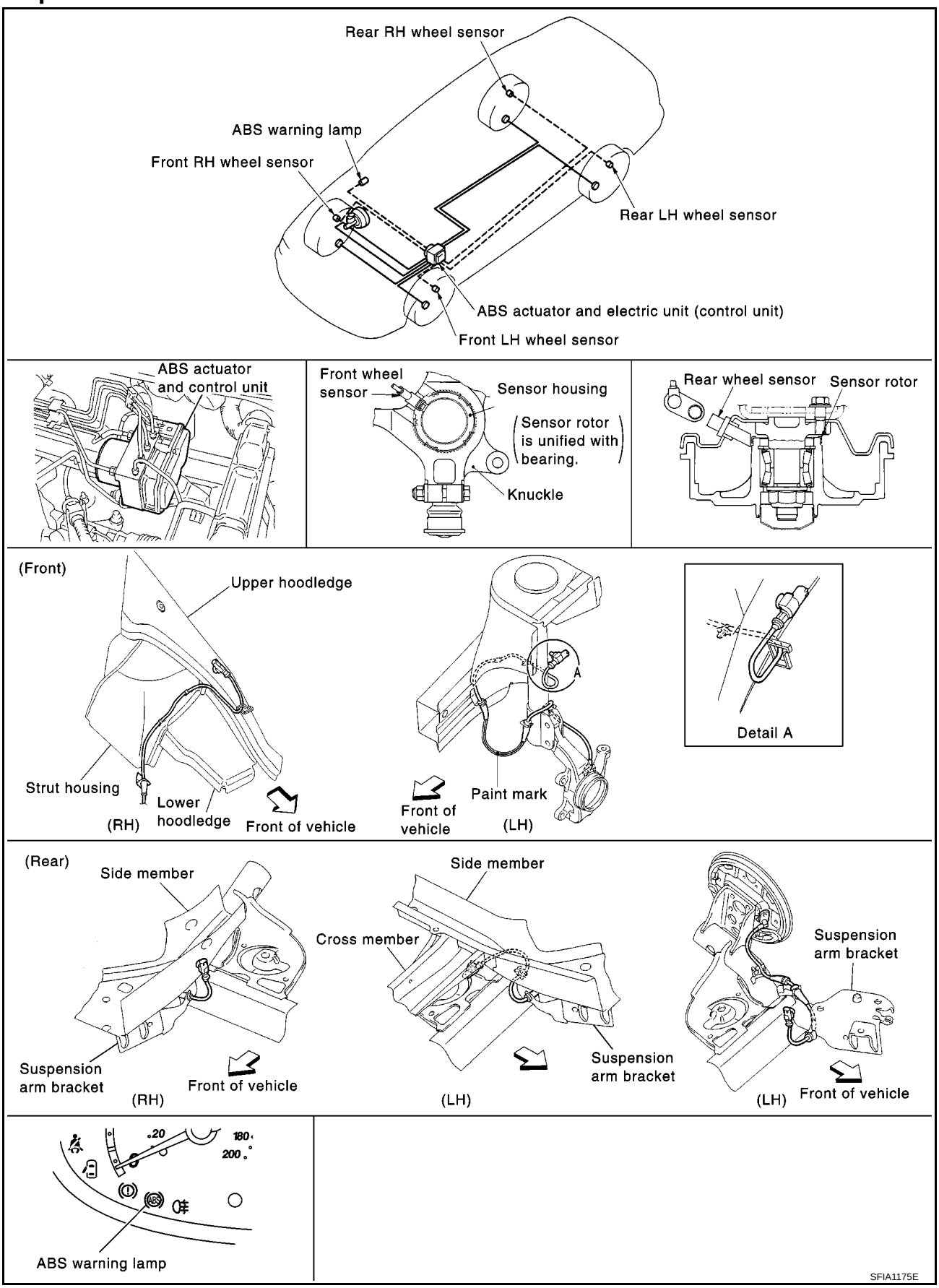
EXAMPLE OF DIAGNOSIS SHEET

Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work. (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA0791E

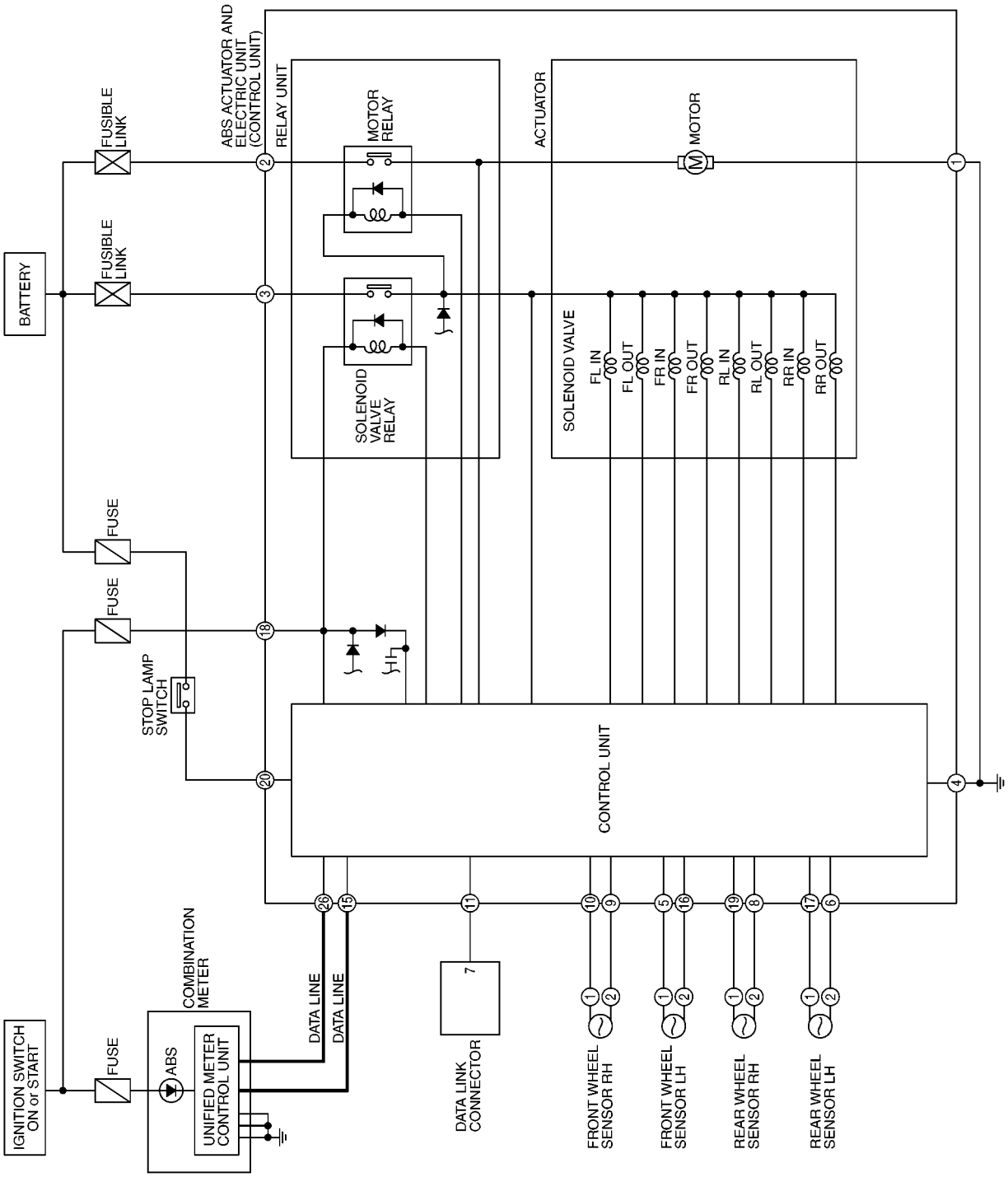
Component Parts Location

EFS004LY



Schematic

EFS004LZ

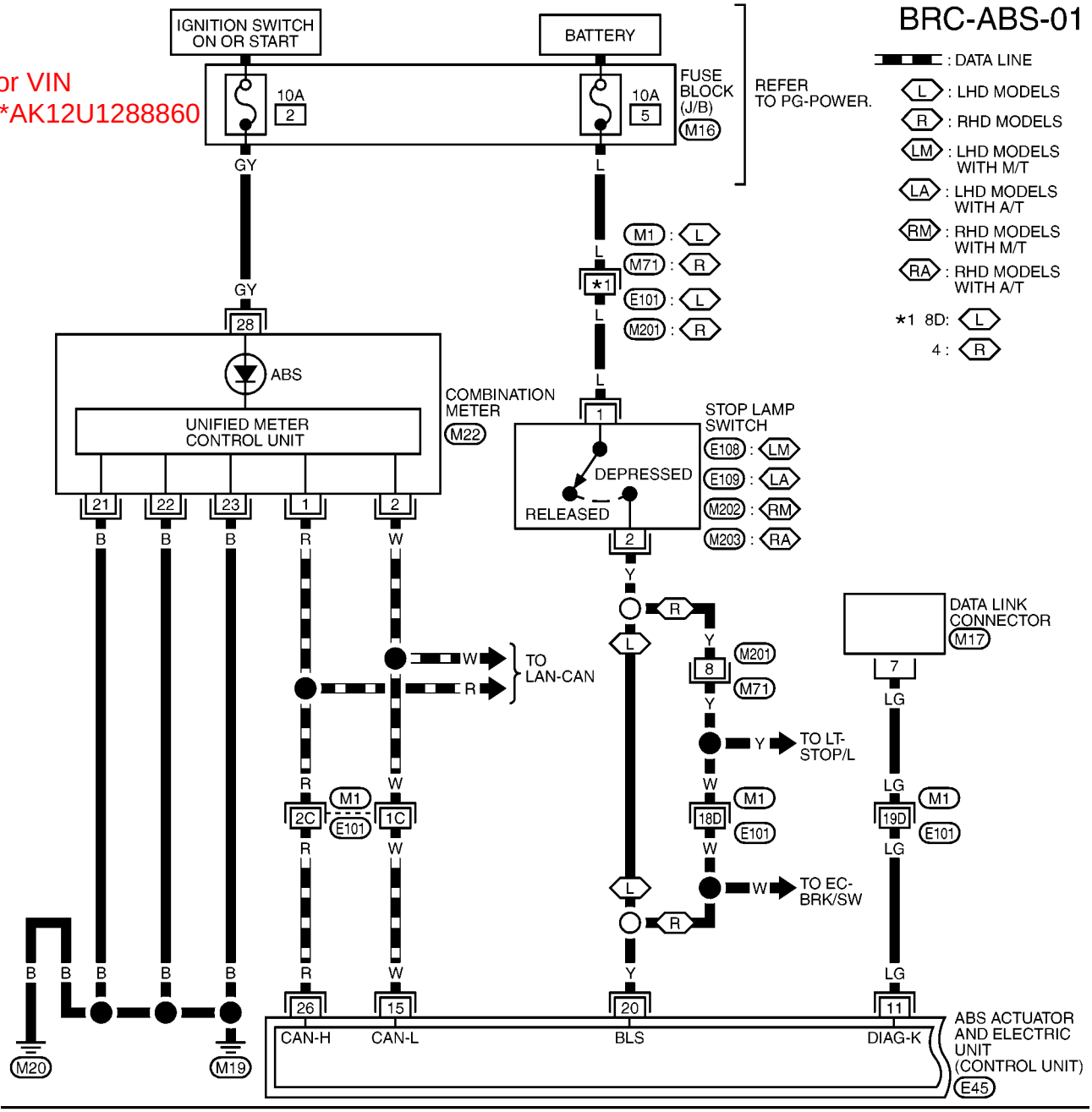


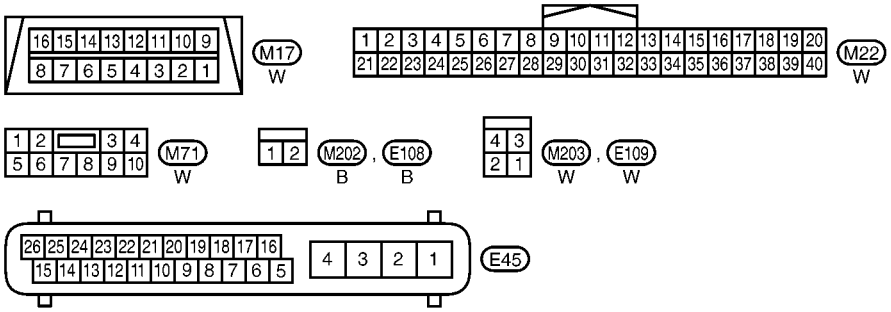
MFWA0016E

Wiring Diagram — ABS — Models with CR Engine

EFS004M0

SMA for VIN >SJN**AK12U1288860

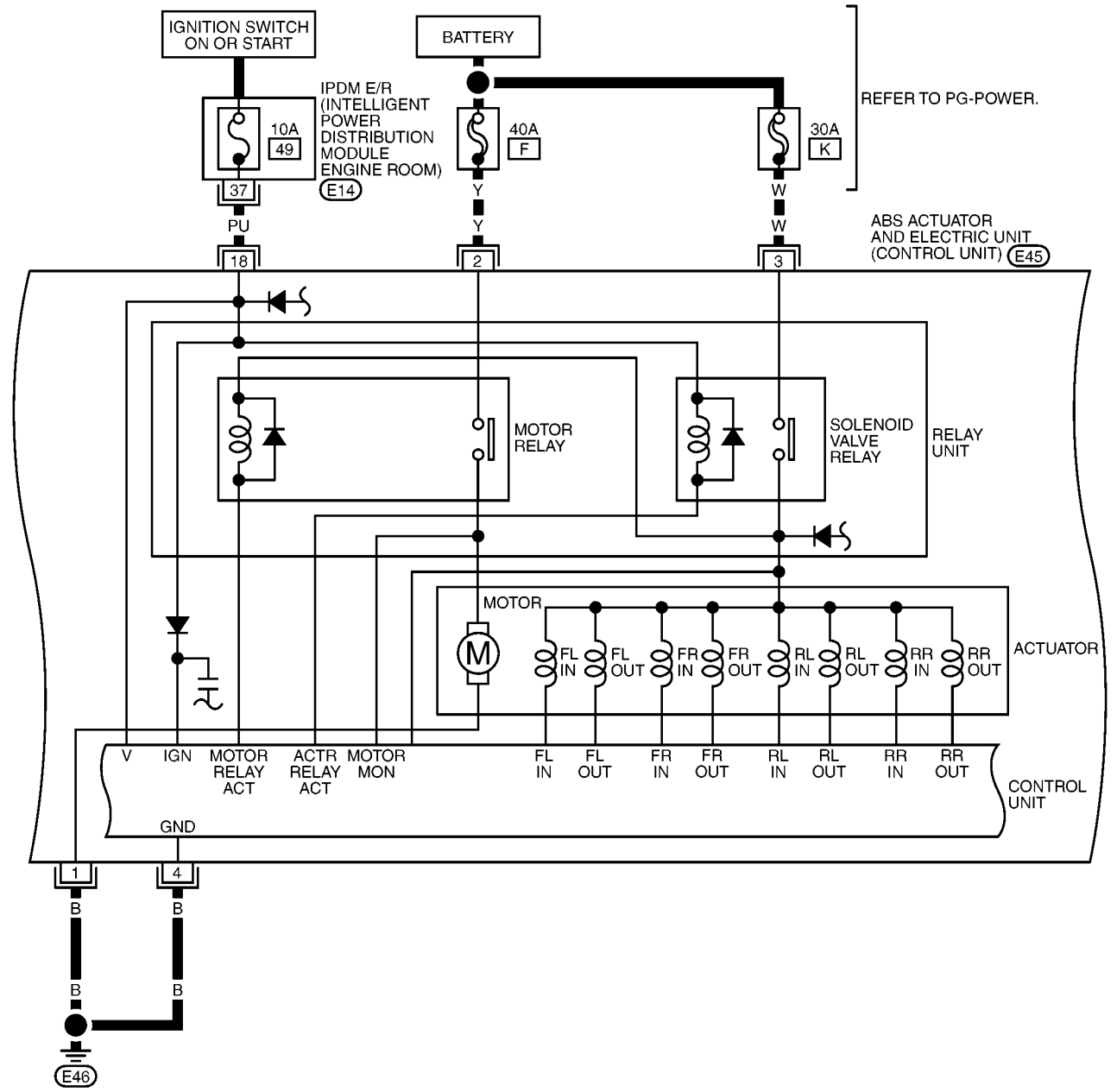


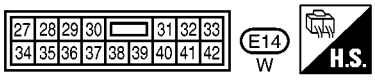


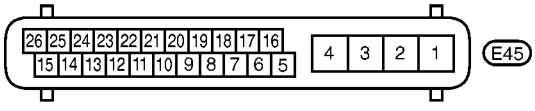
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0017E

BRC-ABS-02







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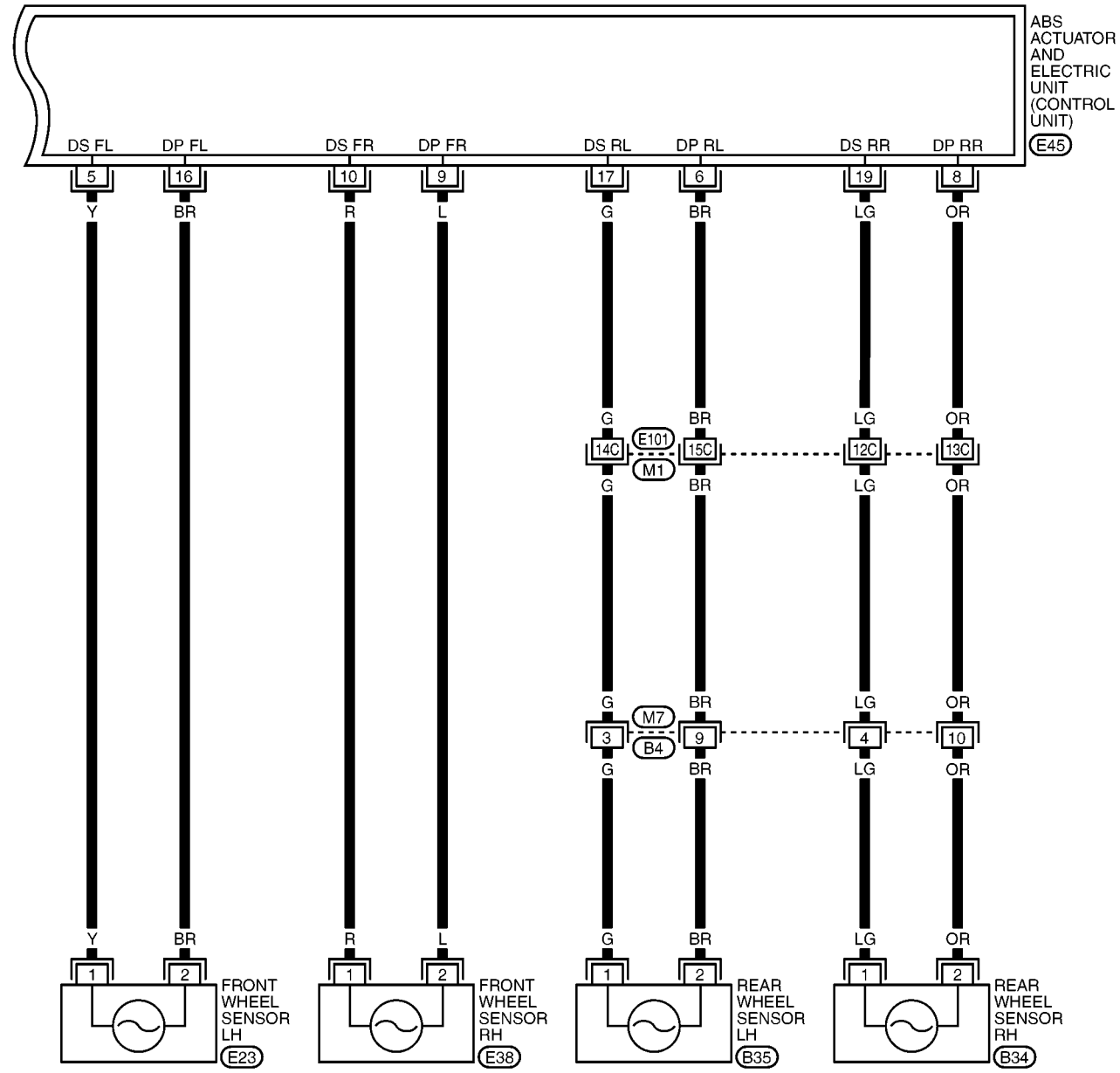
BRC-ABS-03

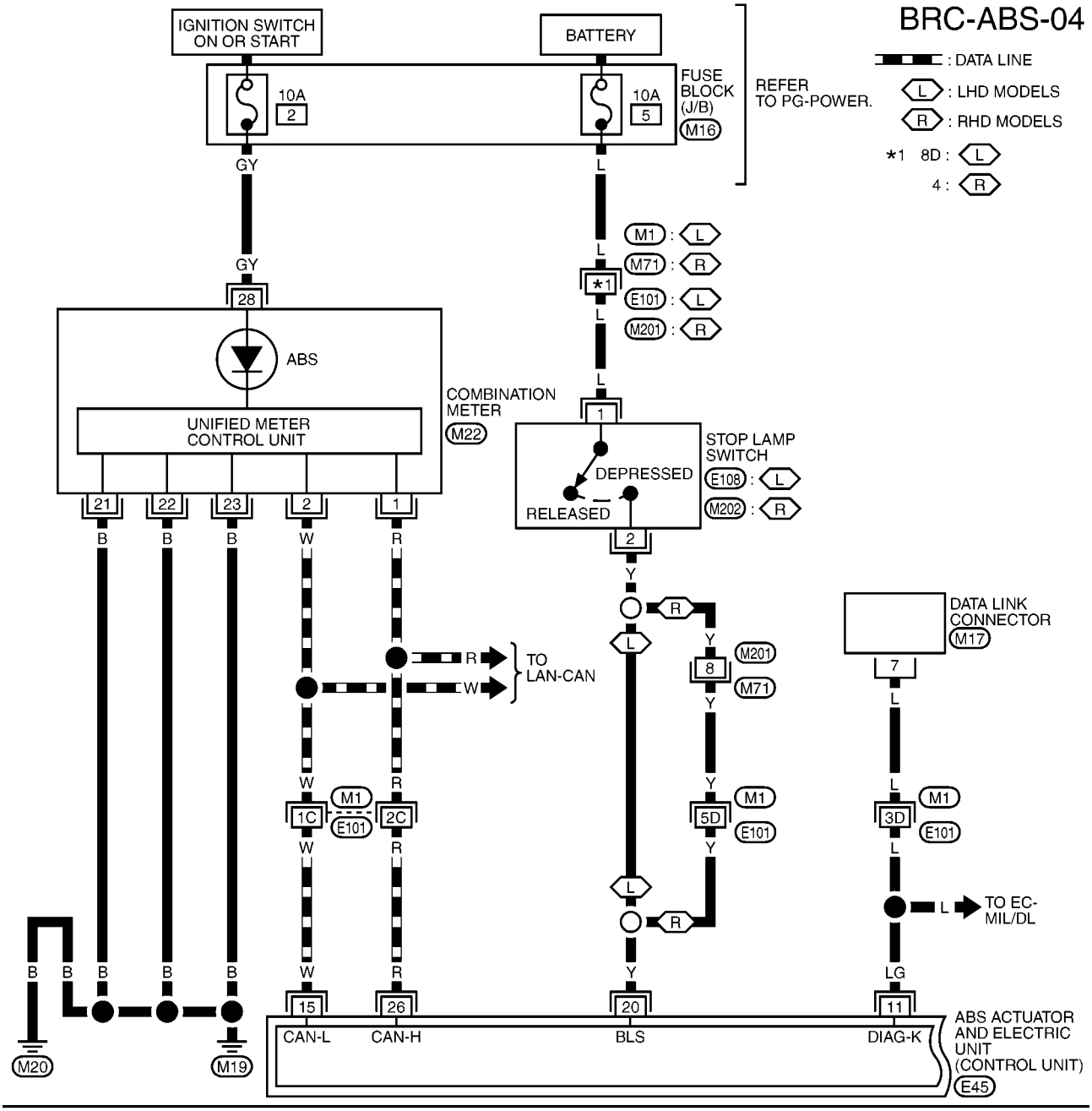


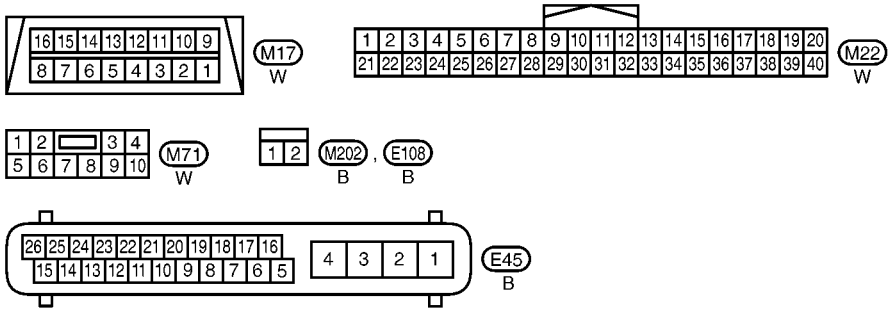
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MFWA0019E

Wiring Diagram — ABS — Models with K9K Engine

EFS005YH





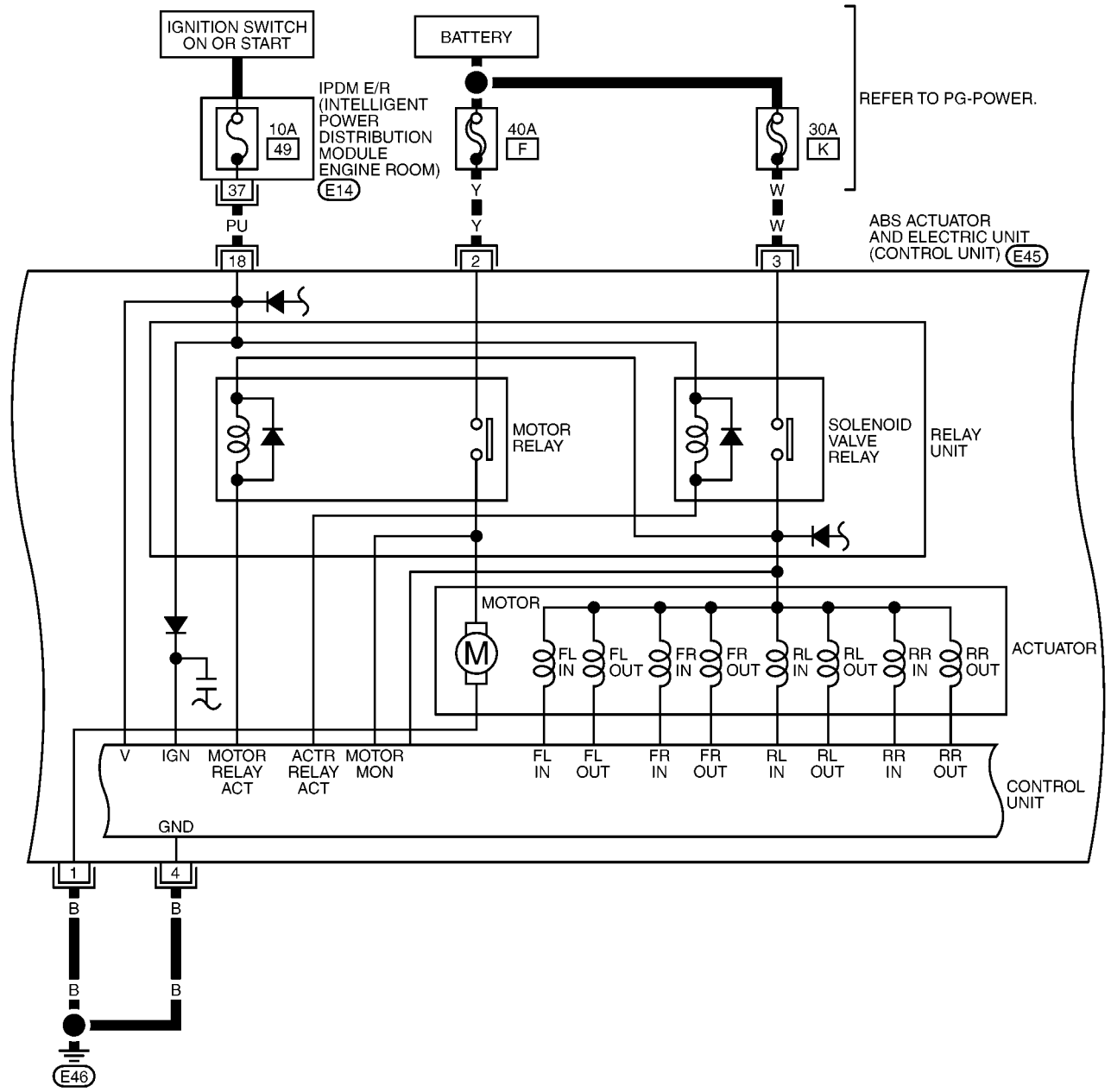
REFER TO THE FOLLOWING.

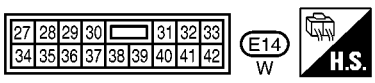
M1 -SUPER MULTIPLE JUNCTION (SMJ)

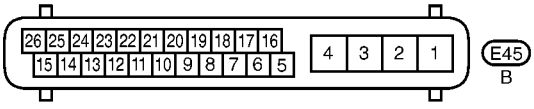
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0031E

BRC-ABS-05

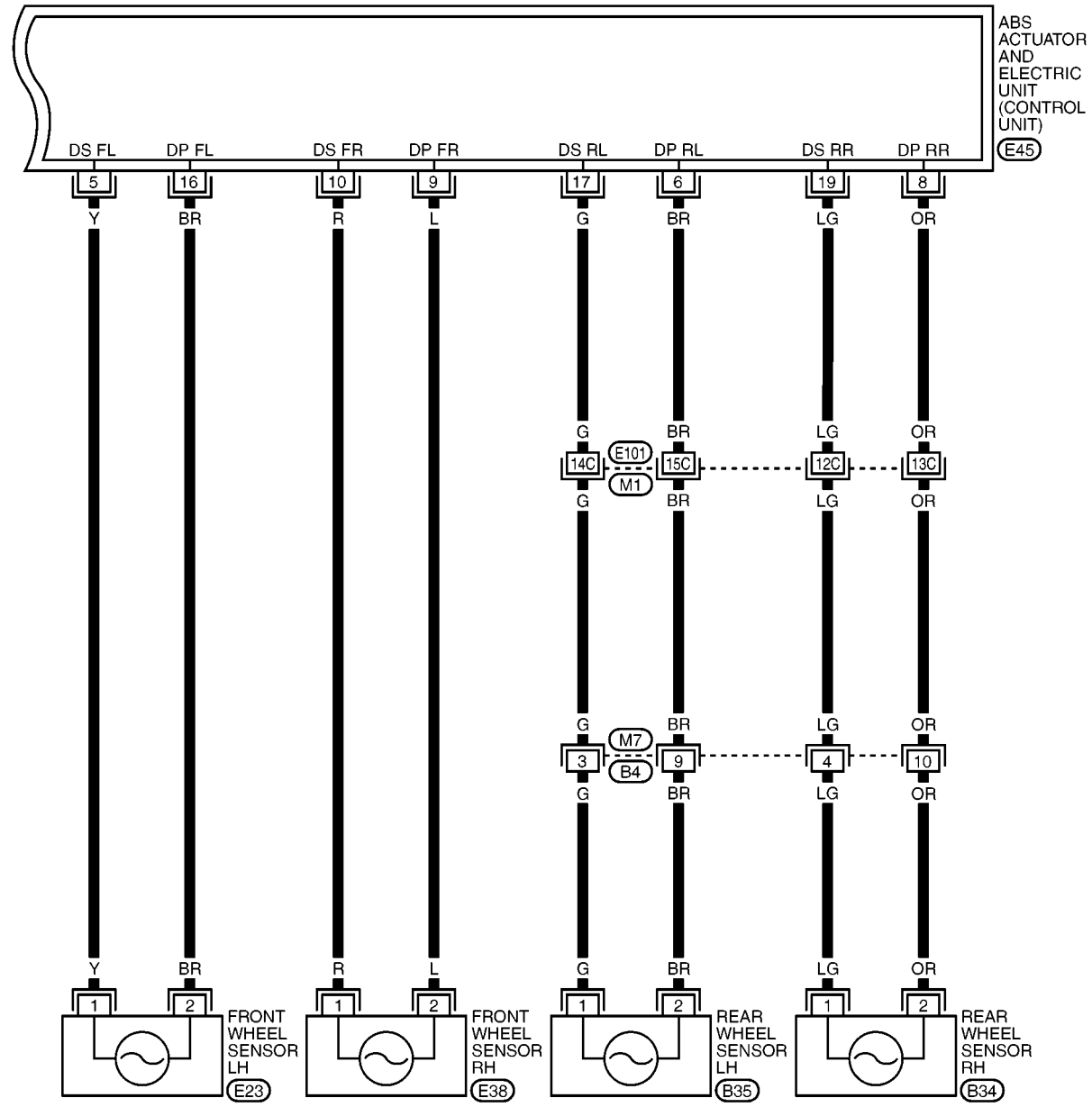


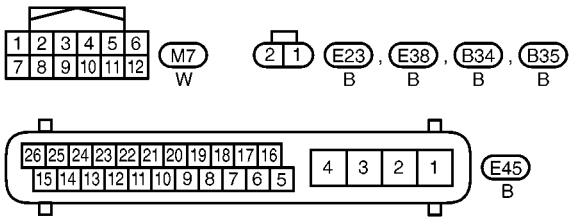




MFWA0032E

BRC-ABS-06





REFER TO THE FOLLOWING.

M1 -SUPER MULTIPLE JUNCTION (SMJ)

MFWA0033E

Control Unit Input/Output Signal Standard

EFS004M1

STANDARDS BY CONSULT-II

CAUTION:

The displayed item is the calculated data by the control unit, so it may indicate a normal value even if an output circuit (harness) is open or shorted.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference values for normal operation	
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Vehicle wheel speed	Vehicle stopped	0 (km/h)	BRC-37, "Inspection 1 Wheel Sensor System"
		While driving (Note 1)	Almost in accordance with the speedometer display (within ±10 %)	
STOP LAMP SWITCH	Brake pedal operation	Brake pedal depressed	ON	BRC-41, "Inspection 6 Stop Lamp Switch System"
		Brake pedal not depressed	OFF	
IN SOL	Solenoid valve operation	ABS solenoid activated or fail-safe activated (Note 2)	ON	BRC-39, "Inspection 4 ABS Actuator Relay or ABS Motor Relay Power System"
OUT SOL		Actuator relay is activated and ABS solenoid is not activated	OFF	
ACTUATOR RLY	Actuator relay activated	Vehicle stop (Ignition switch ON)	ON	
		Vehicle stopped (engine running)	ON	
MOTOR RELAY	Motor relay and motor activated	Motor relay and motor activated	ON	
		Motor relay and motor not activated	OFF	
WARN LAMP	ABS warning lamp ON (Note 3)	ABS warning lamp ON	ON	BRC-35, "BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
BATTERY VOLT	Battery voltage supplied to control unit	Ignition switch ON	Approximately 10 - 16 V	BRC-38, "Inspection 2 ABS Actuator and Electric Unit Power and Ground System"
INITIAL DIAG	CAN communication condition	CAN communication is normal	OK	BRC-40, "Inspection 5 CAN Communication System"
		CAN communication error	NG	
TRANSMIT DIAG	CAN communication condition	CAN communication is normal	OK	
		CAN communication error	UNKWN	
ECM	CAN communication condition	CAN communication is normal	OK	
		CAN communication error	UNKWN	
EBD SIGNAL	EBD operation signal	EBD is operating	ON	—
		EBD is not operating	OFF	
ABS SIGNAL	ABS operation signal	ABS activated	ON	—
		ABS not activated	OFF	
ABS FAIL SIG	ABS fail signal status	During ABS fail-safe During EBD fail-safe	OFF	ABS system EBD system

NOTE:

1. Confirm tyre pressure is normal.
2. The solenoid turns off when the actuator relay is not operating.
3. ON/OFF timing of ABS warning lamp
   ON: When the switch is turned ON for approximately 1 second or when a malfunction is detected.
   OFF: Approximately 1 second after ignition switch is turned ON (when the system is in normal operation).

CONSULT-II Functions

EFS004M2

CONSULT-II FUNCTION APPLICATION TABLE

- "FUNCTION TEST" shall not be used for diagnosis. For details, refer to separately supplied "CONSULT-II Instruction Manual (FUNCTION TEST)".

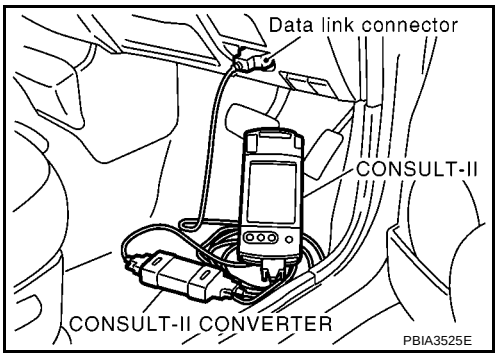
Items	Self-diagnosis	Data monitor	Active test
FR RH SENSOR	×	×	–
FR LH SENSOR	×	×	–
RR RH SENSOR	×	×	–
RR LH SENSOR	×	×	–
Stop lamp switch	×	×	–
FR RH IN ABS SOL	×	×	×
FR RH OUT ABS SOL	×	×	×
FR LH IN ABS SOL	×	×	×
FR LH OUT ABS SOL	×	×	×
RR RH IN ABS SOL	×	×	×
RR RH OUT ABS SOL	×	×	×
RR LH IN ABS SOL	×	×	×
RR LH OUT ABS SOL	×	×	×
ABS ACTUATOR RELAY	×	×	×
ABS MOTOR RELAY	×	×	×
ABS WARNING LAMP	–	×	–
BATTERY VOLTAGE	×	×	–
ABS CONTROL UNIT	×	–	–
CAN COMMUNICATION	×	×	–

×: Applicable
–: Not applicable

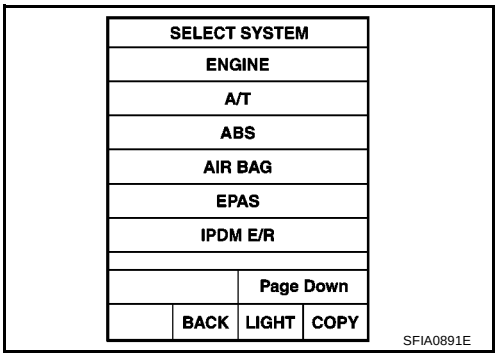
CONSULT-II BASIC OPERATION PROCEDURE

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER data link connector and turn ignition switch ON or start engine.

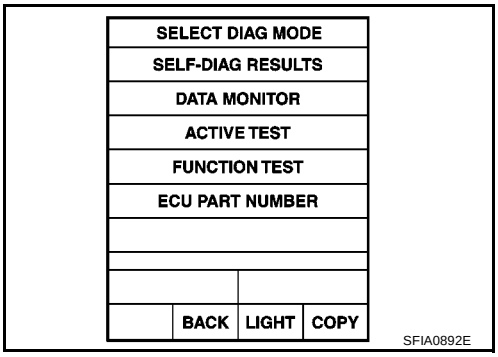
   CAUTION:
   If CONSULT-II is connected without the CONSULT-II CONVERTER, malfunction may be detected by self-diagnosis in Control units that use CAN communication.



3. Touch “START (NISSAN BASED VHCL)”.
4. Touch “ABS” on the “SELECT SYSTEM” screen.



5. Select desired part to be diagnosed on “SELECT DIAG MODE” screen.



SELF-DIAGNOSIS

Description

If a failure occurs in the ABS system, the “ABS warning lamp” turns ON.

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.
3. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
4. After stopping the vehicle, with engine running, touch “START (NISSAN BASED VHCL)”, “ABS”, and “SELF-DIAGNOSIS” on CONSULT-II screen in this order.

   CAUTION:
   Just after starting the engine, or turning ignition switch ON, “ABS” may not be displayed on the system selection screen even if “START (NISSAN BASED VHCL)” is touched. In this case, start over from step 1
5. Self-diagnostic results is displayed. (If necessary, touch “PRINT” to print out self-diagnostic results.)
   - When “NO DTC IS DETECTED” is displayed, check ABS warning lamp. Refer to BRC-35, "Basic Inspection" .
6. Go to appropriate “Inspection” chart according to “Indication item list,” and repair or replace as necessary.
7. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.

   CAUTION:
   If wheel sensor [SHORT] is detected, the ABS warning lamp does not turn off until the vehicle is driven at 30km/h (19 MPH) for approximately 1 minute, even in normal conditions.
8. Turn ignition switch OFF to prepare for erasing the memory.
9. Start engine, and touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAGNOSIS”, and “ERASE MEMORY” on CONSULT-II screen in this order to erase the diagnostic memory.

   CAUTION:
   If memory cannot be erased, start over from step 5.
10. As the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute, and confirm that the ABS warning lamp is OFF.

Display Item List

Suspect systems	Malfunction detecting condition	Inspection system
FR RH SENSOR 1 (Note 1)	Circuit of FR RH wheel sensor is open or shorted.	Wheel sensor circuit [Inspection 1] (Note 2) BRC-37
FR LH SENSOR 1 (Note 1)	Circuit of FR LH wheel sensor is open or shorted.	
RR RH SENSOR 1 (Note 1)	Circuit of RR RH wheel sensor is open or shorted.	
RR LH SENSOR 1 (Note 1)	Circuit of RR LH wheel sensor is open or shorted.	
FR RH SENSOR 2	When there is a sensor power voltage error in the FR RH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
FR LH SENSOR 2	When there is a sensor power voltage error in the FR LH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
RR RH SENSOR 2	When there is a sensor power voltage error in the RR RH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
RR LH SENSOR 2	When there is a sensor power voltage error in the RR LH wheel sensor, and when the control unit cannot recognize sensor pulse because gap between wheel sensor and sensor rotor is large.	
WHEEL SENSOR	When a rotation sensor signal error is detected in one or more of the four wheels, and when operation of one or more of the wheels continues beyond the specified time.	

Suspect systems	Malfunction detecting condition	Inspection system
FR RH IN ABS SOL	Displays when control unit detects error in FR RH IN SOL system.	ABS actuator relay or ABS motor relay power system (Note 3) [Inspection 3] BRC-39
FR LH IN ABS SOL	Displays when control unit detects error in FR LH IN SOL system.	
RR RH IN ABS SOL	Displays when control unit detects error in RR RH IN SOL system.	
RR LH IN ABS SOL	Displays when control unit detects error in RR LH IN SOL system.	
FR RH OUT ABS SOL	Displays when control unit detects error in FR RH OUT SOL system.	
FR LH OUT ABS SOL	Displays when control unit detects error in FR LH OUT SOL system.	
RR RH OUT ABS SOL	Displays when control unit detects error in RR RH OUT SOL system.	
RR LH OUT ABS SOL	Displays when control unit detects error in RR LH OUT SOL system.	
MAIN RELAY	Displayed when control unit detects malfunction in actuator relay system.	
PUMP MOTOR	Displays when control unit detects errors in motor or motor relay system.	
BATTERY VOLTAGE	Battery voltage of control unit is too high.	ABS control unit power and ground systems [Inspection 2] BRC-38
	Battery voltage of control unit is too low.	
STOP LAMP SWITCH	Stop lamp switch circuit is open.	Stop lamp switch system [Inspection 6] BRC-41
CONTROL UNIT	Processing function of control unit is malfunctioning.	ABS control unit system [Inspection 3] BRC-39
CAN COMM	CAN communication error.	CAN communication system [Inspection 5] BRC-40

NOTE:

1. Note 1: After completing repairs of the shorted sensor circuit, when ignition switch is turned ON, the ABS warning lamp turns on. Make sure the ABS warning lamp turns off while driving the vehicle at approx. 30 km/h for approx. 1 minute according to self-diagnosis procedure.
2. Note 2: Also, when each wheel sensor displays 2, check wheel sensor path and control unit power battery voltage.
3. Note 3: If there are no errors in 1 to 3 below, replace the actuator unit.

– Open or short-circuit in the solenoid power supply, motor power supply, or ground harness.
– Unit side connector pin terminal
– Fusible link

DATA MONITOR

Operation Procedure

1. Touch “DATA MONITOR”.
2. Return to monitor item selection screen, and touch any of “control unit INPUT ITEM”, “MAIN ITEM”, “SELECT ITEM MENU” or “CAN DIAGNOSIS SUPPORT MONITOR”. Refer to BRC-24, "Data Monitor Item Chart" .
3. Touch “START”.
4. Screen of data monitor is displayed.

Data Monitor Item Chart

Item (Unit)	Monitor item selection				Remarks
	ECM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
FR RH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by RH rear wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	–	Wheel speed calculated by LH rear wheel sensor signal is displayed.
FR RH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front RH inlet ABS solenoid valve is displayed.
FR RH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front RH outlet ABS solenoid valve is displayed.
FR LH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front LH inlet ABS solenoid valve is displayed.
FR LH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of front LH outlet ABS solenoid valve is displayed.
RR RH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear RH inlet ABS solenoid valve is displayed.
RR RH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear RH outlet ABS solenoid valve is displayed.
RR LH IN SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear LH inlet ABS solenoid valve is displayed.
RR LH OUT SOL (ON/OFF)	–	×	×	–	Condition (ON/OFF) of rear LH outlet ABS solenoid valve is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	–	Condition of stop lamp switch (ON/OFF) is displayed.
ACTUATOR RELAY (ON/OFF)	–	×	×	–	ABS actuator relay (ON/OFF) condition is displayed.
MOTOR RELAY (ON/OFF)	–	×	×	–	ABS motor relay (ON/OFF) condition is displayed.

Item (Unit)	Monitor item selection				Remarks
	ECM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
ABS WARN LAMP (ON/OFF)	–	×	×	–	ABS warning lamp (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	–	Voltage supplied to ABS control unit is displayed.
EBD SIGNAL (ON/OFF)	–	–	×	–	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	–	–	×	–	ABS operation (ON/OFF) status is displayed.
INITIAL DIAG (OK/NG)	–	–	–	×	CAN communication (OK/NG) status is displayed.
TRANSMIT DIAG (OK/UNKWN)	–	–	–	×	CAN communication signal (OK/UNKWN) status is displayed.
ECM (OK/UNKWN)	–	–	–	×	

×: Applicable
–: Not applicable

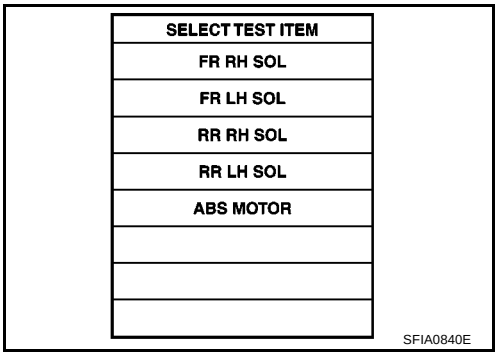
ACTIVE TEST

CAUTION:

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **During active test, ABS and brake warning lamps are on.**

Operation Procedure

1. Touch “ACTIVE TEST”.
2. The “SELECT TEST ITEM” screen is displayed.
3. Touch “TEST ITEM”.
4. Touch “START” with “MAIN SIGNALS” line inverted.
5. The “ACTIVE TEST” screen is displayed, and the following test can be performed.

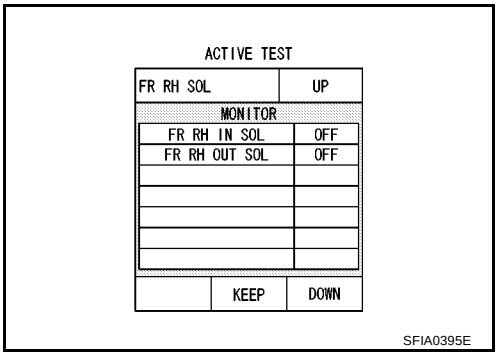


Test Item – ABS Solenoid Valve –

- Touch “UP”, “KEEP” and “DOWN” on the screen to confirm ABS solenoid valves (inlet/outlet) operate as in the following chart.

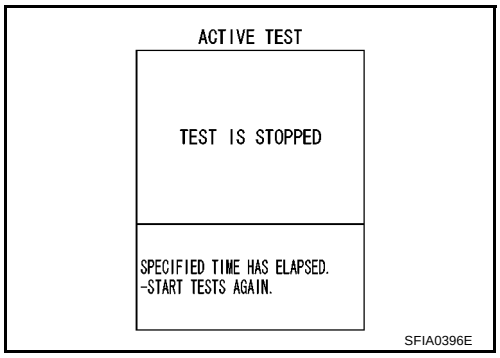
Operation	UP	KEEP	DOWN
ABS inlet S/V	OFF	ON	ON
ABS outlet S/V	OFF	OFF	ON*

*: ON for 1 to 2 seconds after touch, and then OFF



NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed 10 seconds after operation start.
- After "TEST STOP" is displayed, to perform test again, touch "BACK" and repeat step 6.



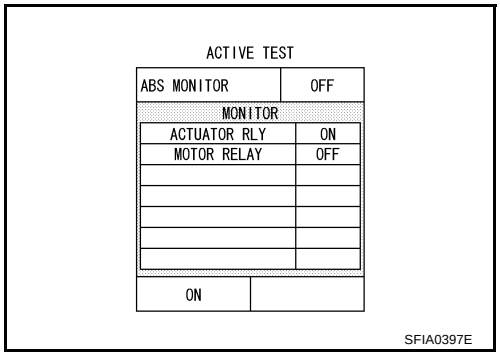
Test Item – ABS Motor –

- Touch "ON" and "OFF" on the screen to confirm the ABS motor relay operates as shown in the following chart.

Operation	ON	OFF
ABS actuator relay	ON	ON
ABS motor relay	ON	OFF

NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- "TEST STOP" is displayed 10 seconds after operation start.



CAN Communication

EFS005XA

SYSTEM DESCRIPTION

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

CAN Communication Unit

EFS005XB

Go to CAN system, when selecting your car model from the following table.

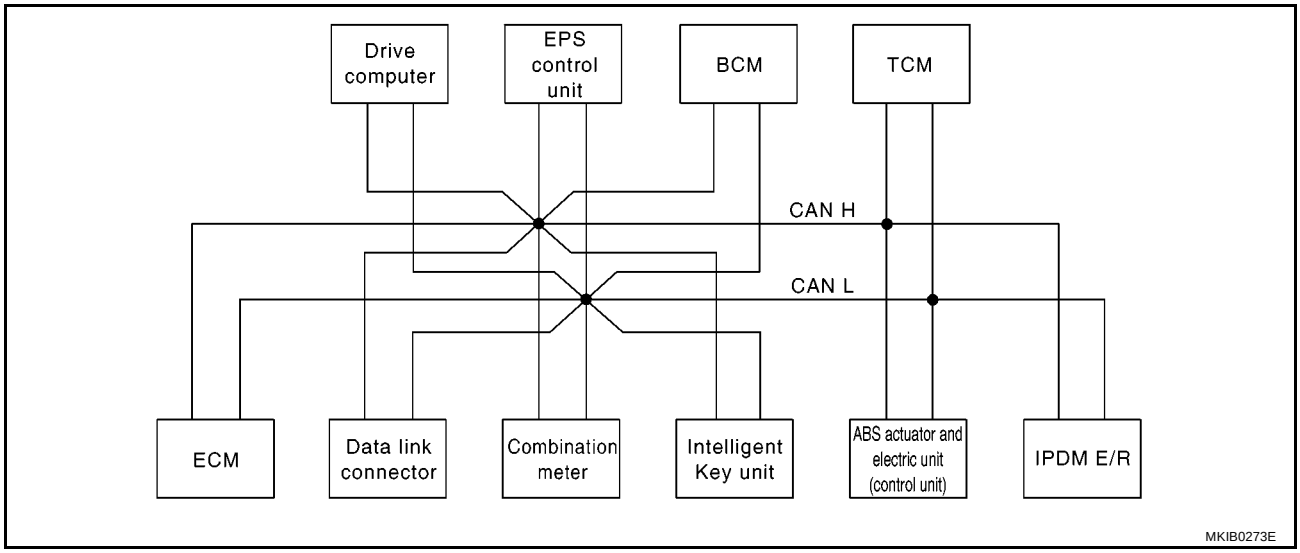
Body type	3door/5door											
Axle	2WD											
Engine	CR10DE/CR12DE/CR14DE								K9K			
Handle	LHD/RHD											
Brake control	ABS											
Transmission	A/T				M/T							
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit												
ECM	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	BRC-28, "TYPE 1/TYPE 2"				BRC-31, "TYPE 3/TYPE 4"				BRC-33, "TYPE 9/TYPE 10"			

×: Applicable

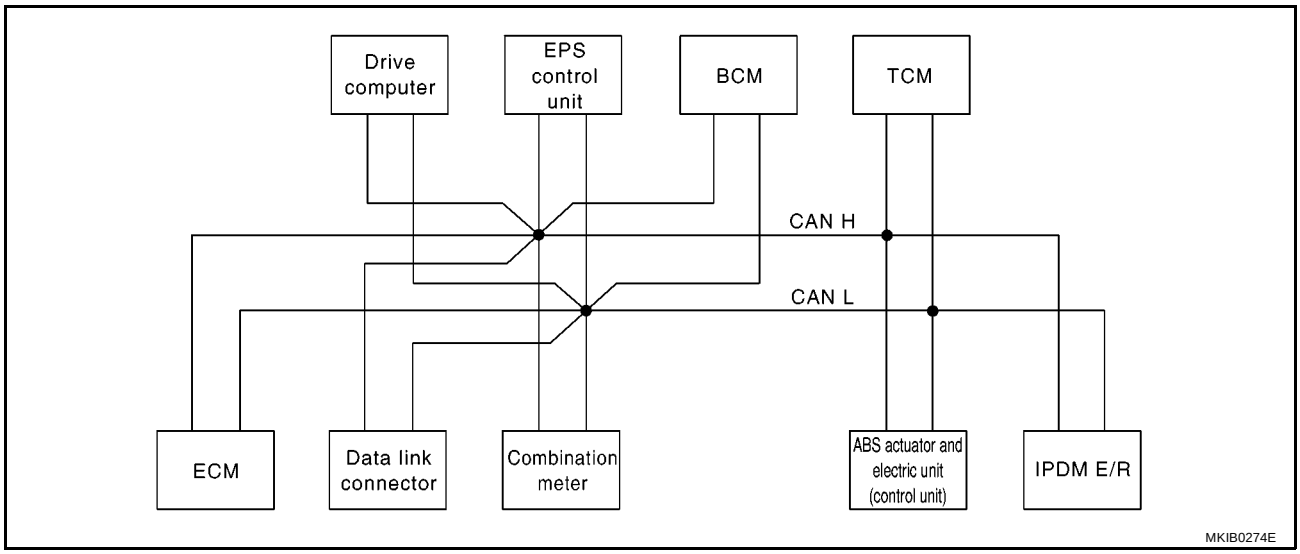
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

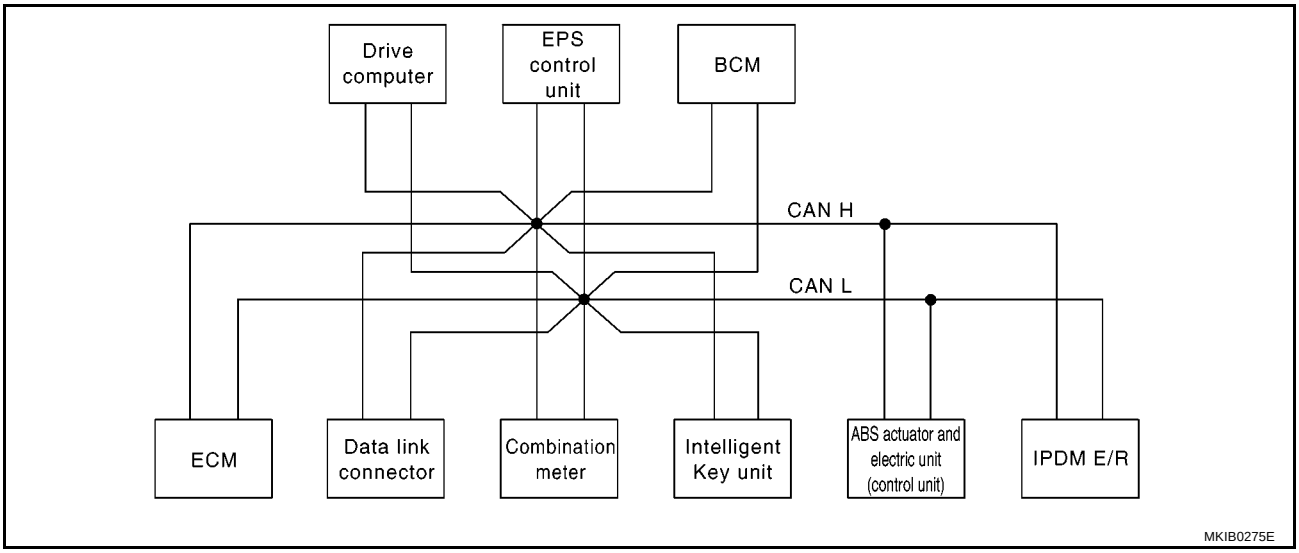
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

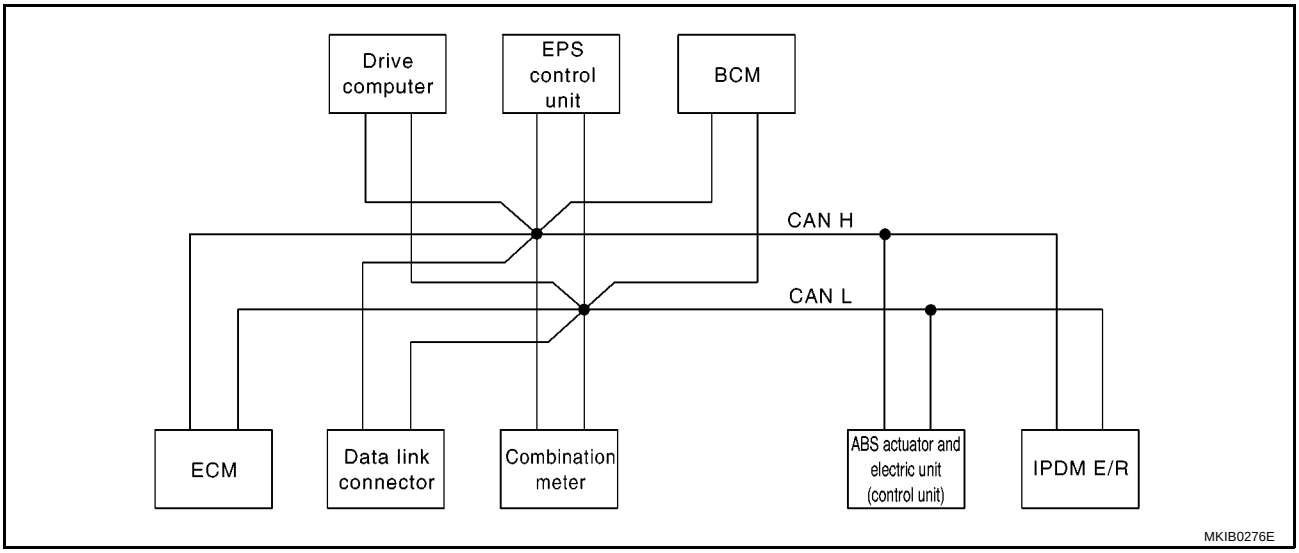
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

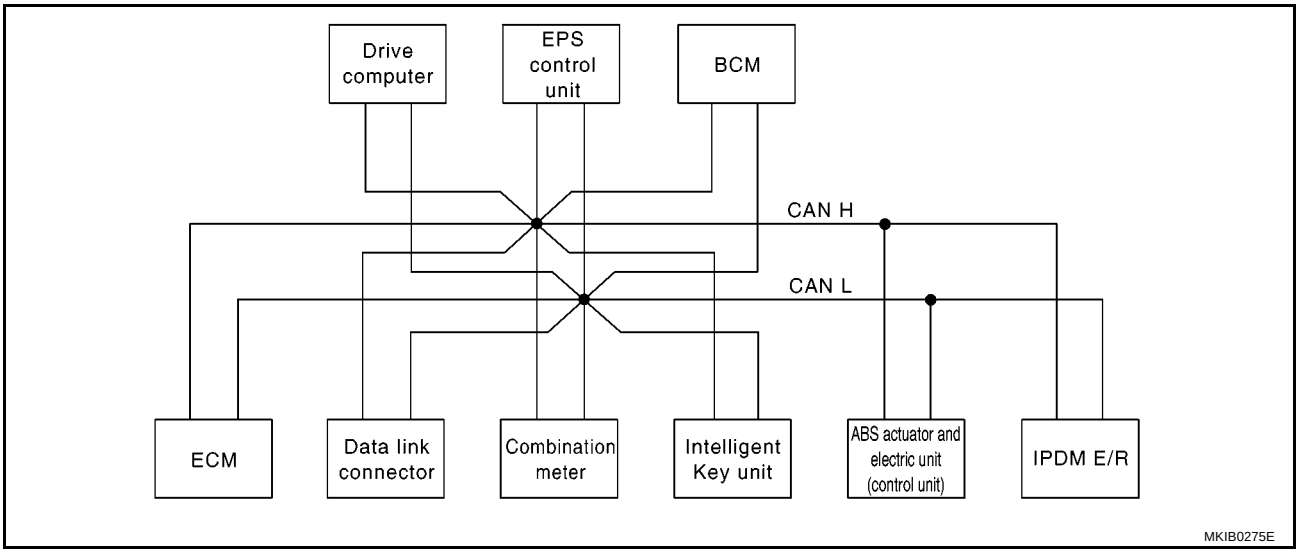
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

TYPE 9/TYPE 10

System diagram

- Type 9



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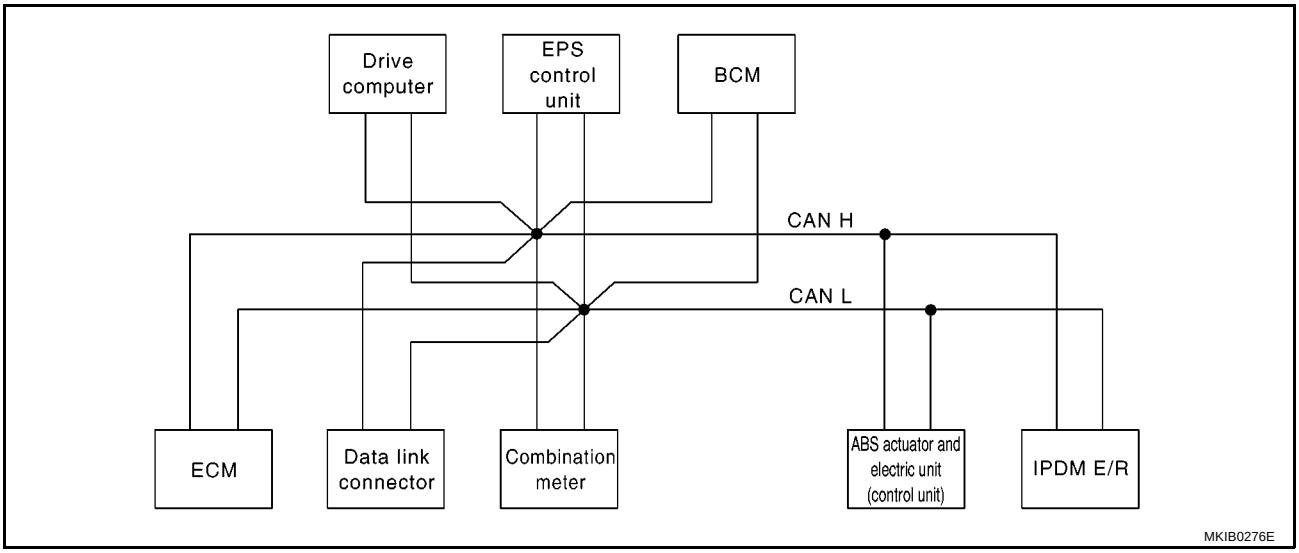


Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

For Fast and Accurate Diagnosis

EFS004M4

PRECAUTIONS FOR TROUBLE DIAGNOSIS

- Always read the “GI General Information” to confirm the general precautions. Refer to GI-4, "General Precautions" .
- After completing the trouble diagnosis, always erase the fault memory. Refer to BRC-22, "SELF-DIAGNOSIS" .
- When inspection of the continuity or voltage between control units is performed, check connector terminals for disconnection, looseness, bend, or collapse. If any non-standard condition is detected, repair or replace applicable part.
- Intermittent errors may be caused by a poor connection in the harness, connector, or terminal.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.

Basic Inspection

EFS004M5

BASIC INSPECTION 1: BRAKE FLUID LEVEL, LEAK AND BRAKE PAD INSPECTION

1. Check fluid level in brake reservoir tank. If fluid level is low, refill the brake fluid.
2. Check area around the brake piping and ABS actuator for leaks. If a leak or oozing is detected, check as follows:
   - If ABS actuator connections are loose, tighten piping to the specified torque. Check again for leaks, and make sure there is no fluid leakage.
   - If flare nuts at the connections and the threads of ABS actuator are damaged, replace damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
   - If a leak or oozing is detected on other parts than ABS actuator connections, wipe the applicable part with a clean cloth. Then check again for leaks, and if there is still a leak or oozing, replace damaged part.
   - If leaks or oozing are detected on ABS actuator body, wipe with a clean cloth and check again. If there is still a leak or oozing, replace ABS actuator.

     CAUTION:
     ABS actuator body cannot be disassembled.
3. Check for brake pad wear. Refer to BR-21, "PAD WEAR INSPECTION" .

BASIC INSPECTION 2: INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY

Check battery for looseness on battery positive/negative cables and ground connection. Also Make sure battery voltage dose not drop.

BASIC INSPECTION 3: ABS WARNING LAMP AND BRAKE WARNING LAMP INSPECTION

1. Make sure ABS warning lamp and brake warning lamp turn on for approximately 1 sec. When ignition switch is turned ON. If they do not turn on, perform CAN communication system diagnosis. Refer to BRC-40, "Inspection 5 CAN Communication System" .
   If CAN communication system is normal, replace combination meter. Refer to DI-34, "Removal and Installation for Combination Meter" .
2. Make sure ABS warning lamp and brake warning lamp turn off after approximately 1 sec. When ignition switch is turned ON. If they do not turn OFF, perform self-diagnosis.
3. Make sure that ABS warning lamp remains off after the vehicle has been driven at approx. 30 km/h (19 MPH) for approx. 1 minute. If it turns on, perform self-diagnosis.
4. After completing self-diagnosis, always erase self-diagnostic results memory. Refer to BRC-22, "SELF-DIAGNOSIS" .

CAUTION:
The brake warning lamp comes on when the parking brake lever is pulled (when switch is on) and when the brake fluid level sensor operates (insufficient brake fluid).

Inspection 1 Wheel Sensor System

EFS004M6

INSPECTION PROCEDURE

After identifying malfunctioning wheel sensor position according to CONSULT-II self-diagnostic results, check the each part and identify the parts to be replaced.

1. CHECK TYRE

Check air pressure, wear and size.

Are air pressure, wear, and size within specifications?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tyre.

2. CHECK SENSOR AND SENSOR ROTOR

- Inspect the appearance of the sensor and sensor rotor.
- Check sensor rotor rubber bar for damage.
- Check sensor for disconnection or loose.

OK or NG

OK >> GO TO 3.
NG >> Replace sensor rotor.

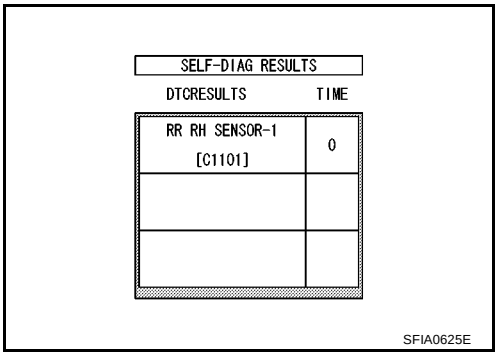
3. SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
FR RH SENSOR 1, 2
FR LH SENSOR 1, 2
RR RH SENSOR 1, 2
RR LH SENSOR 1, 2

Is any of above displayed on self-diagnosis display?

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



4. CHECK CONNECTOR

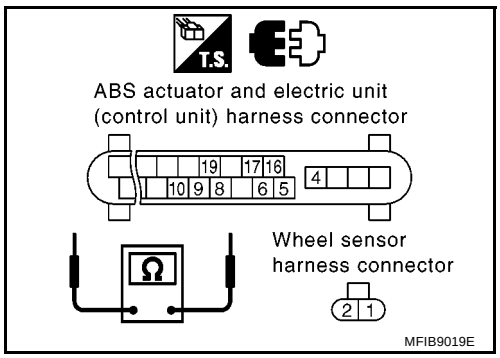
1. Disconnect control unit connector E45 and malfunctioning wheel sensor connector E23 (FL), E38 (FR), B35 (RL) or B34 (RR) and check for deformation, disconnected and loose. If there is any non-standard condition, repair the connector.
2. Reconnect connectors, drive the vehicle at 30km/h (19 MPH) for approximately 1 minute, and then perform self-diagnosis.

OK or NG

OK >> The connector terminal contact is loose, damage, open or shorted.
NG >> GO TO 5.

5. CHECK WHEEL SENSOR HARNESS

1. Disconnect control unit connector E45 and wheel sensor connector E23 (FL), E38 (FR), B35 (RL) and B34 (RR).
2. Check continuity between terminals. (Check resistance as well when turning the steering wheel to the right and left, or moving sensor harness in the wheel well.)



	Power supply system		Signal system		Ground system	
Wheel	Control unit	Wheel sensor	Control unit	Wheel sensor	Control unit (signal)	Control unit (Ground)
Front RH	10 (R)	1 (R)	9 (L)	2 (L)	9 (L), 10 (R)	4 (B)
Front LH	5 (Y)	1 (Y)	16 (BR)	2 (BR)	5 (Y), 16 (BR)	4 (B)
Rear RH	19 (LG)	1 (LG)	8 (OR)	2 (OR)	8 (OR), 19 (LG)	4 (B)
Rear LH	17 (G)	1 (G)	6 (BR)	2 (BR)	6 (BR), 17 (G)	4 (B)

Power supply system : Continuity should exist.
Signal System : Continuity should exist.
Ground system : Continuity should not exist.

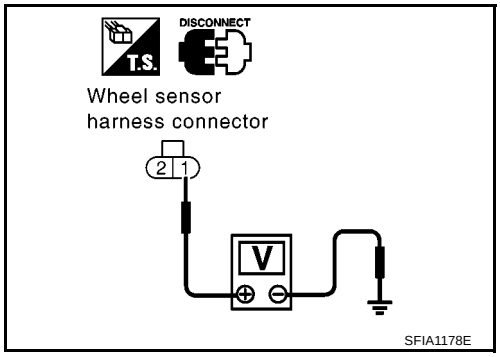
OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and wheel sensor.

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect control unit connector.
2. Turn ignition switch ON.
3. Check voltage between wheel sensor power supply terminal 1 and ground.

Voltage : Approx. 12 V



OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

Inspection 2 ABS Actuator and Electric Unit Power and Ground System

EFS004M7

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

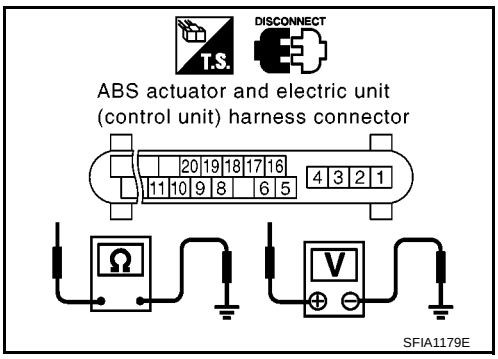
Self-diagnostic results
BATTERY VOLTAGE

Is any of above displayed on self-diagnosis display?

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

2. CHECK POWER SUPPLY AND GROUND CIRCUIT

1. Disconnect control unit connector E45.
2. Check continuity and voltage between control unit connector terminals and ground.



Terminal	Signal	Ignition switch	Measured value
18 (PU)	Power supply	ON	Battery voltage (approx. 12 V)
		OFF	Approx. 0 V
4 (B)	Ground	OFF	Continuity should exist.

OK or NG

OK >> Check battery for loose terminal and low voltage for malfunction. If it returns an error, repair it.
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and fuse or ground.

Inspection 3 ABS Control Unit System

EFS004M8

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONTROL UNIT

Is any of above displayed on self-diagnosis display?

YES >> Replace ABS actuator and electric unit (control unit).
NO >> INSPECTION END

Inspection 4 ABS Actuator Relay or ABS Motor Relay Power System

EFS004M9

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
IN ABS SOL
OUT ABS SOL
MAIN RELAY
PUMP MOTOR

Is above displayed on self-diagnosis display?

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

2. CHECK CONNECTOR

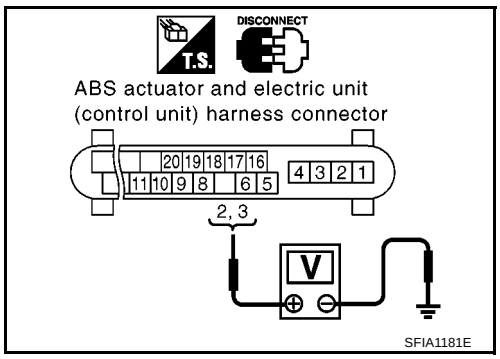
1. Disconnect control unit connector E45. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connector securely, and perform self-diagnosis.

OK or NG

OK >> The connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. ABS ACTUATOR RELAY (SOLENOID VALVE RELAY) OR ABS MOTOR RELAY POWER SYSTEM

1. Disconnect control unit connector E45.
2. For ABS actuator relay (solenoid valve relay), check voltage between control unit connector E45 terminal 3 (W) and ground. For the ABS motor relay, check voltage between control unit connector E45 terminal 2 (Y) and ground.



ABS actuator relay (solenoid valve relay)

3 (W) – Ground : Battery voltage (approx. 12 V)

ABS motor relay

2 (Y) – Ground : Battery voltage (approx. 12 V)

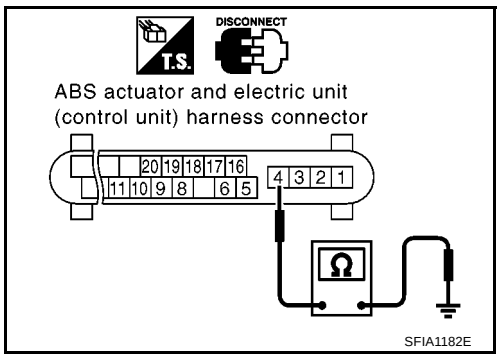
OK or NG

OK >> GO TO 4.

NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and fusible link.

4. CHECK GROUND CIRCUIT

Check continuity between control unit connector E45 terminal 4 (B) and ground.



4 (B) – Ground : Continuity should exist.

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).

NG >> Repair or replace ABS actuator and electric unit ground harness.

Inspection 5 CAN Communication System

EFS004MA

INSPECTION PROCEDURE

1. START INSPECTION

1. Using CONSULT-II, perform self-diagnosis.
2. Print the result of the self-diagnosis.
3. Check “CAN communication support monitor” in data monitor.

CAN Diagnosis Support Monitor

Normal	When failure occurs
INITIAL DIAG: OK	INITIAL DIAG: NG
TRANSMIT DIAG: OK	TRANSMIT DIAG: UNKWN
ECM: OK	ECM: UNKWN

>> After printing the monitor items, GO TO “CAN System”. Refer to LAN-4, "Precautions When Using CONSULT-II" .

Inspection 6 Stop Lamp Switch System

EFS004MB

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
STOP LAMP SW

Is above displayed on self-diagnosis display?

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

2. CHECK CONNECTOR

1. Disconnect control unit connector E45 and stop lamp switch connector E108, E109, M202 or M203.
2. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
3. Reconnect connector securely, and perform self-diagnosis.

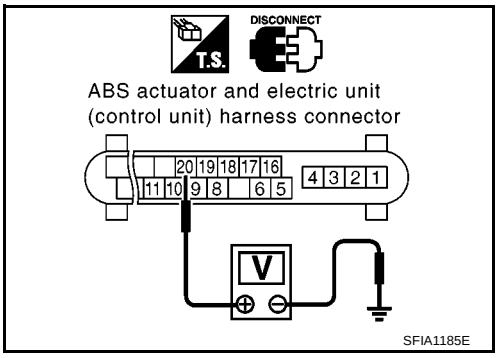
OK or NG

OK >> The connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect control unit connector E45.
2. Check voltage between control unit connector E45 terminal 20 (Y) and ground.

ABS actuator and electric unit (control unit)	Ground	Measuring condition	Voltage
20	—	Brake pedal depressed	Battery voltage (approx. 12 V)
		Brake pedal not depressed	0 V



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair or replace harness connector between ABS actuator and electric unit (control unit) and stop lamp switch.

Symptom 1 ABS Works Frequently.

EFS004MC

1. START INSPECTION

Check brake force distribution.

OK or NG

OK >> GO TO 2.
NG >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Check front and real axle for significant “looseness”.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK WHEEL SENSOR

Wheel Sensor Inspection

- Sensor installation and damage inspection
- Sensor rotor installation and damage inspection
- Sensor connector engagement inspection
- Sensor harness inspection

OK or NG

OK >> GO TO 4.
NG >> ● Replace wheel sensor or sensor rotor.
● Repair harness.

4. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

Symptom 2 Unexpected Pedal Reaction

EFS004MD

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is brake pedal stroke not excessive?

YES >> ● Bleed air from brake piping.
● Check for looseness of brake pedal, master back, and master cylinder. Also check brake system for oil leak. Repair as necessary.
NO >> GO TO 2.

2. PERFORMANCE CHECK

Disconnect control unit connector E45 to deactivate ABS. In this condition, make sure braking force is normal after inspection, reconnect connector.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .
NG >> Check brake system.

Symptom 3 Longer Stopping Distance

EFS004ME

CAUTION:
On slippery road, stopping distance could be longer when ABS is activated than when it is not.

1. CHECK FUNCTION

Disconnect control unit connector E45 to deactivate ABS. In this condition, check braking distance After inspection, reconnect connector.

OK or NG

OK >> ● Bleed air from brake piping.
● Check brake system.

NG >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .

Symptom 4 ABS Does Not Work

EFS004MF

CAUTION:
ABS does not operate when vehicle speed is 10 km/h (6 MPH) or lower.

1. CHECK INDICATOR DISPLAY OF WARNING LAMP

Make sure warning lamp is off approximately 1 second after ignition switch is turned ON or during driving.

OK or NG

OK >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .
NG >> Perform a self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

Symptom 5 Pedal Vibration and ABS Operation Noise

EFS004MG

CAUTION:
Under the following conditions, when brake pedal is lightly depressed (just place a foot on it), ABS is activated and vibration is felt. However, this is normal.

- **When shifting gears and operating clutch**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves [50 mm (1.97 in) or more]**
- **When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]**

1. SYMPTOM CHECK 1

Check brake system for pedal vibration or noise at engine start.

OK or NG

OK >> GO TO 2.
NG >> Perform self-diagnosis. Refer to BRC-22, "SELF-DIAGNOSIS" .

2. SYMPTOM CHECK 2

Operate electrical equipment (head lamp or equivalents), and confirm symptoms.

Does symptom occur when electrical switches (head lamp, etc.) are operated?

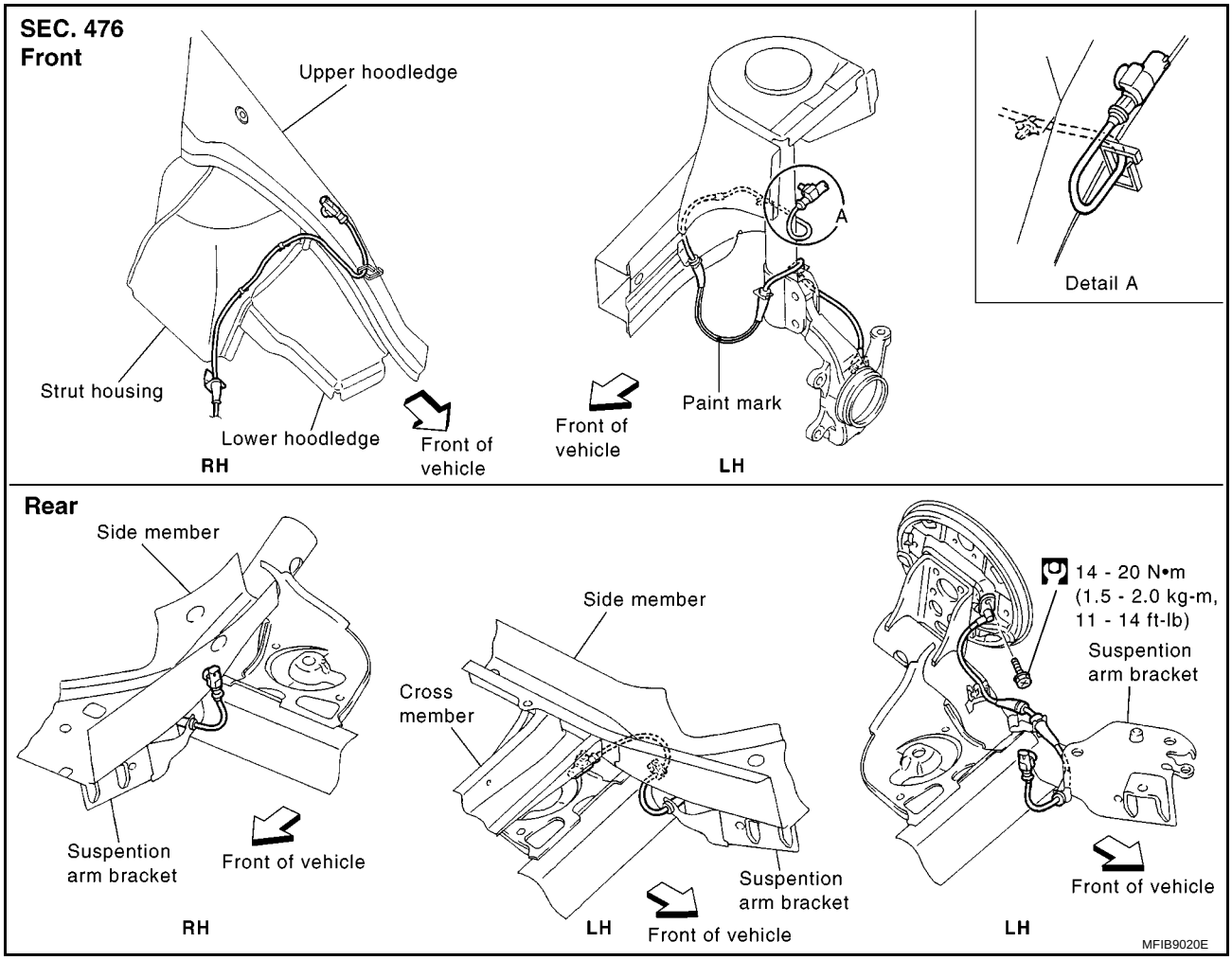
YES >> Check for radio, antenna, and antenna lead-in wires (including wiring) near the control unit. If they are near ABS actuator and electric unit (control unit), move them.
NO >> GO TO 3. Wheel Sensor Inspection in BRC-41, "Symptom 1 ABS Works Frequently." .

WHEEL SENSORS

PFP:47910

Removal and Installation

EFS004MH



REMOVAL

Be careful of the following.

CAUTION:

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

SENSOR ROTOR

PFP:47970

Removal and Installation

EFS004MI

FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

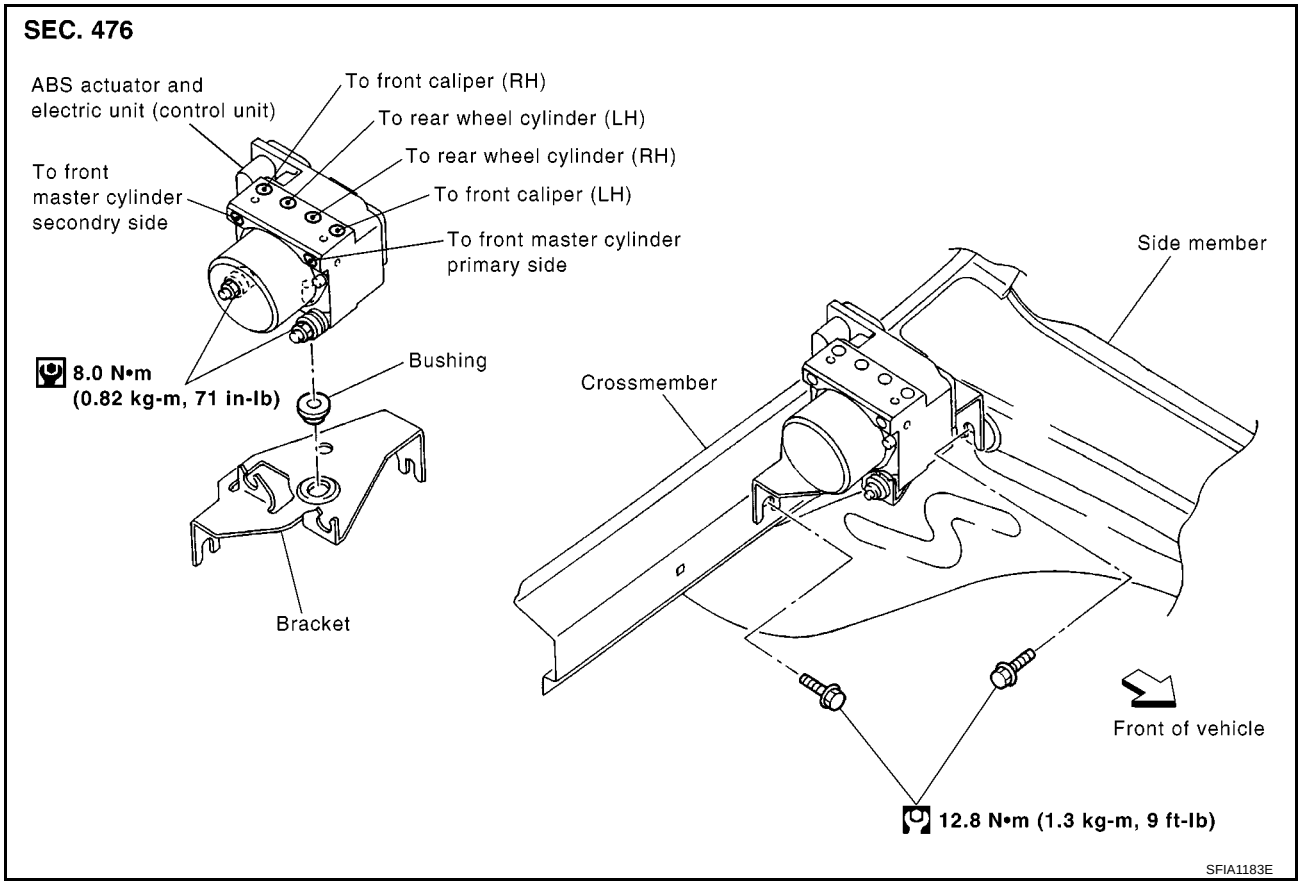
CAUTION:
The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

EFS004MJ



REMOVAL

Be careful of the following.

CAUTION:

- **Before servicing, disconnect the battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench and tighten to the specified torque.**
- **Do not apply excessive impact to the actuator, such as dropping it.**

INSTALLATION

Be careful of the following.

- When setting the actuator in the bracket, push it in until it locks.
- Tighten the mounting bolts and nuts to the specified torque.
- After the work, breed the air from the brake piping. Refer to BR-10, "Bleeding Brake System" .
- After installing the vehicle harness connector in the actuator, make sure the connector is securely locked.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EFS004JB

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

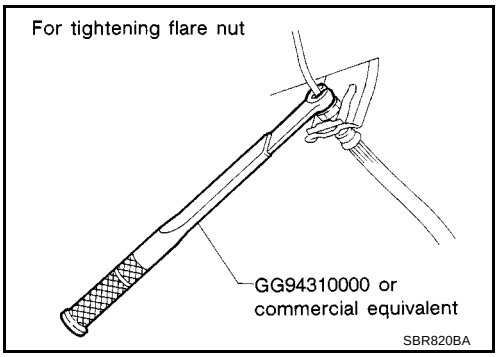
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal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

Precautions for Brake System

EFS004JC

SMA for VIN >SJN**AK12U1072423

- Recommended fluid is brake fluid “DOT 3” or “DOT 4”.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as body. If brake fluid is splashed, wipe it off and flush area with water immediately.
- Do not use mineral oils such as gasoline or kerosene to clean. They will ruin rubber parts and cause improper operation.
- Using a flare nut torque wrench, securely tighten brake tube flare nuts.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit) or battery negative terminals.
- When installing brake piping, be sure to check torque.



Precautions for Brake Control

EFS004JD

- During ESP/TCS/ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noise may be heard from engine room. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from the customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic servicing. Besides the electrical system inspection, check booster operation, brake fluid level, and fluid leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near control module, ESP/TCS/ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.

- If the following components are replaced with non-genuine components or converted, ESP OFF indicator lamp and SLIP indicator lamp may turn on or the ESP system may not operate properly. Components related to suspension (Shock Absorber, Strut, Spring, Bush, etc.), Tires, wheels (exclude specified size), components related to brake (Pad, Rotor, Caliper, etc.), components related to engine (Muffler, ECM, etc.), components related to body reinforcement (Roll bar, Tower bar, etc.).
- Driving in the condition of breakage or excessive wear of suspension, tires or components related to the brakes may cause ESP OFF indicator lamp and SLIP indicator lamp turn on, and the ESP system may not operate properly.
- When the TCS or ESP is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and ESP.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp carves on a freeway), the ESP may not operate normally, or ESP warning lamp and SLIP indicator lamp may turn on. However, this is not a malfunction, if normal operation can be resumed after restarting engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. When ESP function is OFF (ESP SW ON) may cause the G -sensor system indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine.

Diagnosis Precaution

EFS004JE

CAN SYSTEM

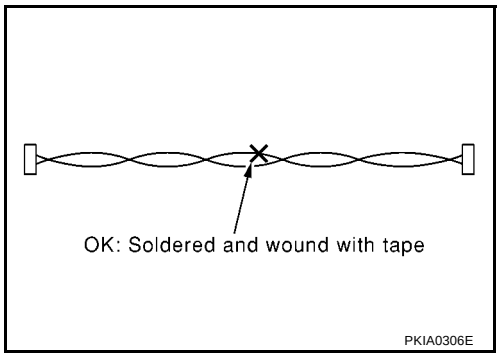
- Do not apply voltage of 7.0 V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use shall be 7.0 V or lower.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.

Precaution for Harness Repair

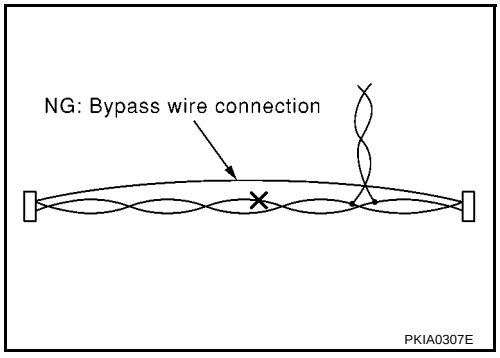
EFS004JF

CAN SYSTEM

- Area to be repaired shall be soldered, and wrapped with a tape [be sure that fraying of twisted wire shall be within 110 mm (4.33 in)].



- Do not make a bypass connection to repaired area. (If it is done, branch part will be removed and characteristics of twisted wire will be lost.)

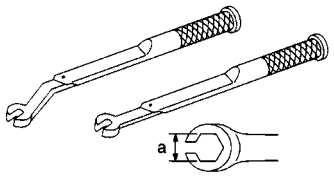


PREPARATION

PFP:00002

Special Service Tools

EFS004JG

Tool number Tool name		Description
GG94310000 Flare nut torque wrench a: 10 mm (0.39 in)	 NT406	Removing and installing each brake piping

ON-VEHICLE SERVICE

PFP:00000

Adjustment of Steering Angle Sensor Neutral Position

SMA for VIN >SJN**AK12U1309269 EFS004JH

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

Situation	Adjustment of Steering Angle Sensor Neutral Position
Disconnecting/connecting the battery	×
Removing/Installing ABS actuator and electric unit (control unit)	–
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Removing/Installing steering components	×
Removing/Installing suspension components	×
Removing/Installing the same tire to the same position	–
Change 4 tires to new ones	–
Change some of 4 tires to new ones (not 4 tires)	–
Tire rotation	–
Adjusting wheel alignment	×

×: Required
–: Not required

CAUTION:
To adjust neutral position of steering angle sensor, make sure to use CONSULT-II.
(Adjustment cannot be done without CONSULT-II.)

OPERATION PROCEDURE

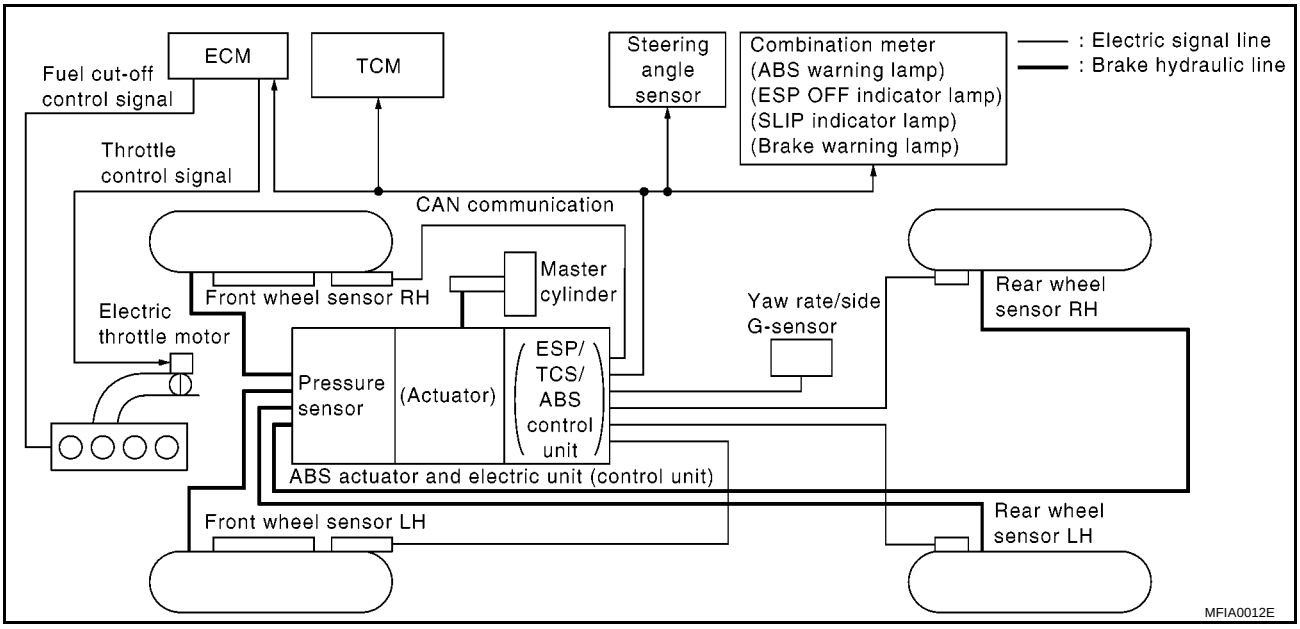
- For operation procedure, refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

SYSTEM DESCRIPTION

PFP:00000

System Diagram

EFS004JI



ESP Function

EFS004JJ

- In addition to the TCS/ABS function, the driver steering amount and brake operation amount are detected from steering angle sensor and pressure sensor, and the vehicle's driving status (amount of under steering / over steering) is determined from information from G-sensor, wheel sensor, etc., and this information is used to improve vehicle stability by controlling the braking and engine power to all four wheels.
- SLIP indicator lamp flashes to inform the driver of ESP operation.
- During ESP operation, body and brake pedal lightly vibrate and mechanical noises may be heard. This is normal.
- ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp might turn on when vehicle is subject to strong shaking or large vibration, such as when vehicle is on a turn table, a ship or a steep slope such as bank while engine is running. In this case, restart engine on a normal road, and if ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn off, there is no problem.

TCS Function

EFS004JK

- The wheel spin of the drive wheels is detected by ABS actuator and electric unit (control unit) from the wheel speed signals from four wheels, so if wheel spin occurs, drive wheel right and left brake fluid pressure control and engine fuel cut are performed while throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the degree throttle is opened is controlled to achieve the optimum engine torque.
- Depending on road circumstances, the driver may have a sluggish feel. This is normal, because the optimum traction has the highest priority under TCS operation.
- TCS may be activated any time vehicle suddenly accelerates, suddenly down/upshifts, or is driven on a road with a varying surface friction coefficient.
- During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

ABS Function

EFS004JL

- The anti-lock brake system is a function that detects wheel revolution while braking, and it improves handling stability during sudden braking by electrically preventing 4 wheel lock. Maneuverability is also improved for avoiding obstacles.
- If the electrical system breaks down, then the fail-safe function starts, the ABS becomes inoperative, and ABS warning lamp turns on.
- Electrical system diagnosis by CONSULT-II is available.
- During ABS operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.

- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

EBD Function

EFS004JM

- Electronic brake distributor is a function that detects subtle slippages between front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- In case of electrical system break down, the fail-safe function is activated, EBD and ABS becomes inoperative, and ABS warning lamp and brake warning lamp are turned on.
- Electrical system diagnosis by CONSULT-II is available.
- During EBD operation, brake pedal lightly vibrates and a mechanical noise may be heard. This is normal.
- When starting engine, or just after starting vehicle, brake pedal may vibrate or motor operating noises may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

Fail-Safe Function

EFS004JN

ESP / TCS SYSTEM

In case of malfunction in the ESP/TCS system, ESP OFF indicator lamp and SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without ESP/TCS system. In case of malfunction in the ESP/TCS system, the ABS control continues to operate normally without ESP/TCS control.

CAUTION:

If the fail-safe function is activated, then perform the self-diagnosis for ESP/TCS/ABS control system.

ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the ESP/TCS/ABS become one of the following conditions of the fail-safe function.

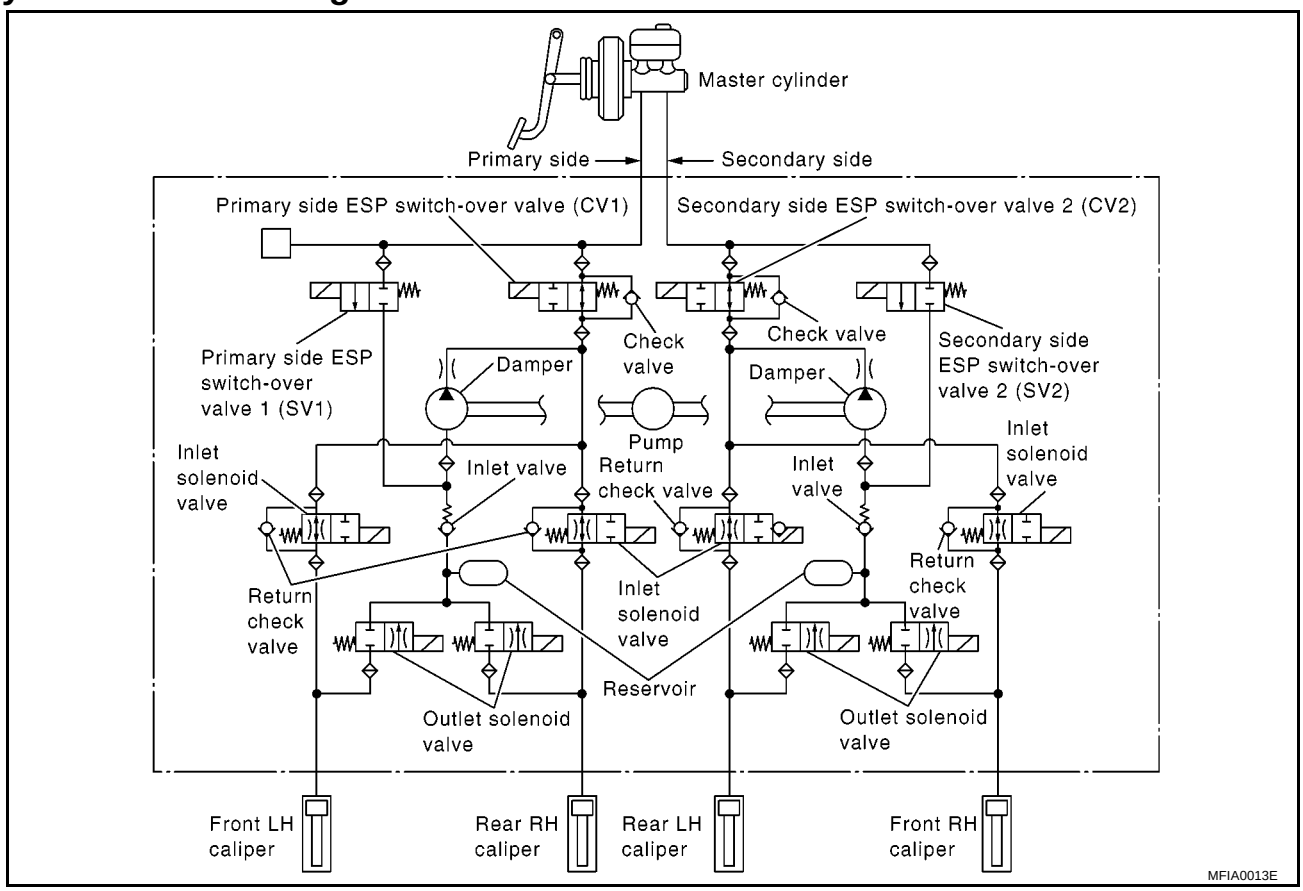
1. For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.
2. For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

NOTE:

In condition 1 described above, an ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for “Key Switch ON” and “the First Starting” are being performed.

Hydraulic Circuit Diagram

EFS004JO



CAN COMMUNICATION

PFP:23710

System Description

EFS005XC

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

CAN Communication Unit

EFS005XD

Go to CAN system, when selecting your car model from the following table.

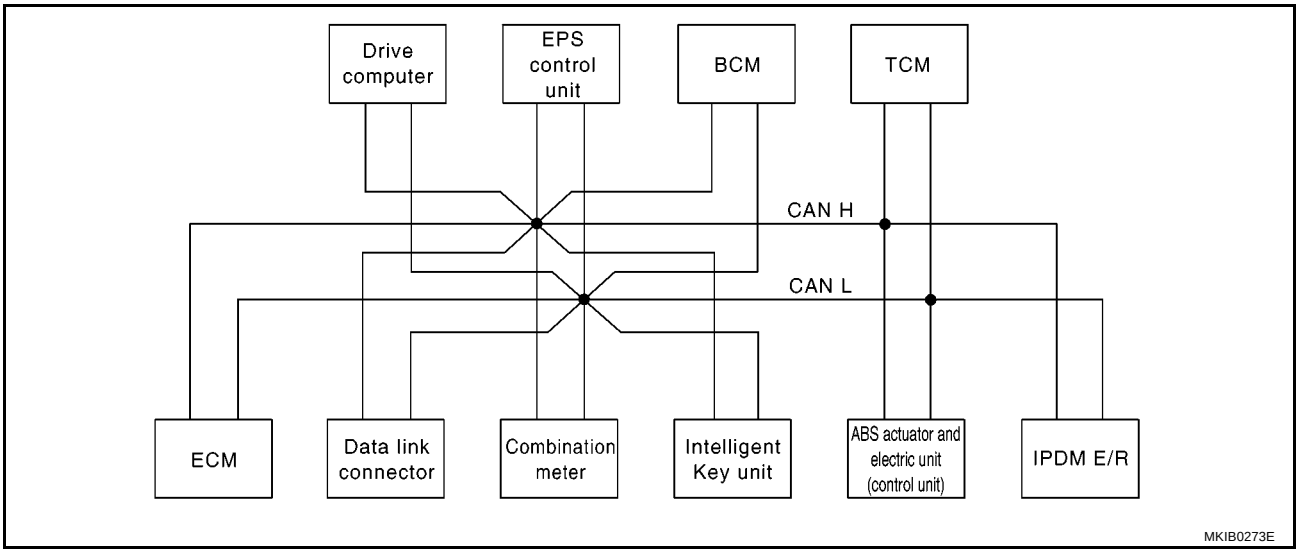
Body type	3door/5door							
Axle	2WD							
Engine	CR12DE/CR14DE							
Handle	LHD/RHD							
Brake control	ESP system							
Transmission	A/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit								
ECM	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×		
Drive computer	×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×
TCM	×	×	×	×				
IPDM E/R	×	×	×	×	×	×	×	×
CAN communication type	BRC-55, "TYPE 5/TYPE 6"				BRC-58, "TYPE 7/TYPE 8"			

×: Applicable

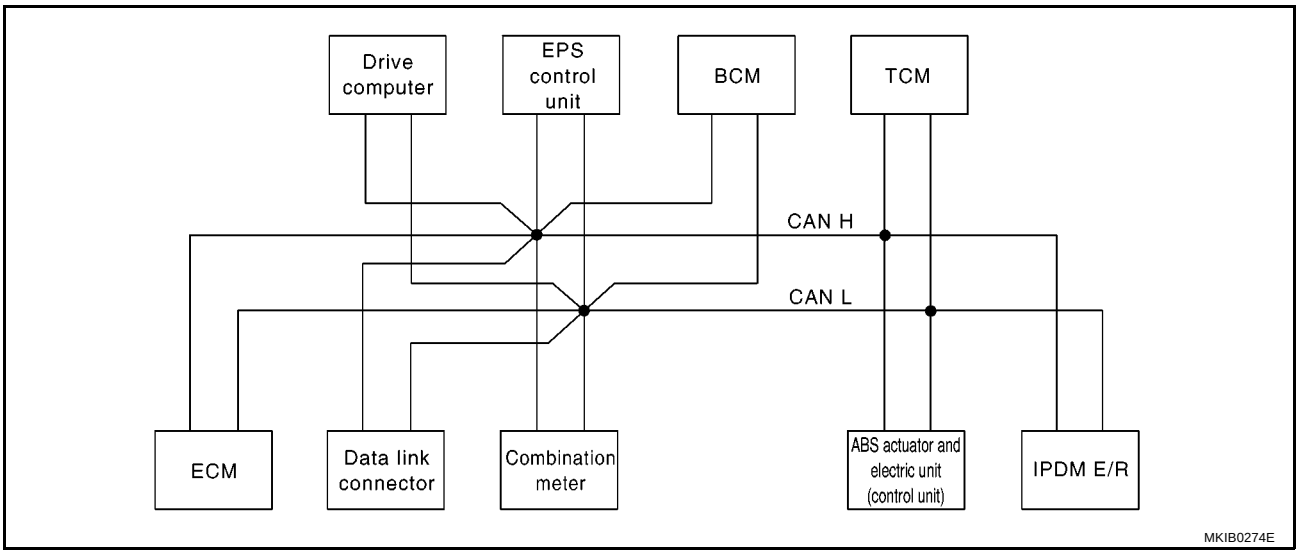
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

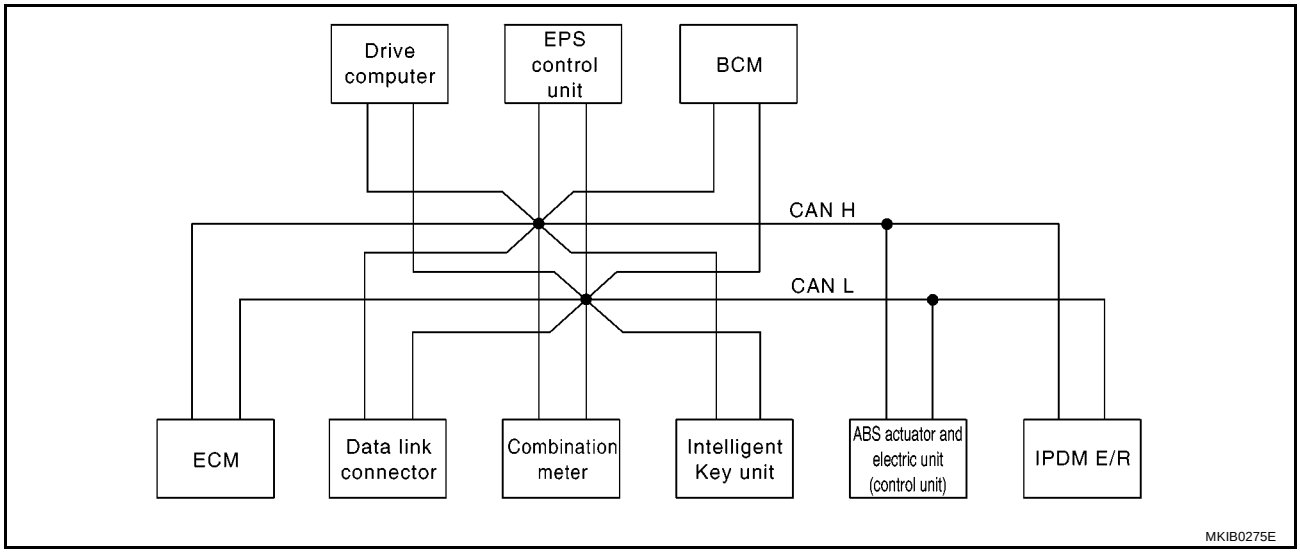
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

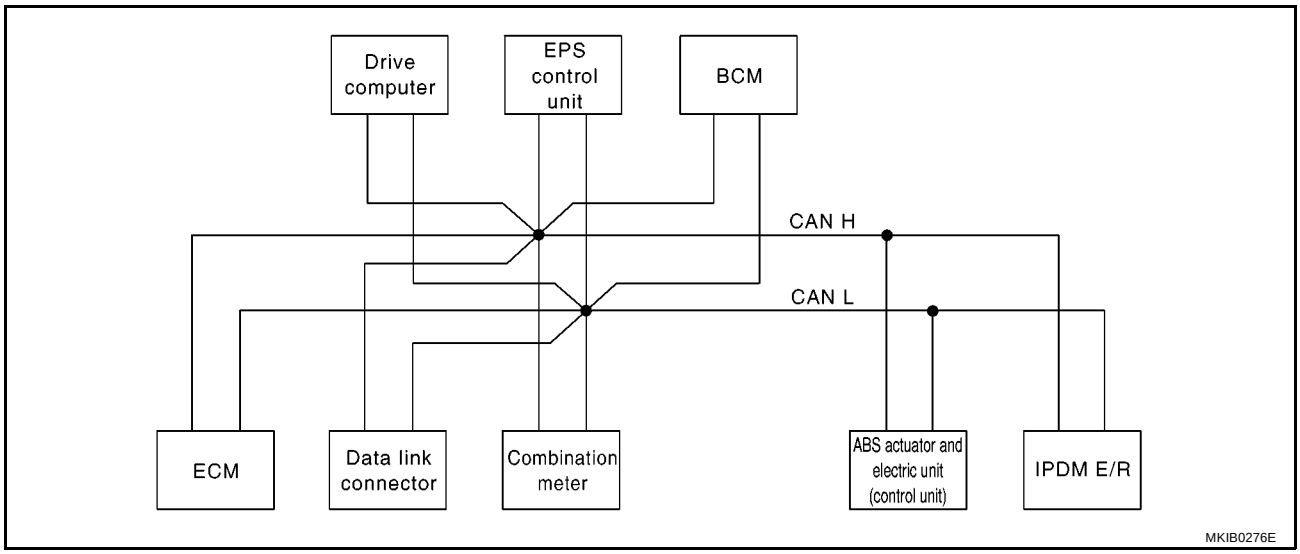
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

TROUBLE DIAGNOSIS

PFP:00004

How to Proceed With Diagnosis

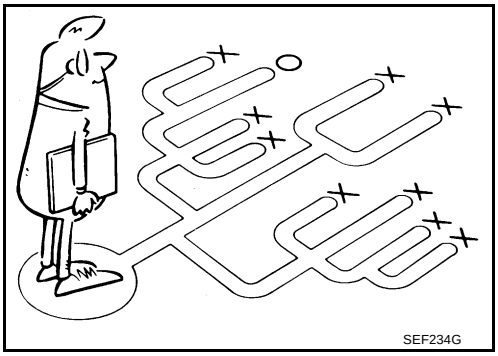
EFS004JR

BASIC CONCEPT

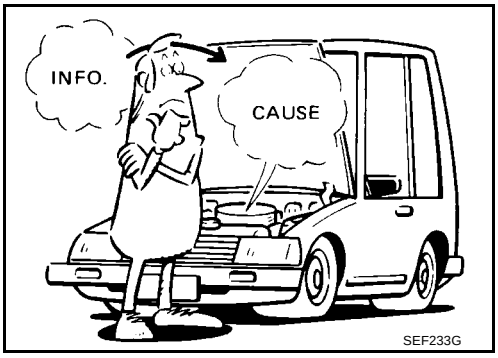
- Most important point to perform diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.

- It is also important to clarify customer complaints before inspection.
  First of all, reproduce symptom, and understand it fully.
  Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptom by driving vehicle with customer.

  NOTE:
  Customers are not professionals. Do not assume “maybe customer means...” or “maybe customer mentioned this symptom”.


SEF234G

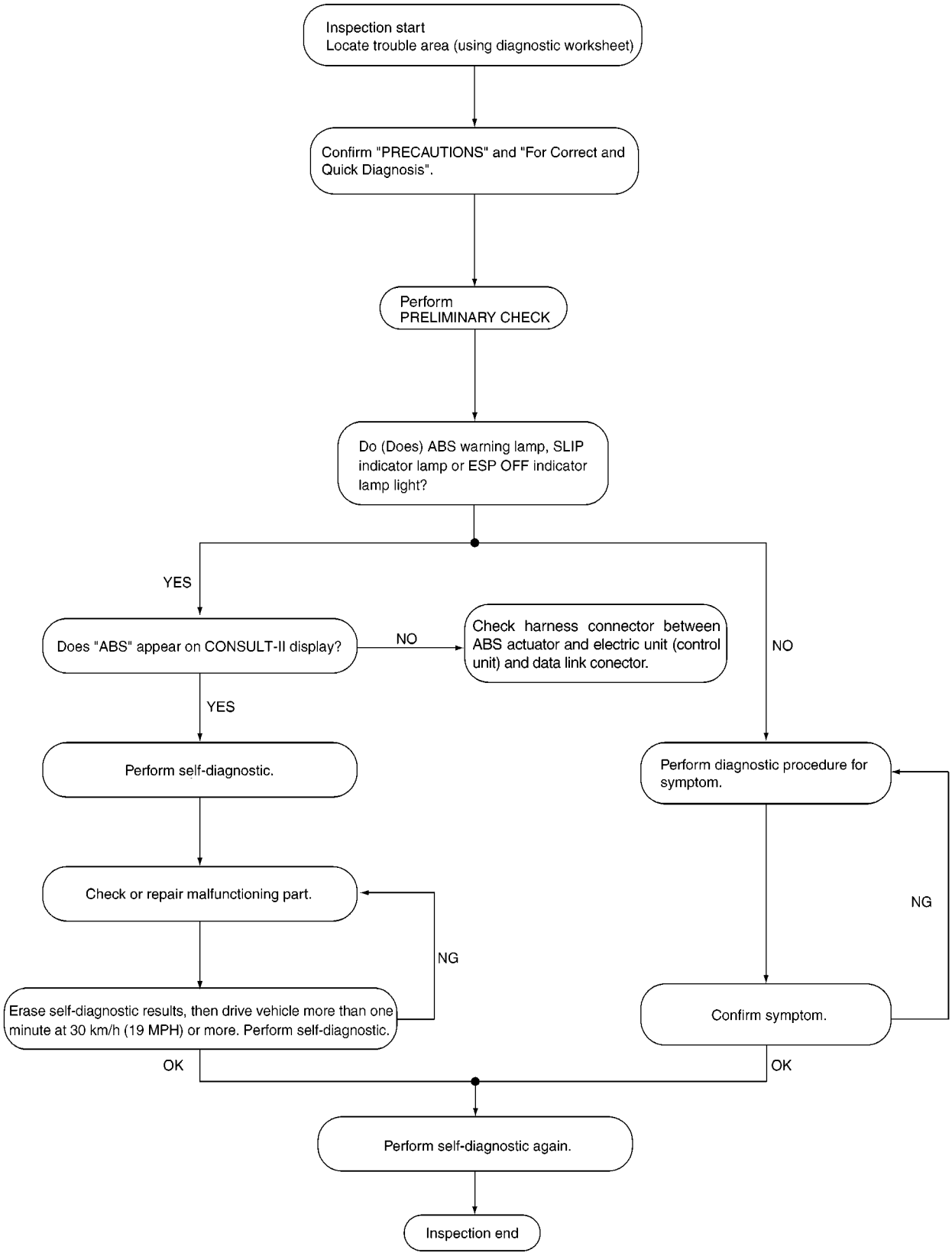
- It is essential to check symptoms right from beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.
- After diagnosis, make sure to carry out “erase memory”. Refer to BRC-75, "SELF-DIAGNOSIS" .
- For an intermittent malfunction, move harness or harness connector by hand to check poor contact or false open circuit.



SEF233G

- Always read “GI General Information” to confirm general precautions. Refer to GI-4, "General Precautions" .

DIAGNOSIS FLOWCHART



MFIA0017E

ASKING COMPLAINTS

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnosis sheet so as not to miss information.

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

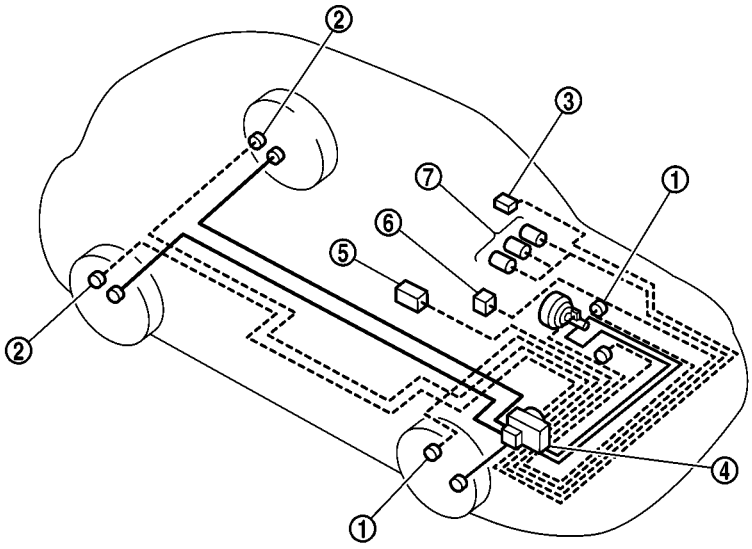
EXAMPLE OF DIAGNOSIS SHEET

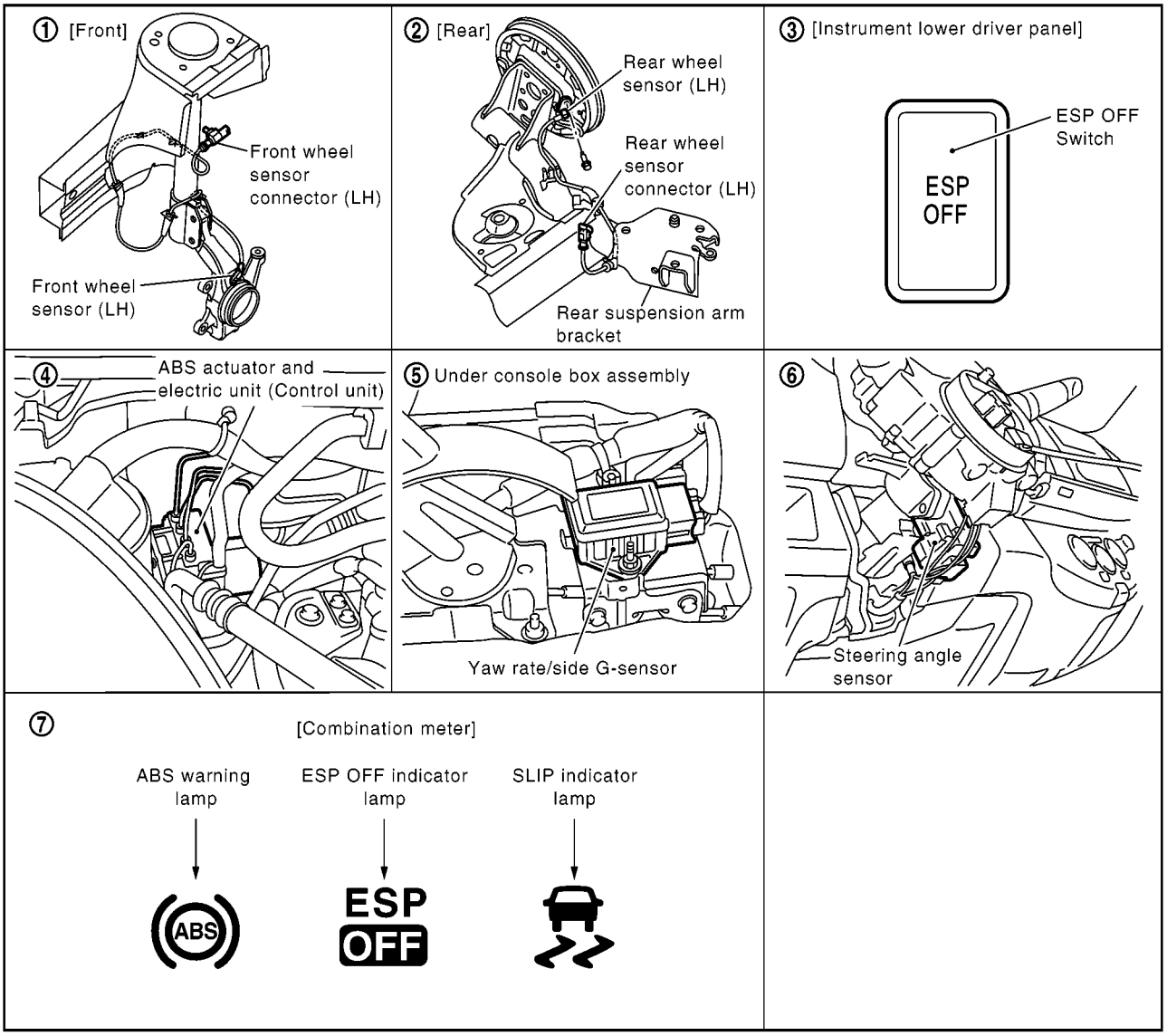
Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work. (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA0791E

Component Installation Location

EFS004JS

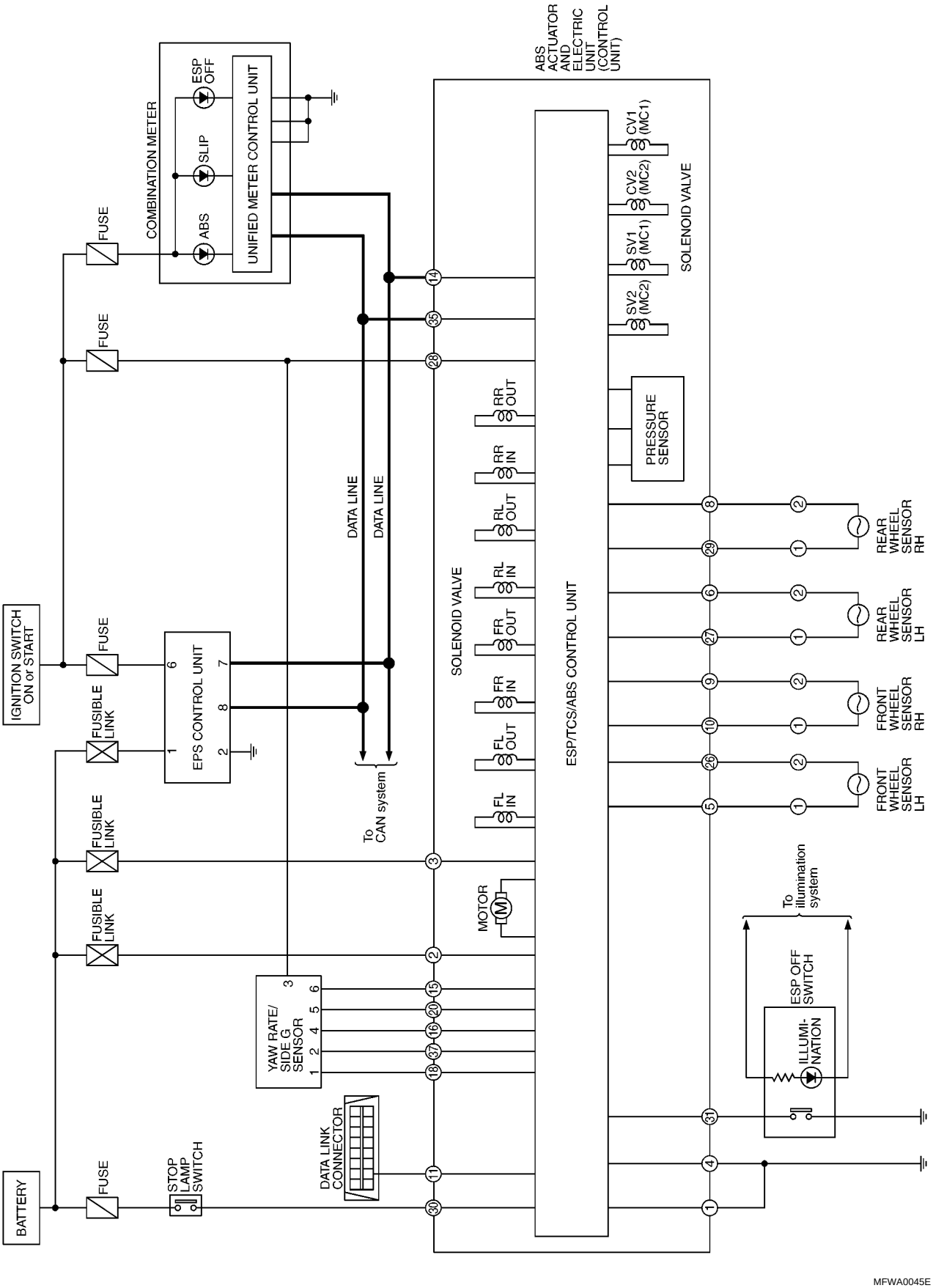




MFIA0011E

Schematic

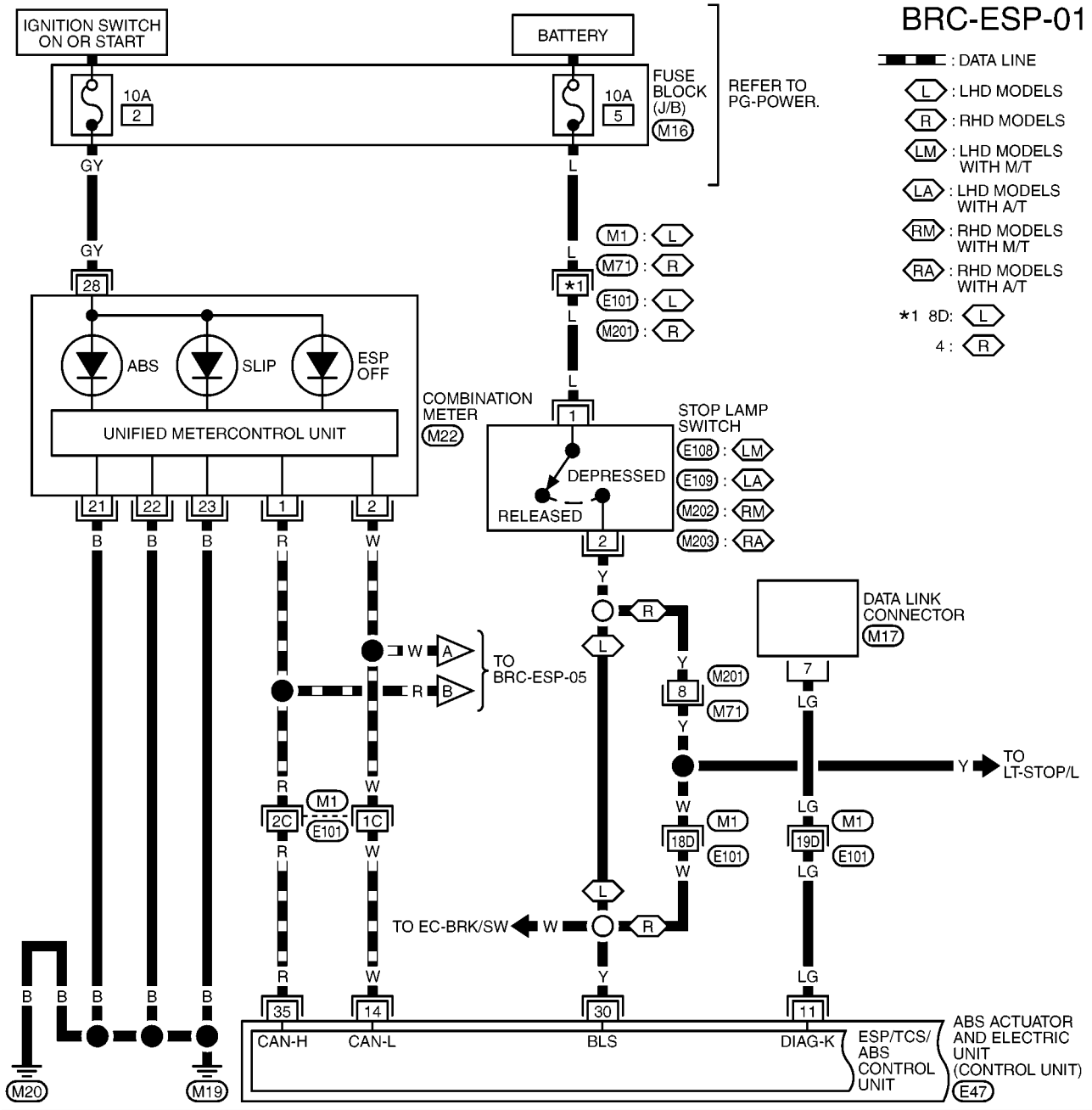
EFS004JT

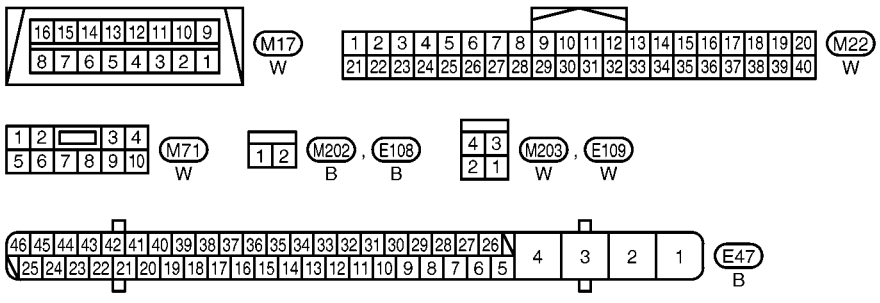


MFWA0045E

Wiring Diagram — ESP —

EFS004JU

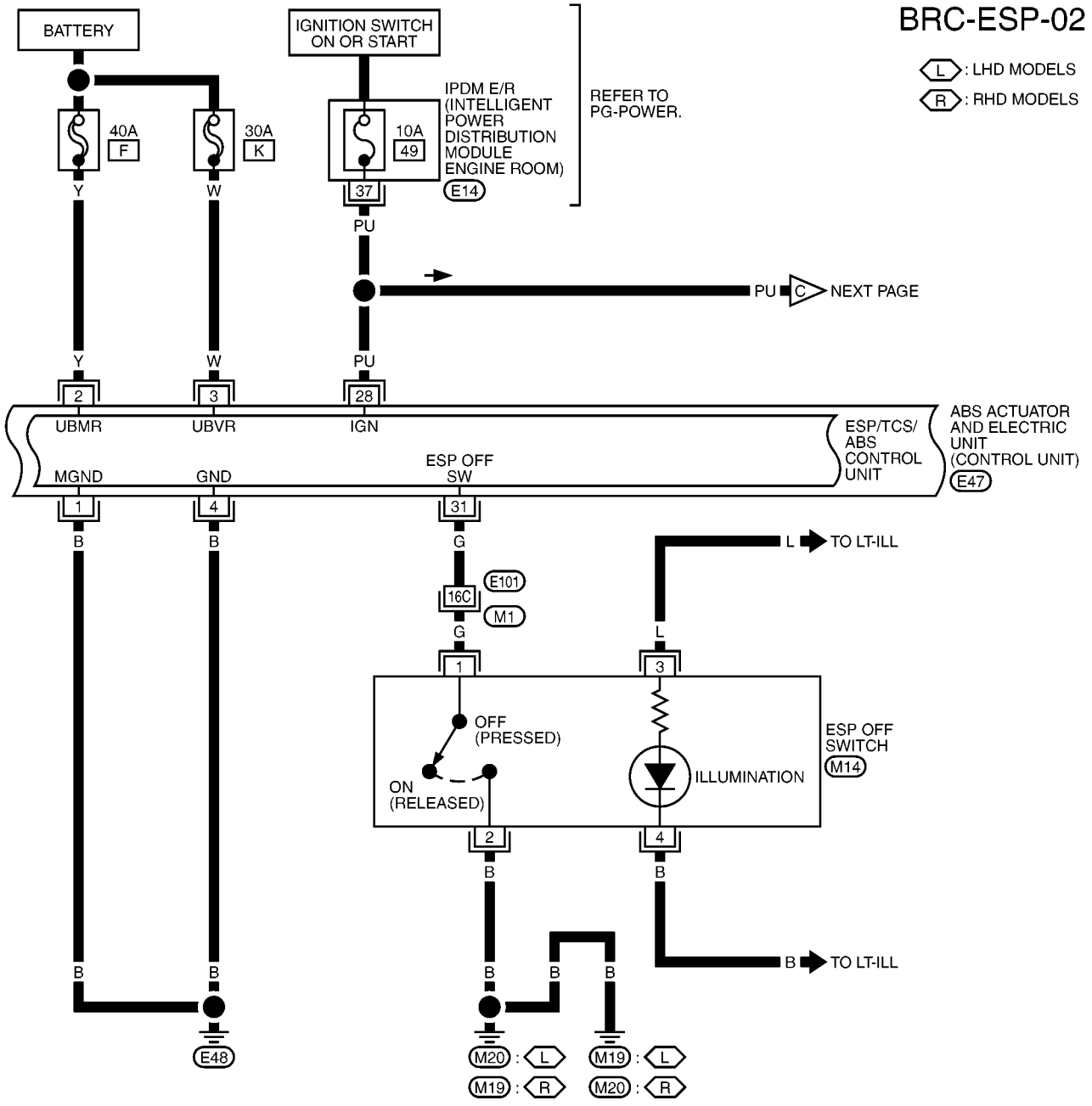


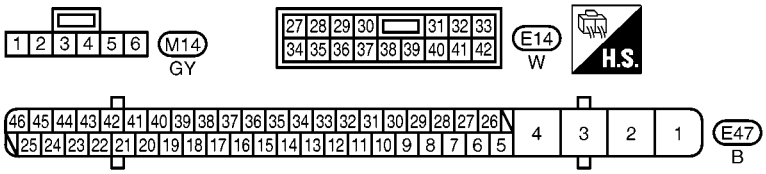


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

MFWA0046E

BRC-ESP-02

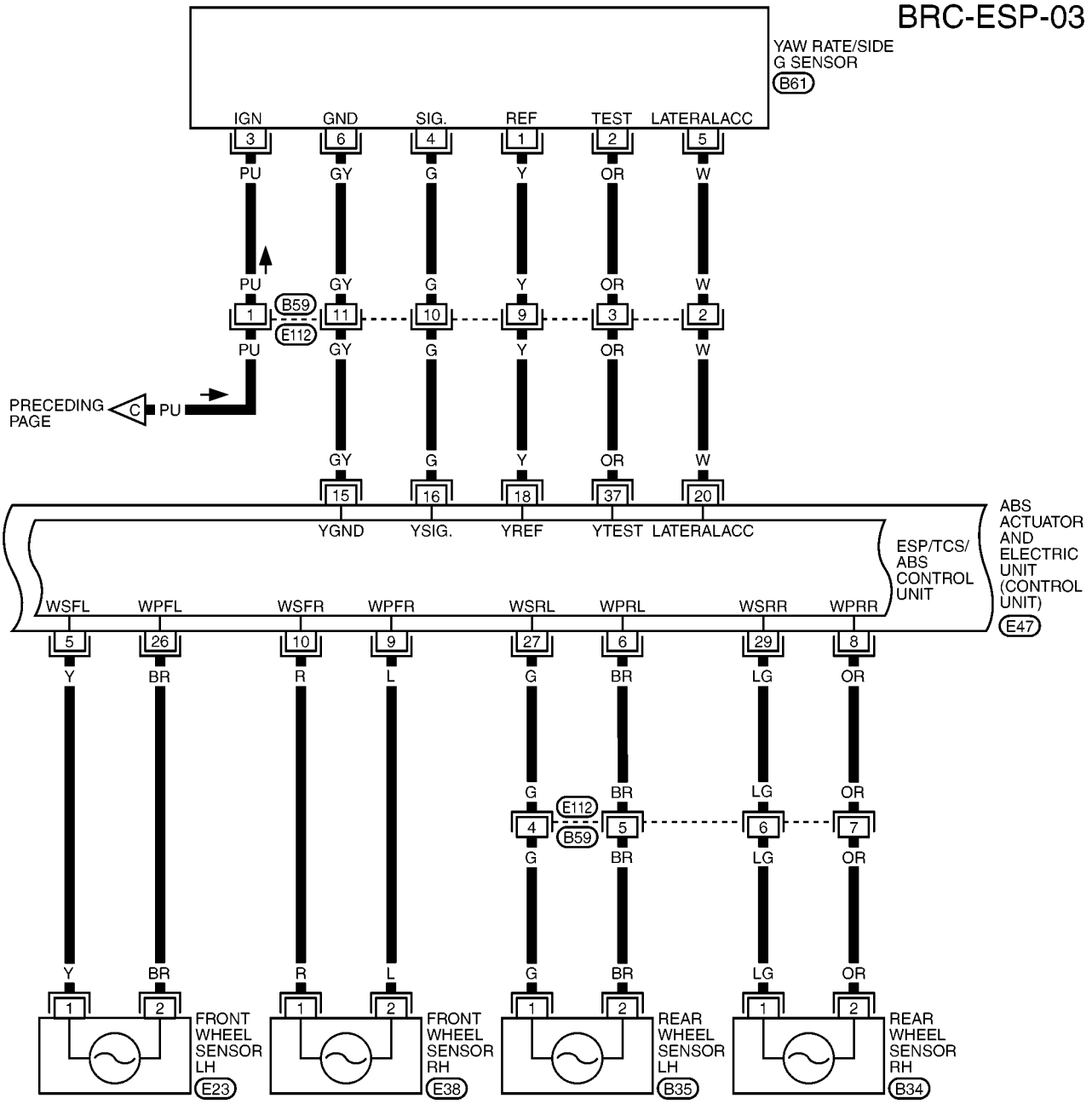


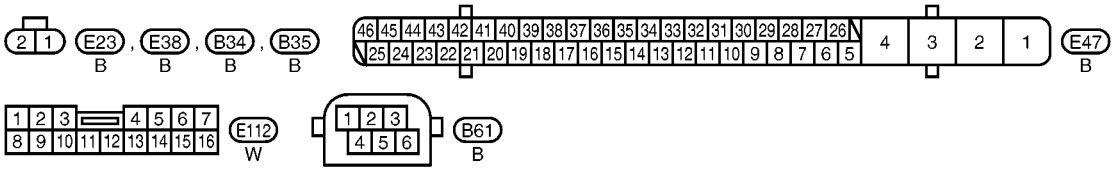


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MFWA0047E

BRC-ESP-03





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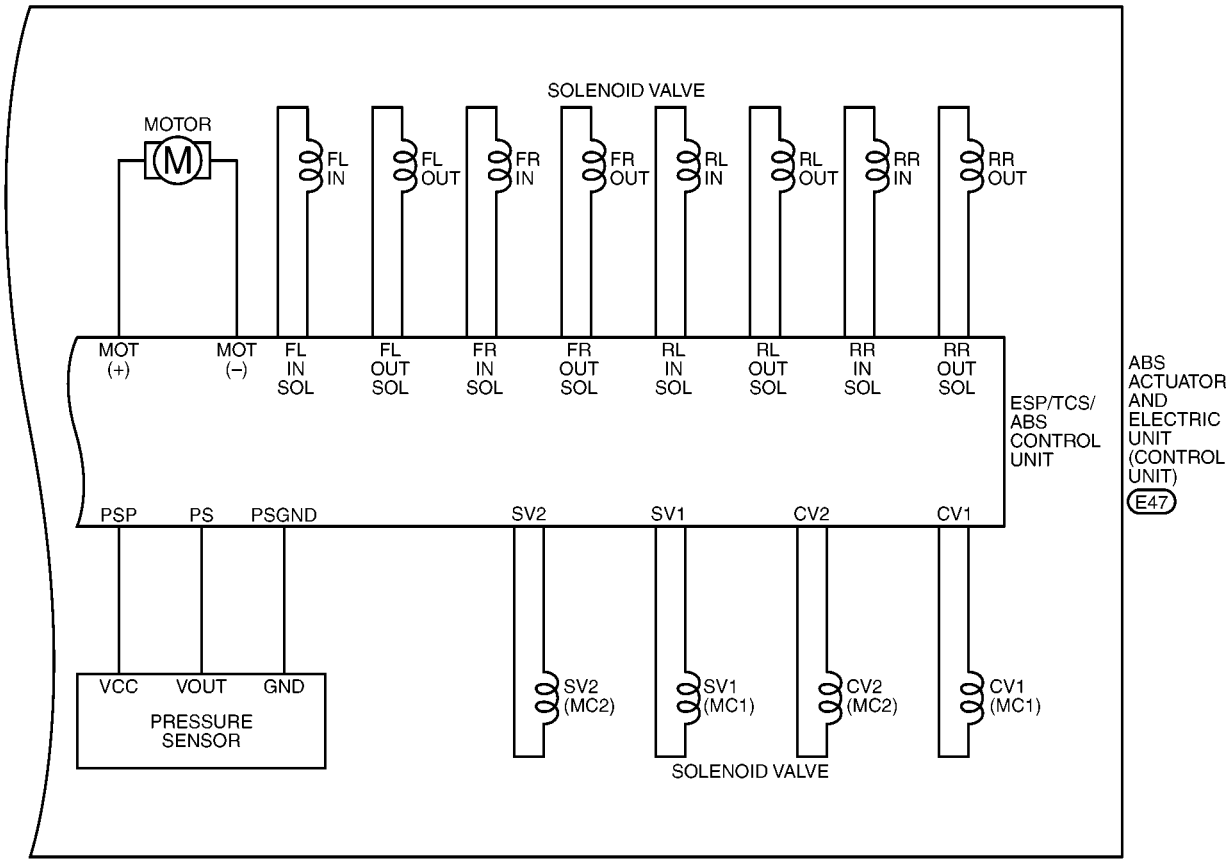
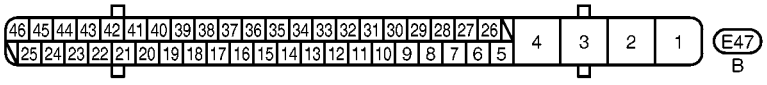
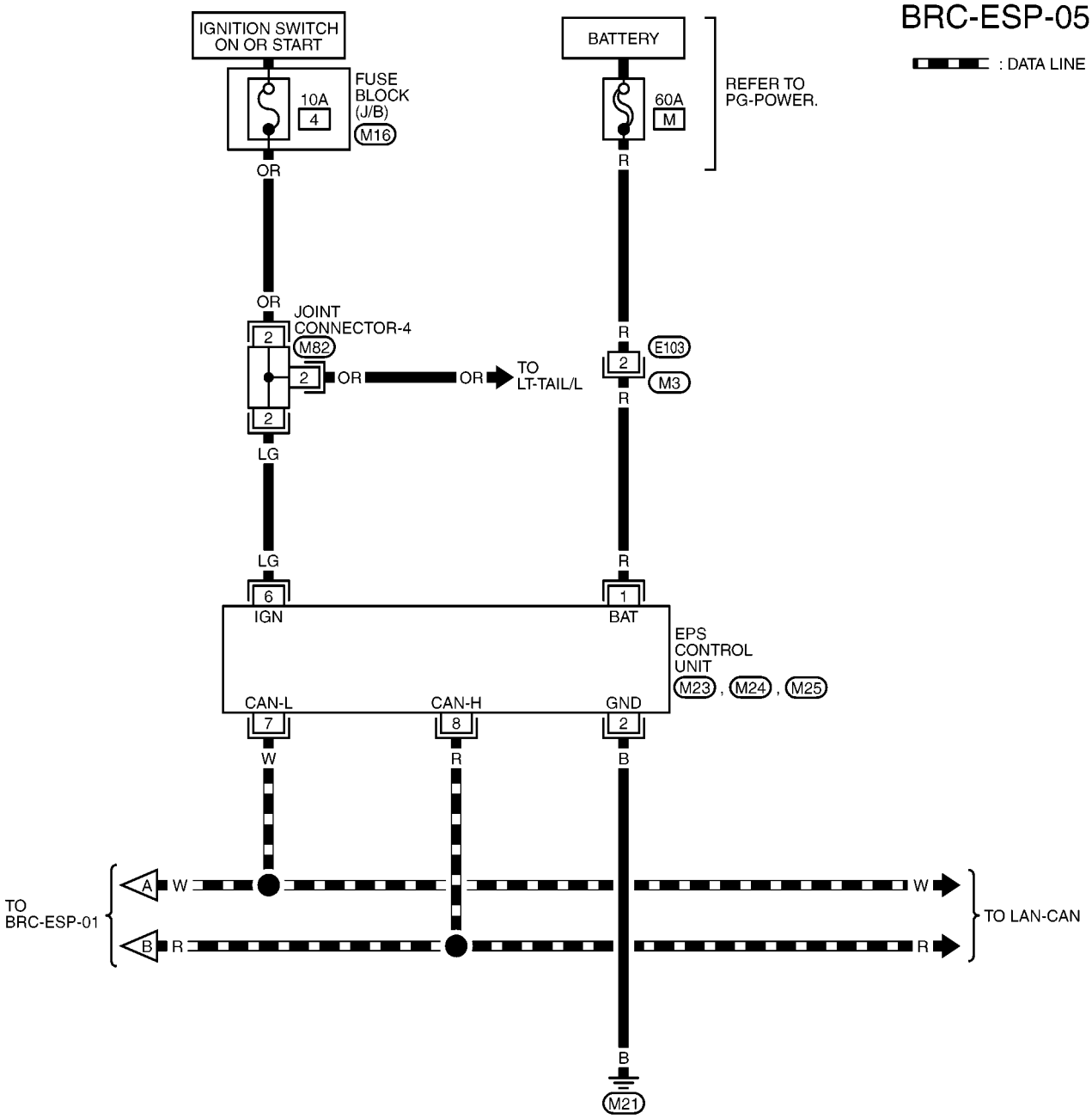
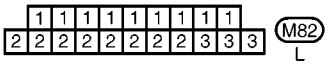

SOLENOID VALVE
MOTOR
M
FL IN
FL OUT
FR IN
FR OUT
RL IN
RL OUT
RR IN
RR OUT
MOT (+)
MOT (–)
FL IN SOL
FL OUT SOL
FR IN SOL
FR OUT SOL
RL IN SOL
RL OUT SOL
RR IN SOL
RR OUT SOL
ESP/TCS/ ABS CONTROL UNIT
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E47
PSP
PS
PSGND
SV2
SV1
CV2
CV1
VCC
VOUT
GND
PRESSURE SENSOR
SV2 (MC2)
SV1 (MC1)
CV2 (MC2)
CV1 (MC1)
SOLENOID VALVE


46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26
25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5
4 3 2 1
E47
B

MFWA0049E

BRC-ESP-05





REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MFWA0050E

Control Unit Input/Output Signal Standard

EFS004JV

REFERENCE VALUE FROM CONSULT-II

CAUTION:

The display shows ABS actuator and electric unit (control unit) calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
GEAR	A/T gear position	1: 1st gear 2: 2nd gear 3: 3rd gear 4: 4th gear		—
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Wheel speed	Vehicle stopped	0 [km/h (MPH)]	BRC-85, "Inspection 1: Wheel Sensor System"
		Vehicle running (Note 1)	Almost in accordance with speedometer display (within ±10 %)	
ACCEL POS SIG	Open/close condition of throttle valve (linked with accelerator pedal).	Accelerator pedal is not depressed (ignition switch is ON)	0 %	EC section
		Accelerator pedal is depressed (ignition switch is ON)	0 to 100 %	
ENGINE SPEED	With engine running	With engine stopped	0 rpm	EC section
		Engine running	Almost in accordance with tachometer display	
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0 deg	BRC-89, "Inspection 4: Steering Angle Sensor System"
		Steering wheel turned	L600 to R600 deg	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
		Vehicle running	–200 to 200 d/s	
SIDE G-SENSOR	Transverse G detected by side G-sensor	Vehicle stopped	Approx. 0 G	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
		Vehicle running	–1.8 to 1.8 G	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		With ignition switch turned ON and brake pedal depressed	–42.5 to 42.5 bar	
BATTERY VOLT	Battery voltage supplied to ABS actuator and electric unit (control unit)	Ignition switch ON	10 to 16 V	BRC-92, "Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System"
STOP LAMP SW	Brake pedal operation	Brake pedal is depressed	ON	BRC-94, "Inspection 7: Stop Lamp Switch System"
		Brake pedal is not depressed	OFF	
OFF SW	ESP OFF switch ON/OFF status	ESP OFF switch ON (When ESP OFF indicator lamp is ON)	ON	BRC-97, "ESP OFF SWITCH"
		ESP OFF switch OFF (When ESP OFF indicator lamp is OFF)	OFF	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
ABS WARN LAMP	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		ABS warning lamp OFF	OFF	
MOTOR RELAY	Operation status of motor and motor relay	Ignition switch ON or engine running (ABS not operated)	OFF	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		Ignition switch ON or engine running (ABS operated)	ON	
ACTUATOR RLY	Actuator relay operation status	Actuator (solenoid) is active	ON	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		When actuator relay is inactive (in fail-safe mode)	OFF	
OFF LAMP	ESP OFF indicator lamp status (Note 3)	When ESP OFF indicator lamp is ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		When ESP OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	
		When SLIP indicator lamp is OFF	OFF	
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Solenoid valve operation	Actuator (solenoid) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON)	ON	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
		When actuator (solenoid) is not active or actuator relay is inactive (in fail-safe mode)	OFF	
HSV [FL-RR] HSV [FR-RL] USV [FL-RR] USV [FR-RL]	ESP/TCS switch-over valve status	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT-II) and actuator relay is active (ignition switch ON)	ON	
		When actuator (switch-over valve) is not active or actuator relay is inactive (in fail-safe mode)	OFF	
FLUID LEV SW	ON/OFF status of brake fluid level switch	When brake fluid level switch ON	ON	BRC-96, "Inspection 8: Brake Fluid Level Switch System"
		When brake fluid level switch OFF	OFF	
EBD WARN LAMP	Brake warning lamp on condition (Note 5)	Brake warning lamp ON	ON	BRC-85, "BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP and SLIP INDICATOR LAMP INSPECTION"
		Brake warning lamp OFF	OFF	
PARK BRAKE SW	Condition of parking brake	When parking brake is applied	ON	—
		When parking brake is released	OFF	
CRANKING SIG	CRANKING status	Cranking	ON	—
		Not cranking	OFF	

Monitor item	Display content	Data monitor		Note: Error inspection checklist
		Condition	Reference value in normal operation	
CAN CIRC 1	CAN communication condition	CAN communications normal	OK	BRC-96, "Inspection 9: CAN Communication System"
		CAN communications error	UNKWN	
CAN CIRC 2		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 3		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 4		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN CIRC 5		CAN communications normal	OK	
		CAN communications error	UNKWN	
CAN 1 STAT (Note 6)	CAN communication condition	CAN communication normal	0	BRC-96, "Inspection 9: CAN Communication System"
		CAN communication error	40	
CAN 2 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 3 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 4 STAT		CAN communication normal	0	
		CAN communication error	40	
CAN 5 STAT		CAN communication normal	0	
		CAN communication error	40	

Note 1: Confirm tire pressure is normal.
Note 2: ON/OFF timing of ABS warning lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Note 3: ON/OFF timing of ESP OFF indicator lamp
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP OFF switch is ON.
OFF: Approx 1.5 seconds after ignition switch is turned ON (when system is in normal operation.) And when ESP OFF switch is OFF.
Note 4: SLIP indicator lamp ON/OFF timing
ON: Approx. Within 1.5 seconds after ignition switch is turned ON, or when a malfunction is detected and ESP/TCS function is activated while driving.
OFF: Approx. 1.5 seconds after ignition switch is turned ON (when system is in normal operation) and ESP/TCS function is not activated.
Blinking: ESP/TCS function is active during driving
Note 5: Serves as EBD warning lamp.
Note 6: CAN status indicates the condition of the CAN communication judged by each signal input.

- Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.
- Malfunction: If there is a malfunction, CAN indicates “40”.

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39”→ “38” → “37” ⋯ “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

CONSULT-II Functions

EFS004JW

CAUTION:

- **Do not use the “function test” for diagnosis. For more information, refer to the separate volume “CONSULT-II OPERATION MANUAL (Function Test)”.**
- **When CONSULT-II is connected and communicating, ABS warning lamp, SLIP indicator lamp, and ESP OFF indicator lamp turn on, and when the communication is interrupted, the lamps will turn off after approximately 2 to 3 sec.**
- **When the self-diagnosis, data monitor, or active test functions are being executed, EBD, ABS, TCS, and ESP control is not performed.**
- **When using CONSULT-II to perform ABS actuator and electric unit (control unit) self-diagnosis, active test, work support, etc., first stop engine, connect CONSULT-II, and select “ABS”.**
- **When an error is shown by the CONSULT-II SELF-DIAG RESULTS and CONSULT-II is used to perform an active test, an engine system malfunction may be shown, but restarting engine will return the status to normal.**
- **When data monitoring is executed by using CONSULT-II, a malfunction code may be indicated as the result of the real time diagnosis. In such a case, execute data monitoring in manual mode. Refer to CONSULT-II Operation Manual.**

CONSULT-II FUNCTION APPLICATION TABLE (MAIN ITEMS)

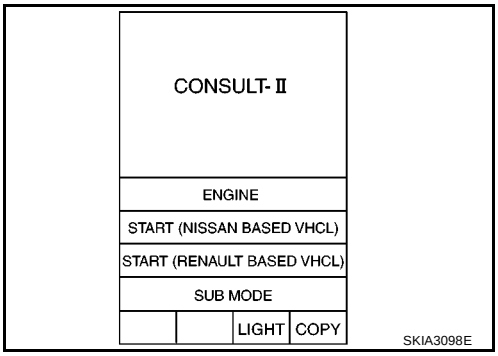
Item	Self-diagnosis	Data monitor	Active test
Wheel sensors	×	×	–
Wheel sensor rotor	×	–	–
Stop lamp switch	×	×	–
Solenoid valves	×	×	×
Switch-over solenoid valves (HSV, USV)	×	–	×
Yaw rate/side G-sensor	×	×	–
Pressure sensor	×	×	–
Steering angle sensor	×	×	–
Actuator relay	×	×	–
Motor relay	×	×	–
ABS warning lamp	–	×	–
Battery voltage	×	×	–
ABS actuator and electric unit (control unit)	×	–	–
ESP/TCS/ABS actuator motor	×	–	×
CAN communication	×	×	–
Engine speed signal	–	×	–
ESP OFF switch	–	×	–
ESP OFF indicator lamp	–	×	–
SLIP indicator lamp	–	×	–
Accel position signal	–	×	–
Gear	–	×	–
Brake fluid level switch	×	×	–
Engine signals	×	–	–
A/T signals	×	–	
EBD warning lamp	–	×	–

×:Applicable
–:Not applicable

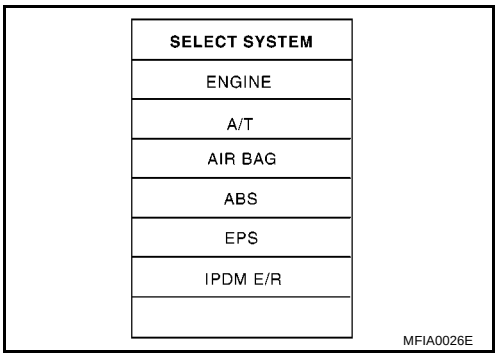
CONSULT-II BASIC OPERATION PROCEDURE

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.

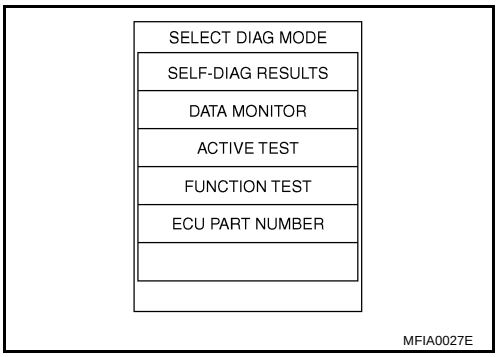
   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “ABS” in the “SELECT SYSTEM” screen.
   If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Select the required diagnostic location from the “SELECT DIAG MODE” screen.
   For further information, see CONSULT-II Operation Manual.



SELF-DIAGNOSIS

Description

- If an error is detected in the system, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp on the combination meter turn on. In this case, perform self-diagnosis as follows:
- While CONSULT-II is used, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp may be turned on in a case of no malfunctioning.

Operation Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.

   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

3. Turn ignition switch ON.
4. Start engine and drive at approximately 30 km/h (19 MPH) for approximately 1 minute.
5. After stopping vehicle, with the engine running, touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS” in order on the CONSULT-II screen.

   CAUTION:
   If “START (NISSAN BASED VHCL)” is touched immediately after starting engine or turning on the ignition switch, “ABS” might not be displayed in the System Selection screen. In this case, repeat the operation from step 1. If it cannot be shown after several attempts, ABS actuator and electric unit (control unit) may have malfunctioned.
6. The self-diagnostic results are displayed. (If necessary, the self-diagnostic results can be printed out by touching “PRINT”.)
   - When “NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.” is displayed, check ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp.
7. Perform the appropriate inspection from the display item list, and repair or replace the malfunctioning component.
8. Drive the vehicle at approximately 30 km/h (19 MPH) for approximately 1 minute.

   CAUTION:
   - **In a case that a wheel sensor is malfunctioning, ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp will turn on. If vehicle is not driven at approximately 30 km/h (19 MPH) for at least approximately 1 minute after repair of the wheel sensor system, ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp may not turn off even if everything is normal. Check again to make sure that there is no malfunction on other parts.**
9. Turn ignition switch OFF to prepare for erasing the memory.
10. Start engine and touch “START (NISSAN BASED VHCL)”, “ABS”, “SELF-DIAG RESULTS”, “ERASE” in order on the CONSULT-II screen to erase the error memory.
    If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

    CAUTION:
    If the error memory is not erased, re-perform the operation from step 5.
11. For the final inspection, drive at approximately 30 km/h (19 MPH) for approximately 1 minute and confirm that ABS warning lamp, ESP OFF indicator lamp and SLIP indicator lamp are OFF.

Display Item List

Self-diagnostic item	Malfunction detecting condition	Check system
FR LH SENSOR [C101F]	Circuit of front LH wheel sensor is open, shorted or sensor power voltage is unusual.	BRC-85, "Inspection 1: Wheel Sensor System"
RR RH SENSOR [C102F]	Circuit of rear RH wheel sensor is open, shorted or sensor power voltage is unusual.	
FR RH SENSOR [C100F]	Circuit of front RH wheel sensor is open, shorted or sensor power voltage is unusual.	
RR LH SENSOR [C103F]	Circuit of rear LH wheel sensor is open, shorted or sensor power voltage is unusual.	
FR LH SENSOR ROTOR [C1042]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
RR RH SENSOR ROTOR [C1043]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
FR RH SENSOR ROTOR [C1041]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
RR LH SENSOR ROTOR [C1044]	ABS actuator and electric unit (control unit) cannot identify sensor pulses, because of large gap between wheel sensor and sensor rotor.	
STOP LAMP SW CIRC [C10C6]	Stop lamp switch is fixed at “ON” position.	BRC-94, "Inspection 7: Stop Lamp Switch System"

Self-diagnostic item	Malfunction detecting condition	Check system
STOP LAMP OR CONT [C10C6]	Stop lamp switch circuit is open or shorted, or controller failure.	BRC-94, "Inspection 7: Stop Lamp Switch System"
ST ANG SEN [C1158]	Neutral position of steering angle sensor is dislocated, or steering angle sensor is malfunctioning initialize of steering angle sensor is not completed.	BRC-89, "Inspection 4: Steering Angle Sensor System"
YAW RATE/G-SEN [C10F4]	Yaw rate/G-sensor has generated an error, or yaw rate/G-sensor signal line is open or shorted.	BRC-90, "Inspection 5: Yaw Rate/Side G-Sensor System"
ABS SENSOR [C1046]	Wheel sensor input is malfunction or wheel sensor power voltage is too low.	BRC-85, "Inspection 1: Wheel Sensor System" (Note 1)
BATTERY VOLTAGE [C10CC]	Supply voltage for ABS actuator and electric unit (control unit) is too low or too high, or abnormal.	BRC-92, "Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System"
CONTROLLER FAILURE [C10C3]	Internal malfunction of ABS actuator and electric unit (control unit)	BRC-89, "Inspection 3: ESP/TCS/ABS Control Unit System"
CAN COMM CIRCUIT [U1000]	● CAN communication line is open or shorted. ● ABS actuator and electric unit (control unit) internal malfunction ● Battery voltage for ECM is suddenly interrupted for approximately 0.5 seconds or more.	BRC-96, "Inspection 9: CAN Communication System" (Note 1)
ECM [C1180]	● CAN communication line is open or shorted. ● CAN communication signal form ECM cannot be received.	BRC-88, "Inspection 2: Engine System", BRC-96, "Inspection 9: CAN Communication System"
AT [C1188]	● CAN communication line is open or shorted. ● CAN communication signal from TCM cannot be received.	BRC-96, "Inspection 9: CAN Communication System"
BR FLUID LEVEL LOW [C1155]	Brake fluid level drops or circuit between ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	BRC-96, "Inspection 8: Brake Fluid Level Switch System"

Note 1: If multiple malfunctions are detected including CAN communication line [U1000], perform diagnosis for CAN communication line first.

DATA MONITOR

Operation Procedure

1. After turning OFF ignition switch, connect CONSULT-II and CONVERTER to data link connector.

   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
2. Turn ignition switch ON.
3. Touch “START (NISSAN BASED VHCL)”, “ABS”, “DATA MONITOR” in order on the CONSULT-II screen. If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

   CAUTION:
   When “START (NISSAN BASED VHCL)” is touched immediately after starting engine or turning on ignition switch, “ABS” might not be displayed in the system selection screen. In this case, repeat the operation from step 1.
4. Return to the Monitor Item Selection screen, and touch “ECU INPUT SIGNALS”, “MAIN SIGNALS” or “SELECTION FROM MENU”. Refer to the following information.
5. When “START” is touched, the data monitor screen is displayed.

Display Item List

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
GEAR	×	×	×	–	Gear position judged by PNP switch signal is displayed.
FR RH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, MPH)	×	×	×	–	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	–	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
ACCEL POS SIG (%)	–	–	×	–	Throttle valve open/close status judged by CAN communication signal is displayed.
ENGINE SPEED (rpm)	–	–	×	–	Engine speed judged by CAN communication signal is displayed.
STR ANGLE SIG (deg)	–	–	×	–	Steering angle detected by steering angle sensor is displayed.
YAW RATE SEN (d/s)	–	–	×	–	Yaw rate detected by yaw rate sensor is displayed.
SIDE G-SENSOR (G)	–	–	×	–	Lateral acceleration detected by side G-sensor is displayed.
PRESS SENSOR (bar)	–	–	×	–	Brake fluid pressure detected by pressure sensor is displayed.
STOP LAMP SW (ON/OFF)	–	–	×	–	Stop lamp switch (ON/OFF) status is displayed.
OFF SW (ON/OFF)	–	–	×	–	ESP OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	–	×	×	–	ABS warning lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	–	–	×	–	SLIP indicator lamp (ON/OFF) status is displayed.
FR LH IN SOL (ON/OFF)	–	×	×	–	Front LH IN ABS solenoid (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	–	×	×	–	Front LH OUT ABS solenoid (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	–	×	×	–	Rear RH IN ABS solenoid (ON/OFF) status is displayed.
RR RH OUT SOL (ON/OFF)	–	×	×	–	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
FR RH IN SOL (ON/OFF)	–	×	×	–	Front RH IN ABS solenoid (ON/OFF) status is displayed.

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
FR RH OUT SOL (ON/OFF)	–	×	×	–	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	–	×	×	–	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	–	×	×	–	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	–	–	×	–	OFF Lamp (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	–	×	×	–	ABS motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	–	×	×	–	ABS actuator relay signal (ON/OFF) status is displayed.
HSV [FL-RR] (ON/OFF)	–	–	×	–	Primary side switch-over solenoid valve 1 (cut valve 1) (ON/OFF) status is displayed.
HSV [FR-RL] (ON/OFF)	–	–	×	–	Secondary side switch-over solenoid valve 2 (cut-valve 2) (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	–	–	×	–	Primary side switch-over solenoid valve 1 (suction valve 1) (ON/OFF) status is displayed.
USV [FR-RL] (ON/OFF)	–	–	×	–	Secondary side switch-over solenoid valve 2 (suction valve 2) (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	–	–	×	–	Brake fluid level switch (ON/OFF) status is displayed.
EBD WARN LAMP (ON/OFF)	–	–	×	–	Brake warning lamp (ON/OFF) status is displayed. (Note 1)
CRANKING SIG (ON/OFF)	–	–	×	–	Cranking condition (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	–	–	×	–	Park brake operation (ON/OFF) status is displayed.
CAN CIRC 1 (OK/UNKWN)	–	–	–	×	CAN communication signal (OK/UNKWN) status is displayed.
CAN CIRC 2 (OK/UNKWN)	–	–	–	×	
CAN CIRC 3 (OK/UNKWN)	–	–	–	×	
CAN CIRC 4 (OK/UNKWN)	–	–	–	×	
CAN CIRC 5 (OK/UNKWN)	–	–	–	×	

Item (Unit)	Data monitor item selection				Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	CAN DIAG SUPPORT MNTR	
CAN 1 STAT (0 - 40)	–	–	–	×	CAN communication line (0 - 40) status is displayed.
CAN 2 STAT (0 - 40)	–	–	–	×	
CAN 3 STAT (0 - 40)	–	–	–	×	
CAN 4 STAT (0 - 40)	–	–	–	×	
CAN 5 STAT (0 - 40)	–	–	–	×	

×:Applicable
–:Not applicable
Note 1: Serves as EBD warning lamp.
Note 2: CAN status indicates the condition of the CAN communication judged by each signal input.

- Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.
- Malfunction: If there is a malfunction, CAN indicates “40”.

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39”→ “38” → “37” ⋯ “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

ACTIVE TEST

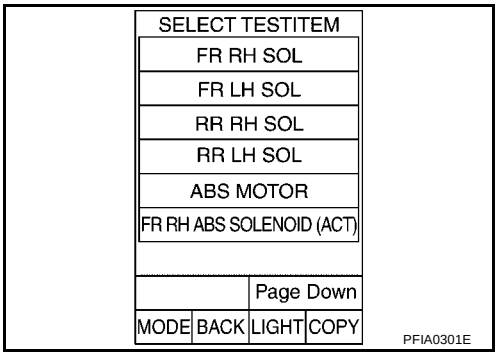
CAUTION:

- **Do not perform active test while driving.**
- **Make sure to completely bleed air from the brake system.**
- **Active test cannot be performed when EBD, ABS, TCS or ESP operation is malfunction.**
- **ABS and brake warning lamps turn on during the active test.**

Operation Procedure

1. Connect CONSULT-II and CONVERTER to data link connector and start engine.

   CAUTION:
   If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.
2. Touch “START (NISSAN BASED VHCL) ” on the display screen.
3. Touch “ABS”.
   If “ABS” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .
4. Touch “ACTIVE TEST”.
5. The test item selection screen is displayed.
6. Touch necessary test item.



7. With the “MAIN SIGNALS” display shown in reverse, touch “START”.
8. The “ACTIVE TEST” screen will be displayed, so perform the following test.

Solenoid Valve Operation Chart

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
	UP	KEEP	DOWN	UP	ACTUATOR UP	ACTUATOR KEEP
FR RH SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON*	OFF
FR LH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON	ON
RR RH ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON*	OFF
RR RL ABS SOLENOID (ACT)	OFF	OFF	OFF	OFF	ON	ON

*: ON for 1 to 2 seconds after the touch, and then OFF

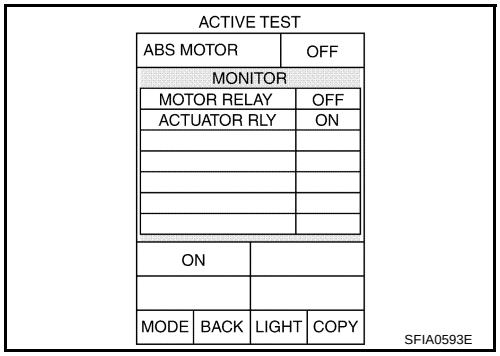
NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.
- After “TEST IS STOPPED” is displayed, touch “BACK” and conduct the test from the Step 8.

ABS Motor

Touch “ON” and “OFF” on the screen. Make sure ABS motor relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RELAY	ON	ON



NOTE:

- If active test is performed with brake pedal depressed, pedal stroke may change. This is normal.
- “TEST IS STOPPED” is displayed approximately 10 seconds after operation starts.

For Fast and Accurate Diagnosis

EFS004JX

PRECAUTIONS FOR DIAGNOSIS

- Before performing diagnosis, always read precautions. Refer to BRC-61, "How to Proceed With Diagnosis" .
- If ABS actuator and electric unit (control unit), steering angle sensor, steering system parts or suspension system parts have been replaced, or if alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-50, "Adjustment of Steering Angle Sensor Neutral Position" .
- After diagnosis is finished, be sure to erase memory. Refer to BRC-75, "SELF-DIAGNOSIS" .
- When checking continuity and voltage between units, be sure to check for disconnection, looseness, bend, or collapse of connector terminals. If any malfunction is found, repair or replace connector terminals.
- For intermittent symptoms, possible cause is malfunction in harness, harness connector, or terminals. Move harness, harness connector, and terminals to check for poor connections.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- To use CONSULT-II to perform self-diagnosis of ABS actuator and electric unit (control unit), active tests, or work support, first stop work, then connect CONSULT-II and select “ABS”.
- While self-diagnostic results of CONSULT-II shows malfunction, if CONSULT-II active test is performed, an engine system error may be indicated. In this case, start engine to resume the normal screen.
- ESP/TCS/ABS system electronically controls brake operation and engine output. The following symptoms may be caused by normal operations:

Symptom	Symptom description	Result
Motor operation noise	This is noise of motor inside ABS actuator and electric unit (control unit). Slight noise may occur during ESP, TCS, and ABS operation.	Normal
	When the vehicle speed goes over 10 km/h (6 MPH), motor and valves operating noise may be heard. It happens only once after IGN (ignition) is ON. This is a normal status of the system operation check.	
System operation check noise	When engine starts, slight “click” noise may be heard from engine room. This is normal and is part of system operation check.	Normal
ESP/TCS operation (SLIP indicator lamp blinking)	TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when up/downshifting, or when fully depressing accelerator pedal.	Normal Cancel the ESP/TCS function for the inspection on a chassis dynamometer.
	For inspection of speedometer or other instruments, press ESP OFF SW to turn ESP/TCS function off.	
	When accelerator pedal is depressed on a chassis dynamometer, vehicle speed will not increase. This is not normal. It is result of TCS being activated by stationary front wheels. Warning lamp may also illuminate to indicate “sensor system error”. This is also normal, and is the result of the stationary front wheels being detected. To be certain, restart engine, and drive vehicle at 30 km/h (19 MPH) or above. Make sure warning lamp does not illuminate.	
ABS operation (Longer stopping distance)	On roads with low friction coefficients, such as snowy roads or gravel roads, vehicles with ABS may require a longer stopping distance. Therefore, when driving on such roads, avoid overconfidence and keep speed sufficiently low.	Normal
Insufficient feeling of acceleration	Depending on road conditions, driver may feel that feeling of acceleration is insufficient. This is because traction control, which controls engine and brakes to achieve optimal traction, has the highest priority (for safety). As a result, there may be times when acceleration is slightly less than usual for the same accelerator pedal operation.	Normal

ON and OFF Timing for ABS Warning Lamp, ESP OFF Indicator Lamp, SLIP Indicator Lamp, Brake Warning Lamp

×: ON –: OFF

Condition	ABS warning lamp	ESP OFF indicator lamp	SLIP indicator lamp	Remarks
Ignition SW OFF.	–	–	–	—
Approx. 1.5 seconds after ignition switch is turned ON.	×	×	×	—
Approx. 1.5 seconds later after ignition switch ON.	–	–	–	Go out 1.5 seconds after ignition switch is turned ON.
ESP OFF SW is turned ON. (ESP/TCS function is OFF.)	–	×	–	—
ESP/TCS/ABS error.	×	×	×	There is an ABS actuator and electric unit (control unit) error. (Power, ground or system malfunction)
When ESP/TCS is not functioning normally.	–	×	×	—

NOTE:

1. Brake warning lamp will turn on in case of operating parking brake (switch turned on) or of actuating brake fluid level switch (brake fluid is insufficient).

Basic Inspection

SMA for VIN >SJN**AK12U1072423

EFS004JY

BASIC INSPECTION 1: BRAKE FLUID AMOUNT, LEAKS, AND BRAKE PADS INSPECTION

1. Check fluid level in the brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check brake piping and around ABS actuator and electric unit (control unit) for leaks. If there is leaking or oozing fluid, check the following items.
   - If ABS actuator and electric unit (control unit) connection is loose, tighten piping to the specified torque and re-perform the leak inspection to make sure there are no leaks.
   - If there is damage to the connection flare nut or ABS actuator and electric unit (control unit) screw, replace the damaged part and re-perform the leak inspection to make sure there are no leaks.
   - When there is fluid leaking or oozing from a part other than ABS actuator and electric unit (control unit) connection, if fluid is just oozing out, use a clean cloth to wipe off the oozing fluid and re-check for leaks. If fluid is still oozing out, replace the damaged part.
   - When there is fluid leaking or oozing at ABS actuator and electric unit (control unit), if fluid is just oozing out, use a clean cloth to wipe off oozing fluid and re-check for leaks. If fluid is still oozing out, replace ABS actuator and electric unit (control unit) body.

     CAUTION:
     ABS actuator and electric unit (control unit) body cannot be disassembled.
3. Check brake pad degree of wear. Refer to BR-21, "FRONT DISC BRAKE" and BR-27, "REAR DRUM BRAKE" .

BASIC INSPECTION 2: POWER SYSTEM TERMINAL LOOSENESS AND BATTERY INSPECTION

Make sure battery positive cable, negative cable and ground connection are not loose. If looseness is detected, tighten the cables. In addition, check the battery voltage to make sure it has not dropped and alternator is normal.

BASIC INSPECTION 3: ABS WARNING LAMP, ESP OFF INDICATOR LAMP AND SLIP INDICATOR LAMP INSPECTION

1. Make sure ABS warning lamp, ESP OFF indicator lamp (when ESP OFF switch is OFF), and SLIP indicator lamp turns on approximately 1.5 second when ignition switch is turned ON. If they do not, check ESP OFF indicator lamp and then ESP OFF switch. Refer to BRC-97, "ESP OFF SWITCH" . Check CAN communications. Refer to “CAN Communication Inspection”. If there are no errors with ESP OFF switch and CAN communication system, check combination meter. Refer to DI-5, "COMBINATION METERS" .
2. Make sure ABS warning lamp, ESP OFF indicator lamp, SLIP indicator lamp turn off approximately 1.5 second after turn ignition switch ON. If lamps do not turn off, perform self-diagnosis.
3. With engine running, make sure ESP OFF indicator lamp turns on and off when ESP OFF switch is turned ON and OFF. If indicator lamp status does not correspond to switch operation, check the ESP OFF switch system. Refer to BRC-97, "ESP OFF SWITCH" .
4. Make sure ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp turn off 1.5 seconds after engine is started. If ABS warning lamp, ESP OFF indicator lamp, and SLIP indicator lamp have not turned off 10 seconds after engine has been started, perform self-diagnosis of ABS actuator and electric unit (control unit).
5. After performing the self-diagnosis, be sure to erase the error memory. Refer to BRC-75, "SELF-DIAGNOSIS" .

Inspection 1: Wheel Sensor System

EFS004JZ

DTC C100F-C103F, C1041-C1043, C1046

After using the CONSULT-II SELF-DIAG RESULTS to determine the location of the malfunctioning wheel sensor, check all areas to determine the component to be replaced.

CAUTION:

- **Do not measure the resistance value and also voltage between sensor terminal with tester etc., because sensor is an active sensor.**
- **Do not expand terminal of connector with a tester terminal stick, when it does the inspection with tester.**

INSPECTION PROCEDURE

1. CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear, and size within the standard values?

YES >> GO TO 2.
NO >> Adjust air pressure, or replace tire.

2. CHECK SENSOR AND SENSOR ROTOR

- Check the condition of the sensor mount (for looseness, etc.).
- Check the surface of front sensor rotor rubber for damage.
- Check rear sensor rotor for damage.

OK or NG

OK >> GO TO 3.
NG >> Repair sensor mount or replace sensor rotor.

3. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnosis results
FR RH SENSOR
FR LH SENSOR
RR RH SENSOR
RR LH SENSOR
FR RH SENSOR ROTOR
FR LH SENSOR ROTOR
RR RH SENSOR ROTOR
RR LH SENSOR ROTOR

Is the above displayed in the self-diagnosis display items?

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

4. CHECK CONNECTOR

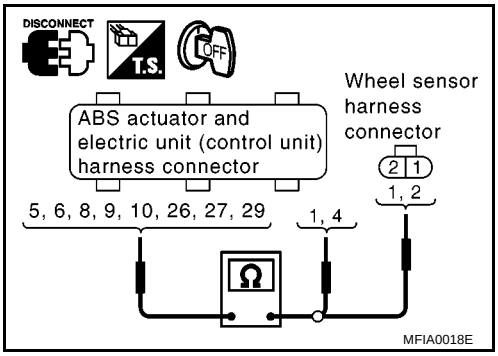
1. Disconnect ABS actuator and electric unit (control unit) connector E47 and malfunctioning wheel sensor connector E23 (FR-LH), E38 (FR-RH), B35 (RR-LH) or B34 (RR-RH). Check terminal for deformation, open circuit, poor contact, etc., and repair or replace if any malfunctioning condition is found.
2. Reconnect connectors, drive at a speed of approximately 30 km/h (19 MPH) for approximately 1minute, and perform self-diagnosis.

OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 5.

5. CHECK WHEEL SENSOR HARNESS

1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E23 (FR-LH), E38 (FR-RH), B34 (RR-RH) or B35 (RR-LH) and ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between terminals. (Also check the continuity when steering wheel is turned right and left and when sensor harness inside wheel well is moved.)



	Power system		Signal system		Ground system	
Wheel	ABS actuator and electric unit (control unit) harness connector E47	Wheel sensor harness connector E23, E38, B35 or B34	ABS actuator and electric unit (control unit) harness connector E47	Wheel sensor harness connector E23, E38, B35 or B34	ABS actuator and electric unit (control unit) harness connector E47 (signal)	ABS actuator and electric unit (control unit) harness connector E47 (ground)
Front RH (E38)	9 (L)	2 (L)	10 (R)	1 (R)	10 (R), 9 (L)	1 (B), 4 (B)
Front LH (E23)	26 (BR)	2 (BR)	5 (Y)	1 (Y)	26 (BR), 5 (Y)	
Rear RH (B34)	8 (OR)	2 (OR)	29 (LG)	1 (LG)	8 (OR), 29 (LG)	
Rear LH (B35)	6 (BR)	2 (BR)	27 (G)	1 (G)	6 (BR), 27 (G)	

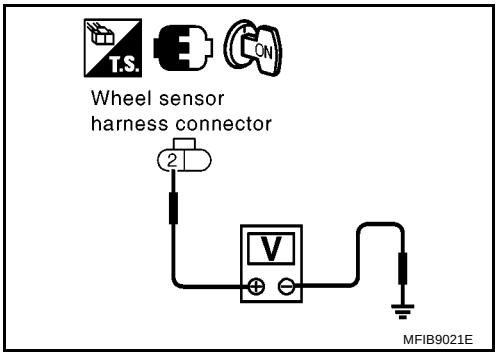
Power system : Continuity should exist.
Signal system : Continuity should exist.
Ground system : Continuity should not exist.

OK or NG

OK >> GO TO 6.
NG >> Repair harness and connector between ABS actuator and electric unit (control unit) and wheel sensor.

6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

1. Connect ABS actuator and electric unit (control unit) connector E47.
2. Turn ignition switch ON and check voltage between malfunctioning wheel sensor harness connector power terminal and ground.



Voltage		
Front RH wheel sensor (Harness connector E38)	**2 (L) - Ground**	**8 V or more**
Front LH wheel sensor (Harness connector E23)	**2 (BR) - Ground**	**8 V or more**
Rear RH wheel sensor (Harness connector B34)	**2 (OR) - Ground**	**8 V or more**
Rear LH wheel sensor (Harness connector B35)	**2 (BR) - Ground**	**8 V or more**

OK or NG

OK >> Replace wheel sensor.
NG >> Replace ABS actuator and electric unit (control unit).

Inspection 2: Engine System

EFS004K0

DTC C1180

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
ECM

Is the above displayed in the self-diagnosis display items?

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

2. CHECK ENGINE SYSTEM

1. Perform an ECM self-diagnosis refer to EC-69, "TROUBLE DIAGNOSIS" (with EURO-OBD), EC-515, "TROUBLE DIAGNOSIS" (without EURO-OBD) and repair or replace malfunctioning items. Re-perform ECM self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 3: ESP/TCS/ABS Control Unit System

EFS004K1

DTC C10C3

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
CONTROLLER FAILURE

Is the above displayed in the self-diagnosis display items?

YES >> Replace ABS actuator and electric unit (control unit). Re-perform the self-diagnosis.
NO >> INSPECTION END

Inspection 4: Steering Angle Sensor System

EFS004K3

DTC C1158

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS-1

Check the self-diagnostic results.

Self-diagnosis results
CAN COMM CIRCUIT

Is the above displayed in the self-diagnosis item?

YES >> GO TO Inspection 9, refer to BRC-96, "Inspection 9: CAN Communication System" .
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS-2

Check the self-diagnostic results.

Self-diagnosis results
ST ANG SEN

Is the above displayed in the self-diagnosis item?

YES >> GO TO 3.
NO >> INSPECTION END

3. CHECK EPS SYSTEM

1. Perform an EPS self-diagnosis refer to STC-6, "TROUBLE DIAGNOSIS" and repair or replace malfunctioning items. Re-perform EPS self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 5: Yaw Rate/Side G-Sensor System

EFS004K4

DTC C10F4

CAUTION:

Sudden turns (such as spin turns, acceleration turns), drifting, etc. May cause the G-sensor system indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine.

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
YAW RATE/G-SEN

CAUTION:

When on a turntable, such as at a parking structure entrance, or when on a moving object with engine running, ESP OFF indicator lamp might turn on and self-diagnosis using CONSULT-II the yaw rate/side G-sensor system might be displayed, but in this case there is no malfunction in yaw rate/side G-sensor system. As soon as vehicle leaves turntable or moving object, restart engine to return the system to normal.

Is the above displayed in the self-diagnosis display items?

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

2. CHECK CONNECTOR

1. Disconnect yaw rate/side G-sensor connector B61 and ABS actuator and electric unit (control unit) connector E47 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Reconnect connectors and re-perform a ABS actuator and electric unit (control unit) self-diagnosis.

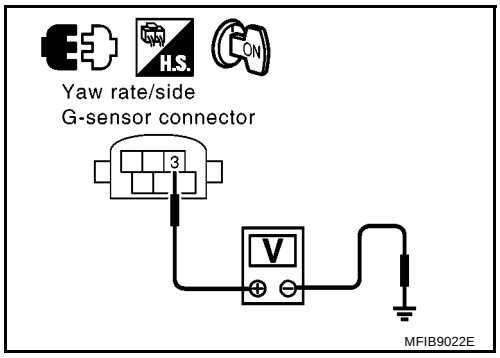
OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK YAW RATE/SIDE G-SENSOR POWER SUPPLY

1. Turn ignition switch OFF and disconnect yaw rate/side G-sensor harness connector B61.
2. Turn ignition switch ON.
3. Check voltage between yaw rate/side G-sensor harness connector B61 and ground.

Yaw rate/side G-sensor (harness connector B61)	Ground	Voltage (V) (Approx.)
3 (PU)	—	12 V

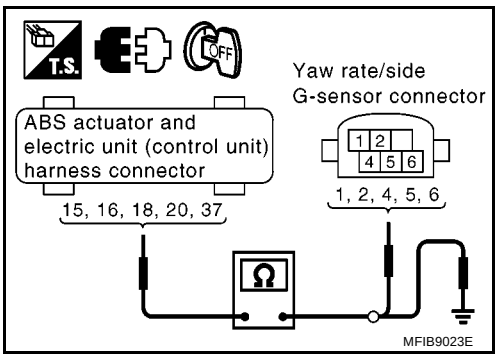


OK or NG

OK >> GO TO 4.
NG >> Repair or replace power supply circuit.

4. CHECK YAW RATE/SIDE G-SENSOR HARNESS

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 and yaw rate/side G-sensor harness connector B61.



ABS actuator and electric unit (control unit) (Harness connector E47)	Yaw rate/side G-sensor (Harness connector B61)	Continuity
15 (GY)	6 (GY)	Yes
16 (G)	4 (G)	Yes
18 (Y)	1 (Y)	Yes
20 (W)	5 (W)	Yes
37 (OR)	2 (OR)	Yes

3. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 15 (GY), 16 (G), 18 (Y), 20 (W) and 37 (OR) and ground. Continuity should not exist.

OK or NG

OK >> GO TO 5.
NG >> If the open or short in harness, repair or replace harness.

5. CHECK YAW RATE/SIDE G-SENSOR

1. Connect yaw rate/side G-sensor connector B61 and ABS actuator and electric unit (control unit) connector E47.
2. Use CONSULT-II “DATA MONITOR” to check if yaw rate/side G-sensor are normal.

Vehicle status	Yaw rate sensor (Data monitor standard)	Side G-sensor (Data monitor standard)
When stopped	–4 to +4 d/s	–1.1 to +1.1 G
Right turn	Negative value	Negative value
Left turn	Positive value	Positive value

OK or NG

OK >> Re-perform ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace malfunctioning yaw rate/side G-sensor, and then re-perform self-diagnosis for ABS actuator and electric unit (control unit).

Inspection 6: ABS Actuator and Electric Unit (Control Unit) Power Supply and Ground System

EFS004K7

DTC C10CC

Inspection Procedure

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
BATTERY VOLTAGE

Does “BATTERY VOLTAGE” appear in self-diagnostic results display?

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

2. STARTING INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) connector E47. Then reconnect it securely.
2. Perform self-diagnosis.

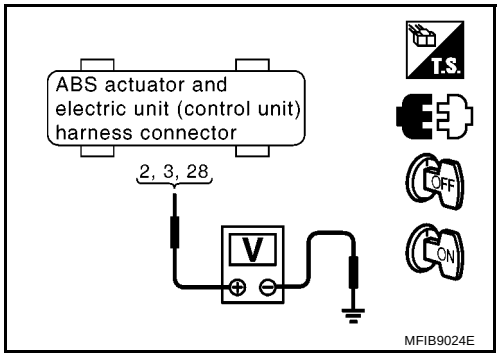
Do any self-diagnosis item appear?

YES >> GO TO 3.
NO >> Poor connection. Repair or replace connector.

3. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (1)

1. Disconnect ABS actuator and electric unit (control unit) connector E47.
2. Turn ignition switch OFF. Check voltage between ABS actuator and electric unit (control unit) harness connector E47 and ground.

ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Voltage (V) (Approx.)
2 (Y), 3 (W)	—	12 V



3. Turn ignition switch ON (but do not start engine). Check voltage between ABS actuator and electric unit (control unit) harness connector E47 and ground.

ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Voltage (V) (Approx.)
28 (PU)	—	12 V

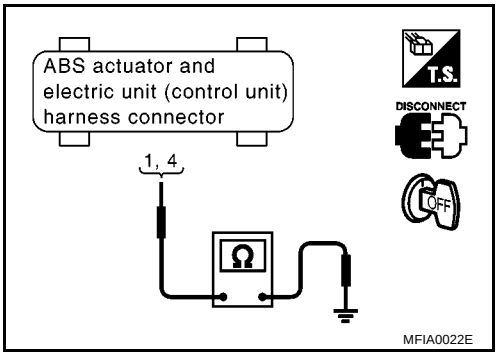
OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND SYSTEM

Check ABS actuator and electric unit (control unit) ground system.

ABS actuator and electric unit (control unit) (Harness connector E47)	Ground	Continuity
1 (B), 4 (B)	—	Yes



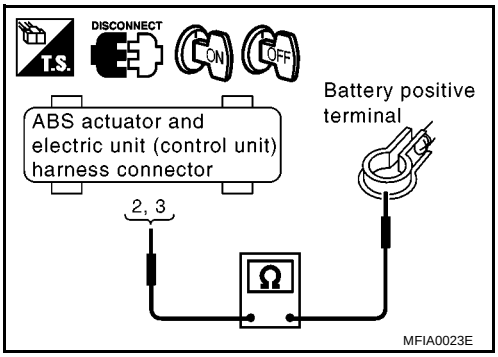
OK or NG

OK >> Perform ABS actuator and electric unit (control unit) self-diagnosis again.
NG >> Repair or replace harness or connectors.

5. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY (2)

1. Check fusible links 40A (terminal 2) and 30A (terminal 3).
2. Turn ignition switch OFF and check continuity between battery positive terminal and ABS actuator and electric unit (control unit) harness connector E47.

ABS actuator and electric unit (control unit) (Harness connector E47)	Battery positive terminal	Continuity
2 (Y), 3 (W)	—	Yes



3. Check fuse 10A (terminal 28)
4. Check continuity between 10A fuse and ABS actuator and electric unit (control unit) harness connector.

OK or NG

OK >> Check for non-standard conditions in battery (terminal looseness, low voltage, etc.) and alternator.
NG >>
- Replace fusible link 40A or 30A or fuse 10A.
- Open or short in harness.

Inspection 7: Stop Lamp Switch System

EFS004K8

DTC C10C6

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Self-diagnostic results
STOP LAMP SW

Is the above displayed in the self-diagnosis display item?

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

2. CHECK CONNECTOR

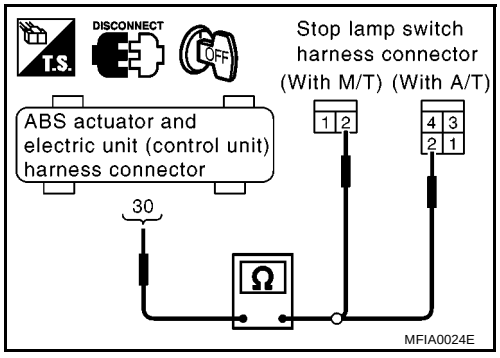
1. Disconnect stop lamp switch connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) connector E47 and check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors.
3. perform self-diagnosis again.

OK or NG

OK >> Connector terminal contact is loose, damaged, open or shorted.
NG >> GO TO 3.

3. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF and disconnect stop lamp switch connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) connector E47.
2. Check continuity between stop lamp switch harness connector E108 (LHD MODELS WITH M/T), E109 (LHD MODELS WITH A/T), M202 (RHD MODELS WITH M/T) or M203 (RHD MODELS WITH A/T) and ABS actuator and electric unit (control unit) harness connector E47.



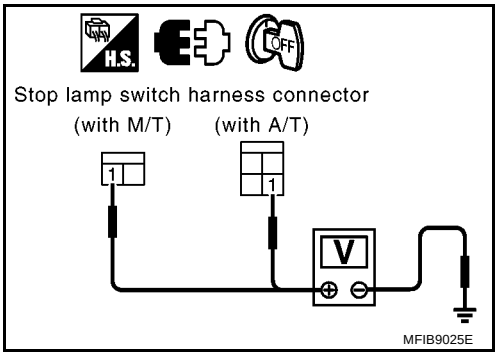
ABS actuator and electric unit (control unit) (Harness connector E47)	Stop lamp switch (Harness connector E108, E107, M202 or M203)	Continuity
30 (Y)	2 (Y)	Yes

OK or NG

OK >> GO TO 4.
NG >> Open or short in harness between stop lamp switch and ABS actuator and electric unit (control unit). Repair or replace applied harness.

4. CHECK STOP LAMP SWITCH POWER SUPPLY

1. Turn ignition switch OFF and disconnect stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T).
2. Check voltage between stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T) and ground.



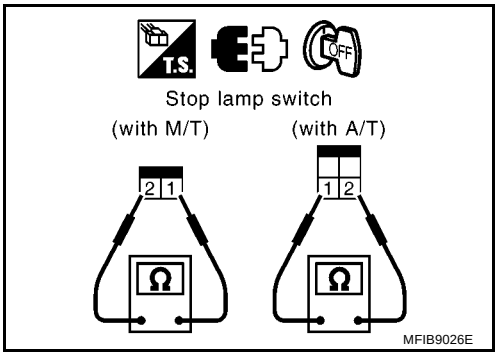
Stop lamp switch (harness connector E108, E109, M202 or M203)	Ground	Voltage (V) (approx.)
1 (L)	—	12 V

OK or NG

OK >> GO TO 5.
NG >> Repair or replace power supply circuit.

5. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF and disconnect stop lamp switch E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T).
2. Check continuity between stop lamp switch harness connector E108 (LHD models with M/T), E109 (LHD models with A/T), M202 (RHD models with M/T) or M203 (RHD models with A/T) terminals 1 and 2.



Terminals		Condition	Continuity
1	2	Depressed	Yes
		Released	No

OK or NG

OK >> Connect connectors and conduct an ABS actuator and electric unit (control unit) self-diagnosis.
NG >> Replace stop lamp switch.

Inspection 8: Brake Fluid Level Switch System

EFS004K9

DTC C1155

INSPECTION PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS-1

Check the self-diagnostic results.

Self-diagnosis results
CAN COMM CIRCUIT

Is the above displayed in the self-diagnosis item?

YES >> GO TO Inspection 9, refer to BRC-96, "Inspection 9: CAN Communication System" .
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULTS-2

1. Check fluid level in brake fluid reservoir tank. If the level is low, add brake fluid.
2. Clear the stored self-diagnostic results and check self-diagnosis results.

Self-diagnostic results
BR FLUID LEVEL LOW

Is the above displayed in the self-diagnosis display item?

YES >> GO TO 3.
NO >> INSPECTION END

3. CHECK WARNING LAMP SYSTEM

1. Perform an WARNING LAMP self-diagnosis refer to DI-65, "WARNING LAMPS" and repair or replace malfunctioning items. Re-perform WARNING LAMP self-diagnosis.
2. Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

OK or NG

OK >> INSPECTION END
NG >> Repair or replace malfunctioning items. Re-perform the self-diagnosis.

Inspection 9: CAN Communication System

EFS004KC

DTC U1000, C1180, C1188

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E47. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
2. Securely reconnect connectors and perform self-diagnosis.

Is “CAN COMM CIRCUIT”, “ECM” or “A/T” displayed in the self-diagnosis display items?

YES >> Print out self-diagnostic results and go to 2.
NO >> Connector terminal connection is loose, damaged, open or shorted.

2. CHECK CAN COMMUNICATION SYSTEM

Check data monitor item “CAN Diagnosis Support Monitor”.

Normal	Error (example)
CAN CIRC 1: OK	CAN CIRC 1: UNKWN
CAN CIRC 2: OK	CAN CIRC 2: UNKWN
CAN CIRC 3: OK	CAN CIRC 3: UNKWN
CAN CIRC 4: UNKWN (Note 1)	CAN CIRC 4: UNKWN
CAN CIRC 5: OK	CAN CIRC 5: UNKWN
CAN 1 STAT: 0 (Note2)	CAN 1 STAT: 40
CAN 2 STAT: 0	CAN 2 STAT: 40
CAN 3 STAT: 0	CAN 3 STAT: 40
CAN 4 STAT: 0	CAN 4 STAT: 40
CAN 5 STAT: 0	CAN 5 STAT: 40

Note 1: Model with A/T is OK.
Note 2: CAN status indicates the condition of the CAN communication judged by each signal input.

- **Normal: If any problems were not found in the past, CAN status indicated “0”. In case of operating properly at the present in spite of having problem in the past, then CAN status indicates “39-1”.**
- **Malfunction: If there is a malfunction, CAN indicates “40”.**

After returning to normal condition, every time ignition switch is turned OFF from ON, the indication will change like “39” → “38” → “37” ··· “1” and if a malfunction is detected again, CAN status indicates “40”. (Though returning to the normal condition, “0” is not indicated. To reset, select and press the “ERASE” on the “SEFL-DIAGNOSIS” screen.)

>> After printing out the monitor items, go to CAN system. Refer to LAN-6, "CAN COMMUNICATION" .

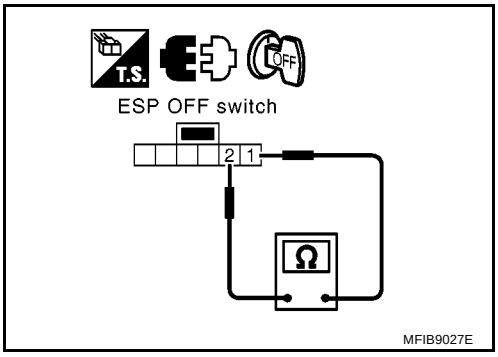
Component Inspection

EFS004KD

ESP OFF SWITCH

- Turn ignition switch OFF and disconnect ESP OFF switch connector M14, and check continuity between ESP OFF switch connector terminals 1 and 2.

1 -2 :Continuity should exist when pushing switch.
continuity should not exist when releasing switch.



Symptom 1: Excessive ABS Function Operation Frequency

EFS004KE

1. FRONT AND REAR AXLE INSPECTION

Make sure there is no excessive looseness in the front and rear axles.

OK or NG

OK >> GO TO 2.
NG >> Check front or rear axle system.

2. WHEEL SENSOR INSPECTION

Perform following inspection for wheel sensor:

- Sensor mount and damage inspection
- Sensor rotor mount and damage inspection
- Sensor connector connection inspection
- Sensor harness inspection

OK or NG

OK >> GO TO 3.
NG >> Sensor or sensor rotor replacement

3. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> Normal
NG >> Perform self-diagnosis. Refer to BRC-75, "SELF-DIAGNOSIS" .

Symptom 2: Unexpected Pedal Reaction

EFS004KF

1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke.

Is the stroke too long?

YES >>
- Bleed air from brake piping.
- Check brake pedal, brake booster, and master cylinder mount for play, looseness, and brake system for fluid leaks, etc. If any malfunctions are found, make repair.

NO >> GO TO 2.

2. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E47 and make sure that braking force is sufficient when ABS in not operating. After the inspection, reconnect connector.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Check brake system.

Symptom 3: The Braking Distance Is Long

EFS004KG

CAUTION:
On slippery road surfaces, the stopping distance might be longer with the ABS operating than when the ABS is not operating.

1. CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector E47 to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

OK or NG

OK >>
- Bleed air from brake piping.
- Check brake system.

NG >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .

Symptom 4: The ABS Function Does Not Operate

EFS004KH

CAUTION:
The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

1. CHECK ABS WARNING LAMP DISPLAY

Make sure warning lamp turns off approximately 2 second after the ignition switch is turned on or when driving.

OK or NG

OK >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .
NG >> Perform self-diagnosis. Refer to BRC-75, "SELF-DIAGNOSIS" .

Symptom 5: Pedal Vibration or ABS Operation Sound Occurs

EFS004KI

CAUTION:
Under the following conditions, when brake pedal is lightly depressed (just place a foot on it), ABS is activated and vibration is felt. However, this is normal.

- **When shifting gears**
- **When driving on slippery road**
- **During cornering at high speed**
- **When passing over bumps or grooves**
- **When pulling away just after starting engine [at approximately 10 km/h (6MPH) or higher]**

1. SYMPTOM CHECK 1

Check if pedal vibration or operation sound occurs when engine is started.

OK or NG

OK >> Perform self-diagnosis. Refer toBRC-75, "SELF-DIAGNOSIS" .
NG >> GO TO 2.

2. SYMPTOM CHECK 2

Check symptom when electrical component (headlamps, etc.) switches are operated.

Does the symptom occur when the electrical component (headlamp, etc.) switches are operated?

YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to ABS actuator and electric unit (control unit) (or its wiring), and if there is, move it farther away.
NO >> GO TO symptom 1 “Step 2”. Refer to BRC-97, "Symptom 1: Excessive ABS Function Operation Frequency" .

Symptom 6: Vehicle Jerks During ESP/TCS/ABS Control

EFS004KJ

1. CHECK ENGINE SPEED SIGNAL

Perform CONSULT-II “DATA MONITOR” to check engine speed.

Is engine speed at idle 400 rpm or higher?

YES >> GO TO 3.
NO >> GO TO 2.

2. ABS WARNING LAMP DISPLAY CHECK

Make sure warning lamp turns off approximately 2 sec. After turn ignition switch ON or when driving.

OK or NG

OK >> System is normal.
NG >> GO TO 3.

3. CHECK ECM SELF-DIAGNOSTIC RESULTS

Perform ECM self-diagnosis.

Are self-diagnosis items displayed?

YES >> Check the corresponding items. Refer to EC-69, "TROUBLE DIAGNOSIS" (with EURO-OBD), EC-515, "TROUBLE DIAGNOSIS" (without EURO-OBD).
NO >> GO TO 4.

4. CHECK A/T SELF-DIAGNOSTIC RESULTS

Perform A/T self-diagnosis.

OK or NG

OK >> GO TO 5.
NG >> Check the corresponding items. Refer to AT-35, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (with EURO-OBD), AT-251, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (without EURO-OBD).

5. CHECK SELF-DIAGNOSTIC RESULTS 1

Perform self-diagnosis of ABS actuator and electric unit (control unit).

Are self-diagnosis items displayed?

YES >> Check the corresponding items, make repairs, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 6.

6. CHECK CONNECTOR

1. Disconnect ABS actuator and electric unit (control unit) connector E47 and ECM connector, check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace connector.
2. Securely reconnect connector and perform self-diagnosis.

OK or NG

OK >> If poor connect, damaged, open or short circuit is found, repair or replace connector terminal.
NG >> GO TO 7.

7. CHECK SELF-DIAGNOSTIC RESULTS 2

Re-perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis items displayed?

YES >> Repair or replace malfunctioning items.
NO >> GO TO 8.

8. CHECK CIRCUIT BETWEEN ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) AND ECM

Check CAN communication system. Refer to BRC-96, "Inspection 9: CAN Communication System" .

OK or NG

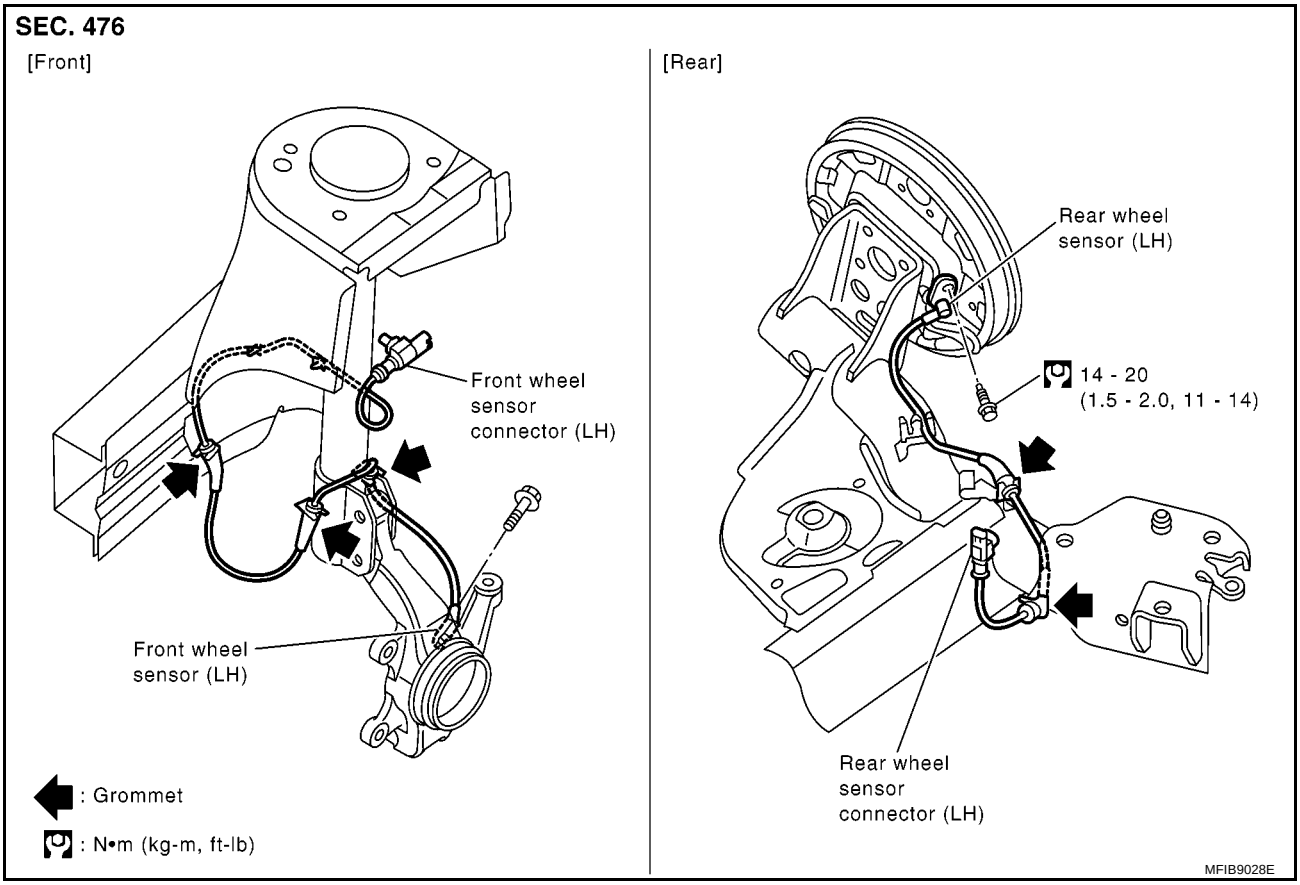
OK >> INSPECTION END
NG >> Connect connectors, and re-perform ABS actuator and electric unit (control unit) self-diagnosis.

WHEEL SENSORS

PFP:47910

Removal and Installation

EFS004KK



REMOVAL

Be careful of the following.

CAUTION:

- **When removing the sensor, do not rotate it if possible, and not forcibly pull the sensor harness.**
- **Before removing front or rear wheel hub, remove wheel sensor to avoid sensor wiring damage.**

INSTALLATION

Be certain to tighten bolts to the specified torque. Be careful of the following:

- Check the inside of the sensor mounting hole for foreign material, the rotor surface for iron chips and other foreign material, and if anything is non-standard, clean it before installation, or replace it.
- When installing the front sensor, completely push in the strut bracket and body bracket rubber grommets until they lock so that the sensor harness does not become twisted. In addition, there should be no twists in the harness when installed. Install the harness so that the painted part faces the outside of the vehicle.
- When installing the rear sensor, completely push in the rubber bracket of the suspension arm bracket and lock the marking area of the side member harness mount so that the sensor harness will not be twisted. In addition, there should be no twists in the harness when installed.

SENSOR ROTOR

PFP:47970

Removal and Installation

EFS004KL

FRONT

- Because the sensor rotor is integrated with the wheel bearing, replace it together with the wheel bearing assembly. Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE" .

REAR

- During removal and installation, remove the wheel hub (brake drum). Refer to RAX-5, "WHEEL HUB" .

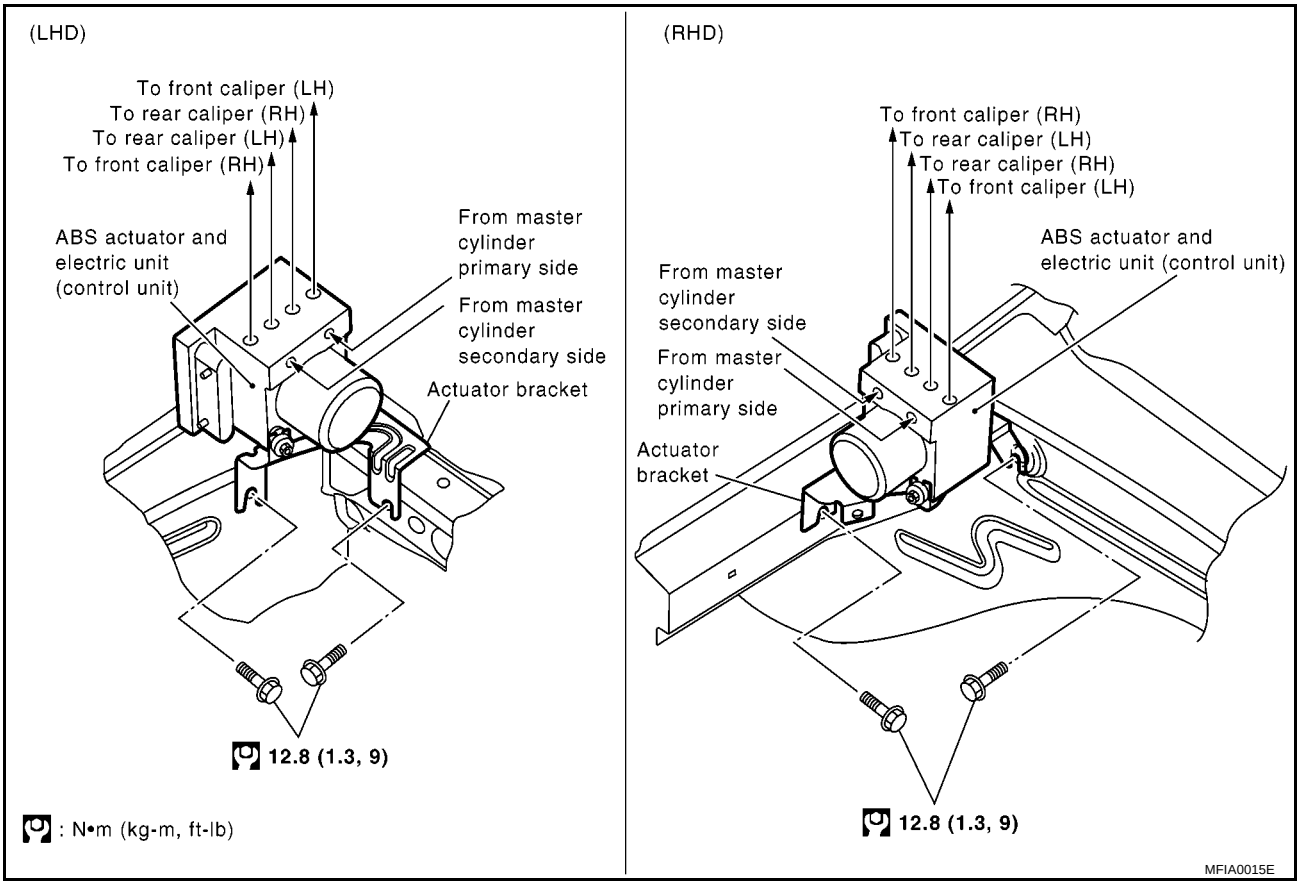
CAUTION:
The sensor rotor is a non-reusable part, it must be replaced by an new part when removing it.

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

PFP:47660

Removal and Installation

EFS004KM



REMOVAL

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
3. Remove ABS actuator and electric unit (control unit) mounting nuts.
4. Remove ABS actuator and electric unit (control unit) from vehicle.

CAUTION:

Be careful of the following when removing ABS actuator and electric unit (control unit).

- **If the part number on the part number label (pasted on actuator upper surface) is the same, ABS actuator and electric unit (control unit) cannot be used on another vehicle.**
  If it is used on another vehicle, ABS warning lamp, SLIP indicator lamp and ESP OFF indicator lamp may turn ON or ESP/TCS/ABS may not operate normally.
  When replacing ABS actuator and electric unit (control unit), must use new service parts.
- **Before servicing, disconnect battery cables.**
- **To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use a flare nut torque wrench (commercial service tool) and tighten to the specified torque.**
- **Do not apply excessive impact to actuator, such as dropping it.**
- **Do not remove and install ABS actuator and electric unit (control unit) by holding harness.**

INSTALLATION

To install, follow procedure for removal in reverse order.

CAUTION:

Be careful of the following when installing ABS actuator and electric unit (control unit).

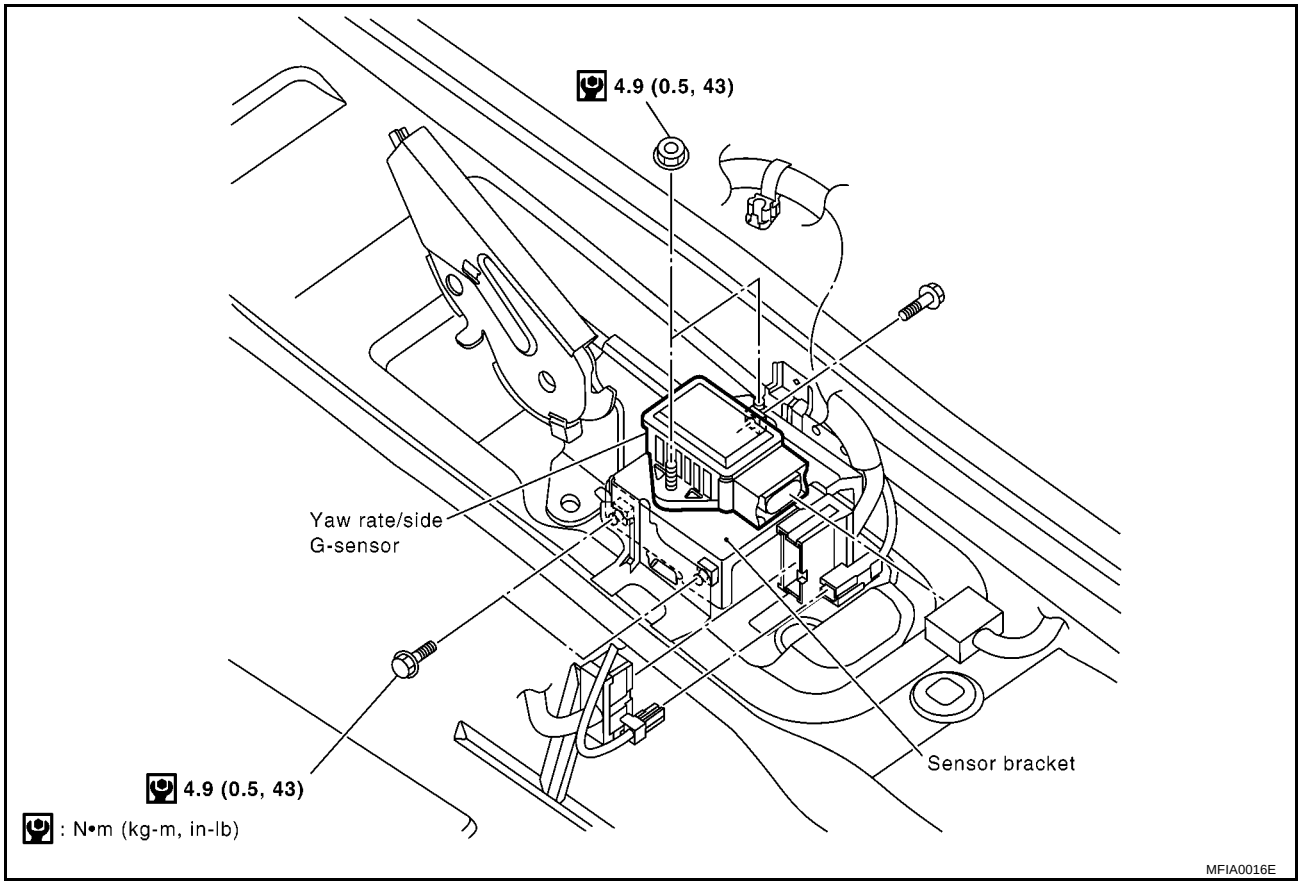
- **Tighten the mounting bolts and nuts to the specified torque.**
- **After the work, bleed air from brake piping. Refer to BR-10, "Bleeding Brake System" .**
- **After installing vehicle harness connector in the actuator, make sure connector is securely locked.**

YAW RATE/SIDE G SENSOR

PFP:47931

Removal and Installation

EFS004KN



REMOVAL

1. Remove center console. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect yaw rate/side G-sensor harness connector.
3. Remove yaw rate/side G-sensor mounting bolts. Then remove yaw rate/side G-sensor from vehicle.

CAUTION:

- **Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.**
- **Do not use power tool etc., because yaw rate/side G-sensor is weak for the impact.**

INSTALLATION

To install, follow procedure for removal in reverse order.

CAUTION:

- **Do not drop or strike yaw rate/side G-sensor, because it has little endurance to impact.**

STEERING ANGLE SENSOR

PFP:25554

Removal and Installation

EFS004KO

For removal and installation of steering angle sensor, refer to PS-7, "STEERING COLUMN" .

SECTION CL

CLUTCH

CONTENTS

PRECAUTIONS 2
Caution 2
PREPARATION 3
Special Service Tools 3
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 4
NVH Troubleshooting Chart 4
CLUTCH 4
CLUTCH PEDAL 5
On Board Inspection 5
HEIGHT INSPECTION 5
PLAY INSPECTION 5
CLEARANCE CHECK 5
Removal and Installation 6
REMOVAL 6
INSPECTION AFTER REMOVAL 6
INSTALLATION 6
CLUTCH FLUID 7
Air Bleeding Procedure 7
CLUTCH MASTER CYLINDER 8
Removal and Installation 8
REMOVAL 8
INSTALLATION 8
CSC (CONCENTRIC SLAVE CYLINDER) 9
Removal and Installation 9
REMOVAL 9
INSPECTION 9
INSTALLATION 9
CLUTCH DISC, CLUTCH COVER AND FLYWHEEL .. 10
Removal and Installation 10
REMOVAL 11
INSPECTION AND ADJUSTMENT AFTER REMOVAL (CR ENGINE) 11
INSPECTION AND ADJUSTMENT AFTER REMOVAL (K9K ENGINE) 12
INSTALLATION 12
SERVICE DATA AND SPECIFICATIONS (SDS) 14
Clutch Pedal 14
Clutch Disc 14
Clutch Cover 14
Clutch Control System 14
Clutch Master Cylinder 14

PRECAUTIONS

PFP:00001

Caution

ECS008JC

- **Recommended fluid is brake fluid “DOT 3” or "DOT 4". Refer to** MA-18, "Fluids and Lubricants".
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas.**
- **Use new brake fluid to clean or wash all parts of master cylinder and concentric slave cylinder.**
- **Never use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.**
- **If manual transaxle is removed from the vehicle, always replace CSC (concentric slave cylinder). CSC insert is returned to original position to remove transaxle. Dust on clutch disc sliding parts may damage CSC seal and may cause fluid leak.**
- **Do not disassemble master cylinder and CSC.**

WARNING:

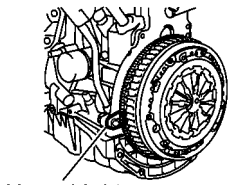
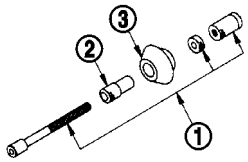
After cleaning clutch disc, wipe it with a dust collector. Do not use compressed air.

PREPARATION

PFP:00002

Special Service Tools

ECS008JD

Tool number (Renault tool number) Tool name		Description
KV10110910 Ring gear stopper (For CR engine)	 ZZA1005D	Removing and Installing clutch cover and flywheel
KV113B0060 (Mot. 582-01) Ring gear stopper (For K9K engine)	 YCL036	Removing and Installing clutch cover and flywheel
ST20050240 Diaphragm spring adjusting wrench	 ZZA0508D	Inspecting diaphragm spring of clutch cover
EM07020000 Clutch aligner	 PCIB0017E	Installing clutch cover and disc

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ECS008SM

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

CLUTCH

Reference page		CL-5.	CL-7.	CL-8.	EM-69.	CL-9	CL-10.	CL-10.	CL-10.	CL-10.	CL-10.	CL-10.	CL-10	CL-10	CL-12.	CL-12.	CL-12.	CL-10
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Free play out of adjustment)	CLUTCH LINE (Air in line)	MASTER CYLINDER PISTON CUP (Damaged)	ENGINE MOUNTING (Loose)	RELEASE BEARING (Worn, dirty or damaged)	CLUTCH DISC (Out of true)	CLUTCH DISC (Runout is excessive)	CLUTCH DISC (Lining broken)	CLUTCH DISC (Dirty or burned)	CLUTCH DISC (Oily)	CLUTCH DISC (Worn out)	CLUTCH DISC (Hardened)	CLUTCH DISC (Lack of spline grease)	DIAPHRAGM SPRING (Damaged)	DIAPHRAGM SPRING (Out of tip alignment)	PRESSURE PLATE (Distortion)	FLYWHEEL (Distortion)
Symptom	Clutch grabs/chatters				1			2			2	2	2			2		
	Clutch pedal spongy		1	2														
	Clutch noisy					1												
	Clutch slips	1									2	2			3		4	5
	Clutch does not disengage	1	2	3			4	4	4	4	4			4	5	5	6	

CLUTCH PEDAL

SMA for VIN >SJN**AK12U1107568

PFP:46540

ECS008JE

On Board Inspection

HEIGHT INSPECTION

1. Make sure clutch pedal height H_1 from upper surface of the dash panel is within the specified range.

Pedal height H_1

: 164 - 174 mm (6.46 - 6.85 in) (CR engine)

: 160 - 169 mm (6.30 - 6.65 in) (LHD with K9K engine)

: 164 - 173 mm (6.46 - 6.81 in) (RHD with K9K engine)

2. If pedal height H_1 is outside the specification, replace pedal assembly.
3. Make sure free play A at pedal pad top surface and pedal height H_2 when clutch is disengaged are within the ranges specified below.

A: Pedal free play at the pedal pad

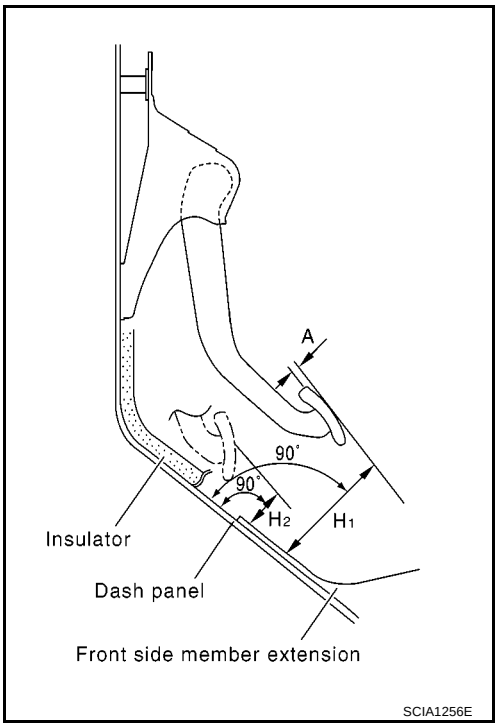
: 2 - 8 mm (0.08 - 0.31 in) (CR engine)

: 5 mm (0.20 in) (K9K engine)

Pedal height H_2 when clutch is disengaged

: 100 mm (3.94 in) or more (CR engine)

4. If free play A at pedal pad top surface and pedal height H_2 when clutch is disengaged are outside the specification, replace clutch pedal assembly.



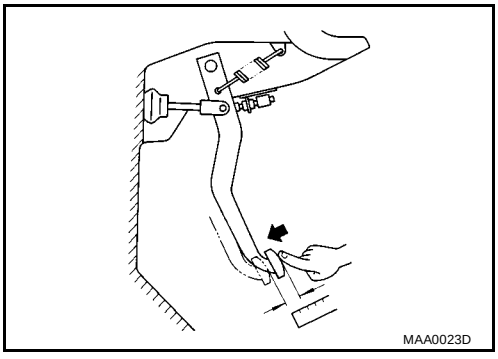
PLAY INSPECTION

- Press the clutch pedal by hand until certain resistance can be felt. Using a scale, Make sure the free play is within the specified range.

Pedal free play

: 2 - 8 mm (0.08 - 0.31 in) (CR engine)

: 5 mm (0.20 in) (K9K engine)

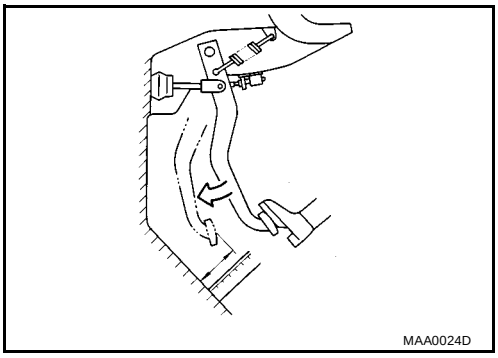


CLEARANCE CHECK

1. Start the engine and let it idle.
2. Apply parking brake.
3. Depress the brake pedal.
4. Fully depress clutch pedal and shift to 1st gear.
5. Release clutch pedal gradually. Using a scale, check the clearance between the clutch pedal and floor panel to see if it is within the specified range.

Pedal height when the clutch disengages

: 100 mm (3.94 in) or more (CR engine)



NOTE:

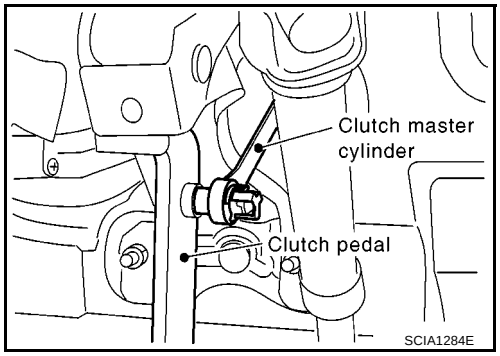
Pedal height at clutch disengagement varies slightly from the clutch engagement point. Despite this, pedal height at clutch engagement is commonly used for both cases in order to simplify the inspection.

Removal and Installation

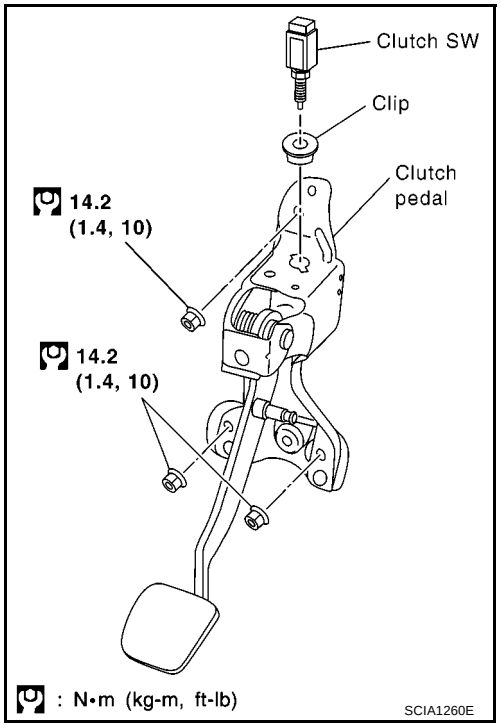
ECS008JF

REMOVAL

1. Remove instrument panel under tray. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Unlock master cylinder rod end and separate master cylinder from clutch pedal.
3. Remove clutch switch harness clamp from pedal bracket.
4. Disconnect clutch switch connector.



5. Remove nuts (3), and remove clutch pedal assembly.



INSPECTION AFTER REMOVAL

- Check clutch pedal for bend, damage, and a cracked weld. If bend, damage, or a cracked weld is found, replace clutch pedal assembly.

INSTALLATION

- Install in the reverse order of removal.

CLUTCH FLUID

PFP:00017

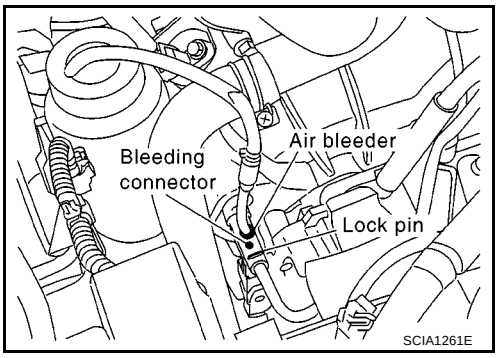
Air Bleeding Procedure

ECS008JG

CAUTION:

- **Monitor fluid level in the reservoir tank to make sure it does not empty.**
- **Do not spill brake fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.**
- **Bleed the bleeding connector.**

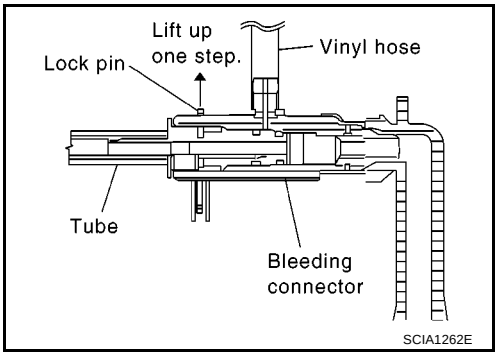
1. Fill the master cylinder reservoir tank with new brake fluid.
2. Remove rubber cap and connect a transparent vinyl hose to air bleeder of bleeding connector.



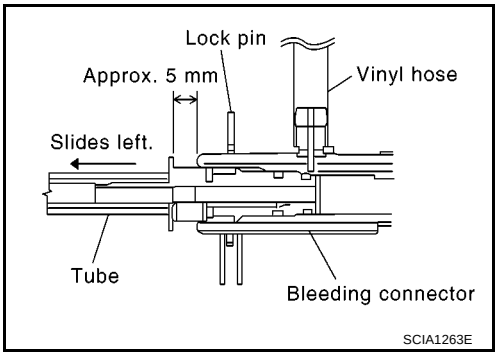
3. Lift tube side lock pin of bleeding connector up one step.

   CAUTION:
   Do not remove lock pin.
4. "Depress" and "release" the clutch pedal slowly and fully 15 times at an interval of 2 to 3 seconds and hold it.

   CAUTION:
   Hold it to prevent releasing tube from bleeding connector when fluid pressure is applied in the tube.



5. Slide tube 5 mm (0.20 in) to the direction shown by the arrow and drain clutch fluid.
6. Return tube to its original position.
7. Release clutch pedal and wait for 5 seconds.
8. Repeat steps 4 to 7 until no bubbles can be observed in the brake fluid.



CLUTCH MASTER CYLINDER

PFP:30610

Removal and Installation

ECS008JH

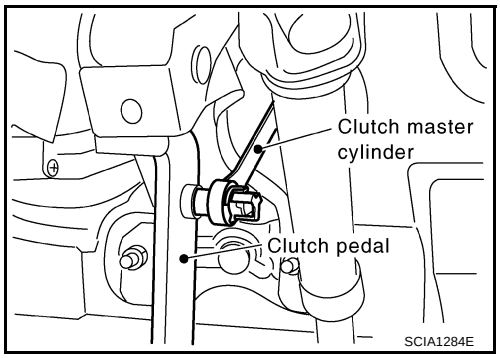
REMOVAL

1. Drain brake fluid from reservoir tank and remove hose from the nipple.

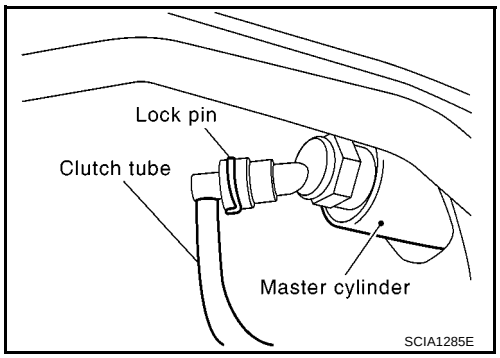
   CAUTION:

   Do not spill brake fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.

2. Unlock master cylinder rod end in the passenger room and separate master cylinder from clutch pedal.

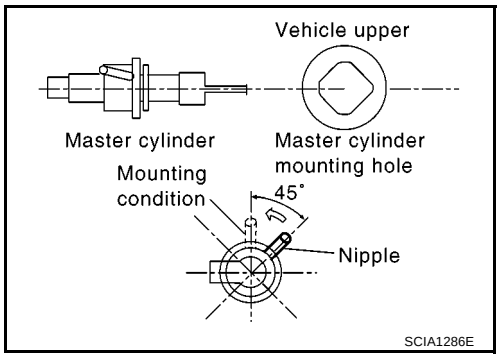


3. Remove lock pin from master cylinder and separate clutch tube.
4. Rotate master cylinder clockwise by 45° and remove from the vehicle.



INSTALLATION

1. Tilt master cylinder clockwise by 45° and insert to the mounting hole. Rotate counter clockwise and secure it. At this time, nipple is upward of the vehicle.
2. After finishing work, perform clutch pedal height inspection and clutch piping air bleeding.
   - Refer to CL-5, "On Board Inspection" ,CL-7, "Air Bleeding Procedure"



CSC (CONCENTRIC SLAVE CYLINDER)

PFP:30500

Removal and Installation

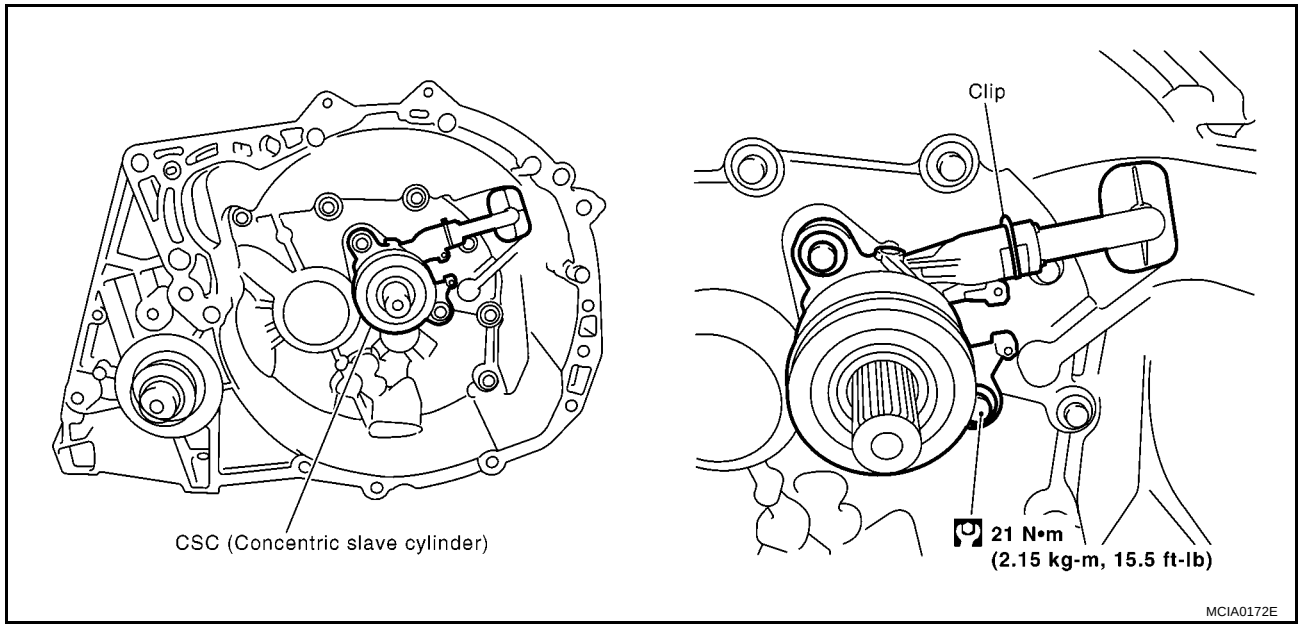
ECS00CW5

CAUTION:

- **Do not spill brake fluid onto painted surfaces.**
  If it spills, wipe up immediately and wash the affected area with water.
- **If manual transaxle is removed from the vehicle, always replace CSC (concentric slave cylinder). CSC insert is returned to original position to remove transaxle. Dust on clutch disc sliding parts may damage CSC seal and may cause brake fluid leak.**

REMOVAL

1. Remove manual transaxle. Refer to MT-7, "REMOVAL AND INSTALLATION" (JH3) or MT-37, "REMOVAL AND INSTALLATION" (JR5).
2. Remove bolts and CSC from manual transaxle.



INSPECTION

NOTE:

- Cannot disassemble CSC and release bearing because they are integral parts. Replace them as an assembly.

Inspect for the following, and replace parts if necessary

- CSC: damage, foreign material, wear or pinholes on the cylinder outer surface.
- Release bearing: damage, incorrect rotation direction, or has poor aligning function, and dust seal is deformed or cracked.

INSTALLATION

1. Install new CSC to manual transaxle. Tighten to the specified torque.

   Tightening torque

   : 21 N·m (2.15 kg-m, 15.5 ft- lb)

   CAUTION:
   Do not insert and operate CSC because piston and stopper of CSC components may fall off.
2. Install manual transaxle to the vehicle. Refer to MT-7, "REMOVAL AND INSTALLATION" (JH3) or MT-37, "REMOVAL AND INSTALLATION" (JR5).
3. Bleed air from the clutch piping. Refer to CL-7, "Air Bleeding Procedure" .

CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

PFP:30100

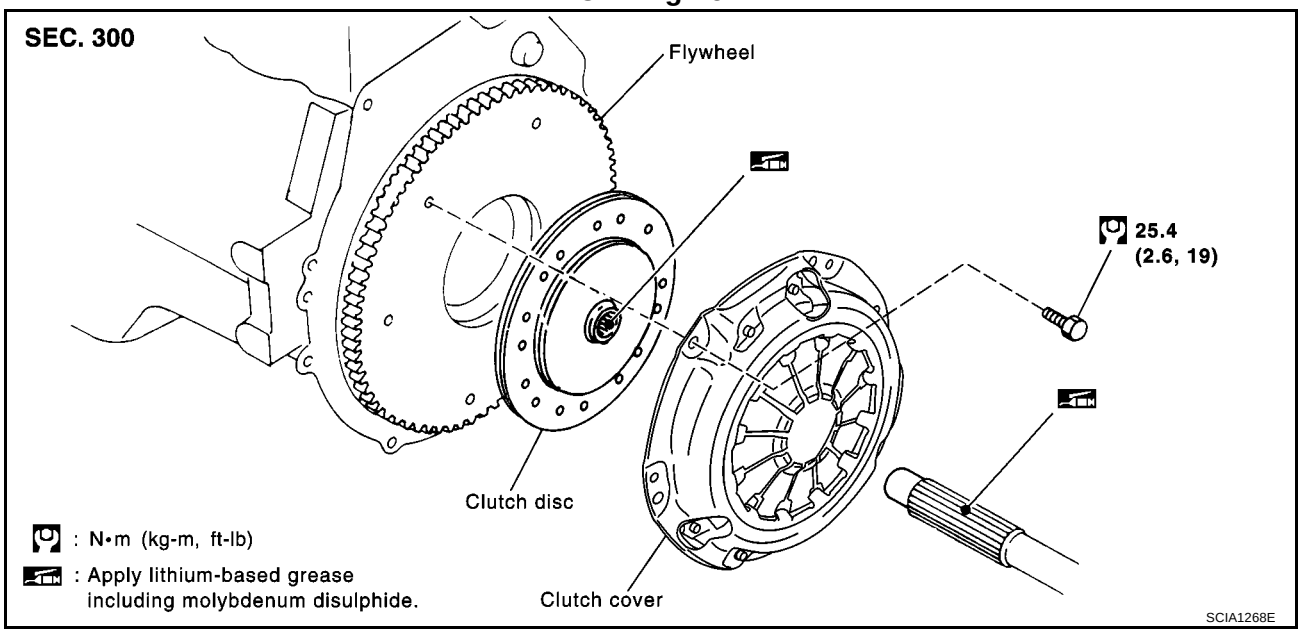
Removal and Installation

ECS008JJ

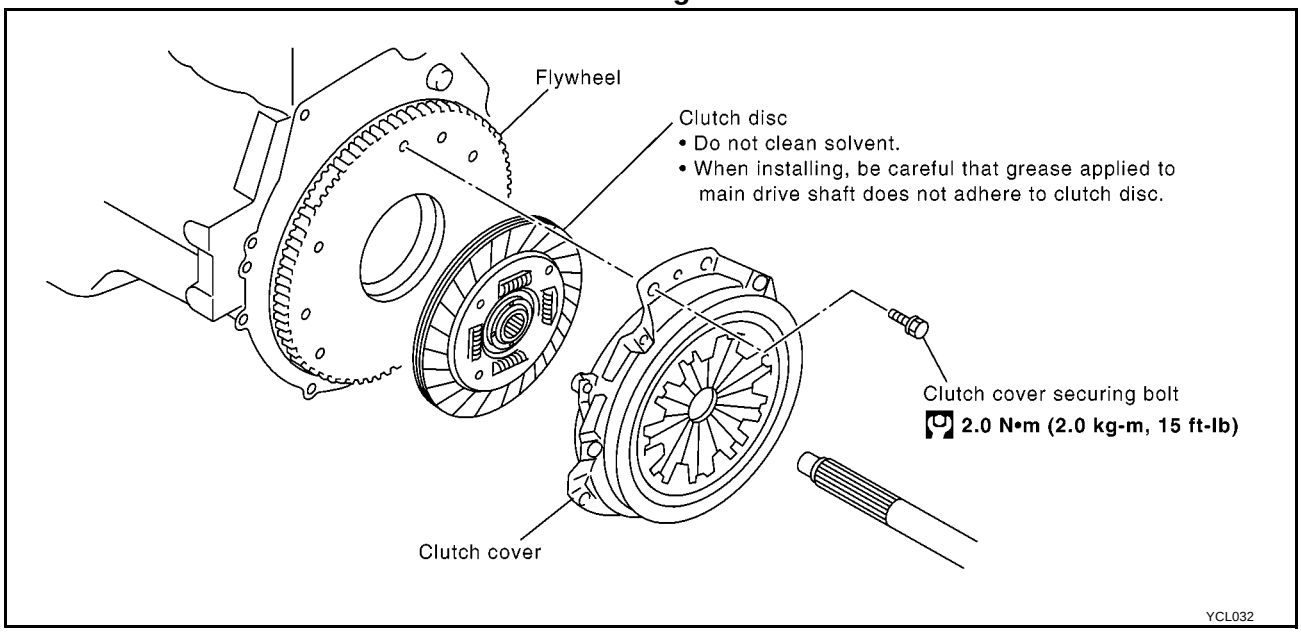
CAUTION:

- **If manual transaxle is removed from the vehicle, always replace CSC (concentric slave cylinder). CSC insert is returned to original position to remove transaxle. Dust on clutch disc sliding parts may damage CSC seal and may cause brake fluid leak.**
- **Be careful not to bring any grease into contact with the clutch disc facing, pressure plate surface, or flywheel surface.**

CR Engine



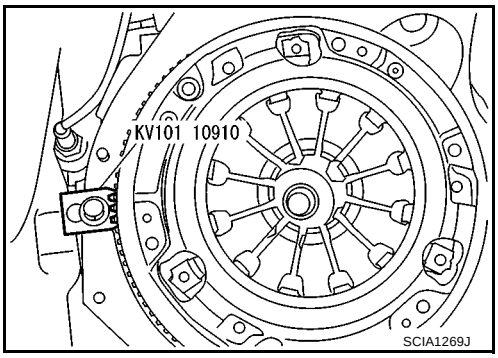
K9K Engine



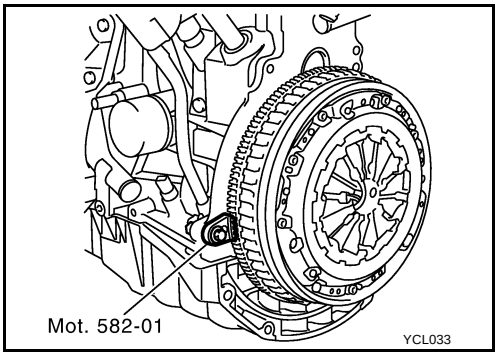
REMOVAL

1. Remove manual transaxle from the vehicle. Refer to MT-7, "REMOVAL AND INSTALLATION" (JH3) or MT-37, "REMOVAL AND INSTALLATION" (JR5).
2. Install a rear gear stopper adapter (SST).

CR Engine



K9K Engine



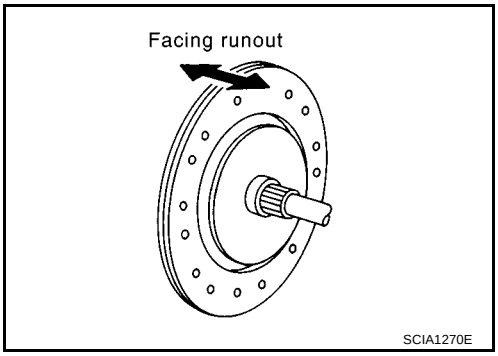
3. Loosen clutch cover mounting bolts evenly. Remove clutch cover and clutch disc.

INSPECTION AND ADJUSTMENT AFTER REMOVAL (CR ENGINE)

Clutch Disc

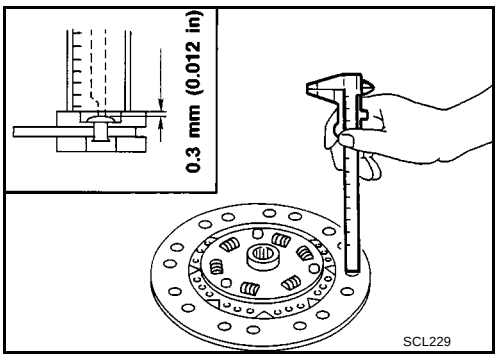
- Measure circumferential runout relative to the clutch disc center spline. If it is outside the specification, replace the clutch disc.

Runout limit/diameter of the area to be measured:
: 0.7 mm (0.028 in) or less/170 (6.69 in) mm dia.



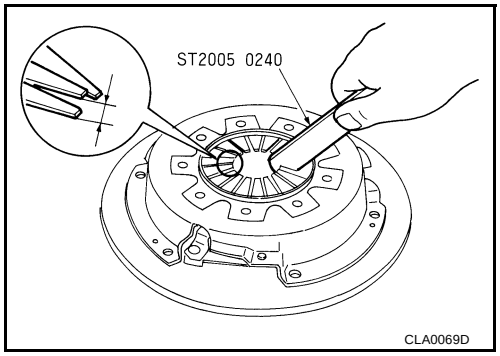
- Using calipers, measure the depth to the clutch disc facing rivet heads. If it exceeds the allowable wear limit, replace the clutch disc.

Facing wear limit (depth to the rivet head)
: 0.3 mm (0.012 in)



Clutch Cover

Check diaphragm spring lever claws for unevenness with the lever still on the vehicle. If they exceed the tolerance, adjust lever height using a diaphragm adjusting wrench (SST).



Tolerance for diaphragm spring lever unevenness

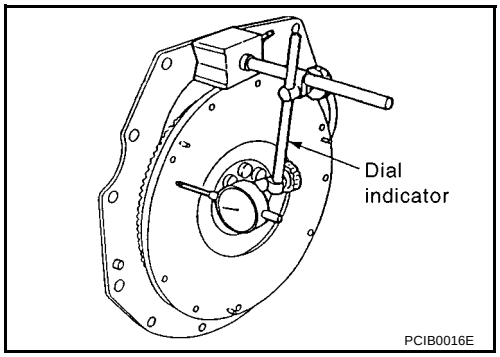
: 0.7 mm (0.028 in)

- Check clutch cover thrust ring for wear or breakage. If wear or breakage is found, replace clutch cover assembly.

  NOTE:
  - Worn thrust ring will generate a beating noise when tapped at the rivet with a hammer.
  - Broken thrust ring will make a clinking sound when cover is shaken up and down.
- If a trace of burn or discoloration is found on the clutch cover pressure plate to clutch disc contact surface, repair the surface with sandpaper. If surface is damaged or distorted, replace the assembly.

Flywheel Runout

Using a dial gauge, measure runout at the flywheel clutch contact surface. If runout is outside the specification, replace the flywheel. If a trace of burn or discoloration is found on the surface, repair it with sandpaper.



Flywheel surface runout

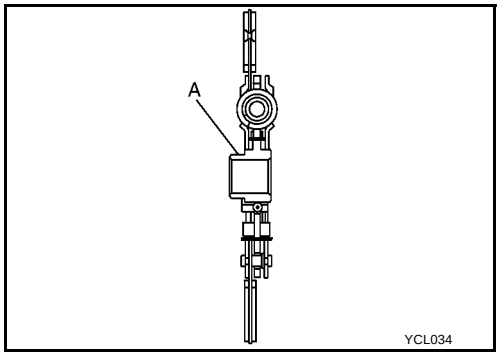
: EM-92, "FLYWHEEL RUNOUT" .

CAUTION:

Measure it at flywheel outer face (not on knock pin and clutch cover mounting hole).

INSPECTION AND ADJUSTMENT AFTER REMOVAL (K9K ENGINE)

Clutch Disc



- The hubs of the clutch discs are nickle plated to improve their sliding performance.
- Clean the splines of the clutch shaft and install the assembly without lubricant.
- Degrease the friction face of the flywheel.
- Install the clutch disc (offset (A) from the hub on the flywheel side).

CAUTION:

Reworking on the clutch face is not permitted.

Flywheel Runout

Replace the flywheel if it has been damaged.

INSTALLATION

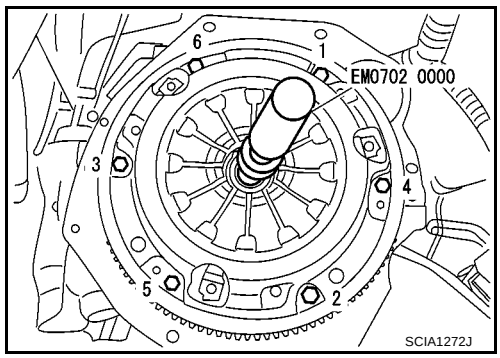
1. Clean input shaft spline by removing grease and dust from wear.
2. Apply recommended Grease to clutch disk and input shaft spline.

   NOTE:

   Applied amount of grease is 0.4 g. Film pressure is 1 mm (0.04 in) or less.
3. Insert clutch disc to input shaft. Wipe off any grease oozing from the parts.

   CAUTION:
   - **Excessive grease may cause slip or judder. And if it adheres to CSC seal, it cause clutch fluid leak. Wipe off excess grease.**
   - **If grease is not applied, it may cause noise, poor disengagement, or damage to the clutch. Be sure to apply grease.**

4. Install clutch disc and clutch cover. Pre-tighten mounting bolts and install a clutch aligner (SST).
5. Tighten clutch cover attaching bolts evenly in two steps in the order shown in the figure. (CR engine)



Tightening torque

First step	**: 9.9 - 19 N·m (1.0 - 2.0 kg-m, 8 - 14 ft-lb)**
Final step	**: 22 - 29 N·m (2.2 - 3.0 kg-m, 17 - 21 ft-lb)**

Tighten clutch cover attaching bolts order shown in the figure. (K9K engine)

6. Install manual transaxle. Refer to MT-7, "REMOVAL AND INSTALLATION" (JH3) or MT-37, "REMOVAL AND INSTALLATION" (JR5).

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Clutch Pedal

SMA for VIN >SJN**AK12U1107568

ECS008JK

Unit mm (in)

Engine type	CR	K9K
Pedal height	164 - 174(6.46 - 6.85)	160 - 169 (6.30 - 6.65) (LHD models) 164 - 173 (6.46 - 6.81) (RHD models)
Pedal height at clutch disengagement	100 (3.94) or more	—
Pedal free play	2 - 8 (0.08 - 0.31)	5 (0.20)

Clutch Disc

ECS008JL

Unit: mm (in)

Engine type	CR	K9K
Size	180 (7.09) dia.	215 (8.46) dia.
Wear limit (depth to rivet head)	0.3 (0.012)	—
Runout limit/diameter of the area to be measured	0.7 (0.028) or less / 170 (6.69) dia.	—

Clutch Cover

ECS008JM

Unit: mm (in)

Engine type	CR	K9K
Size	190 (7.48) dia.	—
Diaphragm spring lever height	32.0 - 34.0 (1. 26 - 1.34)	—
Uneven limit diaphragm spring toe height	0.7 (0.028) or less	—

Clutch Control System

ECS008SO

Type of clutch control	Hydraulic

Clutch Master Cylinder

ECS008SP

Unit: mm (in)

Engine type	CR	K9K
Inner diameter	15.87 (5/8)	17.46 (11/16)

SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

CR

PRECAUTIONS 3
Precautions For Liquid Gasket 3
REMOVAL OF LIQUID GASKET SEALING 3
LIQUID GASKET APPLICATION PROCEDURE.... 3
PREPARATION 4
Special Service Tools 4
OVERHEATING CAUSE ANALYSIS 5
Troubleshooting Chart 5
COOLING SYSTEM 7
Cooling Circuit 7
ENGINE COOLANT 8
Inspection 8
LEVEL CHECK 8
LEAK CHECK 8
Changing Engine coolant 8
DRAINING ENGINE COOLANT 8
REFILLING ENGINE COOLANT 8
FLUSHING COOLING SYSTEM 10
RADIATOR 11
Removal and Installation 11
REMOVAL 12
INSTALLATION 14
Disassembly and Assembly of Cooling Fan 14
DISASSEMBLY 15
ASSEMBLY 15
Checking Radiator Cap 15
Checking Radiator 16
Checking Cooling System Hoses 16
RADIATOR (ALUMINUM TYPE) 17
Disassembly and Assembly 17
PREPARATION 17
DISASSEMBLY 17
ASSEMBLY 18
INSPECTION 20
WATER PUMP 21
Removal and Installation 21
REMOVAL 21
INSPECTION AFTER REMOVAL 22
INSTALLATION 22
THERMOSTAT 23
Removal and Installation 23
REMOVAL 23
INSPECTION AFTER REMOVAL 23
INSTALLATION 24
SERVICE DATA AND SPECIFICATIONS (SDS) 25
Standard and Limit 25
CAPACITY 25
THERMOSTAT 25
RADIATOR 25
Tightening Torque 25

K9K

PRECAUTIONS 26
Precautions For Liquid Gasket 26
REMOVAL OF LIQUID GASKET 26
LIQUID GASKET APPLICATION PROCEDURE.. 26
PREPARATION 27
Special Service Tools 27
OVERHEATING CAUSE ANALYSIS 28
Troubleshooting Chart 28
COOLING SYSTEM 30
Cooling Circuit 30
ENGINE COOLANT 31
Inspection 31
LEVEL CHECK 31
LEAK CHECK 31
Changing Engine Coolant 32
DRAINING ENGINE COOLANT 32
REFILLING ENGINE COOLANT 32
FLUSHING COOLING SYSTEM 33
RADIATOR 34
Removal and Installation 34
REMOVAL 35
INSTALLATION 36
Disassembly and Assembly Radiator Fan 36
DISASSEMBLY 37
ASSEMBLY 38

Checking Reservoir Tank Cap 38
Checking Radiator 38
WATER PUMP 39
Removal and Installation 39
REMOVAL 39
INSPECTION AFTER REMOVAL 39
INSTALLATION 40
INSPECTION AFTER INSTALLATION 40
THERMOSTAT 41
Inspection 41
WATER OUTLET 42
Removal and Installation 42
REMOVAL 42
INSTALLATION 42

PRECAUTIONS

PFP:00001

Precautions For Liquid Gasket

EBS00OJI

REMOVAL OF LIQUID GASKET SEALING

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

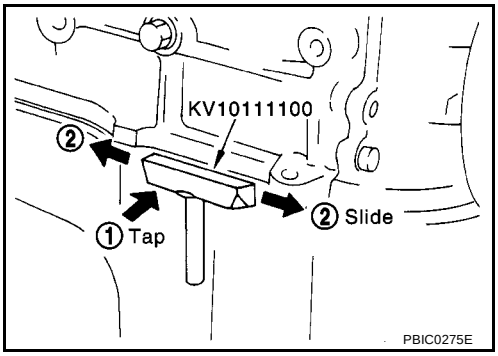
CAUTION:

Be careful not to damage the mating surfaces.

- In areas where the seal cutter is difficult to use, use a plastic hammer to lightly tap the gasket area.

CAUTION:

If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

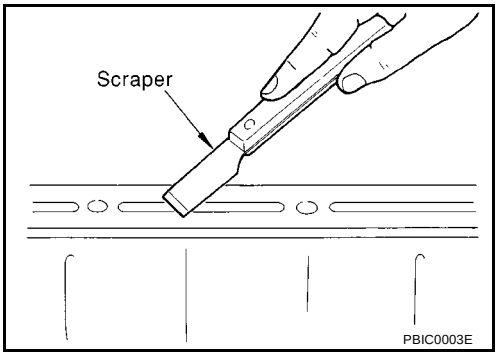


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.

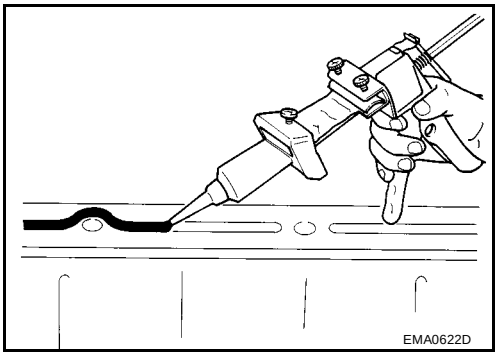
- Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.

2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.



4. Apply the gasket without breaks to the specified location with the specified dimensions.

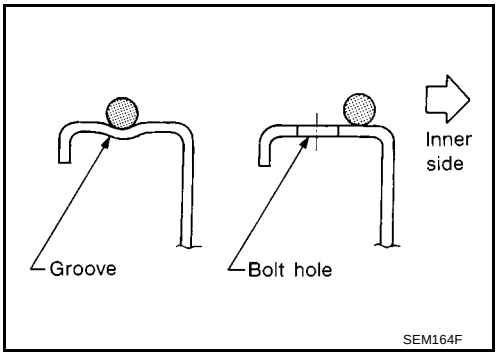
- If there is a groove for the liquid gasket application, apply the gasket to the groove.



- As for the bolt holes, normally apply the gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the instruction in this manual.
- Within five minutes of gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

CAUTION:

If there are additional instructions in this manual, observe them.



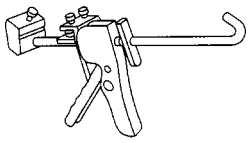
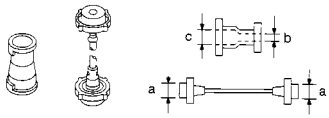
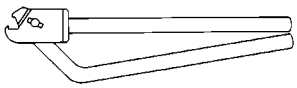
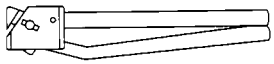
PREPARATION

PFP:00002

Special Service Tools

SMA for VIN>SJN**AK12U1000000

EBS00OJJ

Tool number Tool name	Description
WS39930000 Tube presser  S-NT052	Pressing the tube of liquid gasket
EG17650301 Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV99103510 Radiator plate pliers A  S-NT224	Installing radiator upper and lower tanks
KV99103520 Radiator plate pliers B  S-NT225	Removing radiator upper and lower tanks

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

EBS00OIR

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Mechanical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper coolant mixture ratio	—	—	—
	Poor coolant quality	—	Coolant viscosity	—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Radiator cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

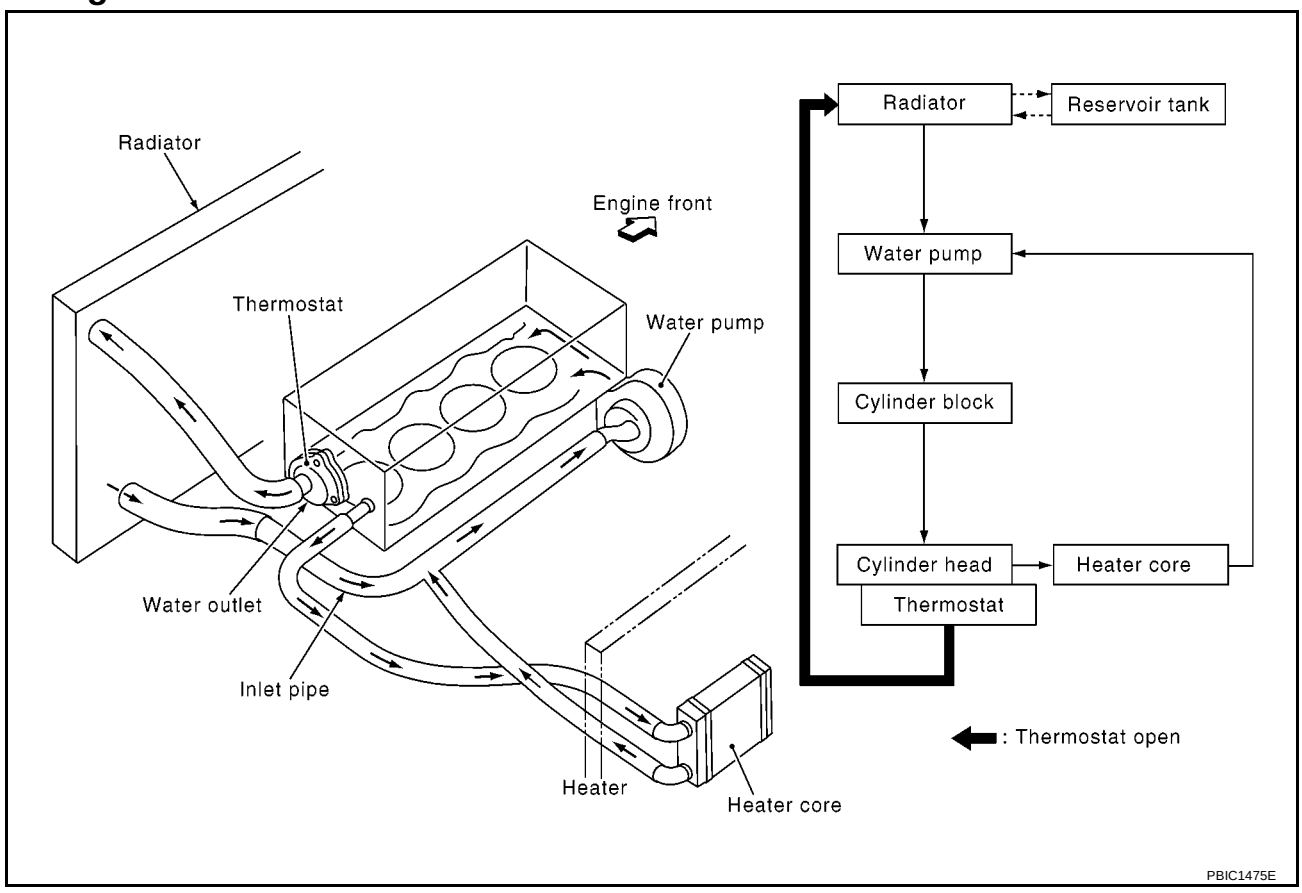
	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Powertrain system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

COOLING SYSTEM

PFP:21020

Cooling Circuit

EBS00OIS



ENGINE COOLANT

PFP:KQ100

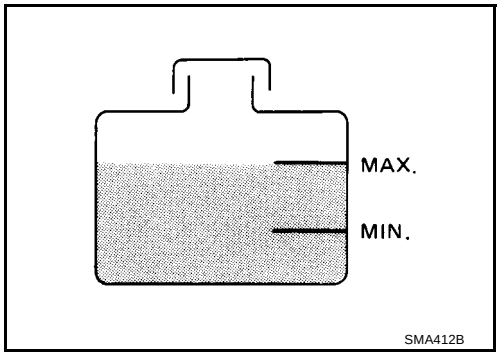
Inspection

SMA for VIN>SJN**AK12U1000000

EBS00OJK

LEVEL CHECK

- Check if the reservoir tank coolant level is within MIN to MAX when engine is cool.
- Drain or refill coolant when it is too much or too little.



LEAK CHECK

- To check for leakage, apply pressure to the cooling system with a tester.

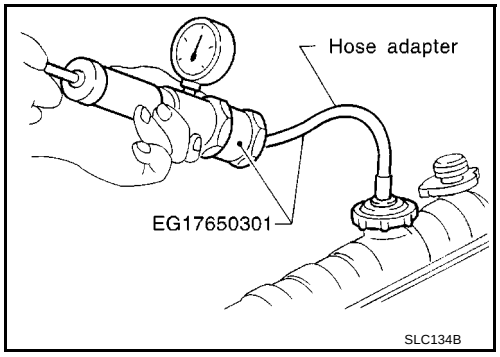
Testing pressure : 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

CAUTION:

Higher pressure than specified may cause radiator damage.



Changing Engine coolant

EBS00OIV

WARNING:

- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

DRAINING ENGINE COOLANT

1. Disconnect radiator lower hose and radiator cap.

   CAUTION:

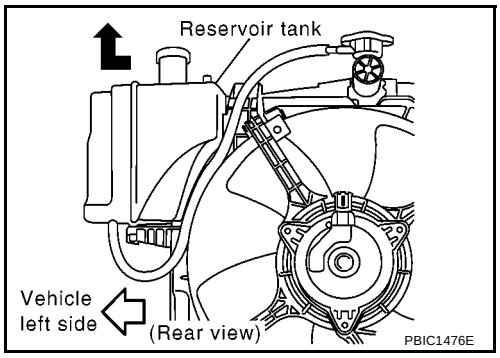
   - **Make sure to drain when the engine coolant temperature is cold.**
   - **Be careful not to allow coolant to contact drive belts.**

2. Remove reservoir tank and drain the engine coolant in the following procedures.

a. Move relay case in front of the battery.

b. Disconnect the reservoir tank from fan shroud to remove. With force applied in the left direction of vehicle, pull up reservoir tank.

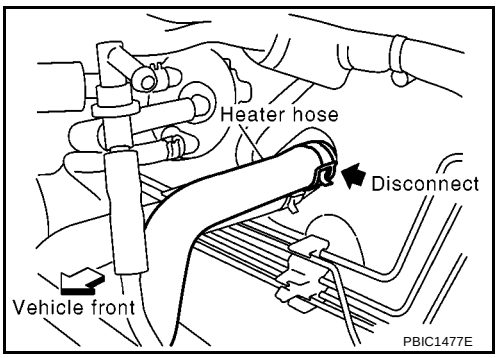
3. Check drain coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-10, "FLUSHING COOLING SYSTEM" .



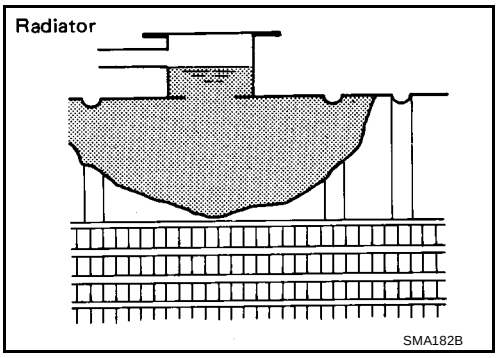
REFILLING ENGINE COOLANT

1. Install reservoir tank.
2. Connect radiator lower hose.

3. Disconnect heater hose (at heater hose outlet side: upper side) as shown in figure. Keep hose end at the same height as that of before removal.



4. Fill radiator and reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**
   - **When coolant from heater hose starts to drain, connect heater hose and continue to fill.**
   - **Use Genuine Nissan Anti-freeze Coolant or equivalent mixed with water (distilled or demineralized).**
     Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS".



Engine coolant capacity (With reservoir tank):

Except M/T models with A/C

: Approx. 4.9 ℓ (4-3/8 Imp qt)

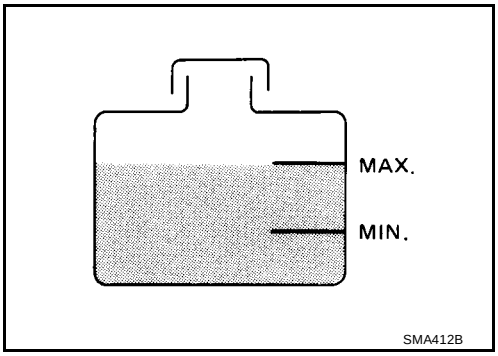
M/T models with A/C

: Approx. 5.3 ℓ (4-5/8 Imp qt)

Reservoir tank:

Except M/T models with A/C : 0.7 ℓ (5/8 Imp qt)

M/T models with A/C : 1.2 ℓ (1-1/8 Imp qt)



5. Warm up engine to normal operating temperature with radiator cap installed.
6. Warm up until thermostat opens. Keep warming at 3,000 rpm for approximately 10 minutes as guide.
   - For thermostat opening, touch radiator upper hose by hand to insure that water flow is hot.

   CAUTION:
   Be careful not to overheat.
7. Stop the engine.
8. After cooling engine [approximately 50°C (122 °F) or lower], remove radiator cap and check coolant level. If the level is low, fill up to the radiator neck again and repeat from step 5.
9. When the coolant level stabilizes, fill reservoir tank up to the “MAX” line.
10. Check cooling system for leaks with engine running.
11. Allow the engine to cool [approximately 50°C (122°F) or lower].
12. Start the engine. Perform the following cycle 3 times. Keep an engine speed of 1,000 rpm for approximately 30 seconds. Then increase it gradually to 3,000 rpm.
13. During the above step 12, make sure water flow sound is not heard from heater core.

- Sound may be noticeable at heater unit.

14. If water flow sound is heard, repeat from step 4 to 13.

- **Clean excess coolant from engine.**

FLUSHING COOLING SYSTEM

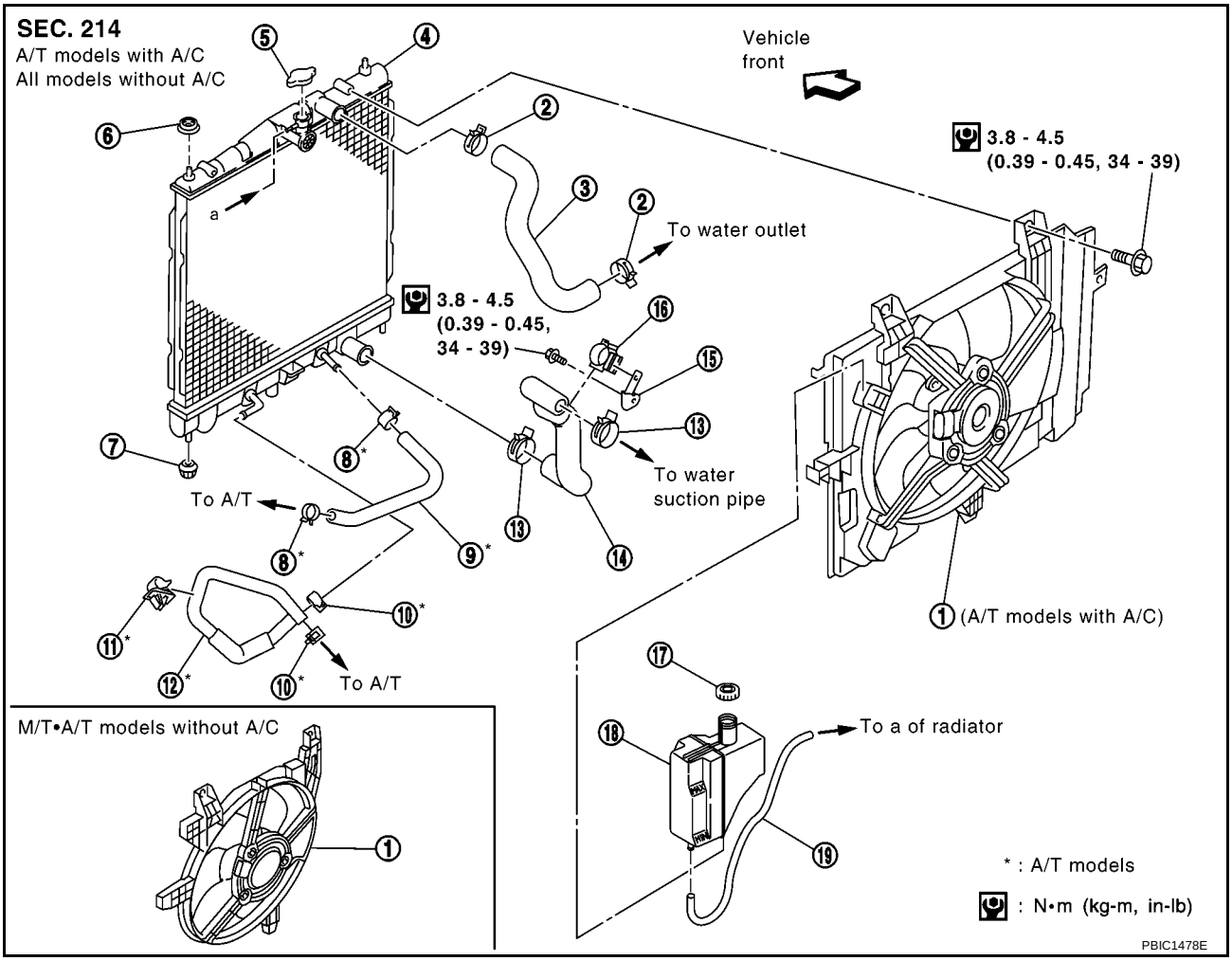
1. Fill radiator with water until water spills from the air relief hole, then close air relief plug. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.

RADIATOR

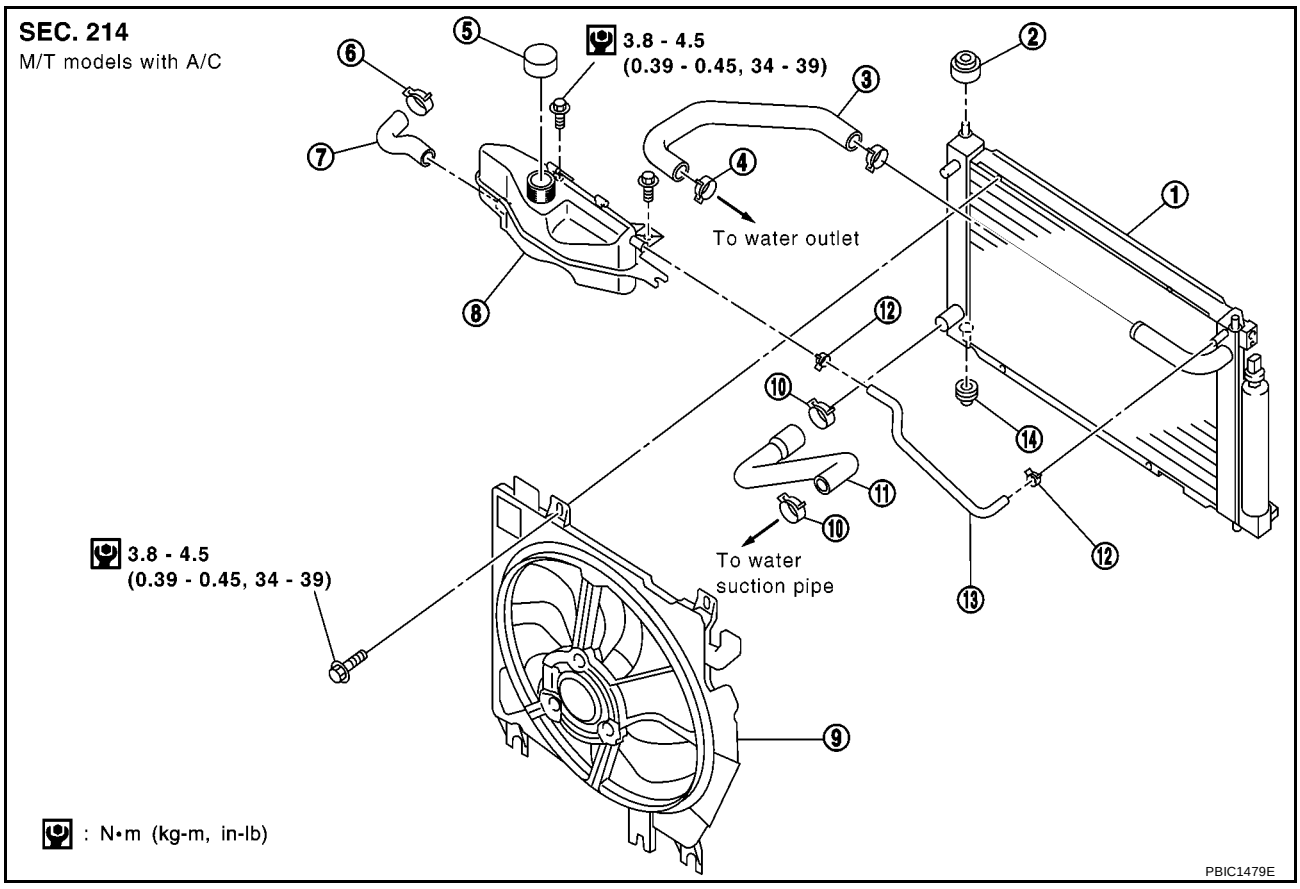
PFP:21400

Removal and Installation

EBS00OIW



1. Cooling fan assembly
2. Hose clamp
3. Radiator hose (upper)
4. Radiator
5. Radiator cap
6. Mounting rubber
7. Mounting rubber
8. Hose clamp (A/T models)
9. A/T oil cooler hose (A/T models)
10. Hose clamp (A/T models)
11. Hose clamp (A/T models)
12. A/T oil cooler hose (A/T models)
13. Hose clamp
14. Radiator hose (lower)
15. Bracket
16. Hose clamp
17. reservoir tank cap
18. Reservoir tank
19. Reservoir tank hose



1. Radiator
2. Mounting rubber
3. Radiator hose (upper)
4. Hose clamp
5. Reserve tank cap
6. Hose clamp
7. Reservoir tank hose
8. Reservoir tank
9. Cooling fan assembly
10. Hose clamp
11. Radiator hose (lower)
12. Hose clamp
13. Reservoir tank hose
14. Mounting rubber

REMOVAL

Operation Description: Remove radiator core support (lower), and pull out radiator and cooling fan assembly to the underside of vehicle.

1. Drain coolant. Refer to CO-8, "ENGINE COOLANT" .

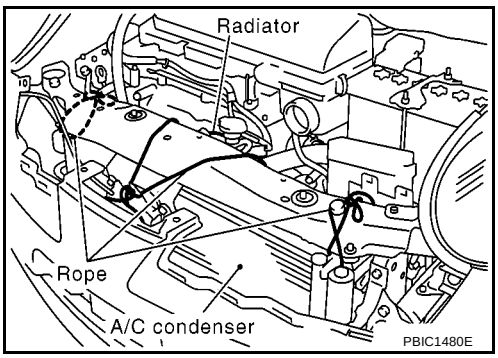
   CAUTION:
   Make sure to drain when the engine coolant temperature is cold.

   WARNING:
   Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.
2. Remove mounting bolts to make relay case movable.
3. Remove the following parts.
   - RH/LH front fender protector
   - RH/LH front grille; Refer to EI-8, "FRONT GRILLE" .
   - Air Duct; Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
4. Remove radiator hose (upper) and (lower).
5. Remove A/T oil cooler hoses. (A/T models)

   CAUTION:
   Install plug to hoses and fluid pipes removed, and be sure to prevent fluid leak.

6. Fix with ropes so that A/C condenser and RH/LH upper mount units of radiator and cooling fan assembly are placed on radiator core support (upper).

CAUTION:
Taking parts strength into consideration, lift up at locations where damage may not occur.



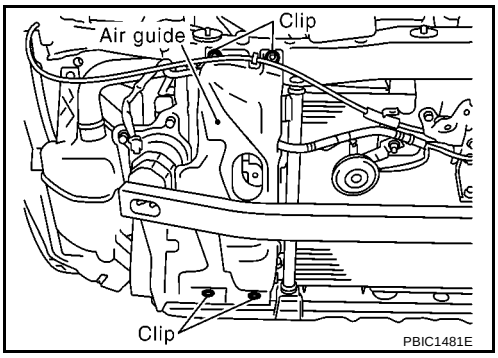
Remove radiator core support (lower) with the following procedures.

a. Remove air guide upper clips at radiator right side.

NOTE:
In figure, bumper fascia is omitted for explanation.

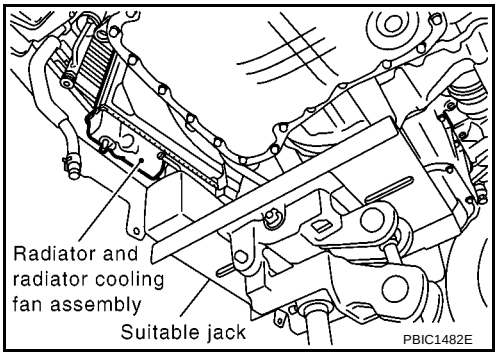
b. Remove radiator core support (lower) mounting bolts (RH/LH). Refer to BL-12, "RADIATOR CORE SUPPORT" .

c. Remove air guide lower clips and remove radiator core support (lower).

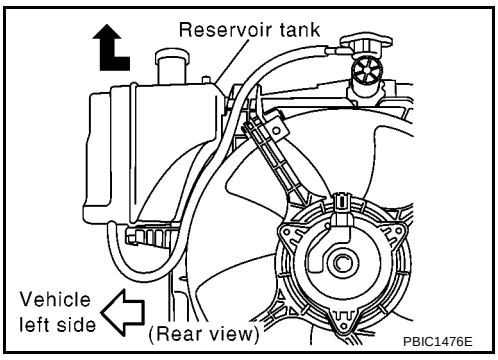


7. Loosen ropes, and pull out radiator and cooling fan assembly to the underside of vehicle, supporting the bottom with suitable jack.

CAUTION:
Be careful not to damage radiator core and A/C condenser core.



8. Remove reservoir tank.
   - Disconnect the reservoir tank from fan shroud to remove. With force applied in the left direction of vehicle, pull up reservoir tank.



9. Remove cooling fan assembly from radiator.

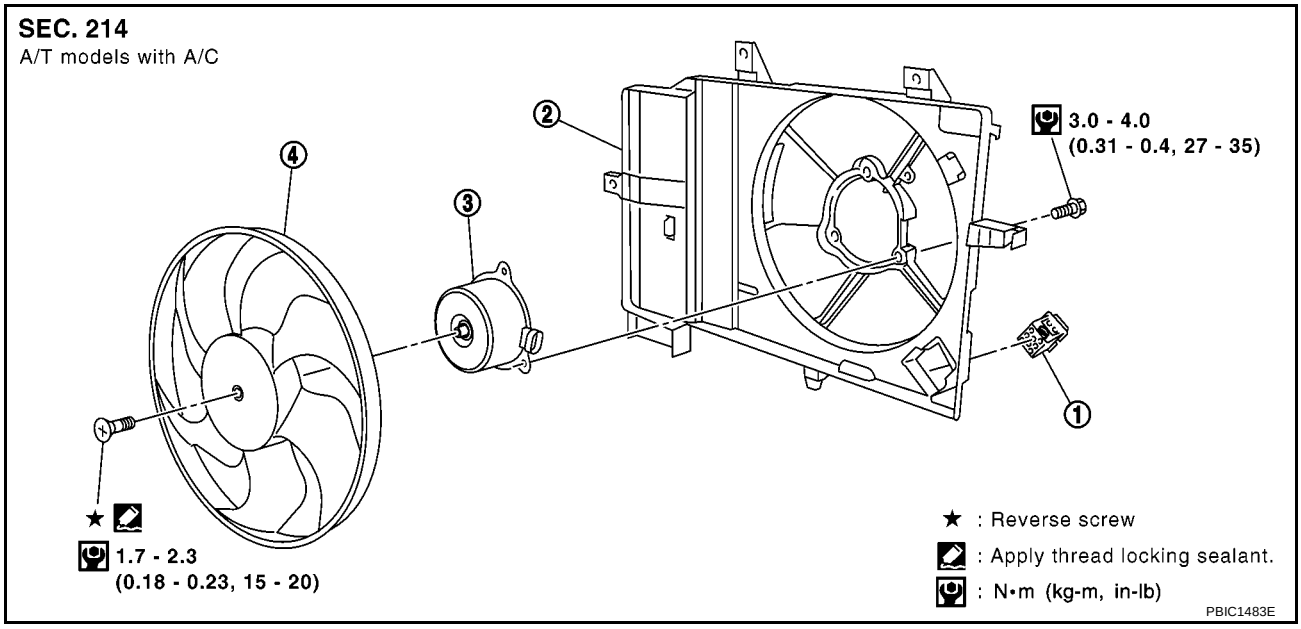
INSTALLATION

Install in the reverse order of removal which being careful of the following.

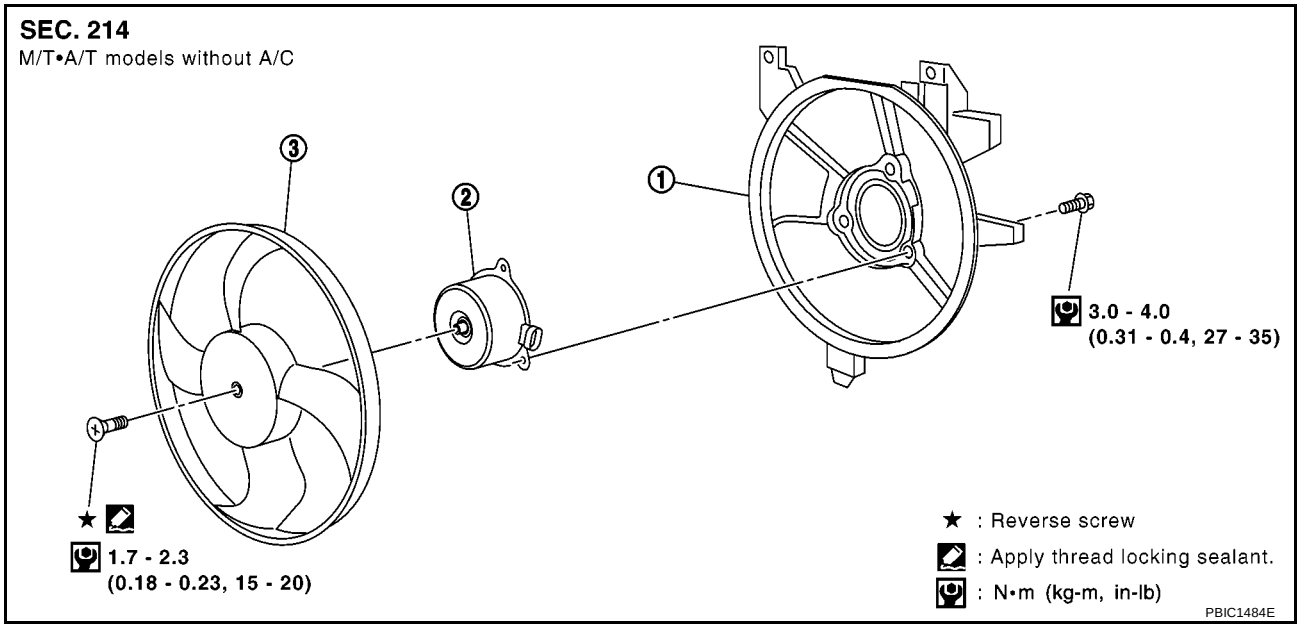
- When installing radiator core support (lower), make sure upper and lower mount units of radiator and A/C condenser are fitted in mounting holes of radiator core support (upper/lower).

Disassembly and Assembly of Cooling Fan

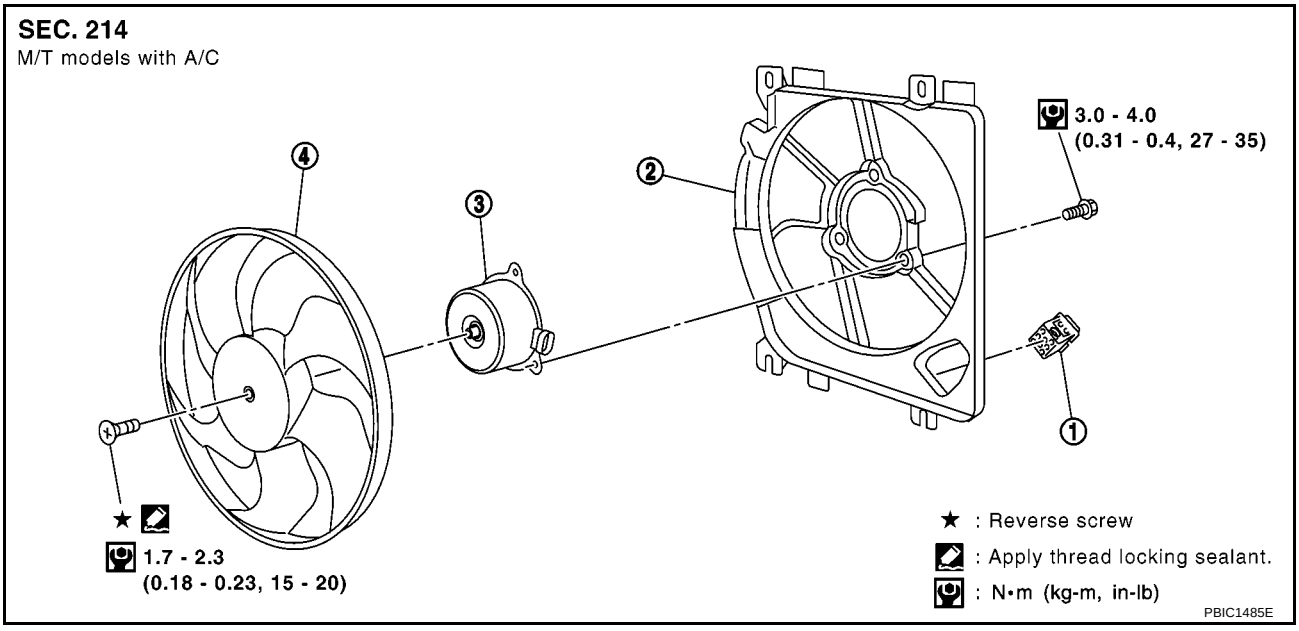
EBS00OIY



1. Resistor
2. Fan shroud
3. Fan motor
4. Fan



1. Fan shroud
2. Fan motor
3. Fan



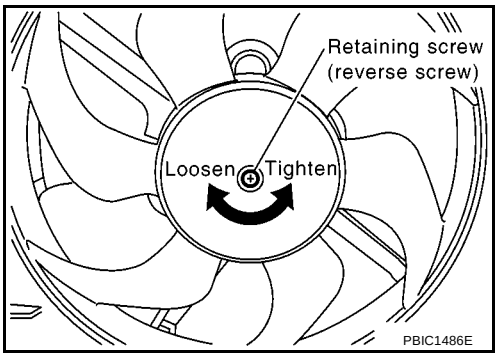
1. Resistor
2. Fan shroud
3. Fan motor
4. Fan

DISASSEMBLY

1. Remove fan.

CAUTION:
Reverse screw are used for the fan attachment screw.When removing or attaching, turn the screw the opposite way as for a normal screw.

2. Remove fan motor from fan shroud.



ASSEMBLY

Assemble cooling fan in the reverse order of disassembly.

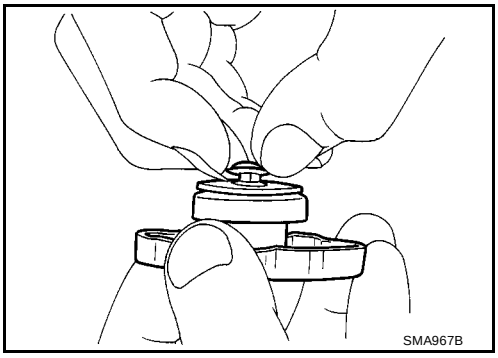
- Apply thread locking sealant and tighten screw to assemble the fan.

Checking Radiator Cap

EBS00OSD

1. Pull the negative-pressure valve to open it and check that it closes completely when released.

- Check that there is no dirt or damage on the valve seat of the radiator cap negative-pressure valve.
- Check that there are no unusual conditions in the opening and closing conditions of the negative-pressure valve.



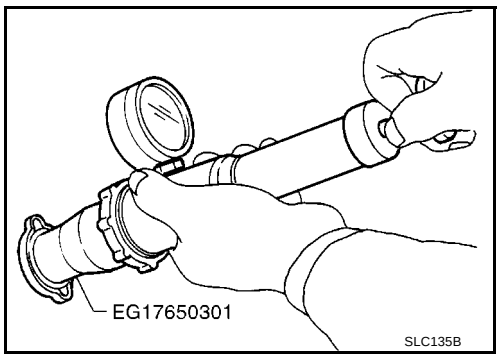
2. Check radiator cap relief pressure.

Standard :

78 - 98 kPa (0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2 , 11 - 14 psi)

Limit :

59 kPa (0.59 bar, 0.6 kg/cm^2 , 9 psi)



- When connecting the radiator cap to the tester, apply water or engine coolant to the cap seal part.
- Replace the radiator cap if there is an unusual conditions in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.

Checking Radiator

EBS00OSE

Check radiator for mud or clogging. If necessary, clean radiator as follows.

- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, fan shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

- Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2 , 71 psi) and keep distance more than 30 cm (11.8 in).

5. Blow air again into all the radiator core surface once per minute until no water sprays out.

Checking Cooling System Hoses

EBS00OSF

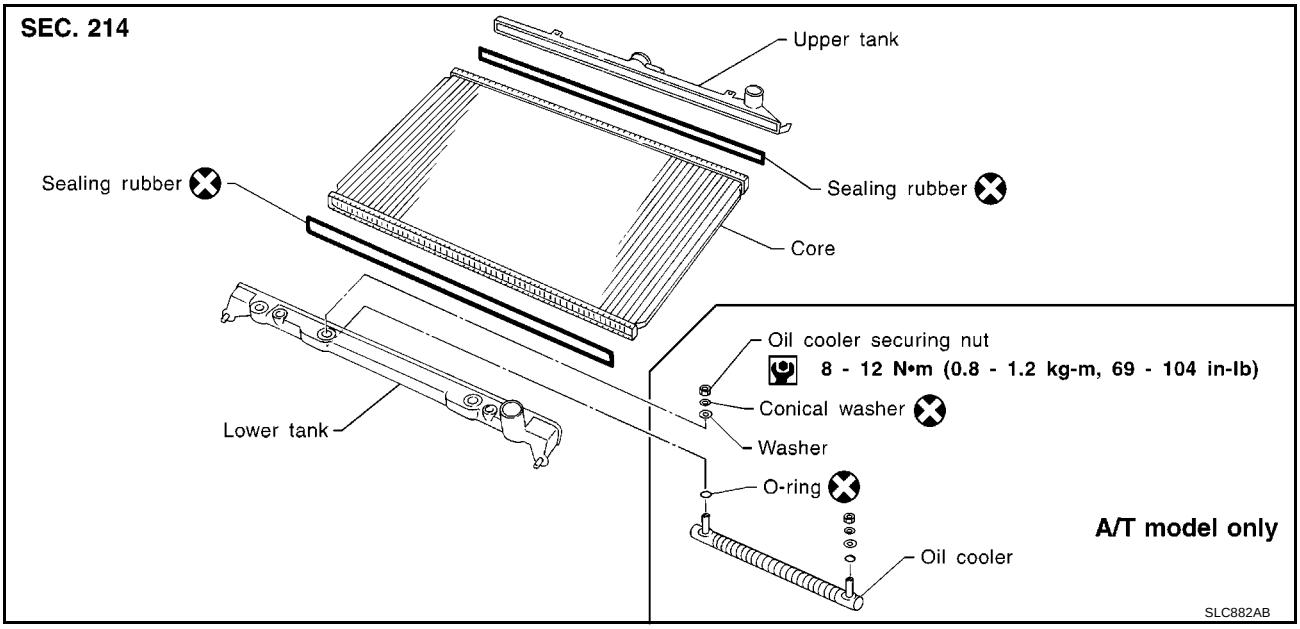
Check hoses for improper attachment, leaks, cracks, damage, loose connections, chaffing and deterioration.

RADIATOR (ALUMINUM TYPE)

PFP:21460

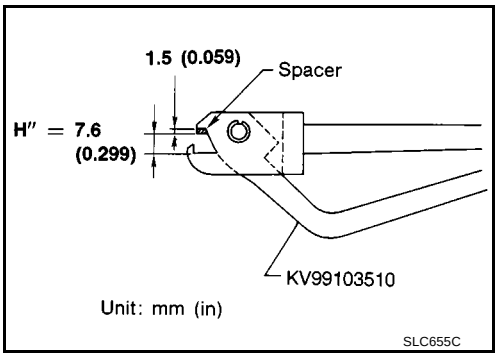
Disassembly and Assembly

EBS00OJ0



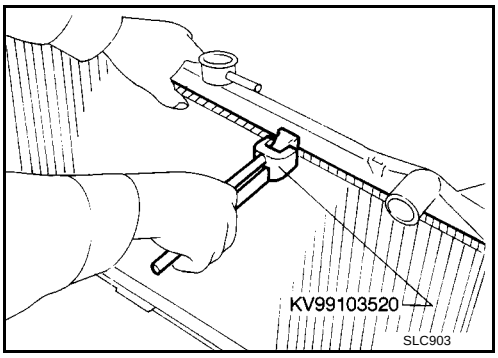
PREPARATION

1. Attach the spacer to the tip of the radiator plate pliers A. Spacer specification: 1.5 mm (0.059 in) thick x 18 mm (0.71 in) wide x 8.5 mm (0.335 in) long.
2. Make sure that when radiator plate pliers A are closed dimension H″ is approx. 7.6 mm (0.299 in).
3. Adjust dimension H″ with the spacer, if necessary.



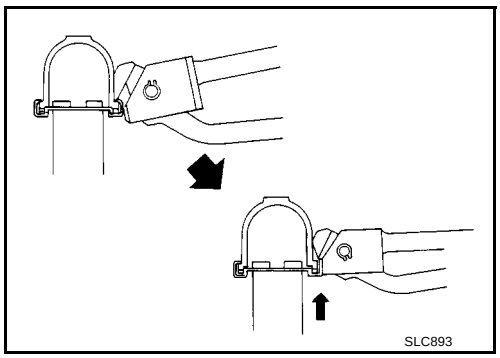
DISASSEMBLY

1. Remove tank with Tool.



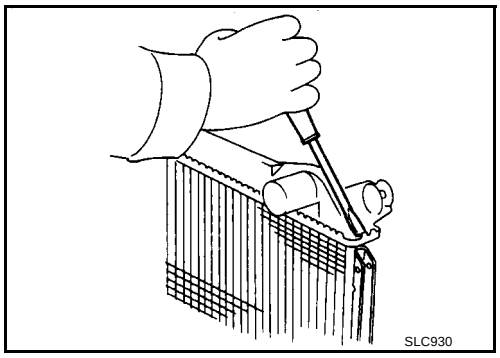
- Grip the crimped edge and bend it upwards so that Tool slips off.

Do not bend excessively.

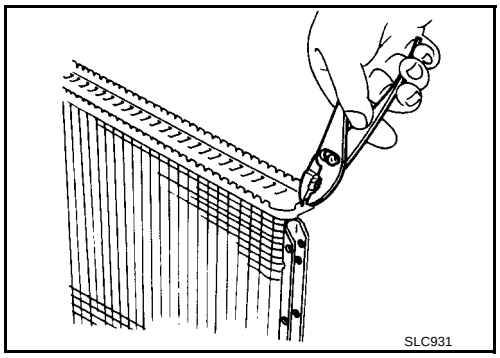


- In areas where Tool cannot be used, use a screwdriver to bend the edge up.

Be careful not to damage tank.



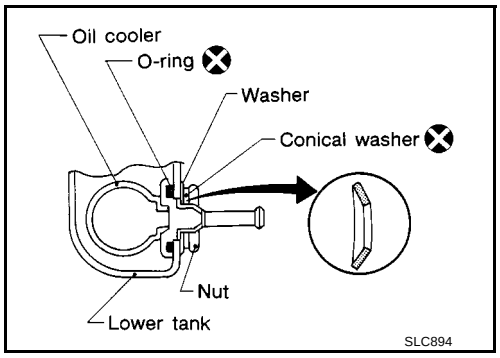
2. Make sure the edge stands straight up.
3. Remove oil cooler from tank. (A/T model only)



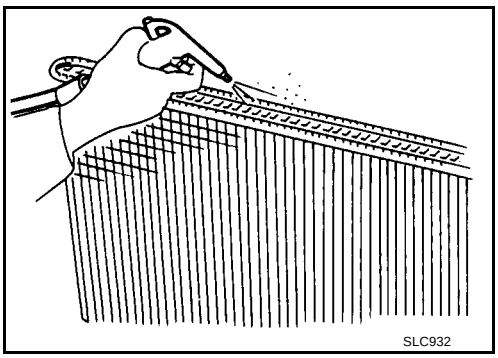
ASSEMBLY

1. Install oil cooler. (A/T model only)

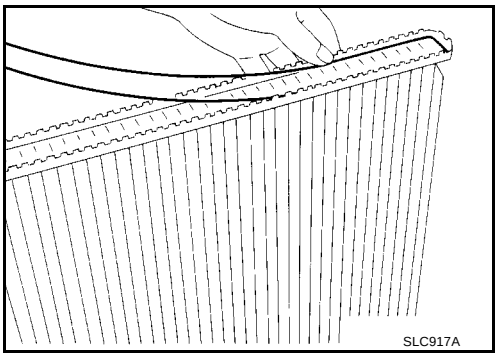
Pay attention to direction of conical washer.



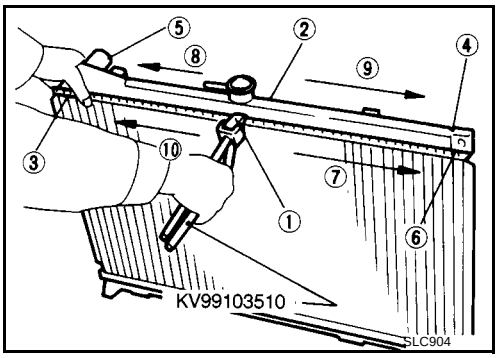
2. Clean contact portion of tank.

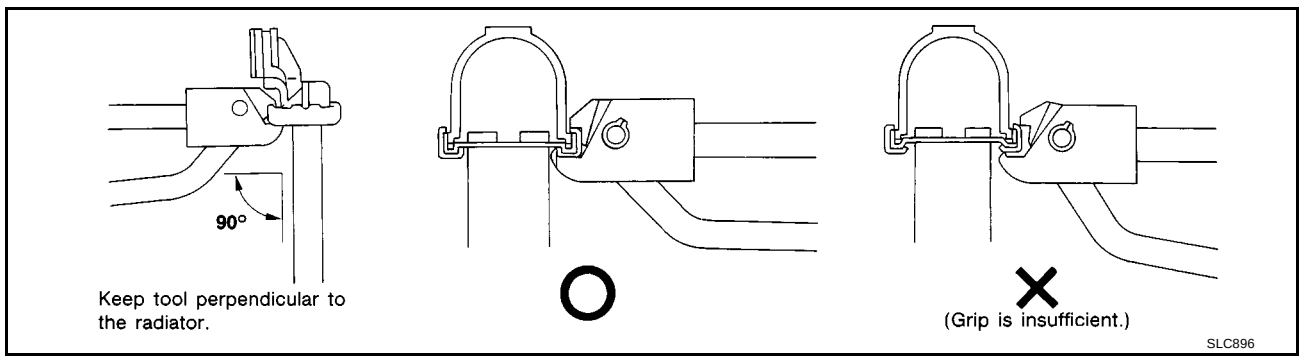


3. Install sealing rubber.
Push it in with fingers.
Be careful not to twist sealing rubber.

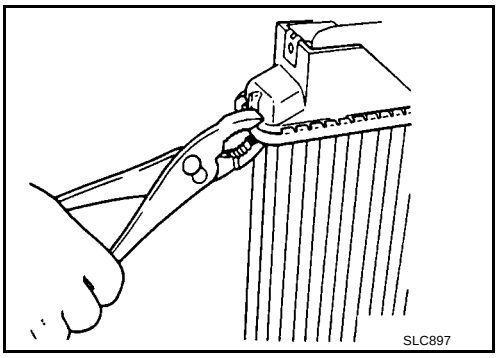


4. Caulk tank in specified sequence with Tool.



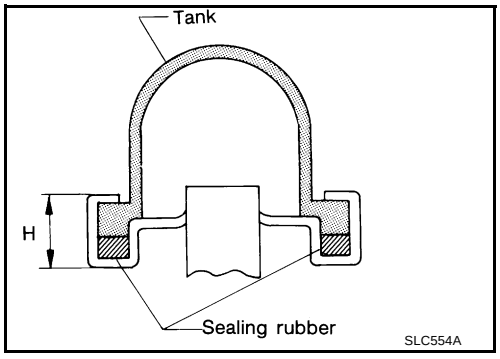


- Use pliers in the locations where Tool cannot be used.



5. Make sure that the rim is completely crimped down.

Standard height "H" : 8.0 - 8.4 mm (0.315 - 0.331 in)



6. Confirm that there is no leakage.

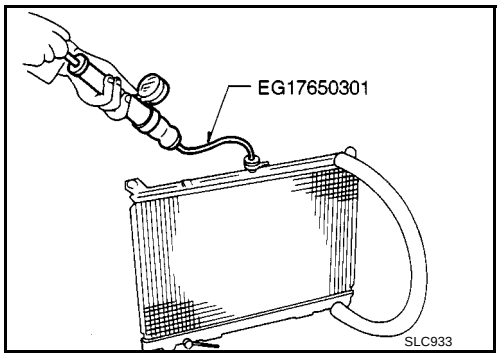
Refer to CO-8, "Inspection" .

INSPECTION

1. Apply pressure with Tool.

Specified pressure value

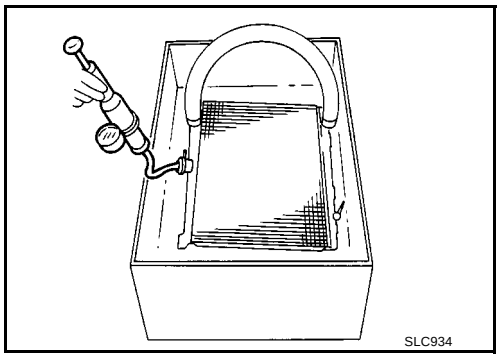
: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)



WARNING:

To prevent the risk of the hose coming undone while under pressure, securely fasten it down with a hose clamp.
Attach a hose to the oil cooler to seal its inlet and outlet. (A/T model only)

2. Check for leakage by soaking radiator in water container.

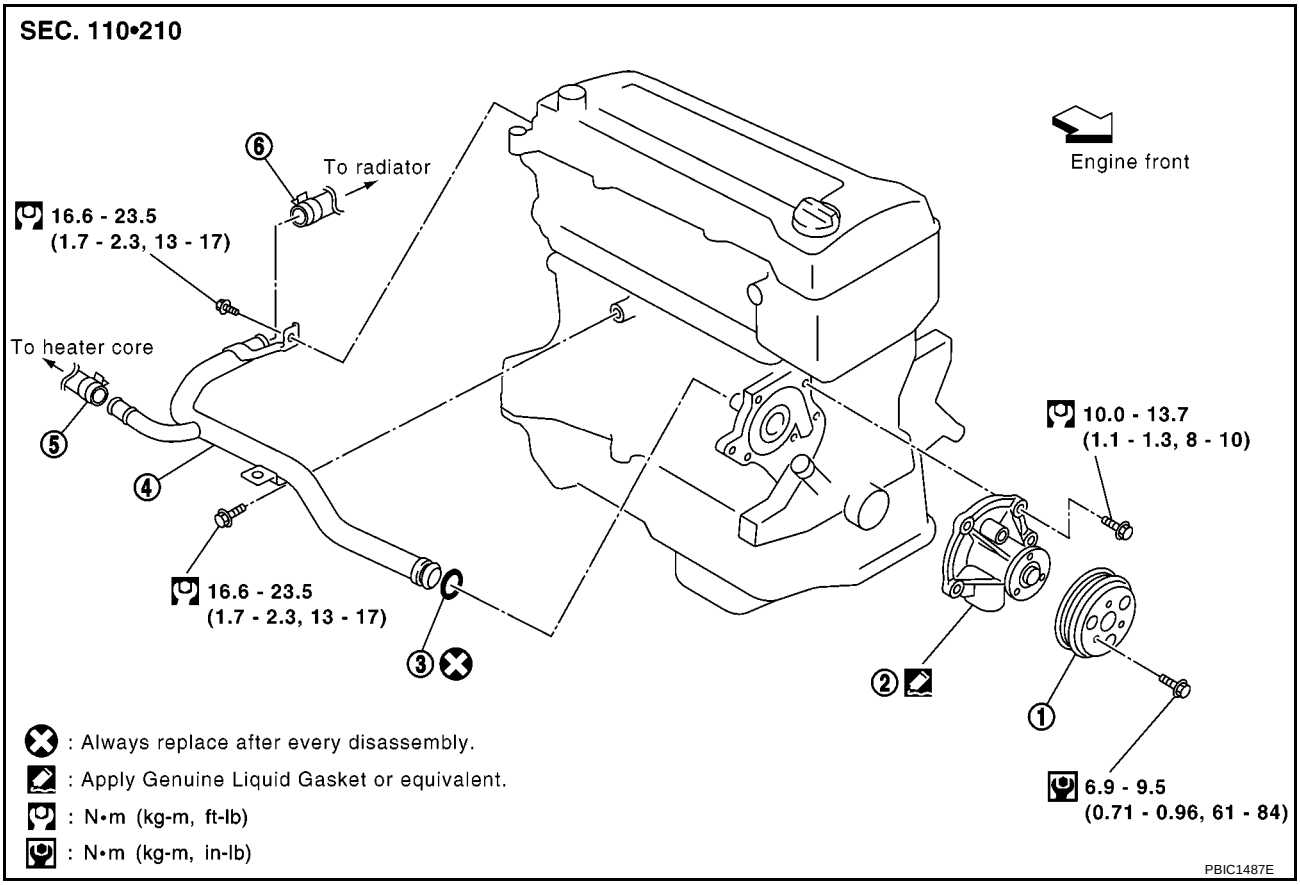


WATER PUMP

PFP:21020

Removal and Installation

EBS00OJ1



1. Water pump pulley
2. Water pump
3. O-ring
4. Water suction pipe
5. Heater hose
6. Radiator hose (lower)

REMOVAL

1. Drain coolant. Refer to CO-8, "ENGINE COOLANT" .

   CAUTION:
   Make sure to drain when the engine coolant temperature is cold.

   WARNING:
   Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.
2. Remove drive belt from water pump pulley. Refer to EM-12, "DRIVE BELTS" .
3. Remove the water pump pulley.

   NOTE:
   To remove it easily, loosen water pump pulley mounting bolt, then water pump belt.
4. Remove water pump.
   - Place a piece of wood or something onto water pump, and tap it with a hammer. Disconnect liquid gasket to remove.
   - Coolant remaining in the engine is drained. Use tray to collect it.

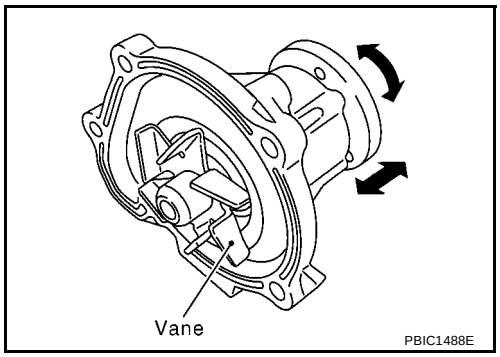
   CAUTION:
   - **Handle the water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**
5. Remove water suction pipe in the following procedures.

a. Remove air cleaner case assembly. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
b. Remove radiator hose (upper and lower), and heater hose.
c. Move harnesses around suction pipe.

d. Remove mounting bolts, and pull water suction pipe toward engine rear side.
   - Coolant remaining in the engine is drained. Use tray to collect it.

INSPECTION AFTER REMOVAL

- Visually check that there is no significant dirt or rusting on the water pump body and vane.
- Check that there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If unusualness is found, replace the water pump.



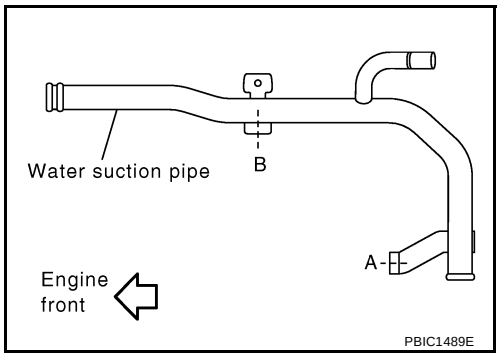
INSTALLATION

- Install in the reverse order of removal which being careful of the following.

Water Suction Pipe Installation

1. Apply neutral detergent on O-ring. Fit O-ring in the groove securely.
2. Tighten mounting bolts with the following procedures.

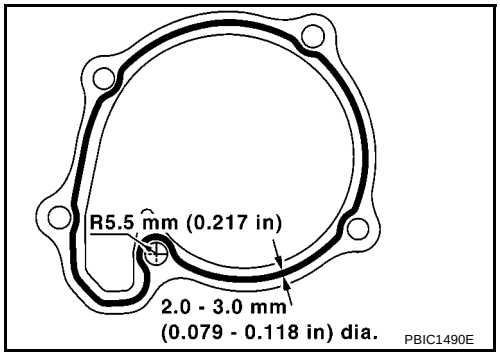
a. Temporarily tighten bolts in order: A to B.
b. Tighten bolts in order: B to A



Water Pump Installation

- Apply liquid gasket as shown in figure, and install.
  Use Genuine Liquid Gasket or equivalent.

  CAUTION:
  Wait at least 30 minutes after water pump installation. Refill coolant and start the engine.

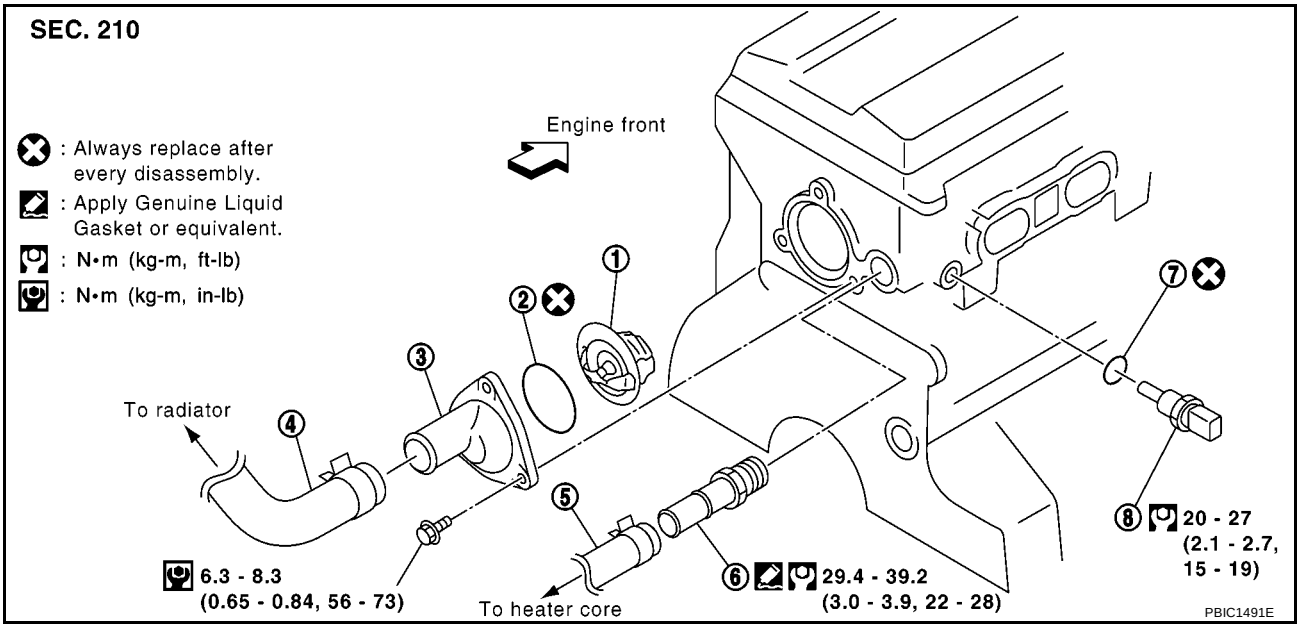


THERMOSTAT

PFP:21200

Removal and Installation

EBS00OJ2



1. Thermostat
2. Rubber ring
3. Water outlet
4. Radiator hose (upper)
5. Heater hose
6. Heater pipe
7. Copper washer
8. Engine coolant temperature sensor

REMOVAL

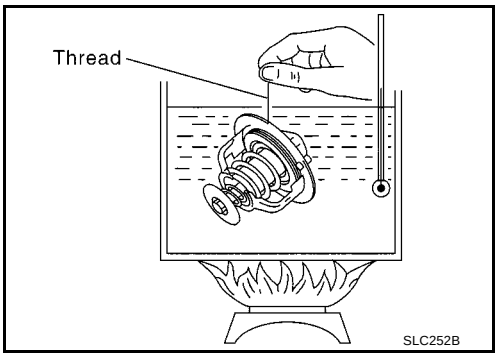
1. Drain engine coolant. Refer to CO-8, "ENGINE COOLANT" .

   CAUTION:
   Make sure to drain when the engine coolant temperature is cold.

   WARNING:
   Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.
2. Remove air duct and air cleaner body. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove radiator hose (upper).
4. Remove water outlet and thermostat.
   - Coolant remaining in the engine is drained. Use tray to collect it.
5. Remove engine coolant temperature sensor if necessary.
6. Remove heater pipe if necessary.

INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves of the thermostat. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows the thermostat.)
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open lift amount.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
- If the measured value is out of the standard value or unusual valve seating condition is found, replace the thermostat.



Standard values

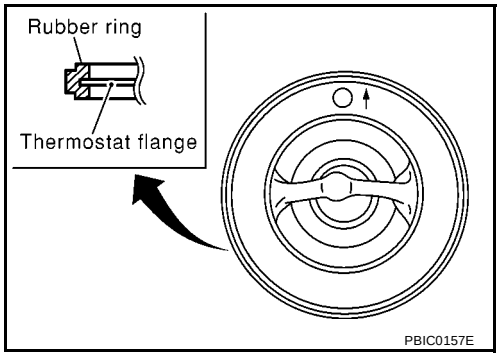
	Thermostat
Valve opening temperature	86.5 - 89.5°C (188 - 193°F)
Full-open lift amount	8 mm or more/ 101°C (0.31 in/ 214 °F)
Valve closing temperature	83°C (181°F)

INSTALLATION

Install in the reverse order of removal which being careful of the following.

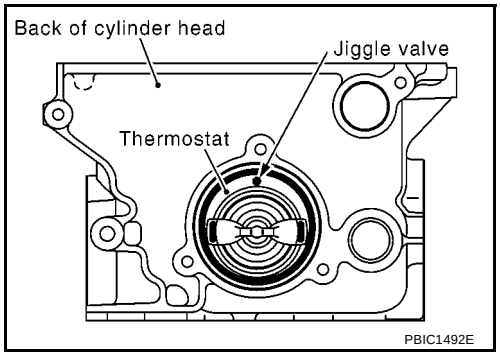
Installation of Thermostat

1. Install the thermostat with the whole circumference of each flange part fit securely inside the rubber ring.



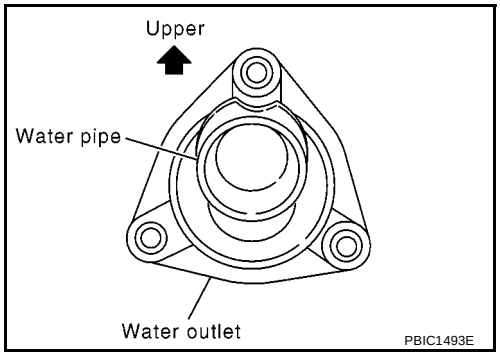
2. Install thermostat with jiggle valve facing the direction shown in the figure.

   NOTE:
   Care must be taken not to trap the thermostat jiggle valve.



Water Outlet Installation

- Install water pipe with it facing upward.
- Install thermostat in place.



Heater Pipe Installation

- Apply liquid gasket to the threads, and install.
  Use Genuine Liquid Gasket or equivalent.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00OJL

CAPACITY

SMA for VIN>SJN**AK12U1000000

Unit: ℓ (Imp qt)

Coolant capacity [With reservoir tank (MAX level)]	Except M/T models with A/C	Approximately 4.9 (4-3/8)
	M/T models with A/C	Approximately 5.3 (4-5/8)
Reservoir tank	Except M/T models with A/C	0.7 (5/8)
	M/T models with A/C	1.2 (1-1/8)

THERMOSTAT

Valve opening temperature	86.5 - 89.5°C (188 - 193°F)
Valve lift	8 mm or more/ 101°C (0.31 in/ 214°F)
Valve closing temperature	83°C (181°F)

RADIATOR

Unit: kPa (bar, kg/cm^2 , psi)

Cap relief pressure	Standard	78 - 98 (0.78 - 0.98, 0.8 - 1.0, 11 - 14)
	Limit	59 (0.59, 0.6, 9)
Leakage test pressure		157 (1.57, 1.6, 23)

Tightening Torque

EBS00OJ4

*1: Parts to be tightened in particular orders

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*2

	Cooling fan assembly	3.8 - 4.5 (0.39 - 0.45, 34 - 39)*2
	Reservoir tank (M/T models with A/C)	3.8 - 4.5 (0.39 - 0.45, 34 - 39)*2
	Cooling fan motor	3.0 - 4.0 (0.31 - 0.40, 27 - 35)*2
	Cooling fan (reverse screw)	1.7 - 2.3 (0.18 - 0.23, 15 - 20)*2
	Water pump	10.0 - 13.7(1.1 - 1.3, 8 - 10)
	Water pump pulley	6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
*1	Water suction pipe	16.6 - 23.5 (1.7 - 2.3, 13 - 17)
	Water outlet	6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
	Heater pipe	29.4 - 39.2 (3.0 - 3.9, 22 - 28)
	Engine coolant temperature sensor	20 - 27(2.1 - 2.7, 15 - 19)

PRECAUTIONS

PFP:00001

Precautions For Liquid Gasket

EBS01C7N

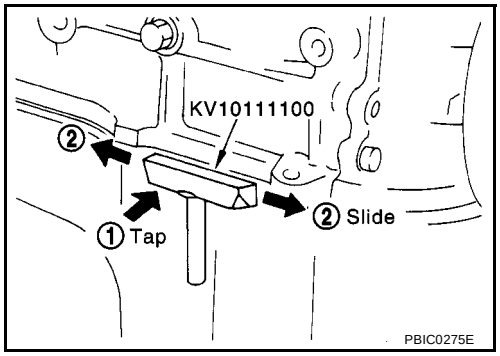
REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

  CAUTION:
  Be careful not to damage the mating surfaces.

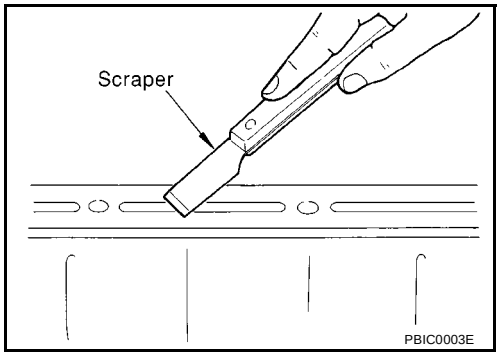
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.

  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

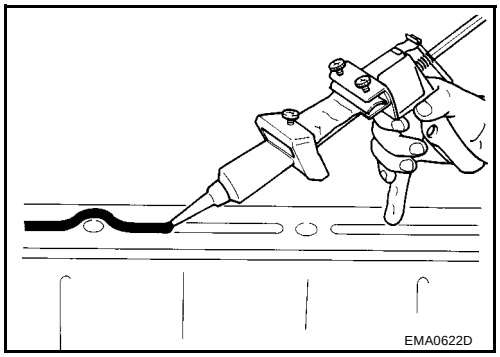


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

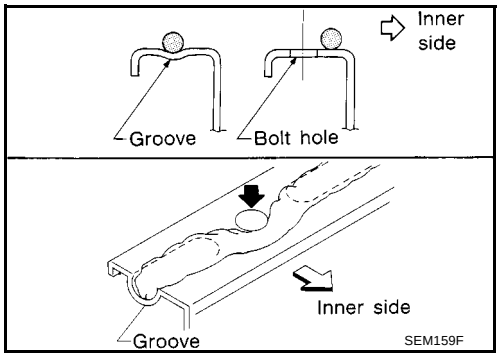


4. Apply the gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



   - As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
   - Within five minutes of gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten after the installation.
   - After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

   CAUTION:
   If there are instructions in this manual, observe them.

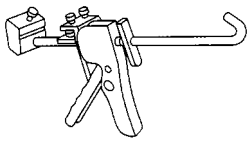
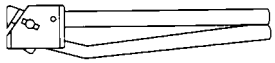
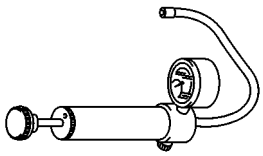
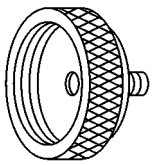
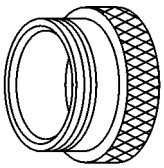


PREPARATION

PFP:00002

Special Service Tools

EBS01C7O

NISSAN tool number (RENAULT too number) Tool name		Description
WS39930000 (—) Tube pressure	 S-NT052	Pressing the tube of liquid gasket
KV99103510 (—) Radiator plate pliers A	 S-NT224	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	 S-NT225	Removing radiator upper and lower tanks
— (M.S. 554_07) Tester	 MLIA0012E	Leak checking Checking reservoir tank cap
— (M.S. 554_01) Reservoir tank cap tester adapter A	 MLIA0013E	Adapting tester to reservoir tank
— (M.S. 554_06) Reservoir tank cap tester adapter B	 MLIA0014E	Adapting tester to reservoir tank cap

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

EBS01C7P

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn timing belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Mechanical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper coolant mixture ratio	—	—	—
	Poor coolant quality	—	—	—
	Insufficient coolant	Coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

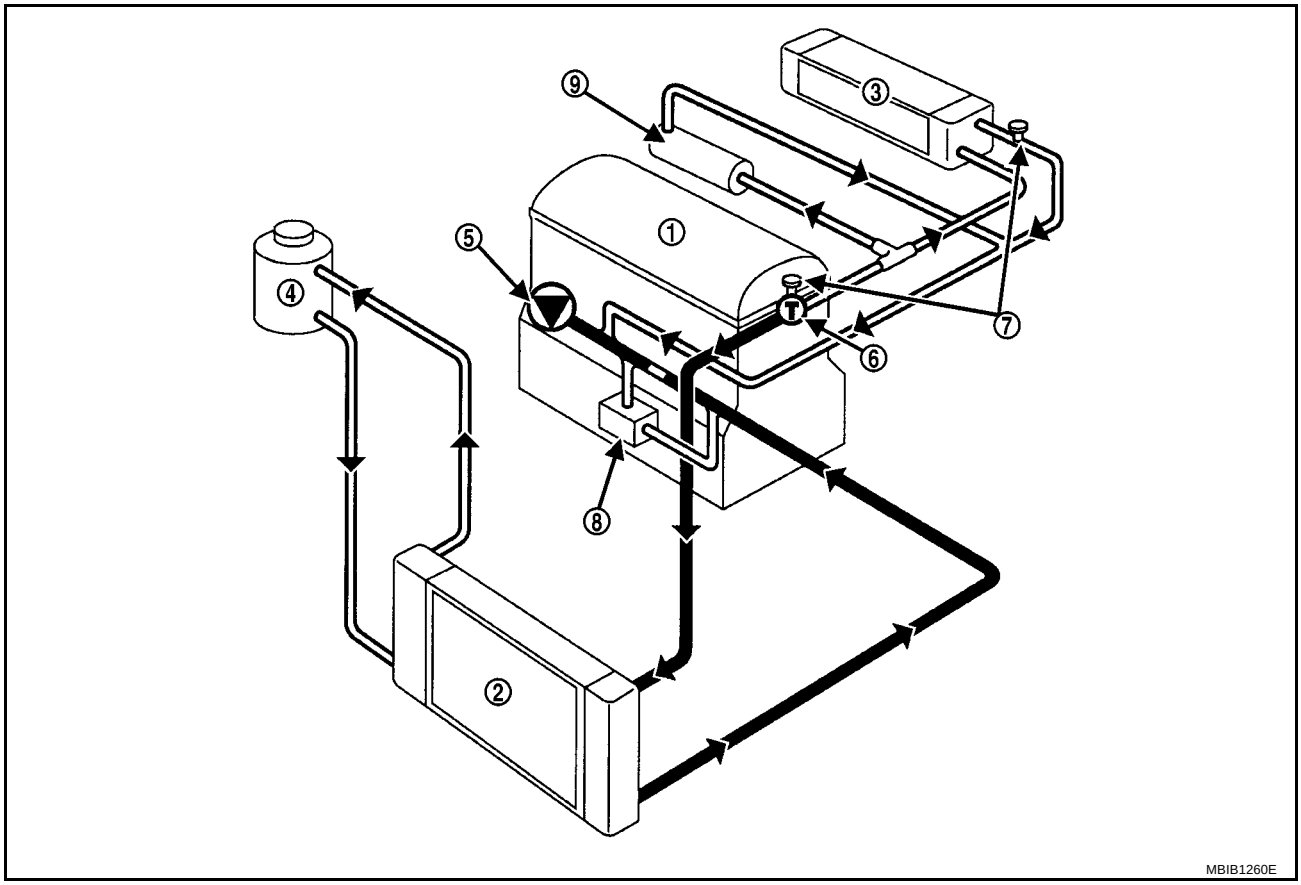
	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Powertrain system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	—	
		Installed large fog lamp		

COOLING SYSTEM

PFP:21020

Cooling Circuit

EBS01FHO



1. Engine
2. Radiator
3. Heater core
4. Reservoir tank
5. Water pump
6. Thermostat
7. Air relief plug
8. Oil cooler
9. EGR cooler

ENGINE COOLANT

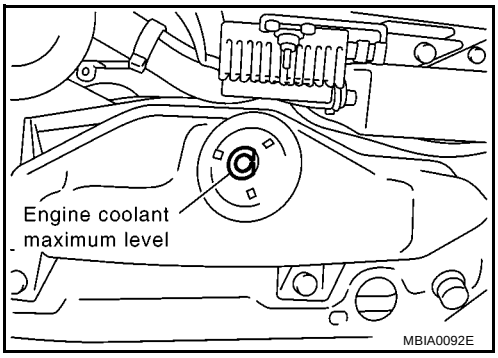
PFP:KQ100

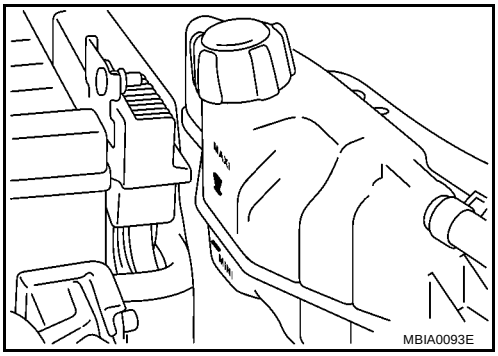
Inspection

EBS01C7Q

LEVEL CHECK

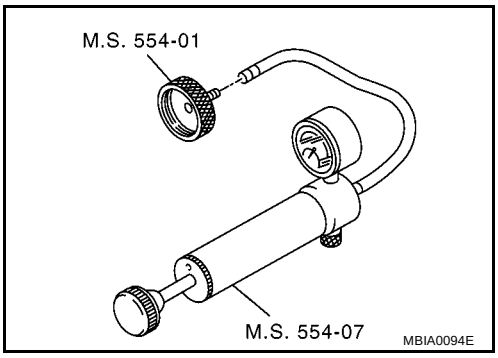
- Check if the reservoir tank coolant level is within MIN to MAX when engine is cool.
- Adjust coolant if too much or too little.





LEAK CHECK

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the tester as shown.
- Warm up the engine and turn it off.
- Apply pressure to the cooling system and stop pumping at **10 kPa (0.1 bar, 0.10 kg/cm^2 , 1.5psi)** .
- If the pressure drops, look for leakage.
- Unscrew slowly the adapter from the reservoir tank to reduce the pressure in cooling system, and install the reservoir tank cap.



WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure engine coolant escaping from the radiator.

CAUTION:

Higher pressure than specified may cause radiator damage.

Changing Engine Coolant

EBS01C7R

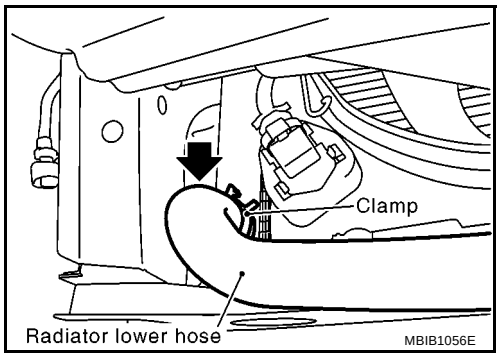
SMA for VIN >SJN**AK12U1107568

WARNING:

- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

DRAINING ENGINE COOLANT

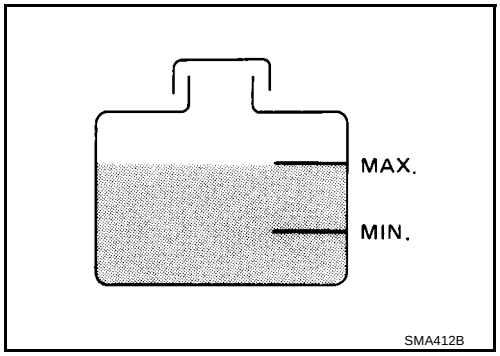
1. Remove engine undercover.
2. Disconnect lower radiator hose, and remove reservoir tank cap and air relief plug.
3. Remove reservoir tank, drain coolant, then clean reservoir tank.
4. Check drained coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to CO-33, "FLUSHING COOLING SYSTEM" .
5. Remove air relief plug from water outlet.
   Refer to CO-42, "WATER OUTLET" .



REFILLING ENGINE COOLANT

- **Before start working, turn off the automatic air conditioner and the blower motor.**

1. Install reservoir tank, lower radiator hose and air relief plug.
2. Fill reservoir tank slowly with coolant until coolant spills from the air relief hole. Refer to CO-42, "WATER OUTLET" .
   - **Put a cloth under the air relief plug to prevent engine coolant to dampen the crankshaft position sensor.**
   - Fill coolant to the MAX level line of the reservoir tank at a rate of 2 litre (1-3/4 lmp qt)/min or lower.



3. Close the air relief plug.

   CAUTION:
   If the filling rate is too fast, this could lead to air being mixed in the coolant. Be sure to fill the coolant slowly according to the rate indicated above.
   Use genuine Nissan anti-freeze coolant or equivalent mixed with water (distilled or demineralised). Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .

   Engine coolant capacity (With reservoir tank):
   6.5 litre (5-3/4 lmp qt)

   Reservoir tank capacity 1.2 litre (1-1/8 lmp qt)

4. Warm up the engine for approximately five minutes without reservoir tank cap installed, and then turn off the engine and loose air relief plug until coolant spills from air relief hole.
   - **If coolant overflows reservoir tank hole, install filler cap.**
   - **Watch engine coolant temperature warning light so as not overheat the engine during all of the operation.**

WARNING:

- **Be careful not be scaled with hot engine coolant or vacuum pump when operating.**
- **Radiator fan blade can start at any time and make personal injuries.**

5. Close the air relief plug and run the engine at 2,000 rpm until the upper hose comes hot and radiator fan operates. Let the engine running approximately 5 minutes at idle speed and check for sound of coolant flow while running engine from idle up to 3,000 rpm.
   - Sound may be noticeable at heater water cock.
6. If sound is heard, bleed air from cooling system by repeating steps 4 through 5 until coolant lever no longer drops.
   - Check the radiator lower hose for any signs of leakage.
7. Turn off the engine and let it cool down.
   - Cool down using a fan to reduce the time.
8. After cooling period, loose the air relief plug and check if coolant spills from the air relief hole. In other case, remove the air relief plug until the coolant spills, and then close the relief air plug. Bleed air from cooling system by repeating steps 5 through 8 until the coolant spills immediately.
9. Check the engine coolant level when engine is cool and refill to MAX level line if the level is lower.
   - Clean excess coolant from engine.

FLUSHING COOLING SYSTEM

1. Fill reservoir tank with water until water spills from the air relief hole, then close air relief plug. Reinstall reservoir tank cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.
7. Blow compressed air into cooling circuit through the reservoir tank valve hole to drain all the water.

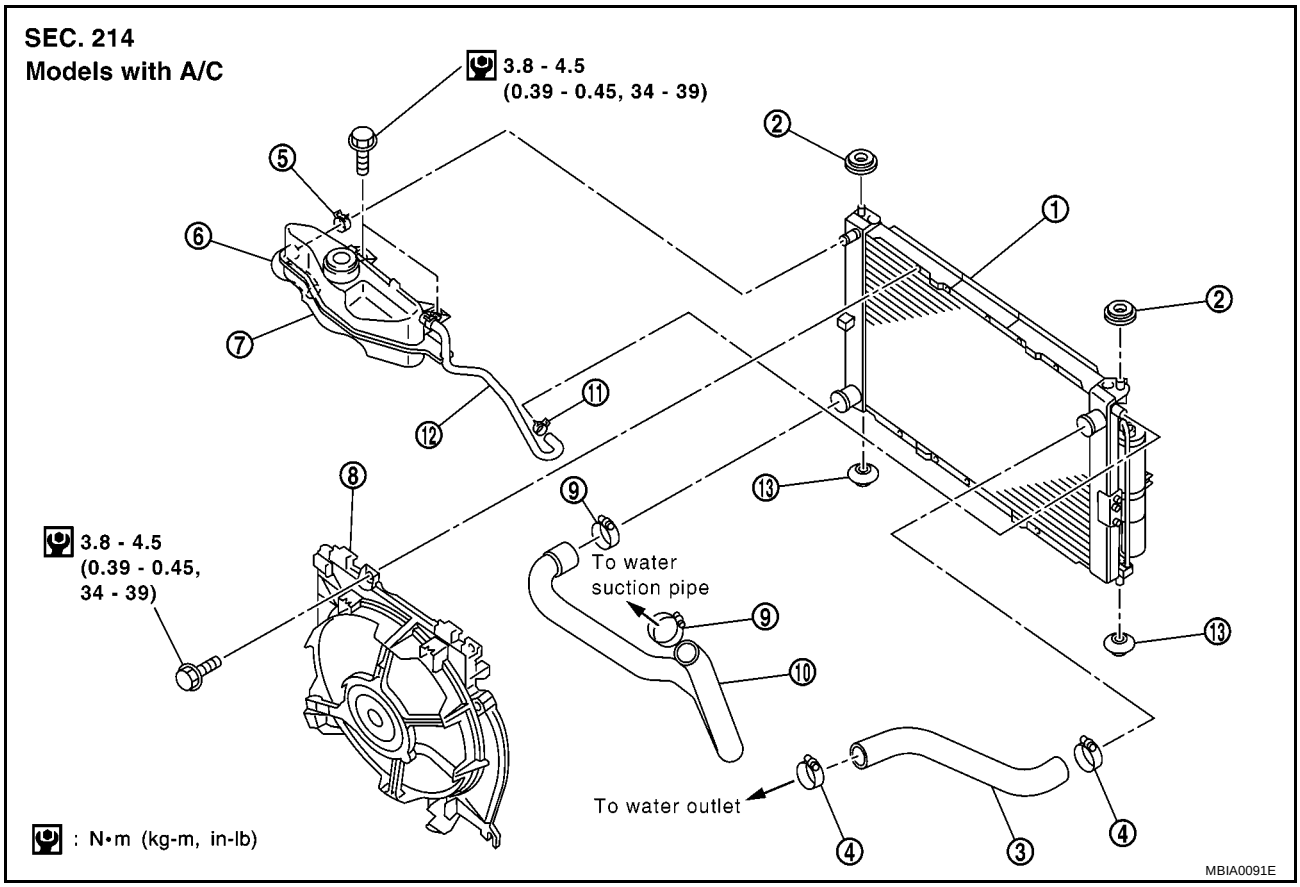
RADIATOR

PFP:21400

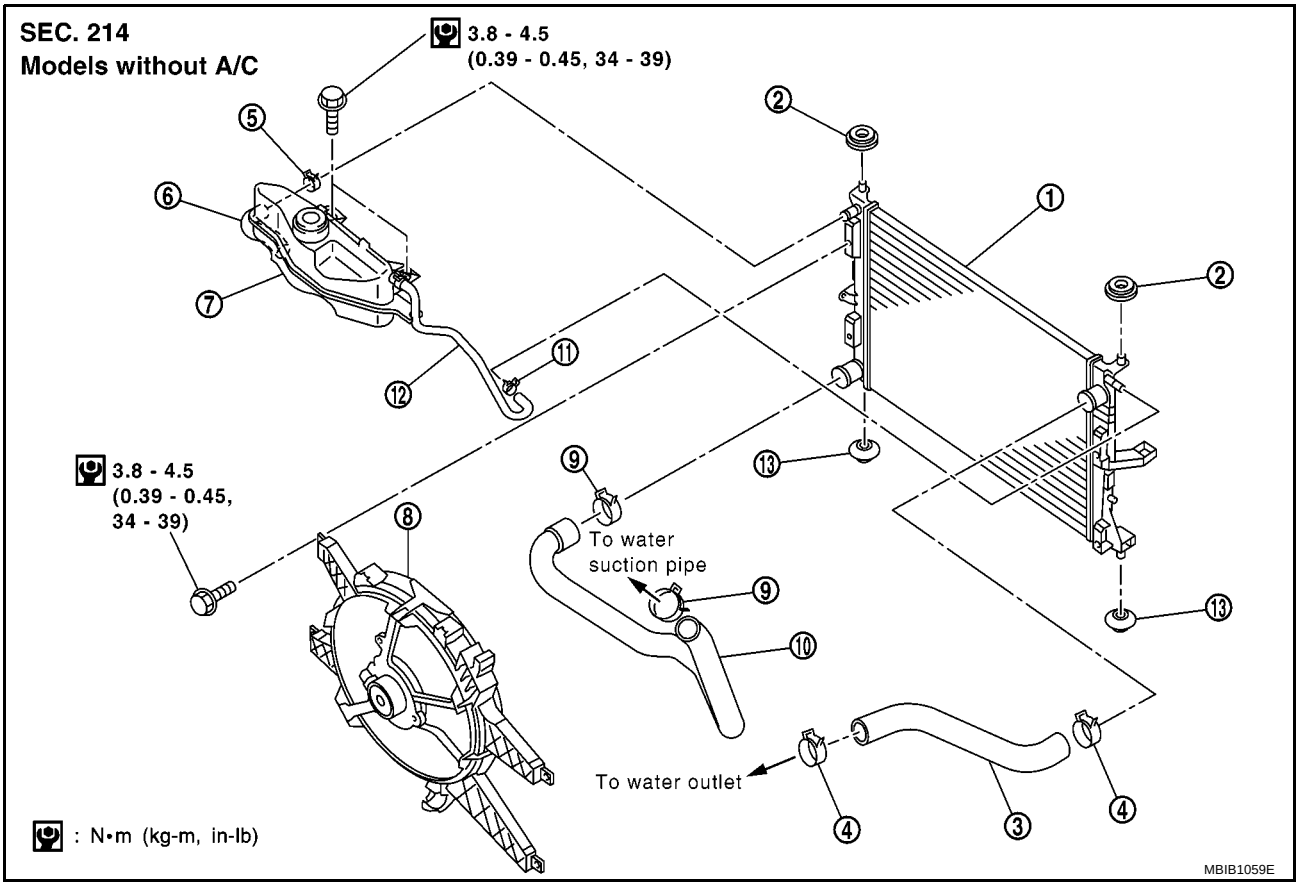
Removal and Installation

SMA for VIN >SJN**AK12U1107568

EBS01C7S



1. Radiator
2. Mounting rubber
3. Radiator hose (upper)
4. Hose clamp
5. Hose clamp
6. Reservoir tank hose
7. Reservoir tank
8. Cooling fan assembly
9. Hose clamp
10. Radiator hose (lower)
11. Hose clamp
12. Reservoir tank hose
13. Mounting rubber



1. Radiator
2. Mounting rubber
3. Radiator hose (upper)
4. Hose clamp
5. Hose clamp
6. Reservoir tank hose
7. Reservoir tank
8. Cooling fan assembly
9. Hose clamp
10. Radiator hose (lower)
11. Hose clamp
12. Reservoir tank hose
13. Mounting rubber

WARNING:
Never remove the reservoir tank cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter turn to allow built-up pressure to escape. Carefully remove the cap by turning it all the way.

REMOVAL

1. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
2. Remove air cleaner case and air duct (inlet). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
3. Remove reservoir tank hose bracket bolt from radiator upper mounting bracket (RH side).
4. Remove radiator fan motor harnesses.
5. Remove engine undercover.
6. Drain engine coolant. Refer to CO-32, "DRAINING ENGINE COOLANT" .

   CAUTION:
   Perform when engine is cold.
7. Disconnect radiator upper hose, reservoir tank hose and mounting bracket.
8. Remove radiator and radiator fan assembly.

- For model with A/C, remove radiator and condenser assembly. Refer to ATC-84, "REFRIGERANT LINES" .
- For model with charge air cooler. Refer to EM-125, "CHARGE AIR COOLER" .

CAUTION:
- **Do not damage or scratch radiator core when removing.**

INSTALLATION

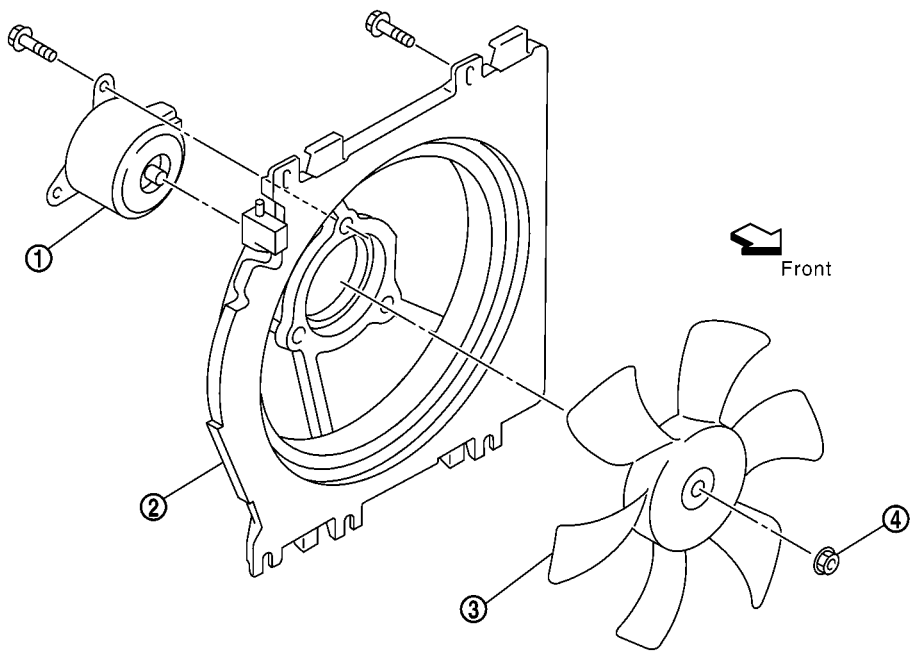
- Reinstall any parts removed in reverse order of removal.
- Check for engine coolant leaks. Refer to CO-31, "LEAK CHECK" .

Disassembly and Assembly Radiator Fan

EBS01C7T

SEC. 214
Models with A/C

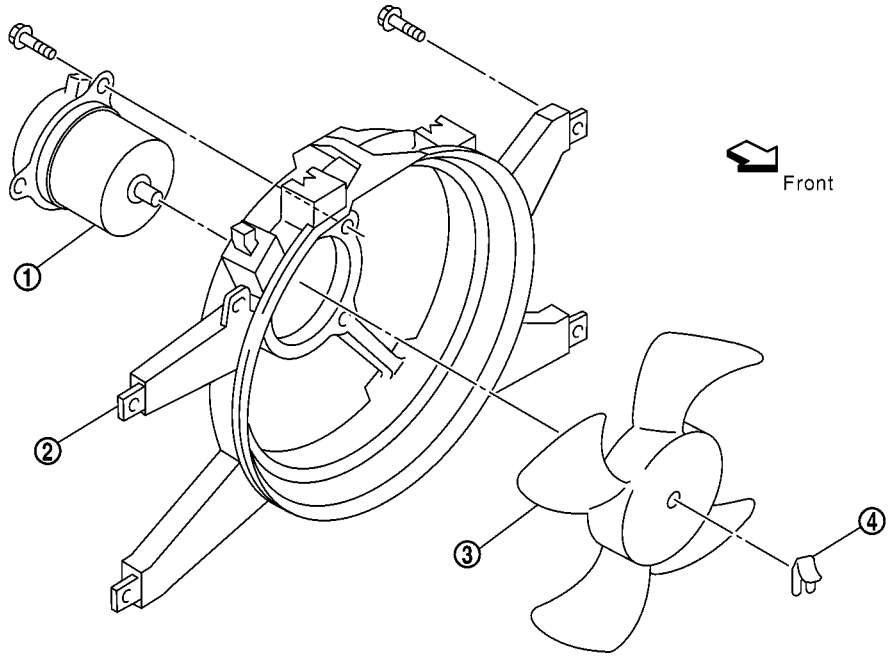
SMA for VIN >SJN**AK12U1309269



MBIB1061E

1. Radiator fan motors
2. Radiator fan shroud
3. Radiator fan
4. Retaining nut

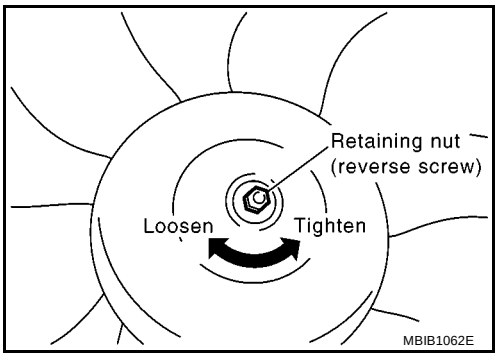
SEC. 214
Models without A/C

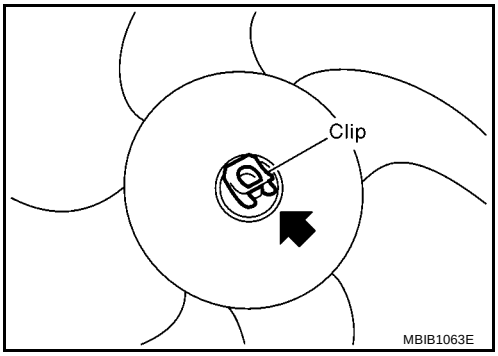


1. Radiator fan motors
2. Radiator fan shroud
3. Radiator fan
4. Clip

DISASSEMBLY

1. Remove radiator fan and shroud assembly.
2. Remove radiator fan as shown.





3. Remove fan motor from fan shroud.

ASSEMBLY

Install in the reverse order of removal.

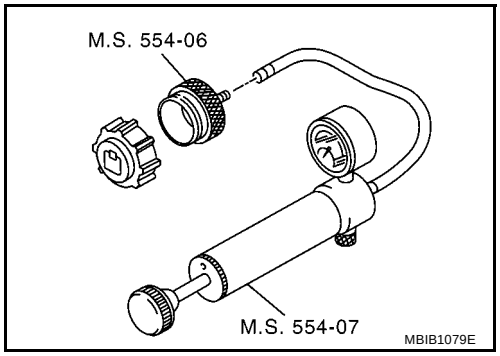
Checking Reservoir Tank Cap

EBS01C7U

- Fit the adapter to the tester as shown.
- When connecting the reservoir tank cap to the tester, apply water or LLC to the cap seal part.
- Check reservoir tank cap relief pressure.

130 - 150 kPa (1.3 - 1.5 bar, 1.33 - 1.53 kg/cm^2 , 18.9 - 21.8 psi)

- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.



Checking Radiator

EBS01C7V

Check radiator for mud or clogging. If necessary, clean radiator as follows.

- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2 , 71psi) and keep distance more than 30 cm (11.8 in).

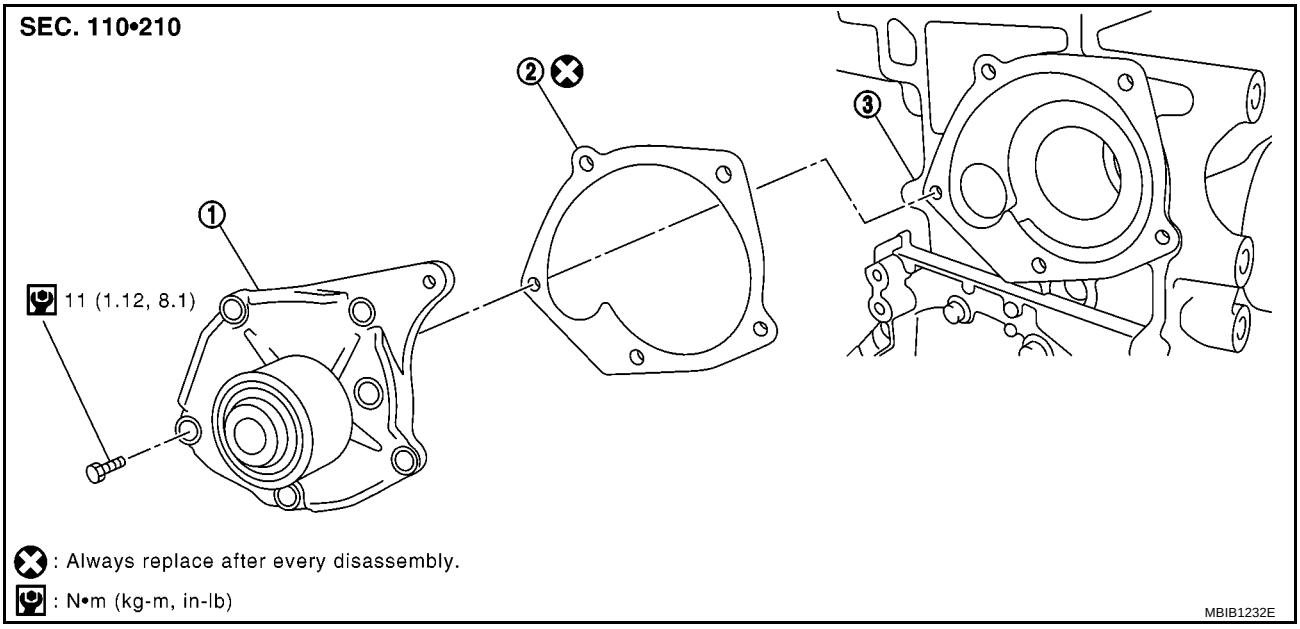
5. Blow air again into all the radiator core surface once per minute until no water sprays out.

WATER PUMP

PFP:21020

Removal and Installation

EBS01C7W



1. Water pump
2. Gasket
3. Cylinder block

WARNING:
Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

REMOVAL

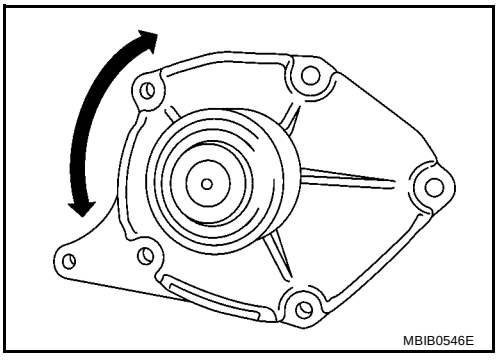
1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
2. Remove right side splash cover.
3. Remove drive belt. Refer to EM-121, "DRIVE BELTS" .
4. Drain engine coolant. Refer to CO-32, "DRAINING ENGINE COOLANT" .

   CAUTION:
   Perform when engine is cold.
5. Remove timing belt and inner cover. Refer to EM-140, "TIMING BELT" .
6. Remove the water pump.
   - Coolant will leak from the cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle the water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**

INSPECTION AFTER REMOVAL

- Visually make sure there is no significant dirt or rusting on the water pump body and vane.
- Make sure there is no looseness in the vane shaft, and that it turns smoothly when rotated by hand.
- If there are any unusualness, replace the water pump assembly.



INSTALLATION

- Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

- Check for engine coolant leaks using reservoir tank cap tester. Refer to CO-31, "LEAK CHECK" .

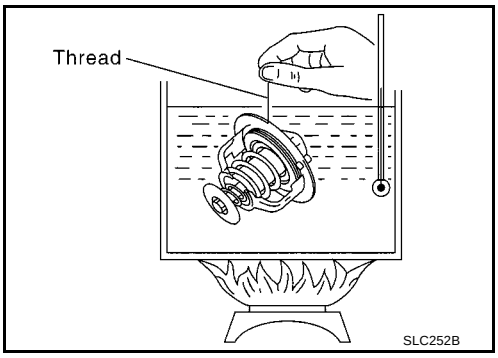
THERMOSTAT

PFP:21200

Inspection

EBS01FHN

- Place a thread so that it is caught in the valves of the thermostat. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows the thermostat.)
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full-open lift amount.
- After checking the full-open lift amount, lower the water temperature and check the valve closing temperature.
- If the measured value is out of the standard value or unusual valve seating condition is found, replace the thermostat.



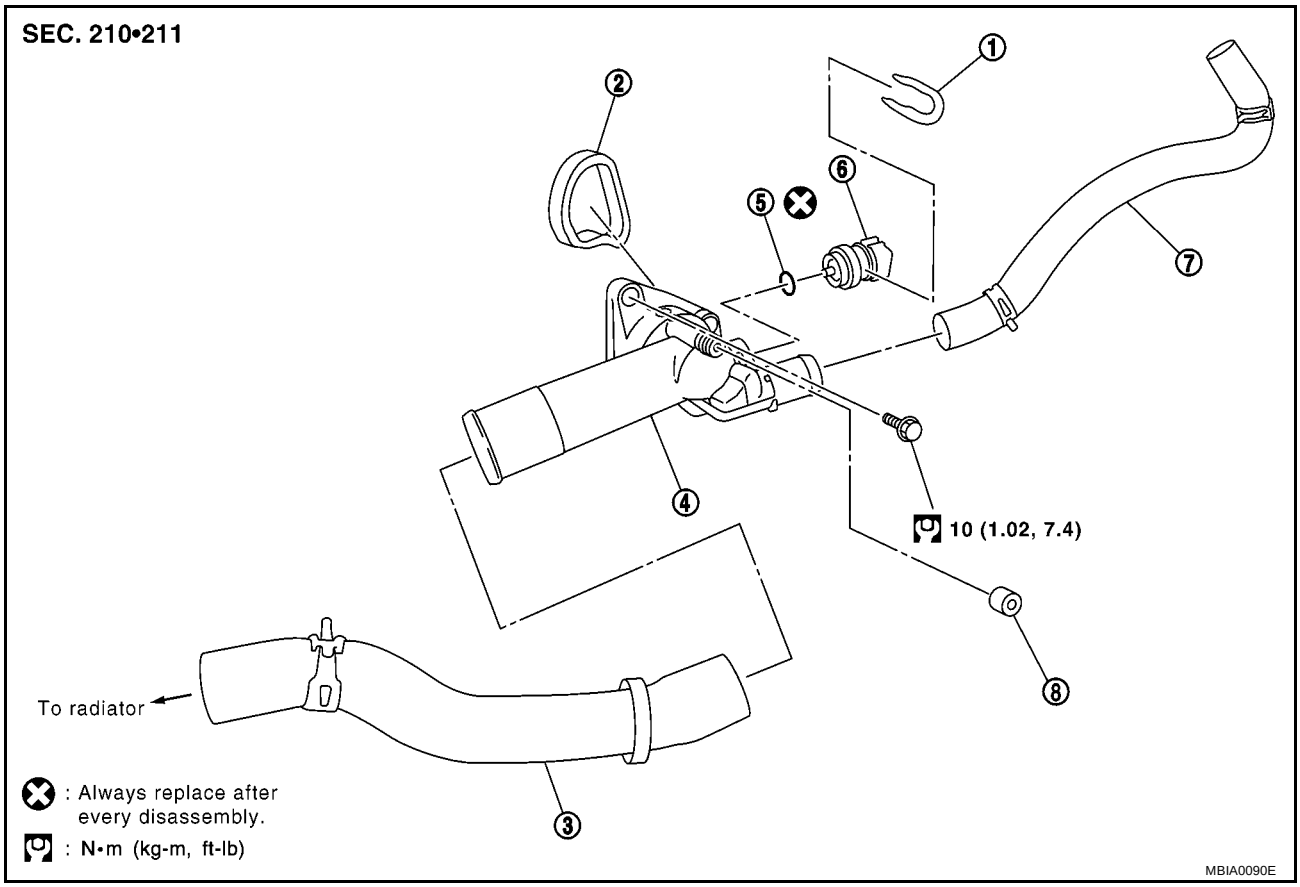
	Temperature °C (°F)
Start of opening	89 (192)
End of opening	97 - 101 (207 - 214)

WATER OUTLET

PFP:11060

Removal and Installation

EBS01C7X



1. Clip
2. Gasket
3. Radiator upper hose
4. Water outlet
5. O-ring
6. Water temperature sensor
7. Heater hose
8. Air relief plug

REMOVAL

1. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
2. Remove air cleaner case and air duct (inlet). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
3. Remove rear engine slinger. Refer to EM-147, "ENGINE ASSEMBLY" .
4. Remove vacuum hose.
5. Remove vacuum pump. Refer to EM-137, "VACUUM PUMP" .
6. Drain engine coolant. Refer to CO-32, "DRAINING ENGINE COOLANT" .

   CAUTION:
   Perform when engine is cold.
7. Remove radiator upper hose. Refer to CO-34, "RADIATOR" .
8. Remove heater hose.
9. Disconnect reservoir tank hose. Refer to CO-34, "RADIATOR" .
10. Remove water outlet.

INSTALLATION

Install in the reverse order of removal.

SECTION DI
DRIVER INFORMATION SYSTEM

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Maintenance Information 3
RHD MODELS 3
LHD MODELS 3
Precautions For Trouble Diagnosis 3
CAN SYSTEM 3
Precautions For Harness Repair 3
CAN SYSTEM 3
Wiring Diagrams and Trouble Diagnosis 4
COMBINATION METERS 5
System Description 5
UNIFIED CONTROL METER 5
HOW TO CHANGE THE DISPLAY FOR ODO/TRIP METER 5
POWER SUPPLY AND GROUND CIRCUIT 5
WATER TEMPERATURE WARNING/INDICATOR LAMP 6
TACHOMETER 6
FUEL GAUGE 6
SPEEDOMETER 6
CAN Communication 7
SYSTEM DESCRIPTION 7
CAN Communication Unit 7
TYPE 1/TYPE 2 8
TYPE 3/TYPE 4 11
TYPE 5/TYPE 6 13
TYPE 7/TYPE 8 16
TYPE 9/TYPE 10 18
Component Parts and Harness Connector Location 20
Combination Meter 21
CHECK 21
Schematic 22
Wiring Diagram — METER — 23
WITHOUT ESP 23
WITH ESP 24
Combination Meter Self-Diagnosis 25
PERFORMING SELF-DIAGNOSIS MODE 25
Trouble Diagnoses 28
PRELIMINARY CHECK 28
SYMPTOM CHART 30
Power Supply and Ground Circuit Check 31
Inspection/Vehicle Speed Signal 31
Inspection/Engine Revolution Signal 31
Inspection/Fuel Level Sensor Unit 32
FUEL LEVEL SENSOR UNIT 32
LOW-FUEL WARNING LAMP 32
Inspection/Water Temperature Warning/indicator Lamp 33
Fuel Gauge Pointer Fluctuates Indicator Wrong Value or Varies 33
Fuel Gauge Does Not Move to FULL position 33
Fuel Gauge Does Not Work 34
Electrical Components Inspection 34
FUEL LEVEL SENSOR UNIT CHECK 34
Removal and Installation for Combination Meter 34
REMOVAL 34
INSTALLATION 34
Disassembly and Assembly for Combination Meter 35
DRIVE COMPUTER 36
System Description 36
POWER SUPPLY AND GROUND 36
DISPLAY MENU 36
OUTSIDE AIR TEMPERATURE 36
DRIVE COMPUTER 37
SETTING 39
MAINTENANCE 40
WARNING INDICATIONS 41
HOW TO CHANGE FOR STEERING SWITCH 42
CAN Communication 43
SYSTEM DESCRIPTION 43
CAN Communication Unit 43
TYPE 1/TYPE 2 44
TYPE 3/TYPE 4 47
TYPE 5/TYPE 6 49
TYPE 7/TYPE 8 52
TYPE 9/TYPE 10 54
Component Parts and Harness Connector and Har-

ness Connector Location 56
Wiring Diagram — D/COMP — 57
Terminals and Reference Value 59
Self-Diagnosis Function 59
DESCRIPTION 59
Performing Self-Diagnosis Mode 59
OPERATION PROCEDURES 59
SELF-DIAGNOSIS RESULT ITEM 59
Power Supply and Ground Circuit Check 60
Outside Air Temperature is not Displayed 61
All of Display is not Displayed Properly 62
Drive Computer of Display Items are not Displayed. (ex, "– –.– km") 62
Steering Wheel Switch Does Not Operate 63
Removal and Installation of Drive Computer 64
WARNING LAMPS 65
Schematic 65
Wiring Diagram — WARN — CR Engine Models ... 66
Wiring Diagram — WARN — K9K Engine Models .. 71
CONSULT-II Functions 77
Oil Pressure Warning Lamp Stays Off (Ignition Switch ON) 77
Oil Pressure Warning Lamp Does Not Turn Off (Oil Pressure Is Normal) 79
Electrical Components Inspection 80
OIL PRESSURE SWITCH CHECK 80
WARNING CHIME 81
System Description 81
POWER SUPPLY AND GROUND CIRCUIT 81
IGNITION KEY WARNING CHIME 81
IGINITION SWITCH OFF WARNING CHIME (WITH INTELLIGENT KEY SYSTEM) 81
LIGHT WARNING CHIME 82
CAN Communication 83
SYSTEM DESCRIPTION 83
CAN Communication Unit 83
TYPE 1/TYPE 2 84
TYPE 3/TYPE 4 87
TYPE 5/TYPE 6 89
TYPE 7/TYPE 8 92
TYPE 9/TYPE 10 94
Component Parts and Harness Connector Location .. 96
Schematic 97
Wiring Diagram — CHIME — 98
Terminals and Reference Value for BCM 101
CONSULT-II Inspection Procedure 101
DIAGNOSTIC ITEMS DESCRIPTION 101
CONSULT-II BASIC OPERATION 102
CONSULT- II Application Items 103
DATA MONITOR 103
ACTIVE TEST 103
Symptom Chart 104
Power Supply and Ground Circuit Check 104
Lighting Switch Input Signal Check 105
Key Switch Signal Check/Without Intelligent Key System 105
Key Switch Signal Check/With Intelligent Key System 107
Ignition Knob Switch Signal Check 108
Ignition ON Signal Check 110
Front Door Switch (Driver side) Check 111

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS0086Z

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EKS008W0

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

Precautions For Trouble Diagnosis

EKS008WG

CAN SYSTEM

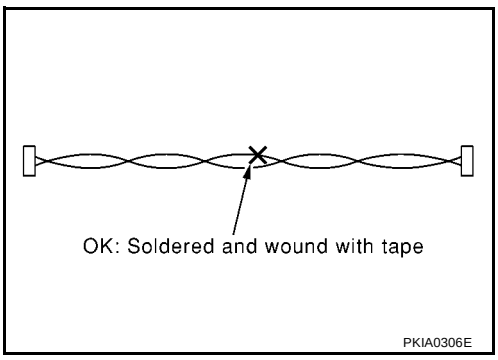
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Be sure to turn ignition switch off and disconnect negative battery cable before checking the circuit.

Precautions For Harness Repair

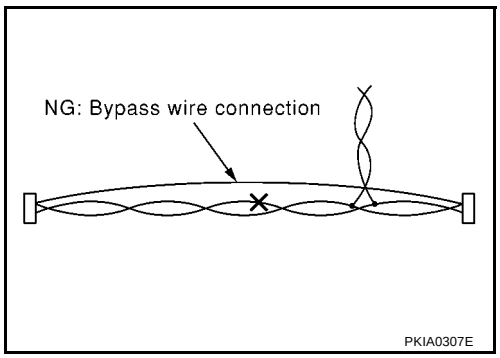
EKS008WH

CAN SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)



Wiring Diagrams and Trouble Diagnosis

EKS006ZV

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When you perform trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses" in GI section
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

COMBINATION METERS

PFP:24814

System Description

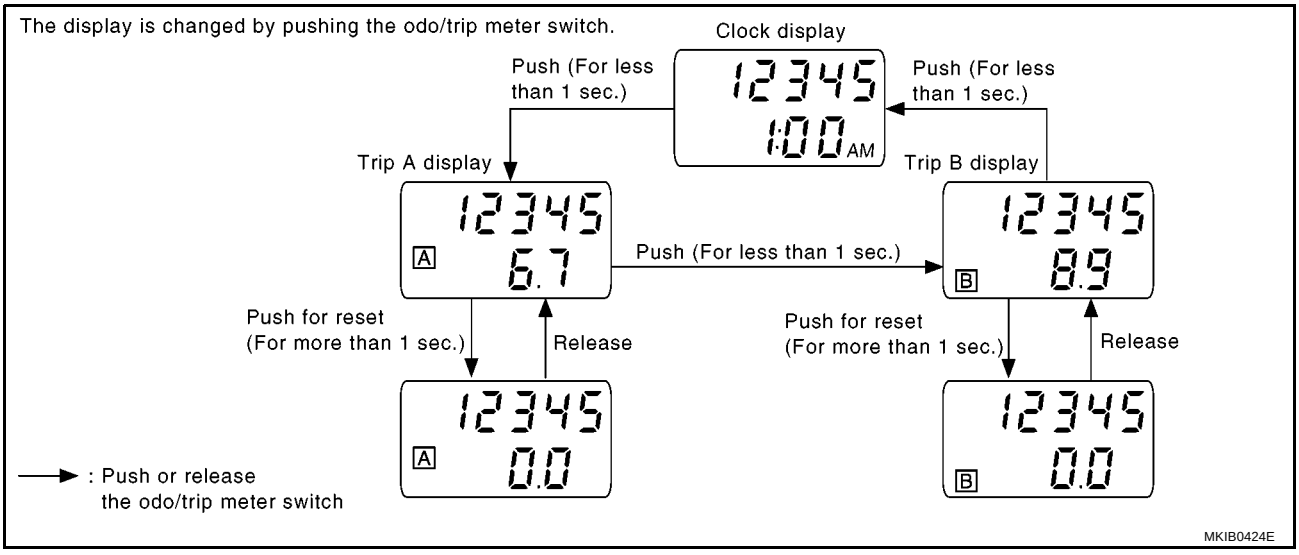
EKS00822

UNIFIED CONTROL METER

- Speedometer, odo/trip meter, tachometer, fuel gauge and water temperature lamps are controlled totally by control unit built in combination meter.
- Signal of speedometer, odo/trip meter, tachometer and water temperature indicator/warning lamps are received via CAN communication line.
- Engine coolant temperature is indicated by water temperature (High) warning lamp and water temperature (Low) indicator lamp.
- Digital meter is adopted for odo/trip meter*.
  *: The record of the odometer is kept even if the battery cable is disconnected. The record of the trip meter is erased when the battery cable is disconnected.
- Odo/trip meter display segments can be checked in self-diagnosis mode.
- Meter/gauge can be checked in self-diagnosis mode.

HOW TO CHANGE THE DISPLAY FOR ODO/TRIP METER

- The CAN communication signals (vehicle speed signal) from ABS actuator and electric unit (control unit), and the memory signals from the meter memory circuit are processed by the combination meter, and the mileage is displayed.
- Operating the odo/trip meter switch allows switching the mode in the following order.



- The odo/trip meter display switching and trip display resetting can be identified by the time from pressing the odo/trip meter switch to releasing it.
- When resetting with trip A displayed, only trip A display is reset (same as trip B).

POWER SUPPLY AND GROUND CIRCUIT

Power is supplied at all times

- through 10A fuse [No. 8, located in the fuse block (J/B)]
- to combination meter terminal 27.

With the ignition switch in the ON or START position, power is supplied

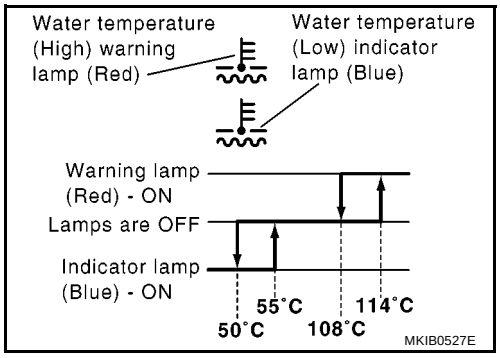
- through 10A fuse [No. 2, located in the fuse block (J/B)]
- to combination meter terminal 28.

Ground is supplied

- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20.

WATER TEMPERATURE WARNING/INDICATOR LAMP

The water temperature warning/indicator lamp indicate the engine coolant temperature.
ECM provides a engine coolant temperature signal to combination meter for water temperature warning/indicator lamp via CAN communication line.
When turn ignition switch ON, water temperature (High) warning lamp and water temperature (Low) indicator lamp will be ON for 2 seconds.
After engine started,



- Water temperature (Low) indicator lamp will be ON while engine coolant temperature is less than 55 °C.
- Water temperature (Low) indicator lamp will be OFF while engine coolant temperature is more than 55 °C.
- Water temperature (High) warning lamp and water temperature (Low) indicator lamp will be OFF, while engine coolant temperature is between 55 °C and 114 °C.
- Water temperature (High) warning lamp will be ON, while engine coolant temperature is more than 114 °C.

TACHOMETER

The tachometer indicates engine speed in revolution per minutes (rpm).
ECM provides an engine speed signal to combination meter for tachometer via CAN communication line.

FUEL GAUGE

The fuel gauge indicates the approximate fuel level in the fuel tank.
The fuel gauge is regulated by a variable resistor signal supplied

- to combination meter terminal 6 for the fuel level sensor
- from terminal 2 of the fuel level sensor unit
- through terminal 4 of the fuel level sensor unit and
- through combination meter terminal 24.

SPEEDOMETER

ABS actuator and electric unit (control unit) provides a vehicle speed signal to the combination meter for the speedometer via CAN communication line.

CAN Communication

EKS00K37

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K38

Go to CAN system, when selecting your car model from the following table.

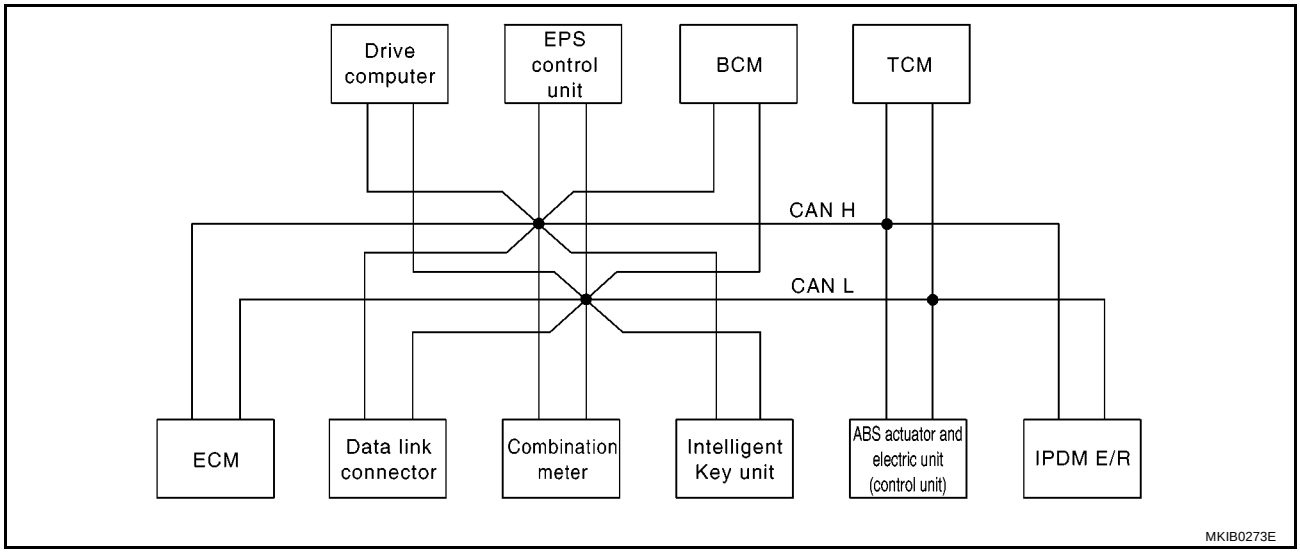
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	DI-8, "TYPE 1/ TYPE 2"				DI-11, "TYPE 3/ TYPE 4"				DI-13, "TYPE 5/ TYPE 6"				DI-16, "TYPE 7/ TYPE 8"				DI-18, "TYPE 9/ TYPE 10"			

×: Applicable

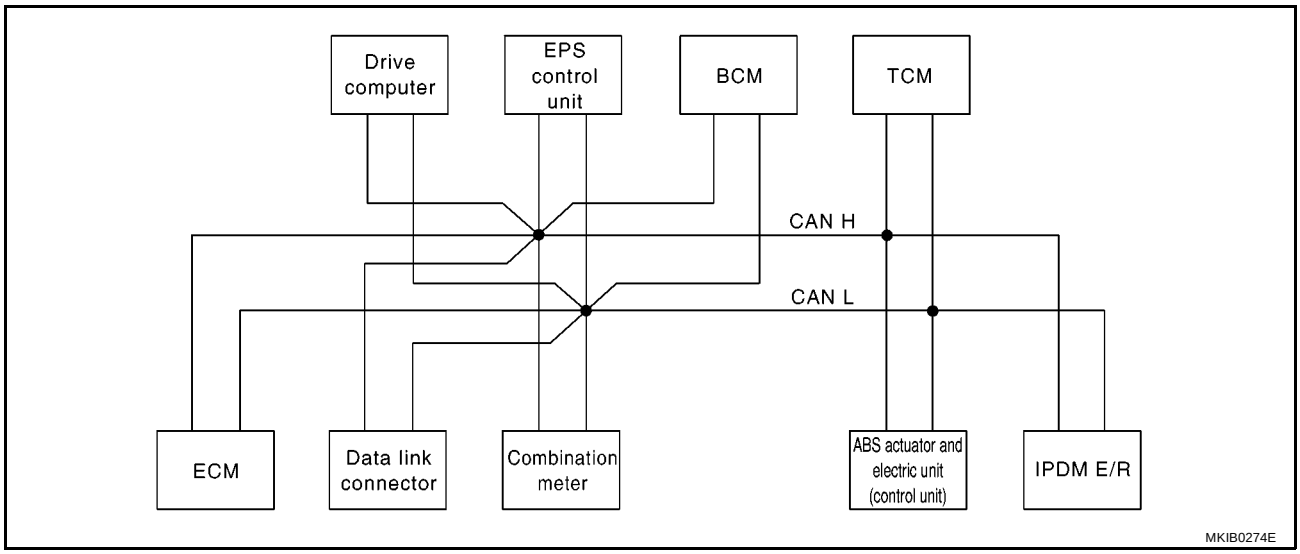
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

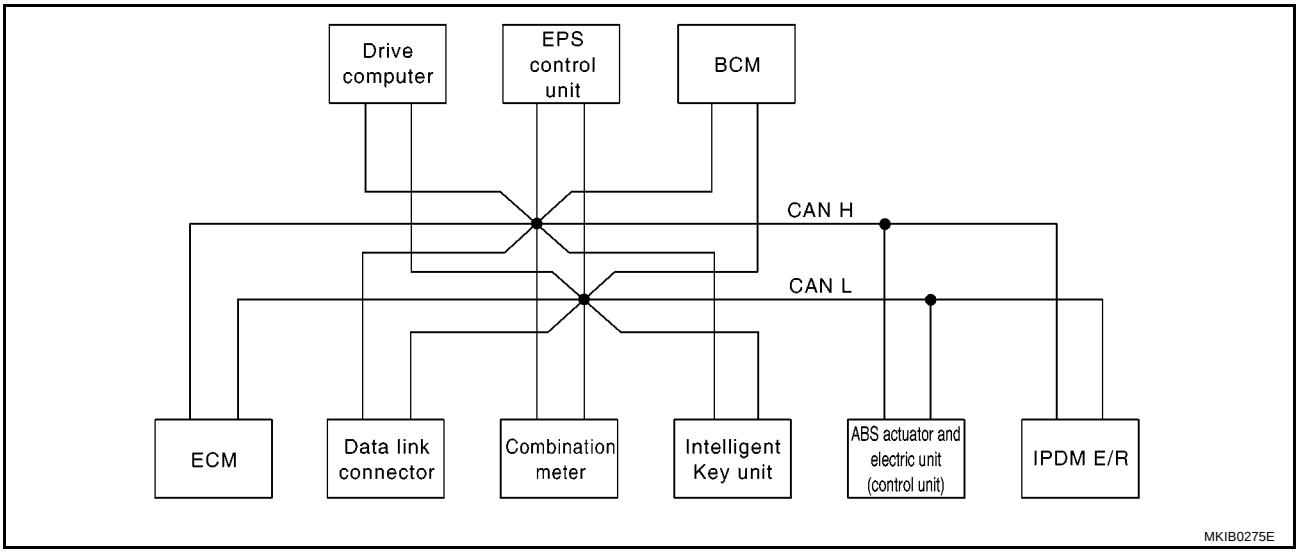
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

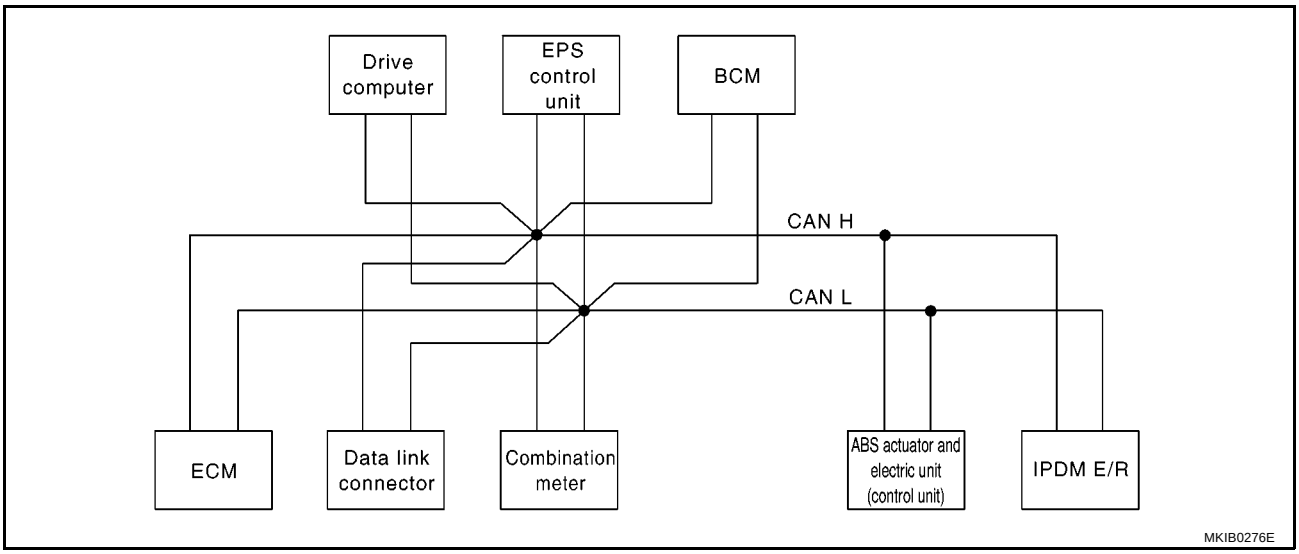
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

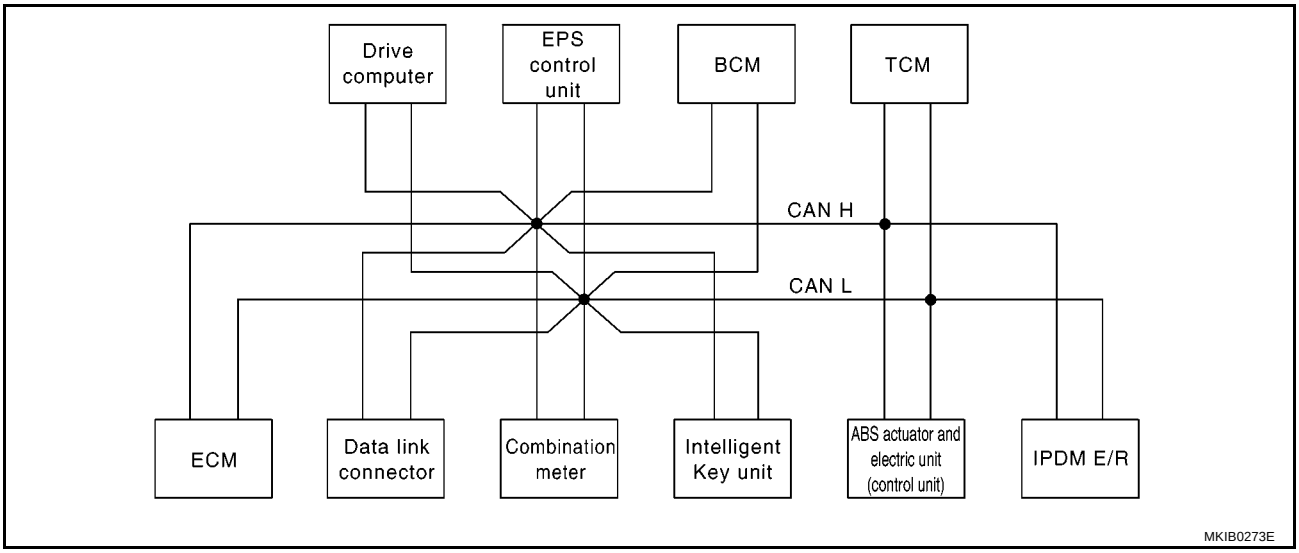
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

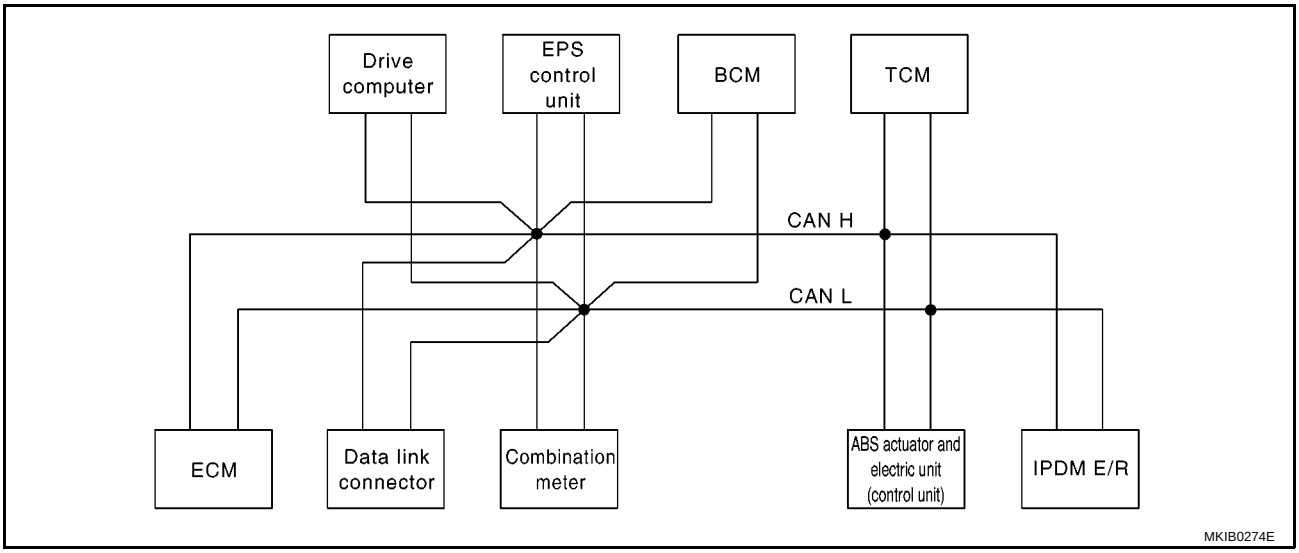
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

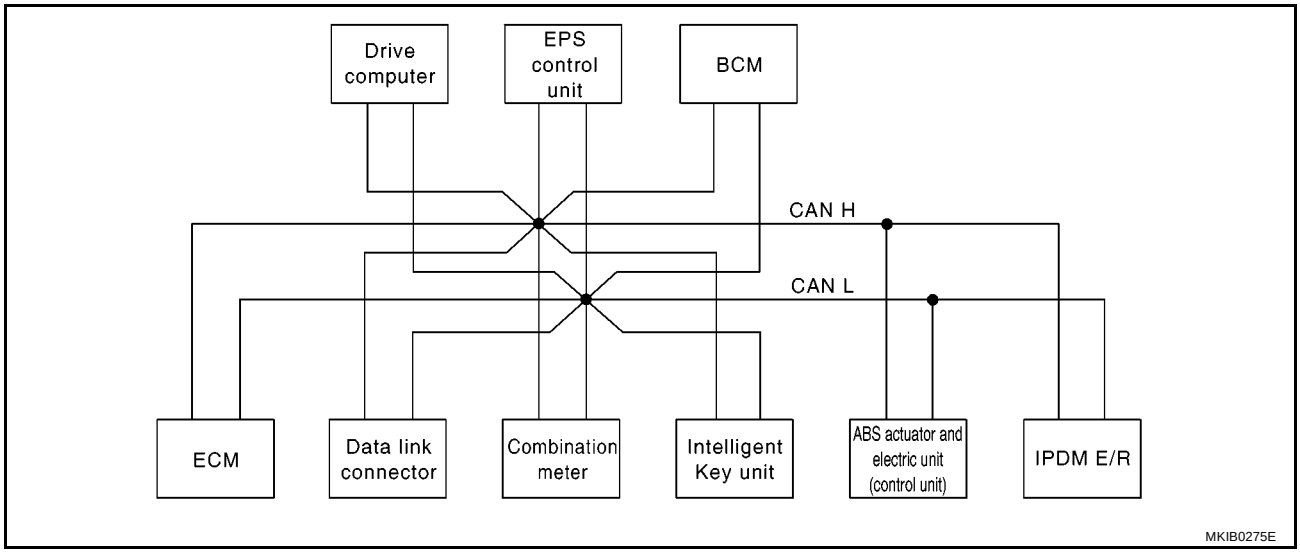
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

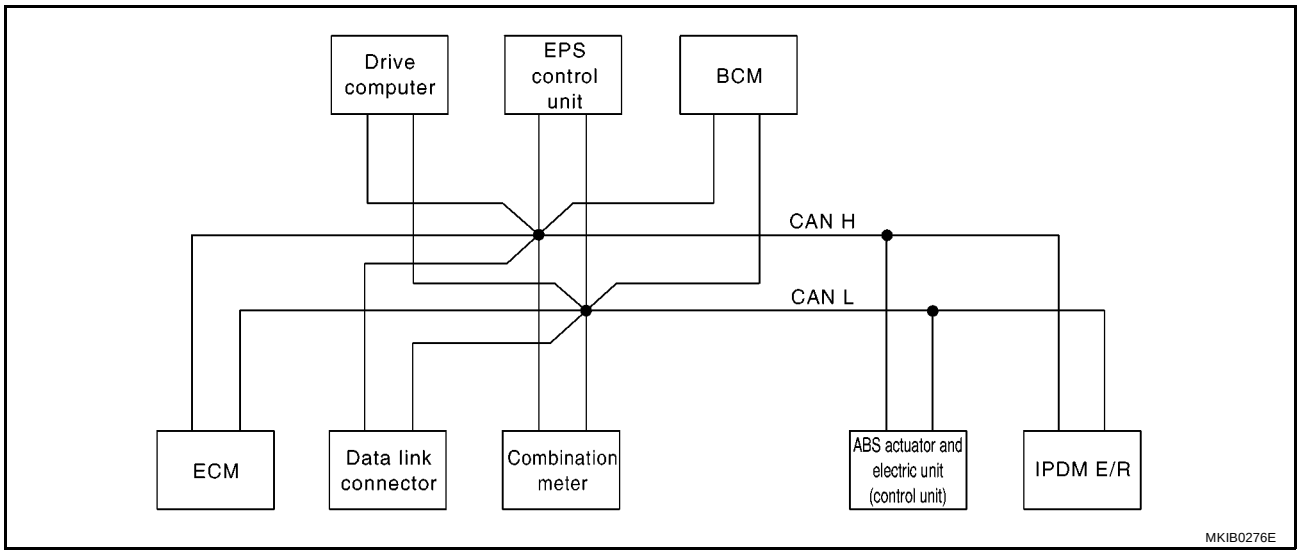
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

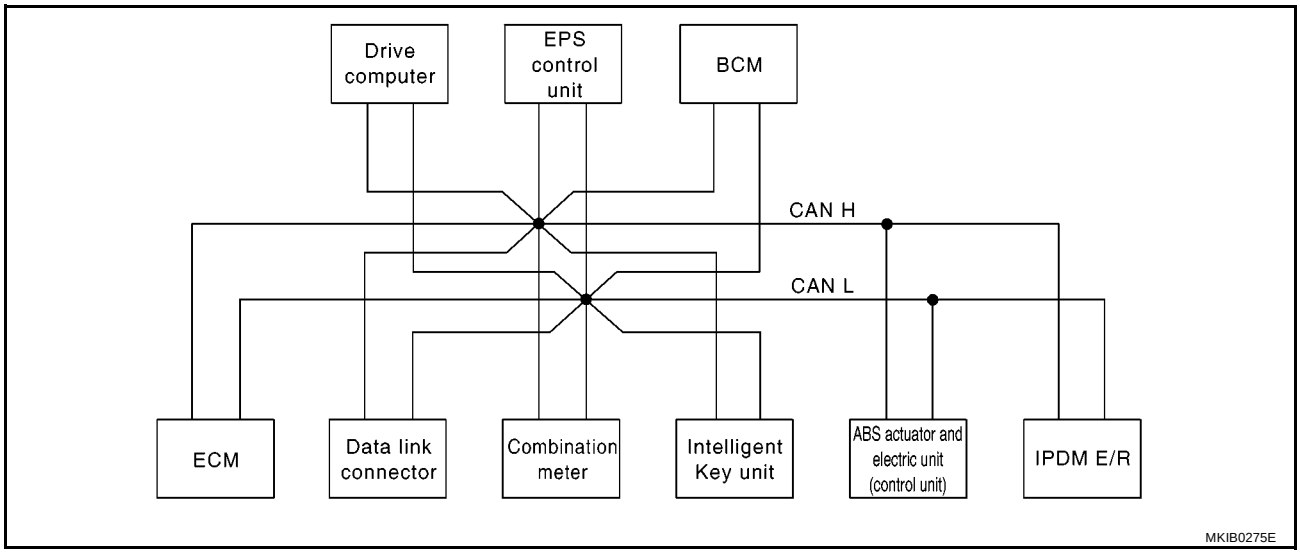
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

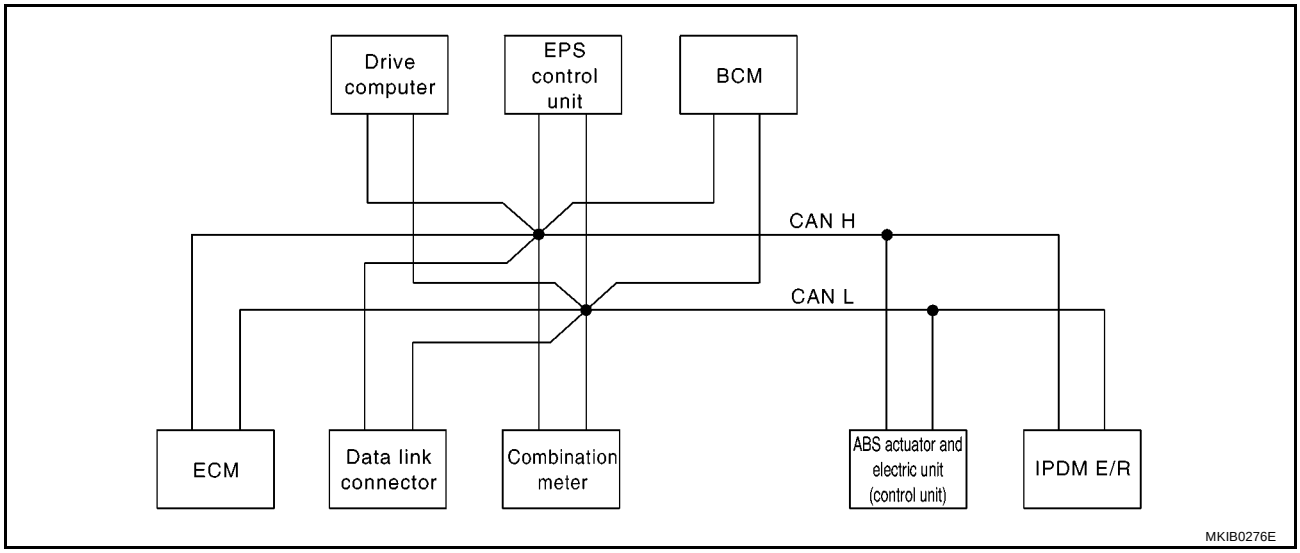
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

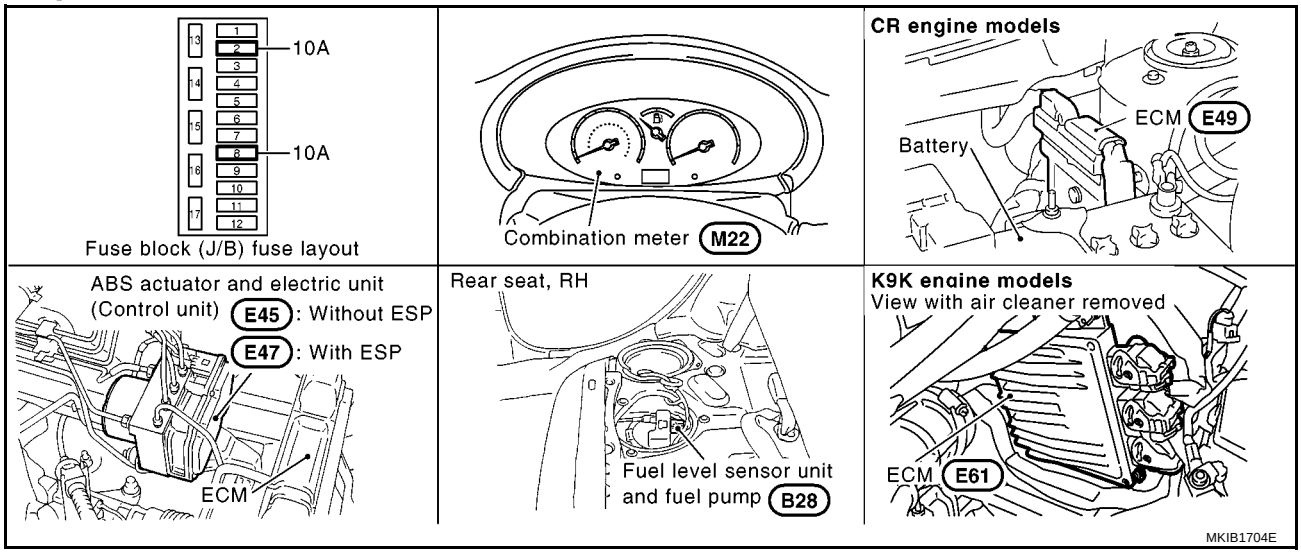
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Component Parts and Harness Connector Location

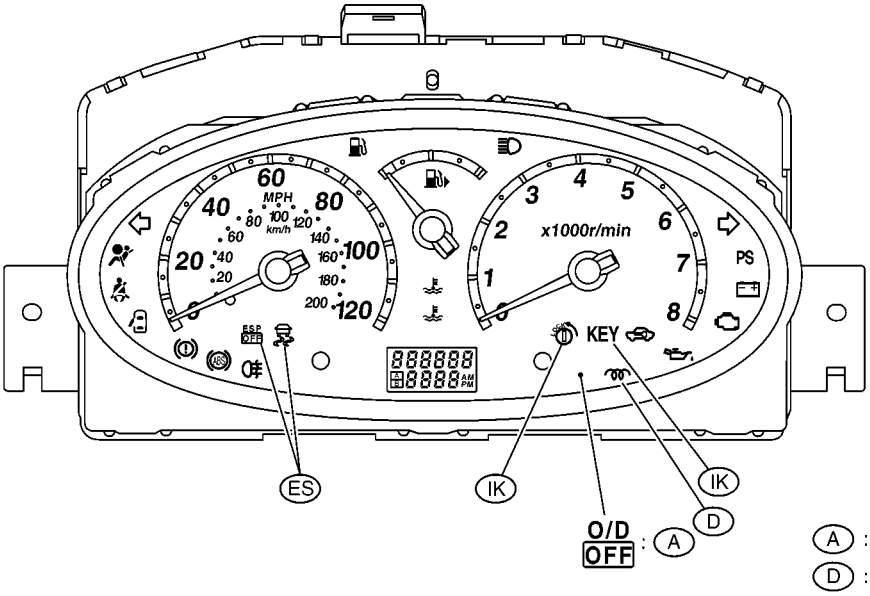
EKS00824



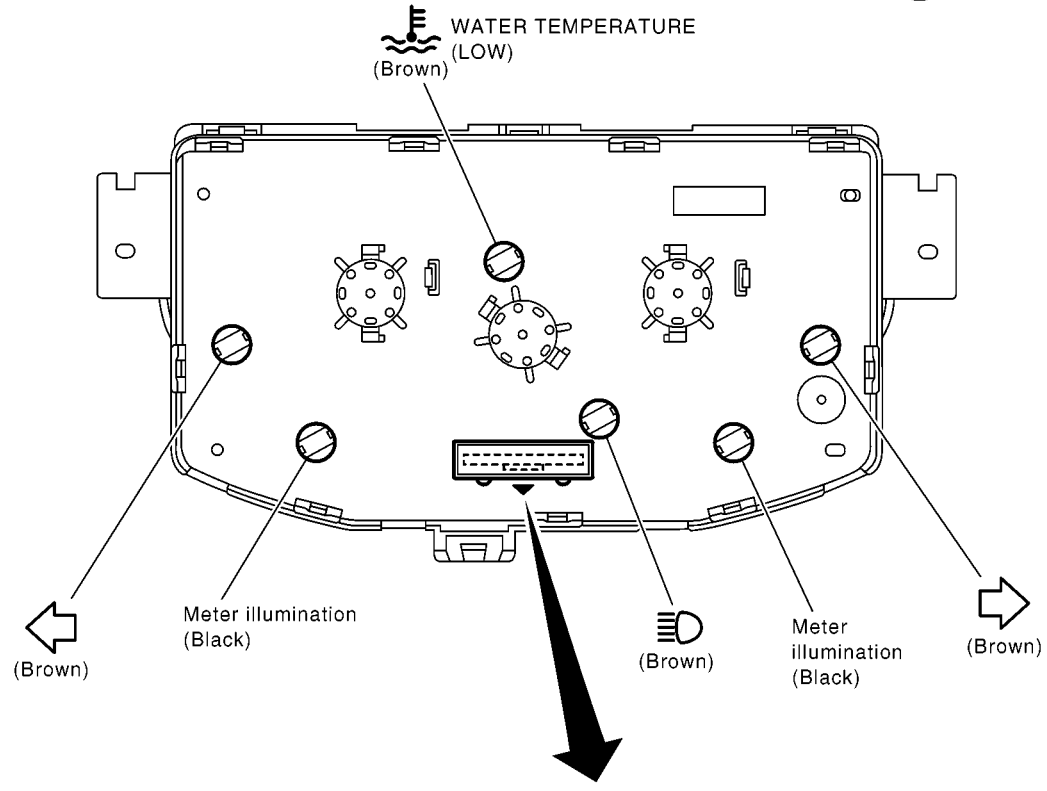
Combination Meter

EKS00825

CHECK



A : With A/T
D : With diesel engine
IK : With Intelligent Key system
ES : With ESP



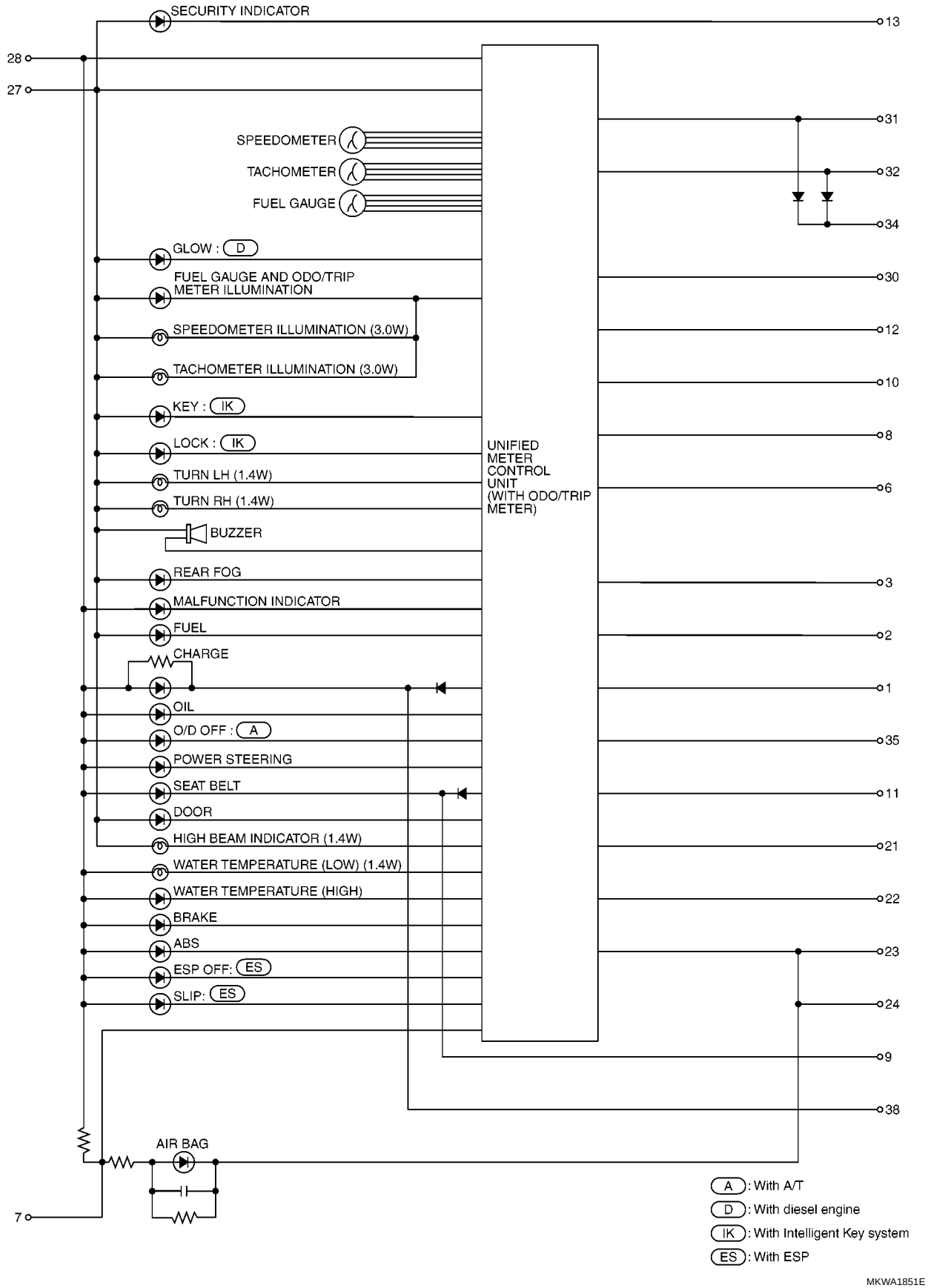
Bulb socket color	Bulb wattage
Brown	1.4W
Black	3.0W

( ): Warning bulb socket color

MKWA1850E

Schematic

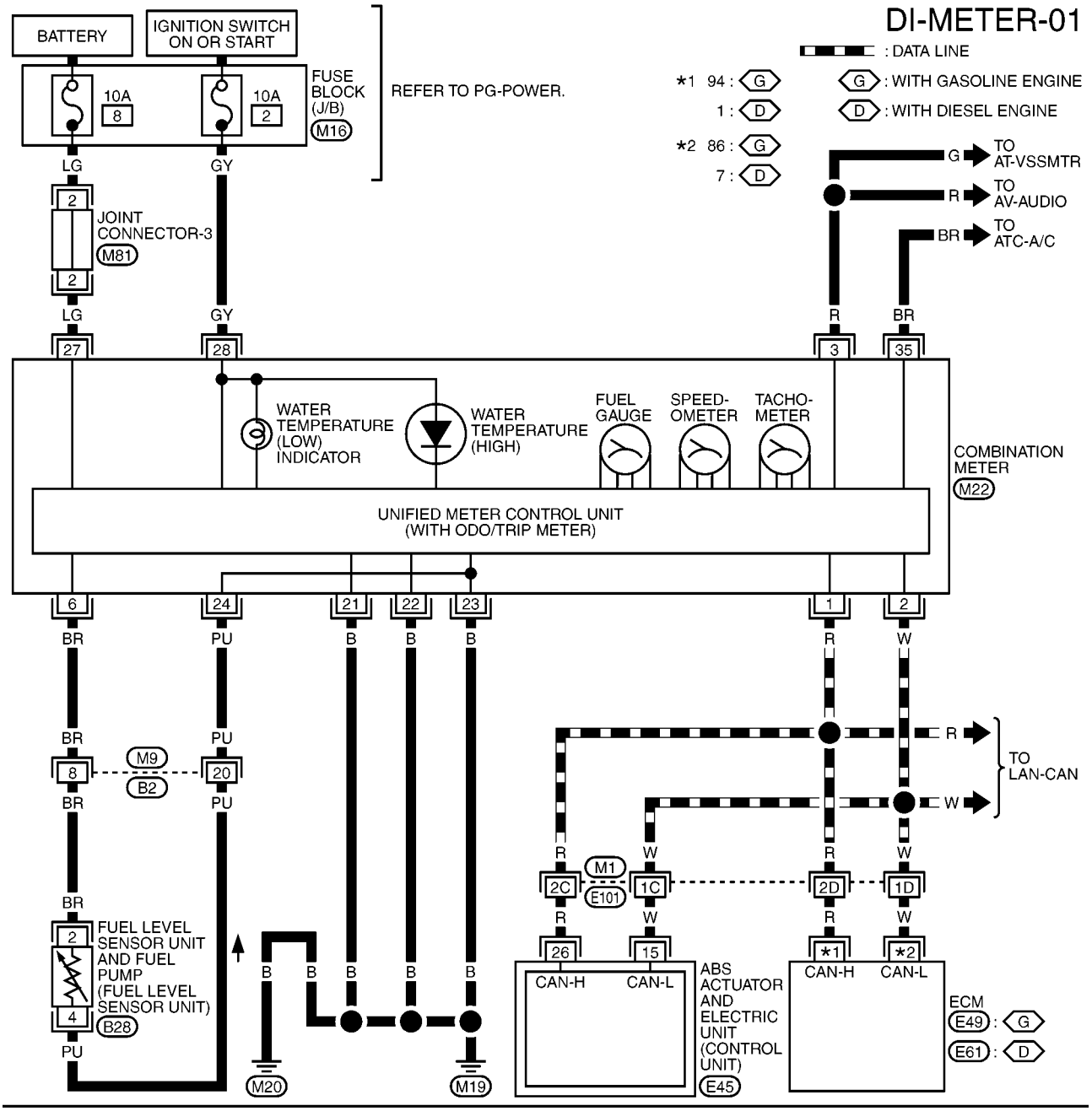
EKS00826

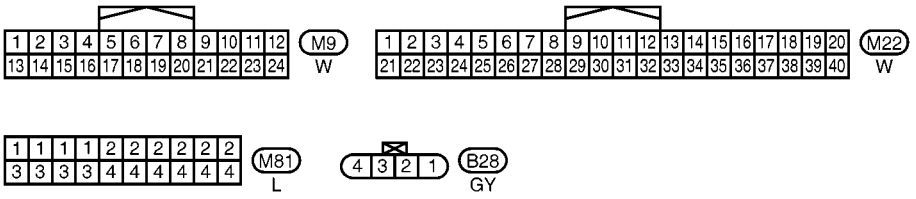


Wiring Diagram — METER —

EKS00827

WITHOUT ESP

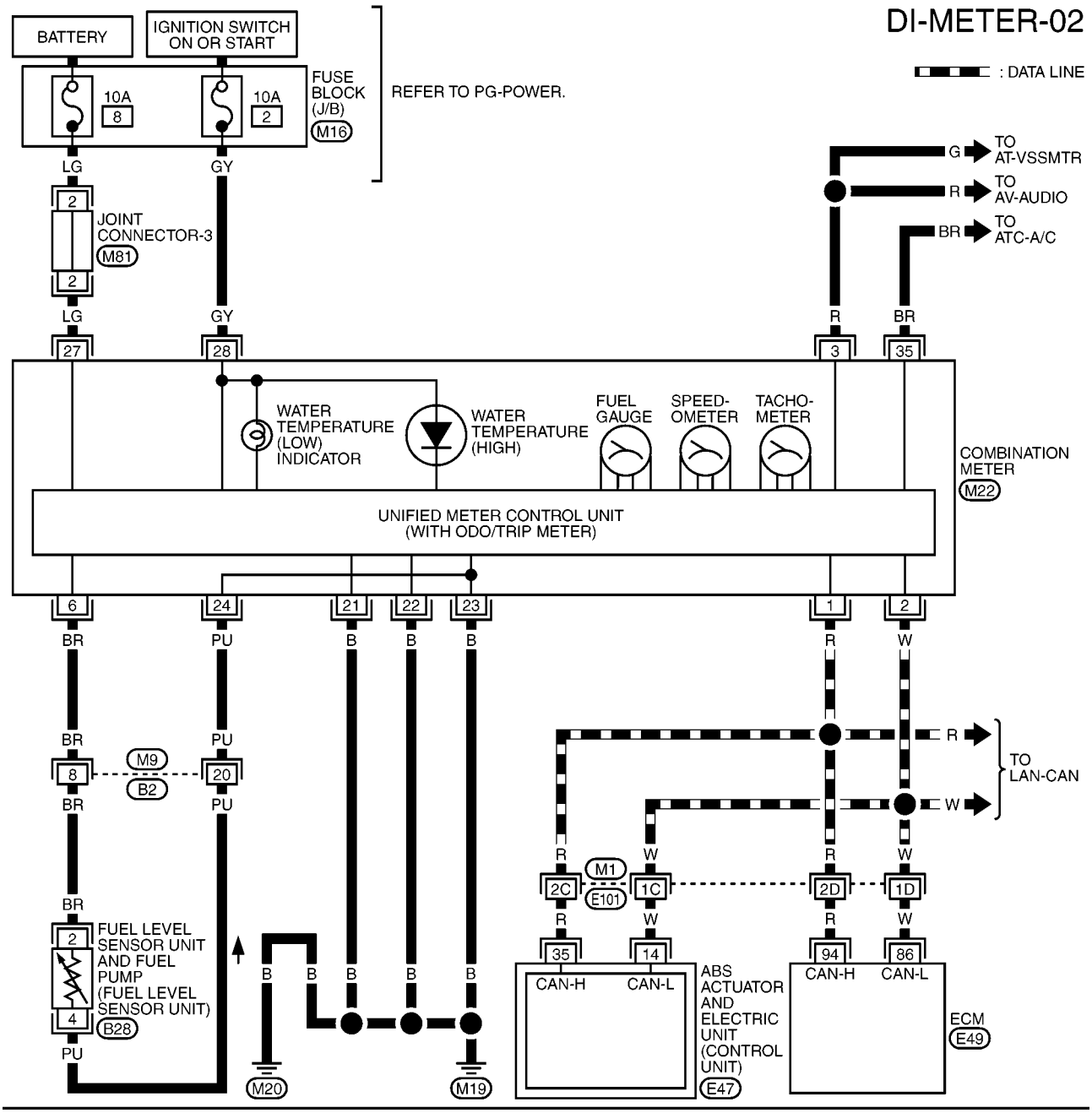


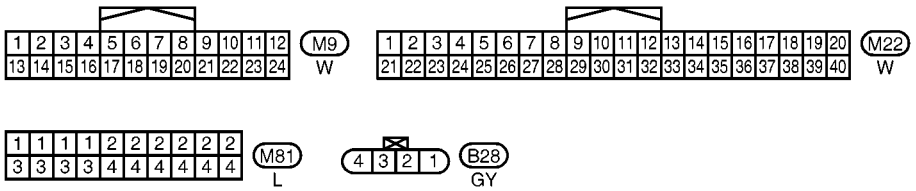


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
E45 , E49 , E61 -ELECTRICAL UNITS

MKWA1801E

WITH ESP





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
E47, E49 -ELECTRICAL UNITS

MKWA1802E

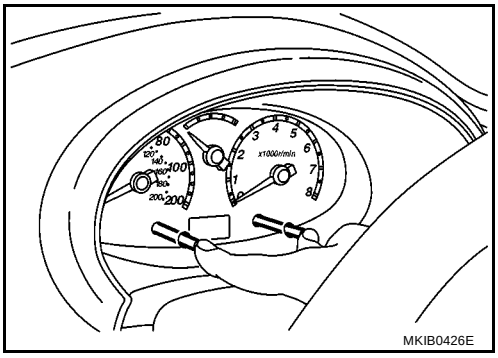
Combination Meter Self-Diagnosis

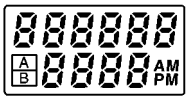
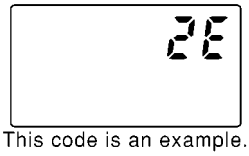
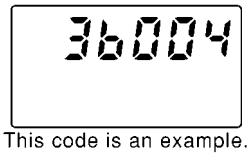
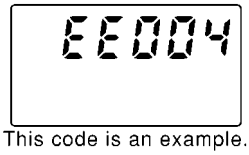
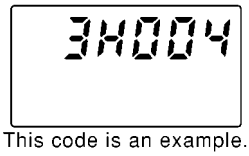
EKS00828

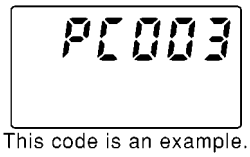
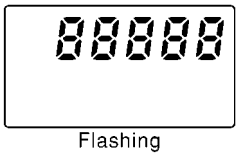
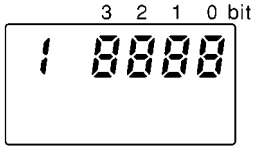
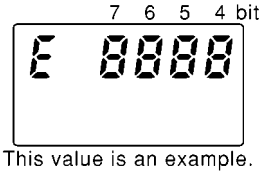
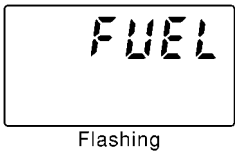
PERFORMING SELF-DIAGNOSIS MODE

1. Turn the ignition switch to the “LOCK” position.
2. Press both reset buttons on the combination meter and keep them depressed.
3. Turn the ignition switch to the “ON” position, while keeping the reset buttons pressed.
4. Release both reset buttons then self-diagnosis will start. The sequence (A to J) is activated by pressing the either reset buttons.

   NOTE:
   If either reset button is not pressed for 20 seconds at each step or if the ignition switch is turned OFF, the self-diagnosis mode is exited.



	Check items	Display	Remarks
A)	Segment test	 MKIB0526E	All odo/trip meter, segments are ON.
B)	Work instruction code	 This code is an example. MKIB0002E	This information is not used for service. Skip this step.
C)	Software code	 This code is an example. MKIB0003E	This information is not used for service. Skip this step.
D)	EEPROM code	 This code is an example. MKIB0004E	This information is not used for service. Skip this step.
E)	Hardware code	 This code is an example. MKIB0005E	This information is not used for service. Skip this step.

	Check items	Display	Remarks
F)	PCB code	 This code is an example. MKIB0006E	This information is not used for service. Skip this step.
G)	Meter/gauge test (Sweeping movement)	 Flashing MKIB0007E	Tachometer, speedometer, fuel level gauge and have sweeping movement test. (The meter/gauges operate MIN. → MAX., MAX. → MIN. for 2 times) Water temperature (High) warning lamp and water temperature (Low) indicator lamp are ON. during the sweep movement. The odo/trip meter segment flashes during the sweep movement.
H)	Error 1 (Bit 0 - Bit 3)	 This value is an example. MKIB0008E	The segment of each bit displays “0”, meaning no malfunction. If the bit(s) displays figures other than “0”, the item of the bit has malfunctioned. For details, refer to DI-27, "Malfunction Chart for “Error 1” and “Error E”" .
I)	Error E (Bit 4 - Bit 7)	 This value is an example. MKIB0009E	
J)	Fuel warning lamp test	 Flashing MKIB0010E	All warning lamp and indicator lamp are ON [Except for water temperature (High) warning lamp, water temperature (Low) indicator lamp and security indicator lamp] and odo/trip meter segment “FUEL” flashes.

Malfunction Chart for “Error 1” and “Error E”

Bit	Detectable items	Description of the malfunction		Displayed figure on the bit	
				Malfunction	No malfunction
0	Speedometer input signal	No input signal When no signal is detected for 30 minutes continuously with the ignition ON, it should be judged as signal malfunction. (If input signal is detected later, then the judgement will be canceled immediately.)		1	0
		Unusual input signal When any signal of frequency which would not exist in normal conditions is detected, it should be judged as signal malfunction.		2	
1	Tachometer input signal	No input signal When no signal is detected for 30 minutes continuously with the ignition ON, it should be judged as signal malfunction. (If input signal is detected later, then the judgement will be canceled immediately.)		1	0
		Unusual input signal When any signal of frequency which would not exist in normal conditions is detected, it should be judged as signal malfunction.		2	
2	Fuel level input signal	Short circuit When short circuit of the signal line is detected for 5 seconds or more, it should be judged as short-circuit malfunction.		1	0
		Open circuit When open circuit of the signal line is detected for 5 seconds or more, it should be judged as open-circuit malfunction.		2	
3	Water temperature input signal	Short circuit When short circuit of the signal line is detected for 5 seconds or more, it should be judged as short-circuit malfunction.		1	0
		Open circuit When open circuit of the signal line is detected for 5 seconds or more, it should be judged as open-circuit malfunction.		2	
4	Reset buttons	Short circuit for reset buttons When the short circuit is continuously detected for 5 minutes or more, it should be judged as short-circuit malfunction.	Right side reset button has malfunctioned.	1	0
			Left side reset button has malfunctioned.	2	
			Both reset buttons have malfunctioned.	3	
5	CPU	CPU RAM malfunction		1	0
6	—	—		0	0

Trouble Diagnoses

EKS00829

PRELIMINARY CHECK

1. CHECK POWER SUPPLY

1. Turn ignition switch ON.
2. Warning lamps should illuminate (seat belt warning or door warning etc.).

Do warning lamps illuminate?

YES >> GO TO 2.
NO >> Power supply and ground check. Refer to DI-31, "Power Supply and Ground Circuit Check" .

2. CHECK OPERATION OF SELF-DIAGNOSIS MODE

Perform self-diagnosis mode. Refer to DI-25, "Performing Self-Diagnosis Mode" .

Can self-diagnosis mode be activated?

YES >> GO TO 3.
NO >> Replace combination meter. Refer to DI-34, "Removal and Installation for Combination Meter" .

3. CHECK OPERATION OF METER/GAUGE

Check meter/gauge operation in self-diagnosis mode (Meter/gauge test). Refer to DI-25, "Performing Self-Diagnosis Mode" .

Is any malfunction indicated in self-diagnosis mode?

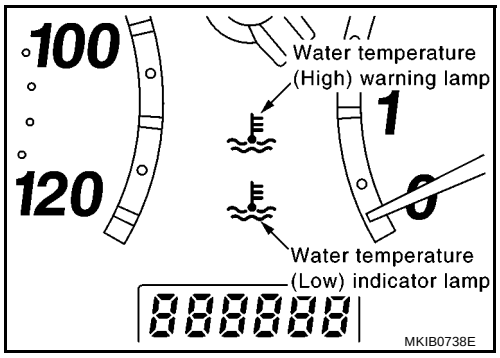
YES >> GO TO “Symptom Chart 1”. Refer to DI-30, "Symptom Chart 1" .
NO >> GO TO 4.

4. CHECK WATER TEMPERATURE WARNING/INDICATOR

Check meter/gauge operation in self-diagnosis mode (Meter/gauge test). Refer to DI-25, "Combination Meter Self-Diagnosis" .

Does water temperature (High) warning lamp and water temperature (Low) indicator is ON?

Yes >> GO TO 5.
Both lamps are OFF>>Replace combination meter.
Only water temperature (High) warning lamp is ON>> Replace combination meter.
Only water temperature (Low) indicator lamp is ON>> Check bulb.

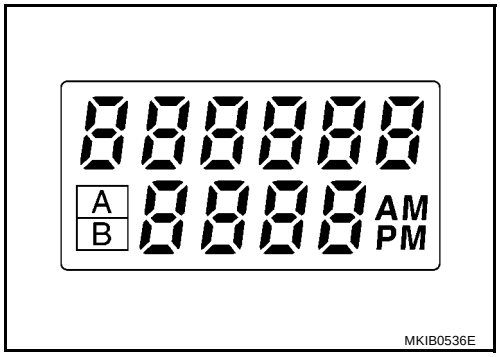


5. CHECK SEGMENTS

Check all odo/trip meter segments in self-diagnosis mode (Odo/trip meter segment test). Refer to DI-25, "Performing Self-Diagnosis Mode" .

Is any malfunction indicated in self-diagnosis mode?

YES >> GO TO “Symptom Chart 1”. Refer to DI-30, "Symptom Chart 1" .
NO >> GO TO 6.



6. CHECK WARNING INDICATOR LAMP

Check fuel warning lamp in self-diagnosis mode (Fuel warning lamp test). Refer to DI-25, "Performing Self-Diagnosis Mode" .

All warning/indicator lamp should turn ON.*

*** Except for water temperature (High) warning lamp, water temperature (Low) indicator lamp and security indicator lamp.**

OK or NG

OK >> GO TO 7.
NG >> Replace combination meter.

7. CHECK INPUT SIGNALS

Check input signals from each sensors in self-diagnosis mode (Error 1 and Error E). Refer to DI-27, "Malfunction Chart for “Error 1” and “Error E”" .

OK or NG

OK >> GO TO 8.
NG >> GO TO “Symptom Chart 2”. Refer to DI-30, "Symptom Chart 2" .

8. CHECK OTHER MALFUNCTION

Check each malfunction according to the instruction of the “SYMPTOM CHART 3”. Refer to DI-30, "Symptom Chart 3" .

OK or NG

OK >> Combination meter is OK.
NG >> Check the case of malfunction.

SYMPTOM CHART

Symptom Chart 1

Symptom	Possible causes	Repair order
Odo/trip meter indicates malfunction in Diagnosis mode.	Unified meter control unit	Replace combination meter. Refer to DI-34, "Removal and Installation for Combination Meter" .
Multiple meter/gauge indicate malfunction in Diagnosis mode.		
One of speedometer/tachometer/fuel gauge/Water temperature (High) warning lamp. indicates malfunction in Diagnosis mode.		

Symptom Chart 2

Symptom	Possible causes	Repair order
Speedometer input signal indicates malfunction in Diagnosis mode.	Speedometer input signal	Check signal for speedometer. Refer toDI-31, "Inspection/Vehicle Speed Signal" .
Tachometer input signal indicates malfunction in Diagnosis mode.	Tachometer input signal	Check signal for tachometer. Refer to DI-31, "Inspection/Engine Revolution Signal" .
Fuel level input signal indicates malfunction in Diagnosis mode.	Fuel level input signal	Check fuel level signal. Refer to DI-32, "Inspection/Fuel Level Sensor Unit" .
Water temperature input signal Indicates malfunction in Diagnosis mode.	Water temp. warning/indicator lamps input signal	Check water temperature signal. Refer to DI-33, "Inspection/Water Temperature Warning/indicator Lamp" .
Reset buttons indicates malfunction in Diagnosis mode.	Unified meter control unit	Combination meter. Refer toDI-34, "Removal and Installation for Combination Meter" .
CPU indicates malfunction in Diagnosis mode.	Unified meter control unit	Combination meter. Refer toDI-34, "Removal and Installation for Combination Meter" .

Symptom Chart 3

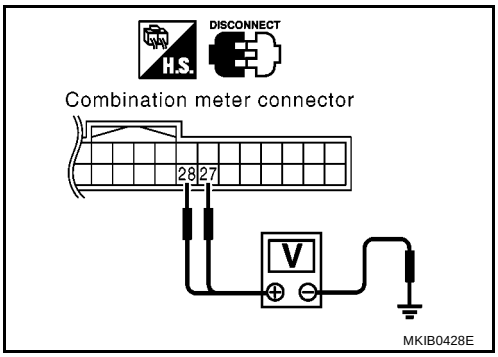
Symptom	Possible causes	Repair order
Fuel gauge pointer fluctuates, Indicator wrong value or varies.	-	Check the case of malfunction. Refer to DI-33, "Fuel Gauge Pointer Fluctuates Indicator Wrong Value or Varies" .
Fuel gauge does not move to “F” position.	-	Check the case of malfunction. Refer to DI-33, "Fuel Gauge Does Not Move to FULL position" .
Fuel gauge does not work.	-	Check the case of malfunction. Refer to DI-34, "Fuel Gauge Does Not Work" .

Power Supply and Ground Circuit Check

EKS0082A

1. CHECK POWER SUPPLY CIRCUIT

1. Disconnect combination meter connector.
2. Check voltage between combination meter harness connector and ground in the following conditions.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M22	27 (LG)	Ground	Battery voltage	Battery voltage	Battery voltage
M22	28 (GY)	Ground	0V	0V	Battery voltage

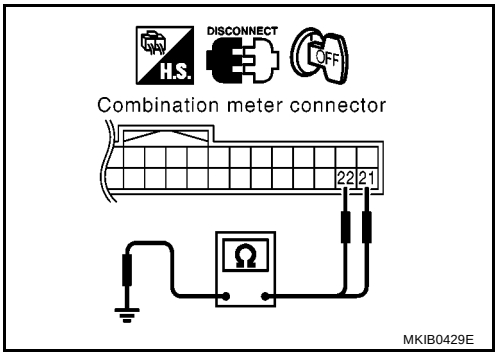
OK or NG

OK >> GO TO 2.
NG >> Check the following.

- 10A fuse [No. 2, located in fuse block (J/B)].
- 10A fuse [No. 8, located in fuse block (J/B)].
- Harness for open or short between fuse and combination meter.

2. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between combination meter and ground.



Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M22	21 (B)	Ground	Yes
M22	22 (B)	Ground	Yes

OK or NG

OK >> INSPECTION END
NG >> Harness for open ground circuit.

Inspection/Vehicle Speed Signal

EKS0082C

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT SYSTEM

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-20, "CONSULT-II Functions".

OK or NG

OK >> Perform “PRELIMINARY CHECK” again.
NG >> Perform “Diagnostic procedure” for displayed self-diagnosis result.

Inspection/Engine Revolution Signal

EKS0082D

1. CHECK ECM SYSTEM

Perform ECM self-diagnosis. Refer to EC-48, "Emission-related Diagnostic Information" (CR engine models with EURO-OBD), EC-508, "Emission-related Diagnostic Information" (CR engine models without EURO-OBD) or EC-K9K-57, “Trouble diagnosis — Introduction”, “DIESEL INJECTION” (K9K engine models).

OK or NG

OK >> Perform “PRELIMINARY CHECK” again.
NG >> Perform “Diagnostic procedure” for displayed DTC.

Inspection/Fuel Level Sensor Unit

EKS0082E

FUEL LEVEL SENSOR UNIT

The following symptoms do not indicate a malfunction.

- Depending on vehicle posture or driving circumstance, the fuel level in the tank varies, and the pointer may fluctuate.
- If the vehicle is fueled with the ignition switch ON, the pointer will move slowly.

LOW-FUEL WARNING LAMP

Depending on vehicle posture or driving circumstance, the fuel level in the tank varies, and the warning lamp ON timing may be changed.

1. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Check combination meter, fuel level sensor unit and terminals (meter-side, module-side, and harness-side) for poor connection and bend.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace terminals or connectors.

2. CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT

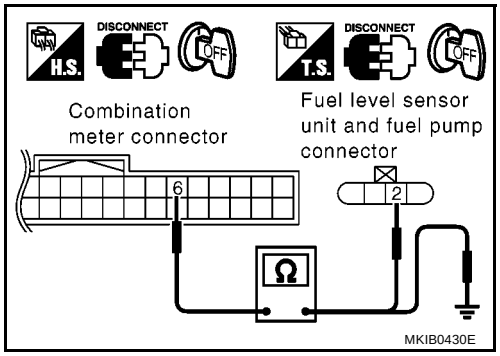
1. Disconnect fuel level sensor unit connector and combination meter connector.
2. Check the following.

– Harness continuity between fuel level sensor unit and fuel pump harness connector B28 terminal 2 (BR) and combination meter harness connector M22 terminal 6 (BR).

2 (BR) – 6 (BR) : Continuity should exist.

– Harness continuity between combination meter harness connector M22 terminal 6 (BR) and ground.

6 (BR) – Ground : Continuity should not exist.



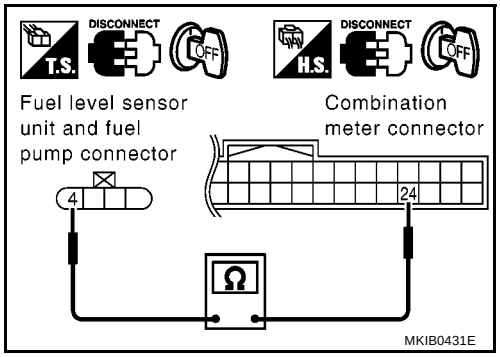
OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK FUEL LEVEL SENSOR GROUND CIRCUIT

Check harness continuity between fuel level sensor unit and fuel pump harness connector B28 terminal 4 (PU) and combination meter connector M22 terminal 24 (PU).

4 (PU) – 24 (PU) : Continuity should exist.



OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK FUEL LEVEL SENSOR UNIT

Refer to DI-34, "FUEL LEVEL SENSOR UNIT CHECK" .

OK or NG

OK >> GO TO 5.
NG >> Replace fuel level sensor unit.

5. CHECK INSTALLATION CONDITION

Check fuel level sensor unit installation, and check whether the float arm interferes or binds with any components inside the arm.

OK or NG

OK >> Replace combination meter.
NG >> Install fuel level sensor unit properly.

Inspection/Water Temperature Warning/indicator Lamp

EKS0082F

1. CHECK ECM SYSTEM

Perform ECM self-diagnosis. Refer to EC-48, "Emission-related Diagnostic Information" (CR engine models with EURO-OBD), EC-508, "Emission-related Diagnostic Information" (CR engine models without EURO-OBD) or EC-K9K-57, “Trouble diagnosis — Introduction”, “DIESEL INJECTION” (K9K engine models).

OK or NG

OK >> Perform “PRELIMINARY CHECK” again.
NG >> Perform “Diagnostic procedure” for displayed DTC.

Fuel Gauge Pointer Fluctuates Indicator Wrong Value or Varies

EKS0082G

1. CHECK FUEL GAUGE FLUCTUATION

Test drive vehicle to see if gauge fluctuates only during driving or at the instant of stopping.

Does the indication value vary only during driving or at the instant of stopping?

YES >> The pointer fluctuation may be caused by fuel level change in the fuel tank. Condition is normal.
NO >> Ask the customer about the situation when the symptom occurs in detail, and perform the trouble diagnosis.

Fuel Gauge Does Not Move to FULL position

EKS0082H

1. QUESTION 1

Does it take a long time for the pointer to move to FULL position?

YES or NO

YES >> GO TO 2.
NO >> GO TO 3.

2. QUESTION 2

Was the vehicle fueled with the ignition switch ON?

YES or NO

YES >> Be sure to fuel the vehicle with the ignition switch OFF. Otherwise it will take a long time to move to FULL position because of the characteristic of the fuel gauge.
NO >> GO TO 3.

3. QUESTION 3

Is the floor or the vehicle inclined?

YES or NO

YES >> It may not be filled fully.
NO >> GO TO 4.

4. QUESTION 4

During driving, does the fuel gauge pointer move gradually toward EMPTY position?

YES or NO

YES >> Check the components. Refer to DI-34, "Electrical Components Inspection" .
NO >> The float arm may interfere or bind with any of the components in the fuel tank.

Fuel Gauge Does Not Work

EKS0082I

1. CHECK HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Check combination meter, fuel level sensor unit and terminals (meter-side, and harness-side) for poor connection and bend.

OK or NG

OK >> GO TO 2.
NG >> Repair connector.

2. CHECK INSTALLATION CONDITION

Check fuel level sensor unit installation [refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" (CR engine models) or FL-17, "FUEL LEVEL SENSOR UNIT" (K9K engine models)], and check whether the float arm interferes or binds with any components inside the arm.

OK or NG

OK >> Perform “PRELIMINARY CHECK” again.
NG >> Check fuel level sensor unit. Refer to DI-34, "Electrical Components Inspection" .

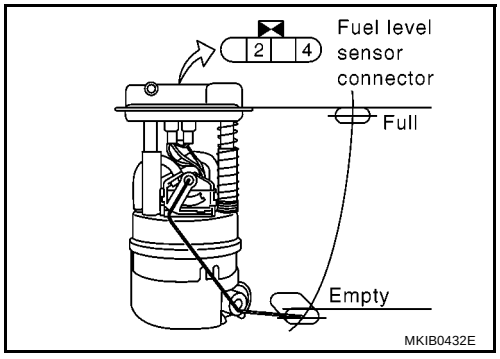
Electrical Components Inspection

EKS0082J

FUEL LEVEL SENSOR UNIT CHECK

For removal, refer to [refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" (CR engine models) or FL-17, "FUEL LEVEL SENSOR UNIT" (K9K engine models)].
Check the resistance between terminals 2 and 4.

Ohmmeter		Float position	Resistance value [Ω]
(+)	(–)		
4	2	Full	Approx. 46
		Empty	Approx. 320



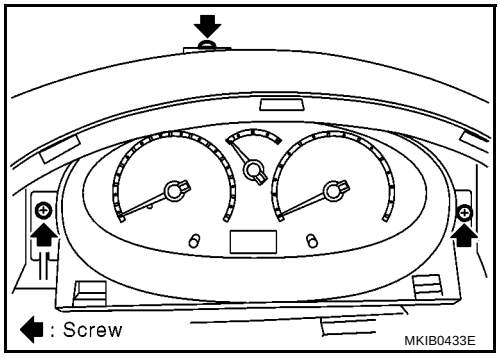
Removal and Installation for Combination Meter

EKS0082K

CAUTION:
Always replace with new* combination meter when the combination meter replacement is required.
***: New one means virgin control unit that has never been energized on-board.**

REMOVAL

1. Remove the upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .
2. Remove the steering column cover. Refer to IP-6, "F. Steering Column Cover" .
3. Remove the cluster lid A. Refer to IP-7, "H. Cluster lid “A”" .
4. Remove the screws (4), and pull out combination meter.
5. Disconnect connectors and remove combination meter.

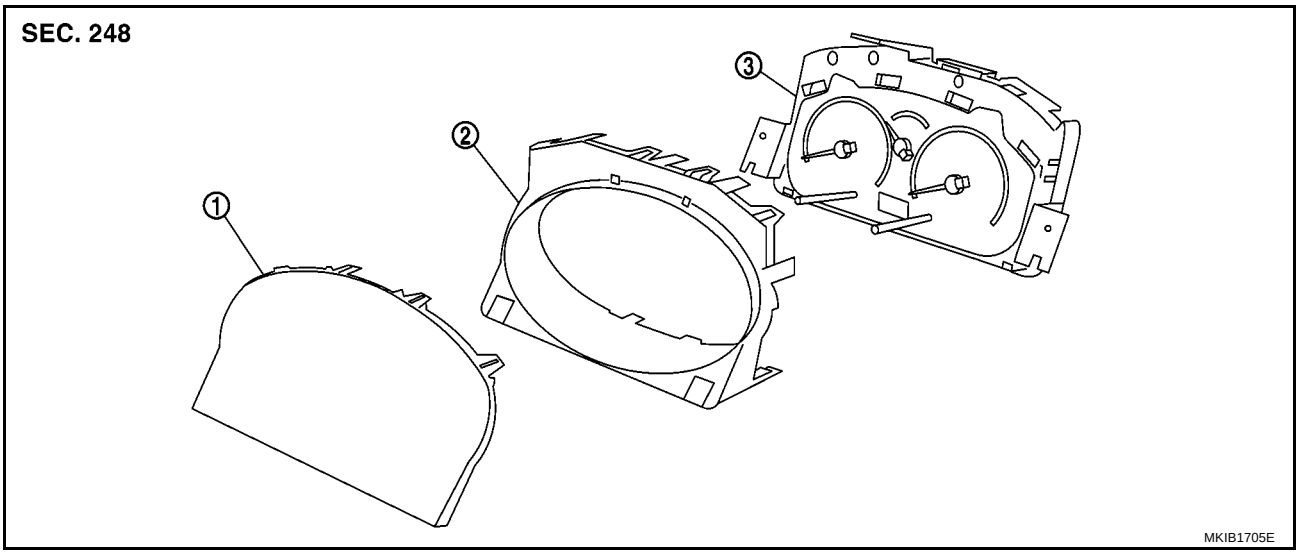


INSTALLATION

- Install in the reverse order of removal.

Disassembly and Assembly for Combination Meter

EKS0082L



1. Front cover
2. Upper housing
3. Unified meter control unit assembly

1. Disengage the tabs (13) to separate upper housing.
2. Disengage the tabs (7) to separate front cover.

DRIVE COMPUTER

PFP:24859

System Description

EKS0082M

Refer to Owner's Manual for drive computer operating instructions.
Drive computer can be set anniversary information, maintenance information, clock and calender, etc.
And, drive computer is displayed drive information, outside temperature and warning information, etc.

POWER SUPPLY AND GROUND

Power is supplied at all times

- through 10A fuse [No. 8, located in fuse block (J/B)]
- to drive computer terminal 6 and
- to combination meter terminals 27.

When ignition switch is in ACC or ON position, power is supplied

- through 10A fuse [No. 12, located in fuse block (J/B)]
- to drive computer terminal 5.

When ignition switch is in ON or START position, power is supplied

- through 10A fuse [No. 4, located in fuse block (J/B)]
- to display unit terminal 4, and
- through 10A fuse [No. 2, located in fuse block (J/B)]
- to combination meter terminal 28.

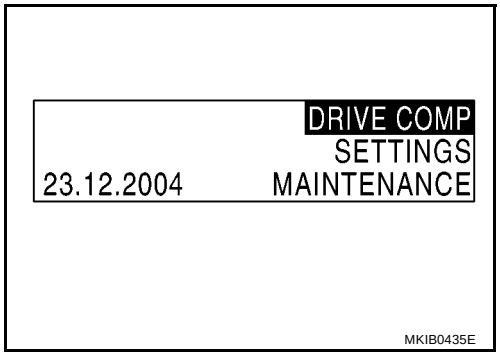
Ground is supplied

- to drive computer terminals 12
- to combination meter terminals 21, 22 and 23
- through body grounds, M19 and M20.

DISPLAY MENU

Turn ignition switch ON, the following function is displayed.

- CLOCK: This clock is to have 12/24 hour mode
- CALENDAR: Calendar is displayed
- OUTSIDE AIR TEMPERATURE
- DRIVE COMP
- SETTINGS
- MAINTENANCE



OUTSIDE AIR TEMPERATURE

Outside air temperature is displayed ON when ignition switch ON after 2.5 seconds.

- When the outside air temperature is lower than -30°C or higher than 56°C the display shows. only "– – –" though it is operating. This is not a malfunction.
- When the outside air temperature drops below freezing point (Approx. 3°C), it display as following. (Low temperature warning)

– Outside air temperature is 3°C⋯"3°C" is flushed.
– Outside air temperature is -2°C⋯"°C" is flushed.
– Outside air temperature is more than 4°C low temperature warning is canceled.

Drive computer should read outside air temperature sensor.
The outside air temperature sensor is regulated by a variable resistor signal supplied

- to drive computer terminal 3
- from outside air temperature sensor terminal 1
- through outside air temperature sensor terminal 2 and
- through drive computer terminal 2.

DRIVE COMPUTER

1. Select “DRIVE COMP”.
2. Drive computer has following function.
   - Fuel economy
   - Trip computer
   - Global reset

   Indication can be changed by in the following order by pushing “▼” button.
   Fuel economy→ Trip computer→ Global reset→ Fuel economy

Display items		Display contents
Fuel Economy	Average fuel economy (l/100km)	Displays fuel economy with ignition switch ON, average fuel economy each 30 minutes.
	Instantaneous fuel economy (l/100km)	Displays fuel economy each approx. 100 ms.
	History (l/100 km)	Displays average fuel consumption history.
Trip Computer	Range	Displays range to empty with a range of 0 to 2000km.
	Trip distance (km)	Displays driving distance with a range of 0 to 9999.
	Trip time	Displays driving time with a range of 0 to 99 hour 59 minutes.
	Average speed (km/h)	Displays average speed with a range of 0 to 260 km/h (160 MPH).
Global Reset	Drive computer functions are all reset	

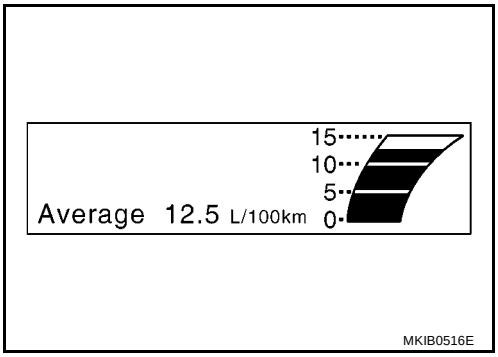
Fuel Economy

1. Select “Fuel Economy”.
2. Fuel Economy has average fuel economy, instantaneous fuel economy and history functions.

Indication can be changed by following order by pushing “▼” button.
Average fuel economy → Instantaneous fuel economy → History

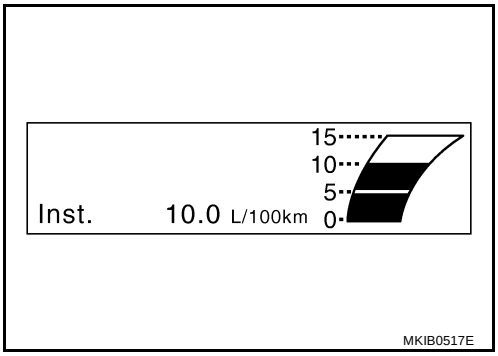
Average fuel economy

- The average fuel economy is conducted by combination meter and sent to drive computer as CAN communication line. Combination meter calculate the average fuel economy by fuel consumption signal and vehicle speed signal.
- Indication will be renewed every 30 seconds.
- When pushing “OK” switch more than approx.1 second, average fuel economy will be reset.
- After reset operation, the display shows “– –.–” until the vehicle is driven 500 m (1,600 ft) or 30 seconds has passed.
- Fuel economy with a range is 0 to 99.9 (ℓ/100 km).



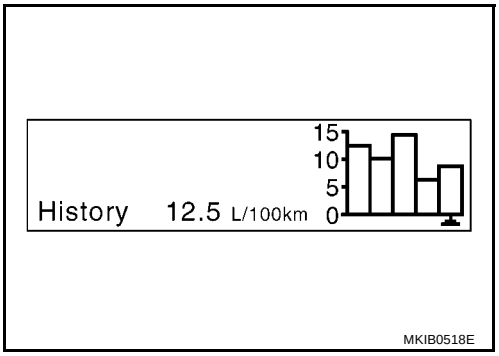
Instantaneous fuel economy

- The instantaneous fuel economy is conducted by combination meter and sent to drive computer as CAN communication line. Combination meter calculate the instantaneous fuel economy by fuel consumption signal and vehicle speed signal.
- Indication will be renewed every 2 seconds (number) and 100ms (bar graph)
- After reset operation, the display shows “– –.–” until the vehicle speed is below than 20 km/h (**MPH).
- Displays fuel economy with a range is 0 to 99.9 (ℓ/100 km).



History

- History displays previous 4 average fuel economy values and current average fuel economy value.
- With average fuel economy displayed, press “OK” switch more than 1 seconds then average fuel economy resets and added to history record. Current history data is same as average fuel economy data.



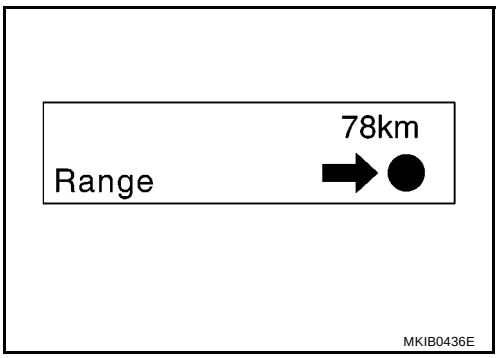
Trip Computer

1. Select “Trip Computer”.
2. .Trip computer has following functions.
   - Range
   - Trip distance
   - Trip time
   - Average speed

Indication can be changed by following order by pushing “▼” button.
Range → Trip distance → Trip time → Average speed → Range.

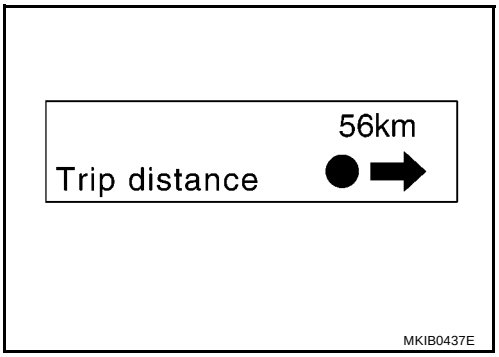
Range

- The elapsed time indication provides driver with an estimation of the distance that can be driven before refuelling.The range is conducted by fuel tank level sensor unit (fuel remaining), ECM pulse signal (fuel consumption) and vehicle speed signal.
- Indication will be renewed every 30 seconds.
- The range is conducted by combination meter and sent to drive computer as CAN communication line. Combination meter calculate the range by fuel level sensor unit (fuel remaining), ECM pulse signal (fuel consumption signal) and vehicle speed signal.
- When combination meter low fuel warning lamp is ON, if drive computer detects low fuel warning lamp signal from combination meter via CAN communication line. Display will be changed range automatically and flashing as following.
  Range reached < 16km
  Range display (number, symbol and unit) will be flashing “– –.–”.
  Range changed > 34km
  Number will be displayed. Flashing or not flashing is depending on combination meter (low fuel warning lamp) condition.



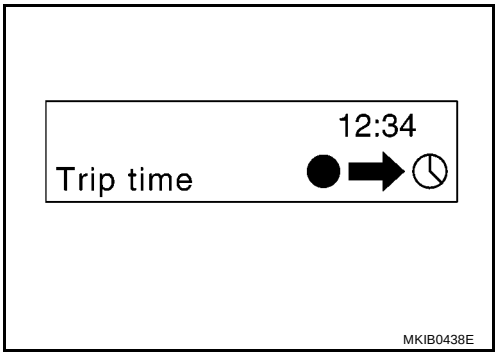
Trip distance

- Trip distance indication is conducted by vehicle speed signal via CAN communication line.
- When pushing “OK” switch more than approximately 1 second, trip distance will be reset.



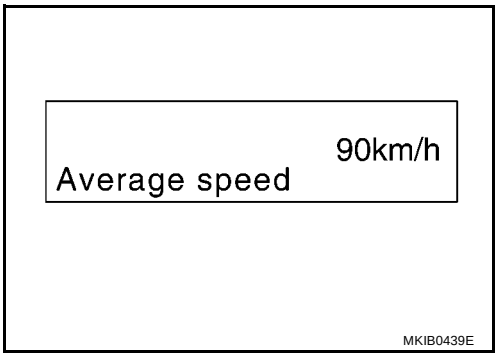
Trip time

- Trip time is calculated by drive computer as elapsed time since last reset.
- It only increases with ignition switch ON.
- When pushing “OK” switch more than approximately 1 second, trip time distance will be reset.



Average vehicle speed

- Average vehicle speed indication is conducted by trip distance and trip time.
- Indication will be renewed every 30 seconds.
- When pushing “OK” switch more than approximately 1 second, average speed will be reset.
- If average vehicle speed is reset, average fuel consumption will be reset at the same time.
- After reset operation, the displays shows “– –.–” for 30 seconds.



SETTING

1. Select “SETTING”.
2. SETTING has following functions.
   - TIME/DATE
   - LANGUAGE
   - ANNIVERSARY

   Indication can be changed by in the following order by pushing “▼” button.
   TIME/DATE→ LANGUAGE→ ANNIVERSARY→ TIME/DATE

Time/Date

This function is used to set clock and calendar.

Timer

- Default time is 12:00 AM
- This function is used to change hour, minutes or 12/24 hour.

Calendar

- Default date is “01.01.2003”
- This function is used to change day, month or year.

Language

The display text can be changed to the following languages:

- ENGLISH (mile)
- ENGLISH (km)
- FRENCH
- GERMAN
- DUTCH
- SPANISH
- ITALIAN
- DANISH
- SWEDISH

NOTE:
Disconnect the battery cable erase memories Time/Date.

MAINTENANCE

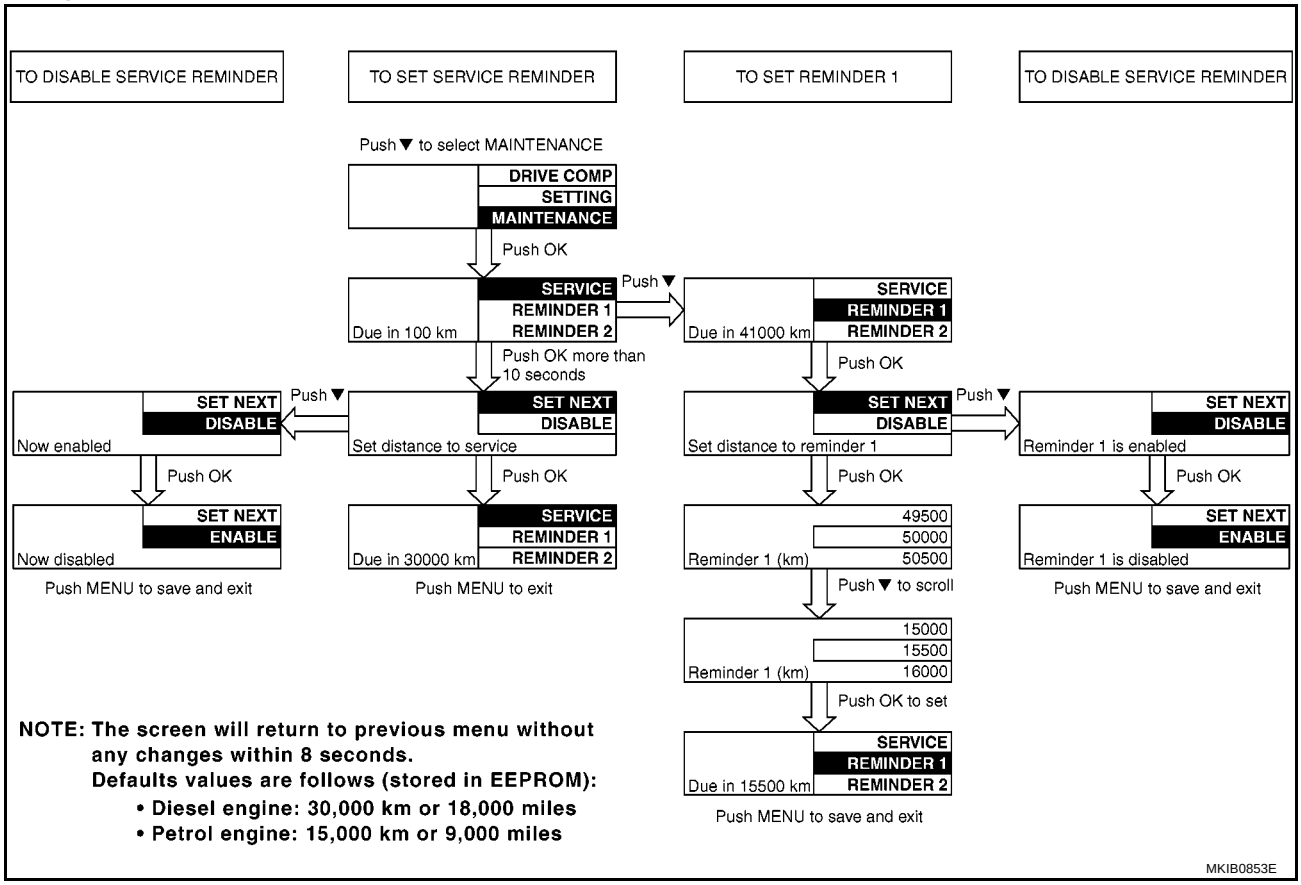
1. Select “MAINTENANCE”.
2. MAINTENANCE has following functions.
   - SERVICE
   - REMINDER1
   - REMINDER2

   Indication can be changed in the following order by pushing “▼” button.
   SERVICE→ REMINDER1→ REMINDER2 →SERVICE

Service, Reminder1/2 Function

- When maintenance information is displayed, pressing any button return to at last ignition OFF screen.
- Maintenance reminder counts will not reset if battery disconnected.
- Maintenance reminder count down is disabled for 500 km (300 miles) after first battery on.
- To set a maintenance information for service or any reminder (tire change, drive belts change, air cleaner filter change, etc.)
- “SERVICE” information should provide a information to the driver at the accumulated distance, or 12 months whichever comes first.
- The service information screen should appear 8 seconds at every ignition switch ON after 12 months (petrol engine), 24 months (diesel engine) or 1,500 km (1,000 miles) before the scheduled service is due. Whichever comes first.
- The 12 months, 24 months timer should start after the accumulated distance 300 km (200 miles).
- Reminder 1 or reminder 2 are controlled by only distance.

Setting



WARNING INDICATIONS

When combination meter receives warning signal from some control units or sensors, then combination meter warning lamp is illuminated.
Then combination meter sends warning signal to drive computer warning indications on the screen.

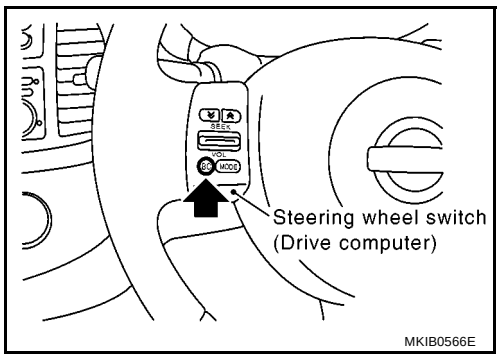
Control items	Active massage	Warning indicators	Warning detection and cancel conditions		Cases of malfunction
ENGINE	Contact a NISSAN dealer	ENGINE CHECK WARNING	Detection condition	Warning lamp ON signal is detected while engine is running.	ECM malfunction
			Cancel condition	Warning lamp OFF signal is detected.	
Engine oil pressure	STOP and contact a NISSAN dealer	ENGINE OIL WARNING	Detection condition	Warning lamp ON signal is detected for at least approx. 5 seconds while engine is running.	Engine oil pressure decreases.
			Cancel condition	Warning lamp OFF signal is detected.	
Front right door	Check door	DOOR OPEN	Detection condition	Vehicle is running [approx. 5 km/h (3 MPH) or faster] and door ajar of any of the doors is detected.	Door is open
Front left door					
Rear right door			Cancel condition	Vehicle is stopped and all the doors lock	
Rear left door					
Back door	Check tail gate	TAIL GATE OPEN	Detection condition	Vehicle is running [approx. 5 km/h (3 MPH) or faster] and door ajar of any of the doors is detected.	Back door is open
			Cancel condition	Vehicle is stopped and all the doors lock	
ANY DOORS (More than two doors)	Check doors	DOORS OPEN	Detection condition	Vehicle is running [approx. 5 km/h (3 MPH) or faster] and door ajar of any of the doors is detected.	Any door is open
			Cancel condition	Vehicle is stopped and all the doors lock	
Air bag	Contact a NISSAN dealer	AIR BAG WARNING	Detection condition	Warning lamp ON signal is detected for at least approx. 10 seconds after ignition switch is turned ON.	SRS air bag system malfunction
			Cancel condition	Warning lamp OFF signal is detected.	
Over heat	STOP and contact a NISSAN dealer	ENGINE TEMPERATURE WARNING	Detection condition	Engine coolant temperature as being approx. 105°C (246°F) min.	Engine cooling system malfunction
			Cancel condition	Engine coolant temperature as being approx. 105°C (221°F) max.	
Charge	Contact a NISSAN dealer	CHARGE WARNING	Detection condition	Warning lamp ON signal is detected while engine is running. Charging system malfunction	Charging system malfunction
			Cancel condition	Warning lamp OFF signal is detected.	
Fuel level	Refuel when possible	LOW FUEL WARNING	Detection condition	After warning lamp ON signal is detected, vehicle is driven for over specified distance.	Low fuel level
			Cancel condition	Warning lamp OFF signal is detected.	
ABS	Contact a NISSAN dealer	ABS WARNING	Detection condition	Warning lamp ON signal is detected when engine is running.	ABS control system malfunction
			Cancel condition	Warning lamp OFF signal is detected.	

Control items	Active massage	Warning indicators	Warning detection and cancel conditions		Cases of malfunction
EPS	Contact a NISSAN dealer	POWER STEERING WARNING	Detection condition	Warning lamp ON signal is detected after ignition switch is turned ON.	EPS system malfunction
			Cancel condition	Warning lamp OFF signal is detected.	

HOW TO CHANGE FOR STEERING SWITCH

- Indication can be changed in the following order by pushing steering switch.

Range → Trip Distance → Trip Time → Average Vehicle Speed → Average Fuel Economy → Instantaneous Fuel Economy → Range



CAN Communication

EKS00K39

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K3A

Go to CAN system, when selecting your car model from the following table.

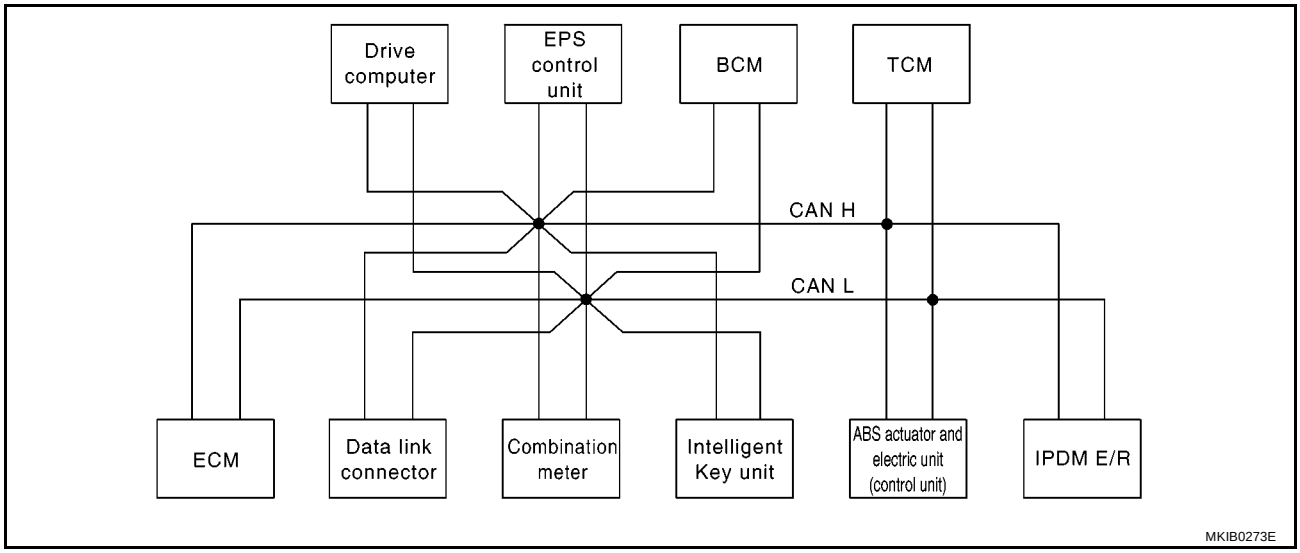
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	DI-44, "TYPE 1/ TYPE 2"				DI-47, "TYPE 3/ TYPE 4"				DI-49, "TYPE 5/ TYPE 6"				DI-52, "TYPE 7/ TYPE 8"				DI-54, "TYPE 9/ TYPE 10"			

×: Applicable

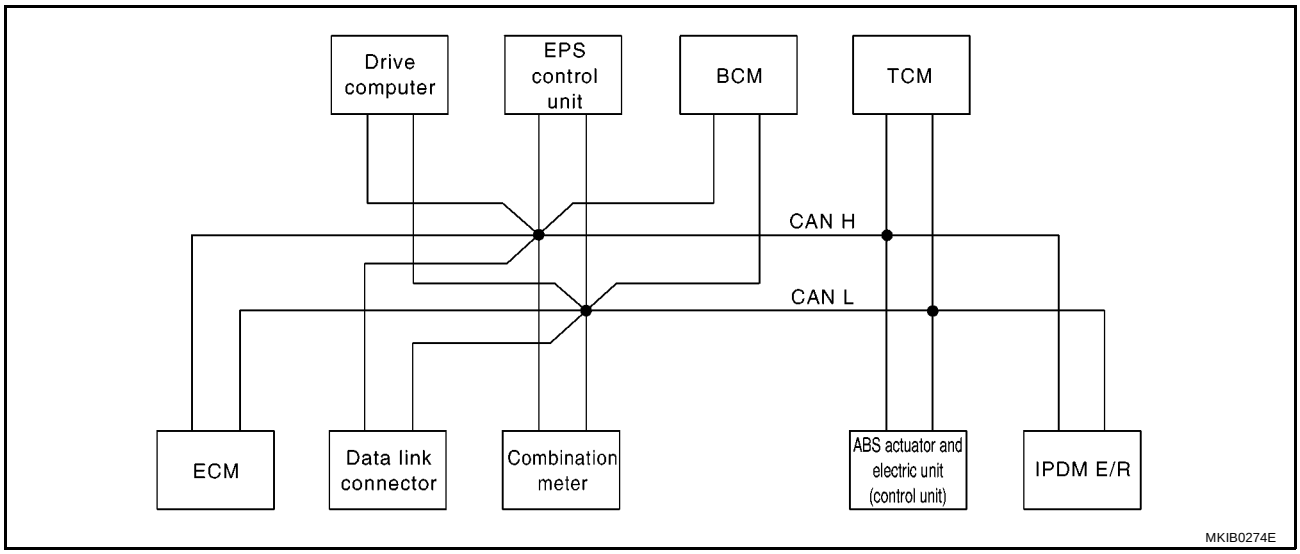
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

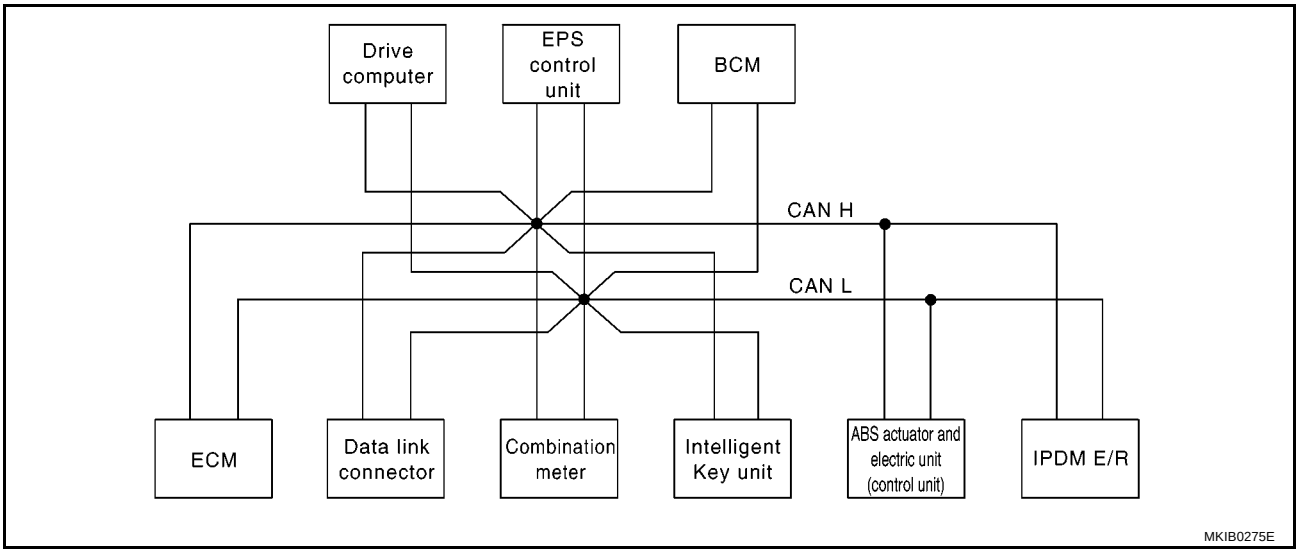
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

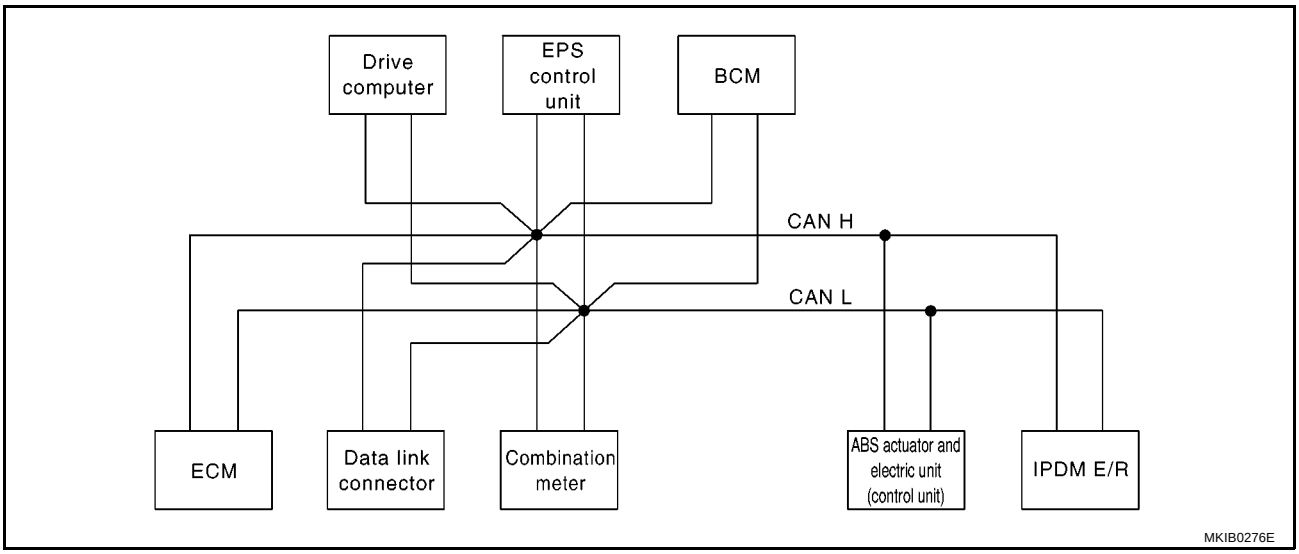
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

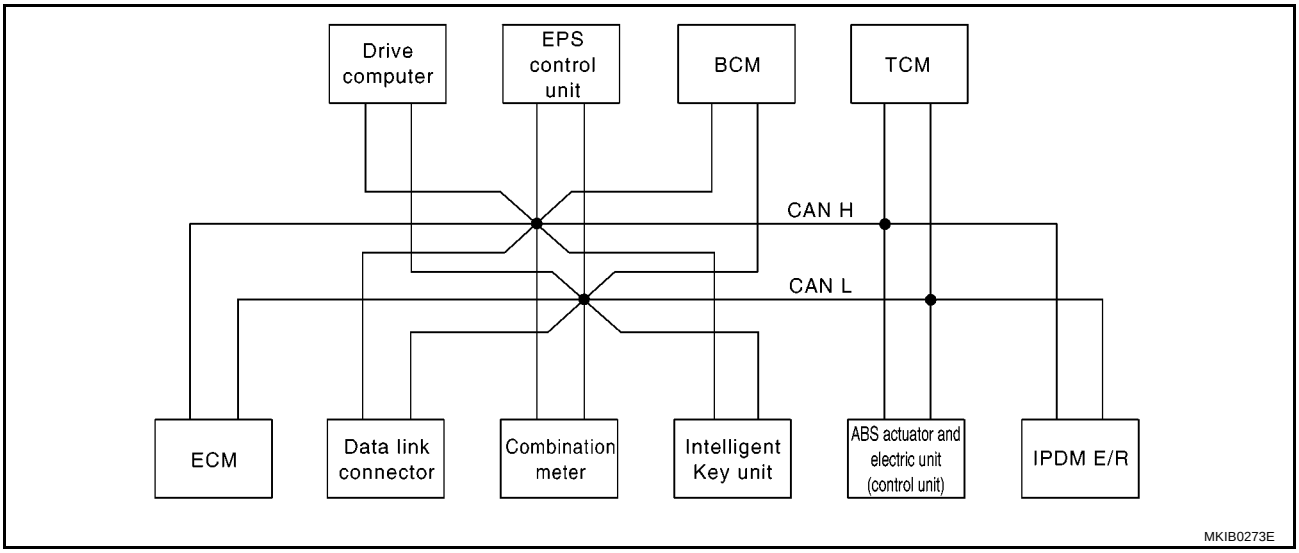
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

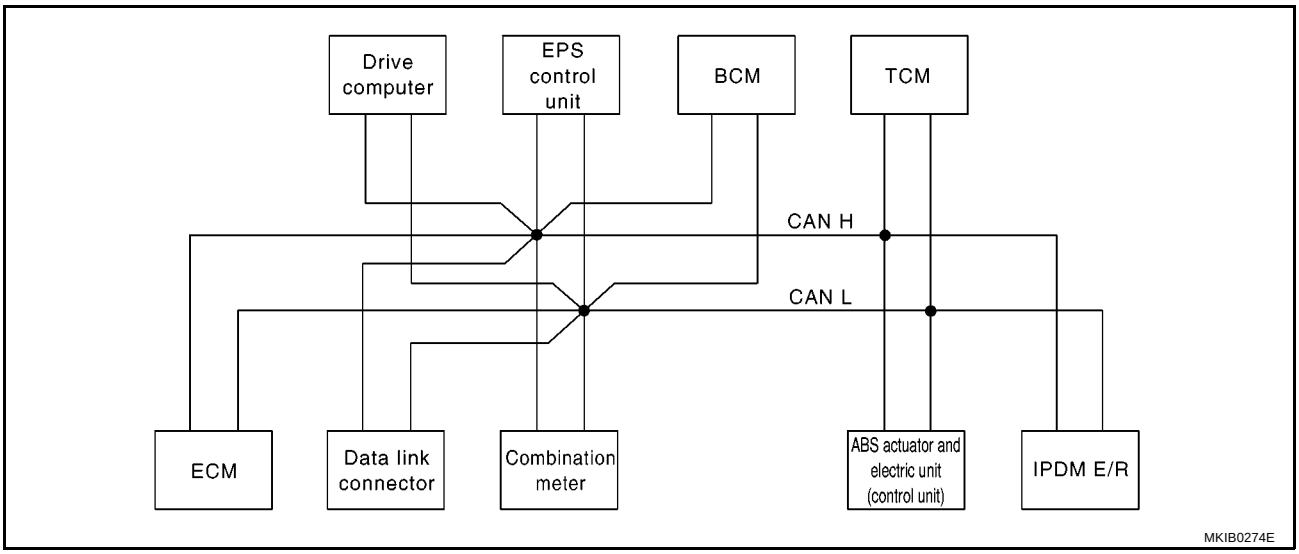
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

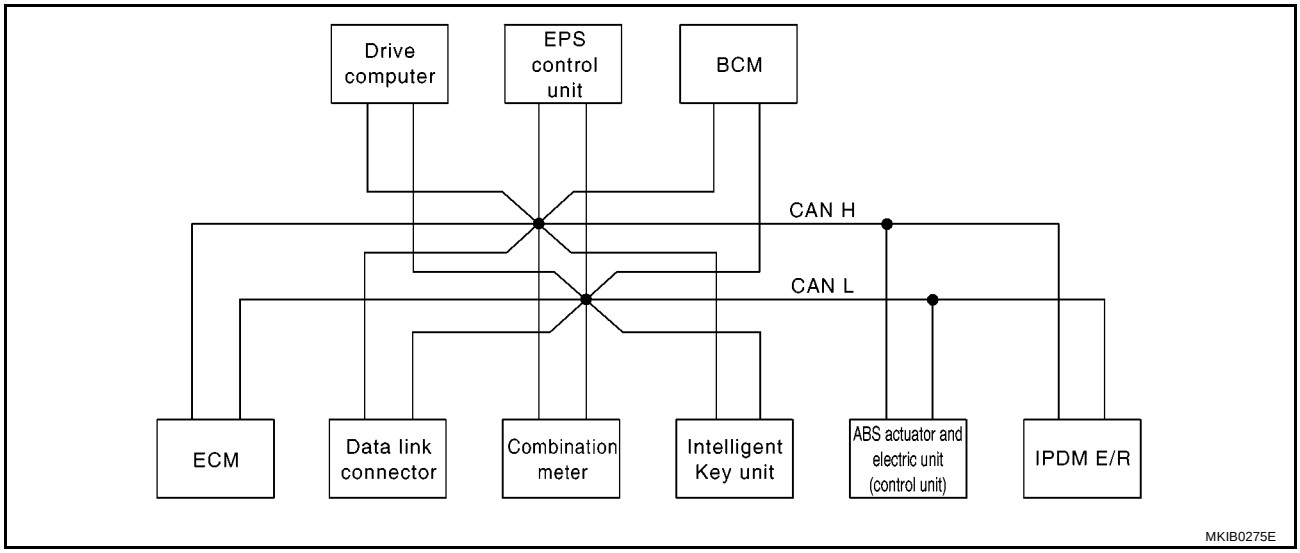
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

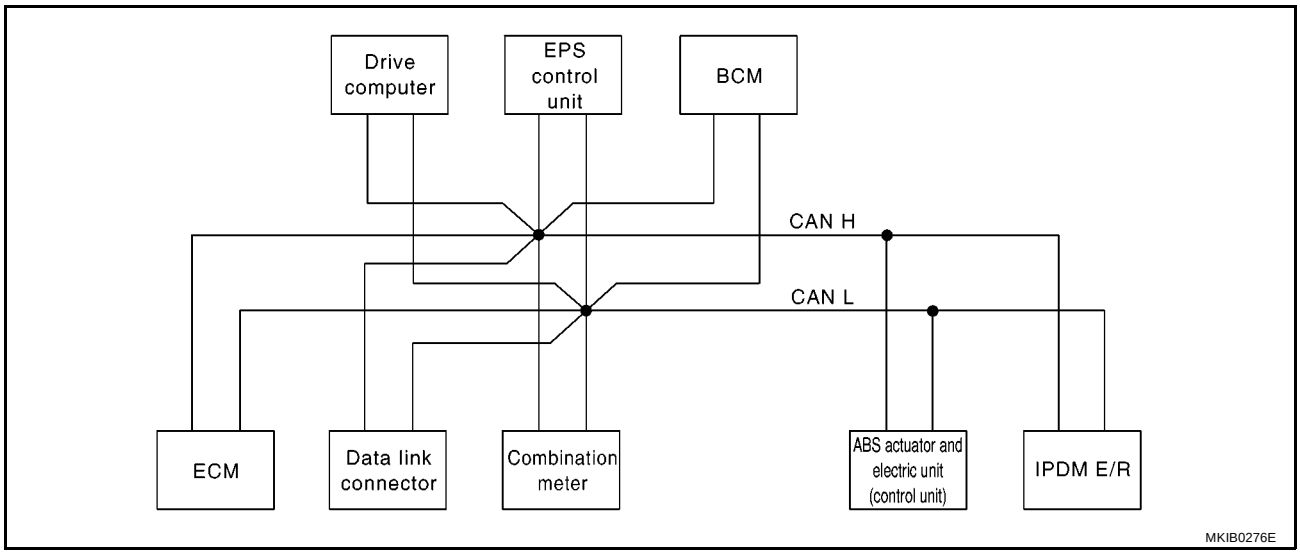
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

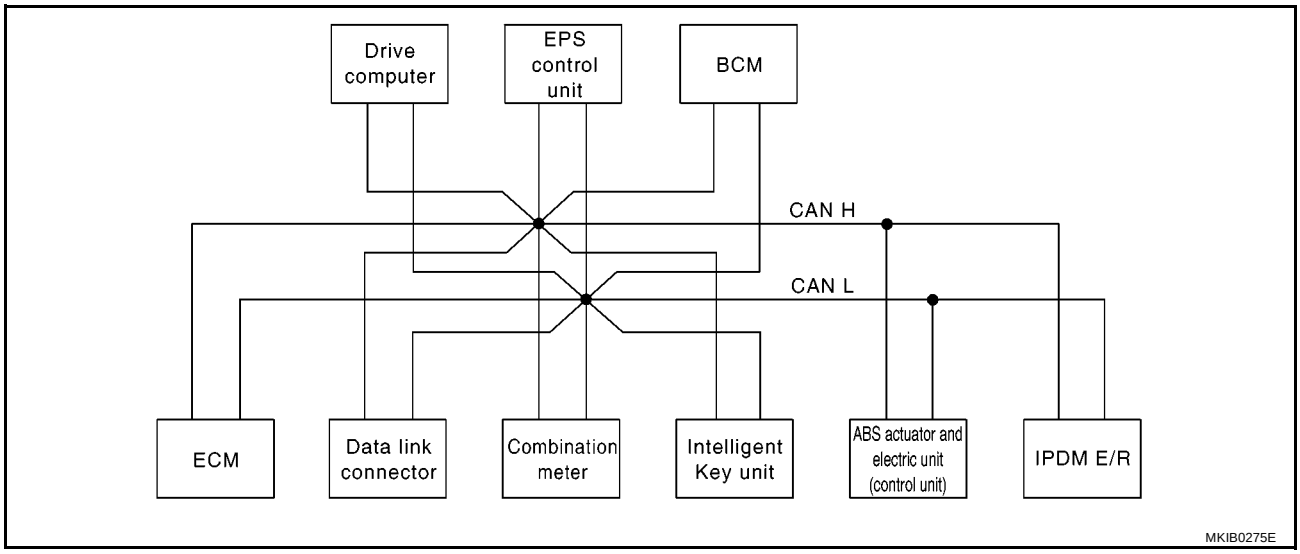
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

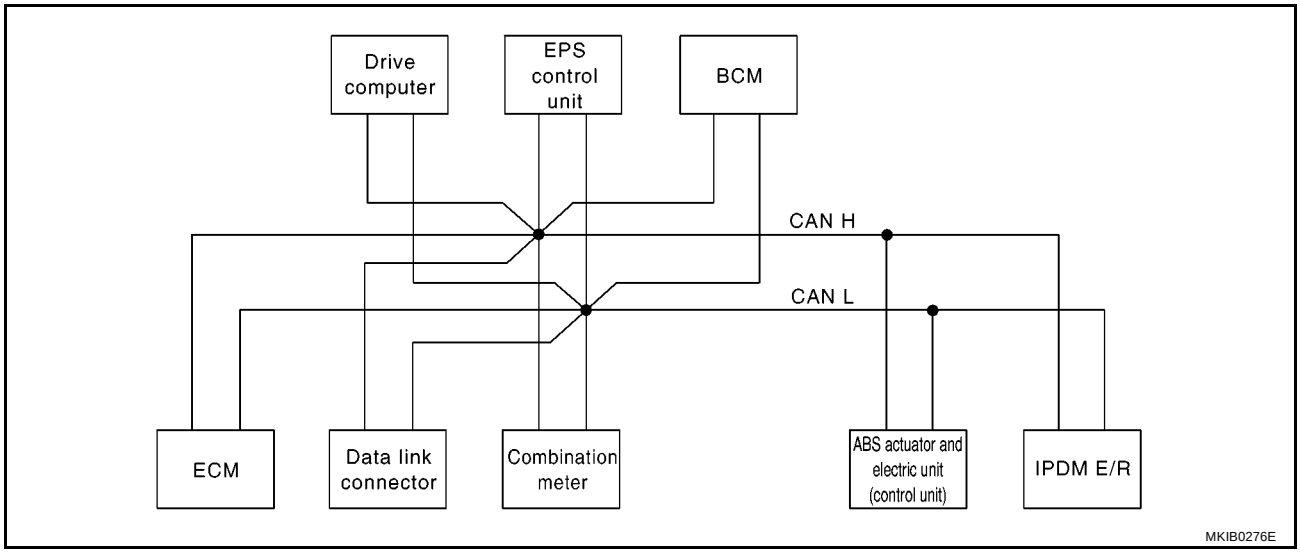
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

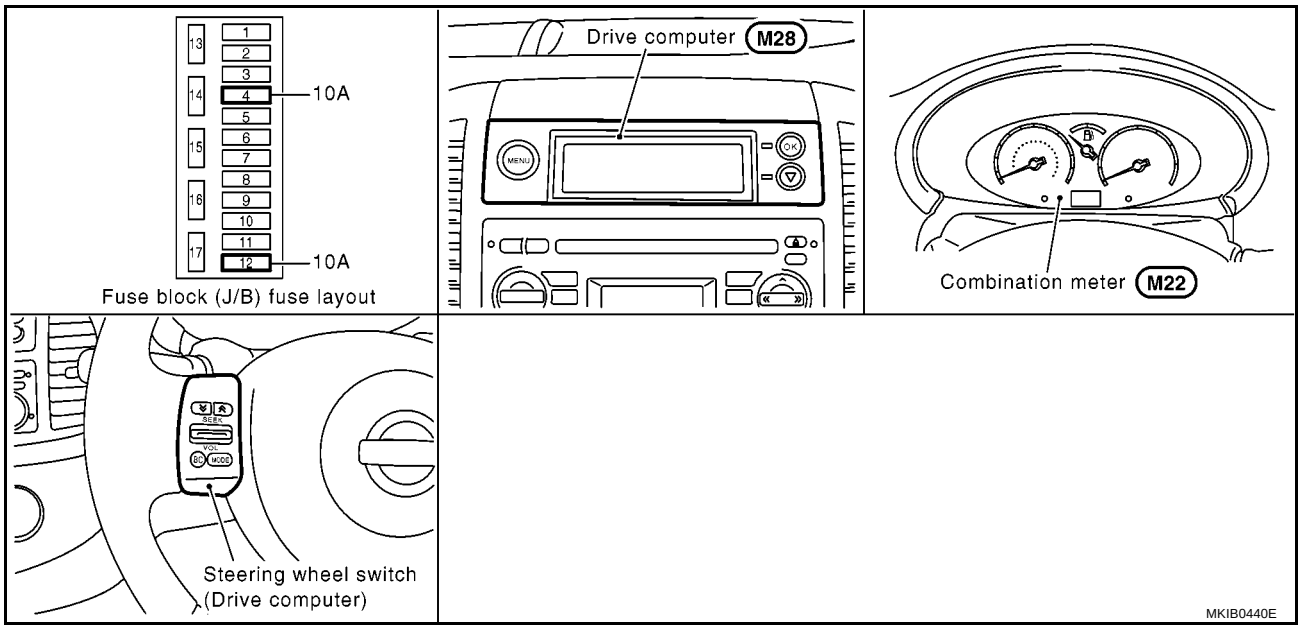
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Component Parts and Harness Connector and Harness Connector Location

EKS0082N

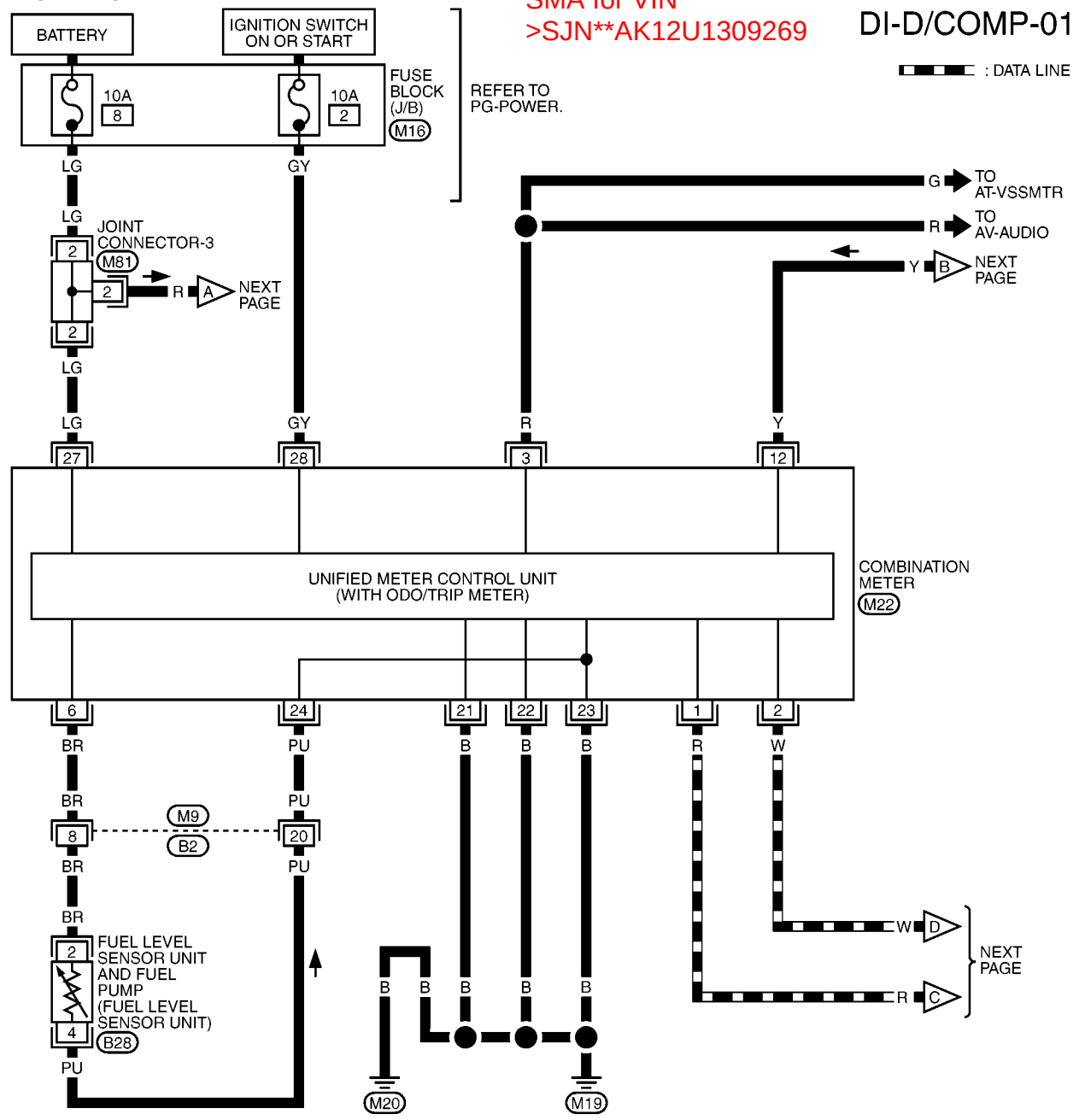


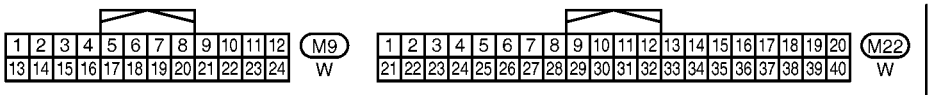
Wiring Diagram — D/COMP —

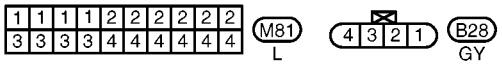
EKS0082O

SMA for VIN
>SJN**AK12U1309269

DI-D/COMP-01

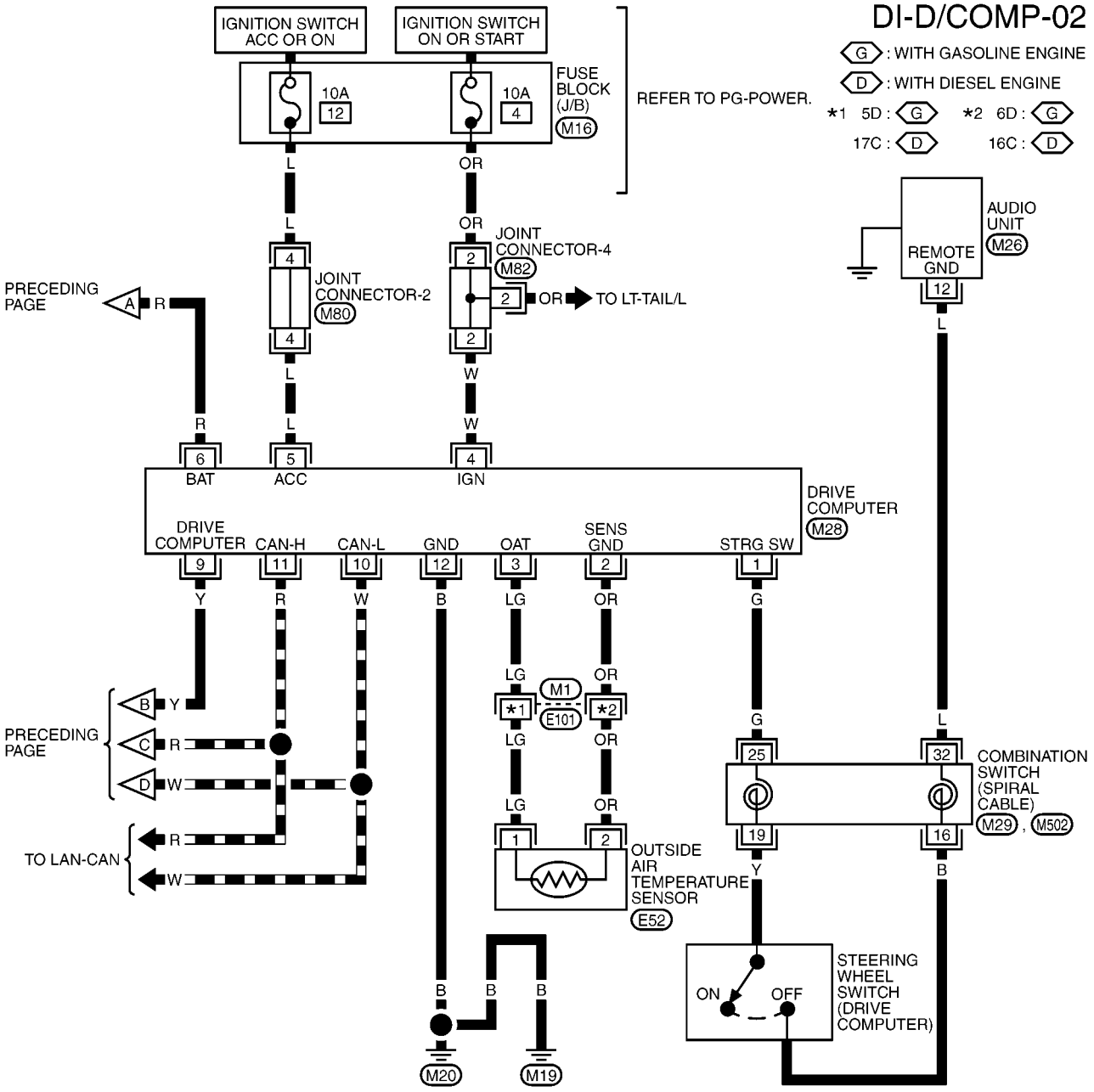


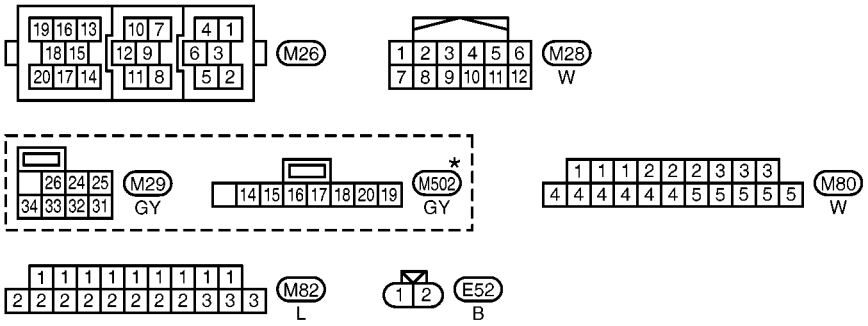




REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1548E





★ : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA3237E

Terminals and Reference Value

EKS0082P

Terminal	Wire color	Item	Condition		Voltage [V]
			Ignition switch	Operation	
1	G	Communication signal (+)	ON	Steering wheel switch is pushed.	Approx. 0
				Steering wheel switch is released.	Battery voltage
2	OR	OAT (GND)	—	—	—
3	LG	OAT	ON	—	Approx. 5
4	W	Ignition switch (ON)	ON	—	Battery voltage
5	L	Ignition switch (ACC)	ACC	—	Battery voltage
6	R	Power source (ON)	OFF	—	Battery voltage
9	Y	Drive computer	ON	—	Approx.0
10	W	CAN L	—	—	—
11	R	CAN H	—	—	—
12	B	Ground	—	—	Approx.0

Self-Diagnosis Function

EKS0082R

DESCRIPTION

Self-diagnosis items are as follows.

- Screen of all segments check
- Software version of drive computer is displayed. (This information is not used for service, skip this step.)
- EEPROM code of drive computer is displayed. (This information is not used for service, skip this step)

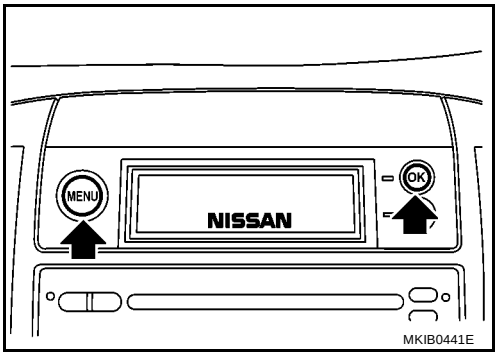
Performing Self-Diagnosis Mode

EKS0082S

OPERATION PROCEDURES

1. Turn ignition switch ACC.
2. Press “OK” button 3 times with holding “MENU” button.

NOTE:
If any button is not pressed for 20 seconds at each step or if the ignition switch is turned OFF, the self-diagnosis mode is exited.

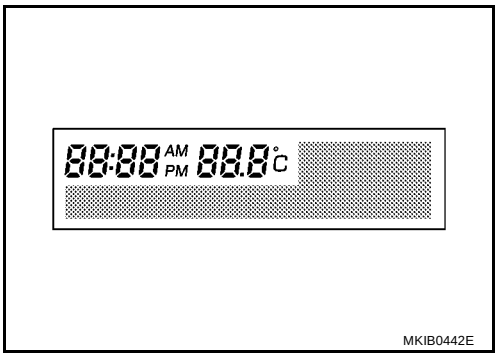


MKIB0441E

SELF-DIAGNOSIS RESULT ITEM

Display of all segments indicate

This mode is checking the display of all segments.
If any of the segment is not displayed, replace the drive computer.



MKIB0442E

Power Supply and Ground Circuit Check

EKS0082T

1. CHECK FUSE

Check that the following fuses in drive computer are blown.

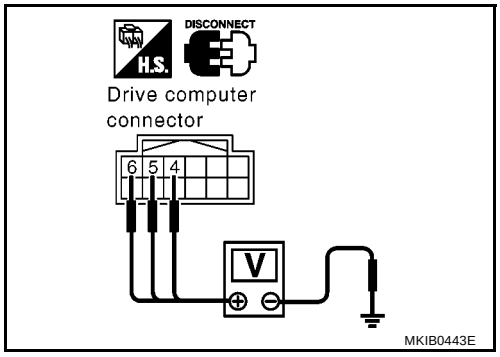
Unit	Power source	Fuse No.
Drive computer	Power source (BAT)	8
	Ignition switch (IGN)	4
	Ignition switch (ACC)	12

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect display connector.
2. Check voltage between drive computer and ground.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M28	4 (W)	Ground	0V	0V	Battery voltage
	5 (L)	Ground	0V	Battery voltage	Battery voltage
	6 (R)	Ground	Battery voltage	Battery voltage	Battery voltage

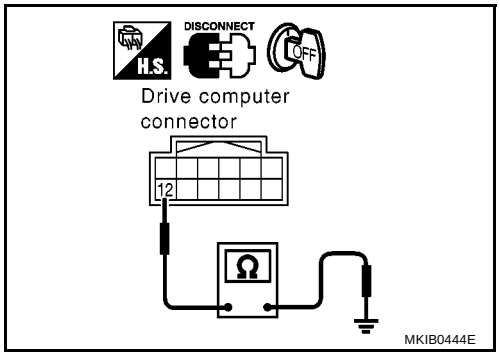
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between drive computer and fuse.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between drive computer harness connector M28 terminal 12 (B) and ground.

12 (B) - Ground : Continuity should exist.



OK or NG

OK >> INSPECTION END
NG >> Harness for open ground circuit.

Outside Air Temperature is not Displayed

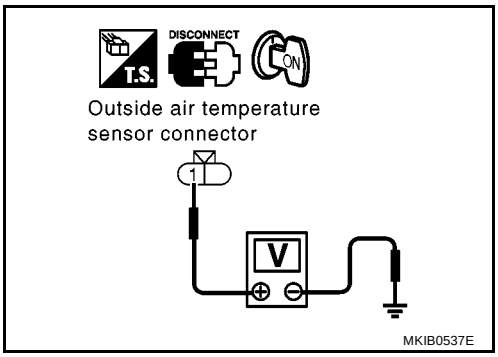
EKS008IG

SMA for VIN >SJN**AK12U1309269

1. CHECK OUTSIDE AIR TEMPERATURE SENSOR IN PUT SIGNAL

1. Disconnect outside air temperature sensor connector.
2. Turn ignition switch ON.
3. Check voltage between outside air temperature sensor harness connector E52 terminal 1 (LG) and ground.

1 (LG) – Ground : Approx. 5V



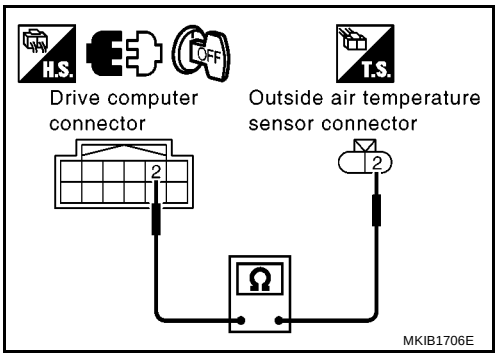
OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK OUTSIDE AIR TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect drive computer harness connector.
3. Check continuity between outside air temperature sensor harness connector E52 terminal 2 (OR) and drive computer harness connector M28 terminal 2 (OR).

2 (OR) - 2 (OR) : Continuity should exist.



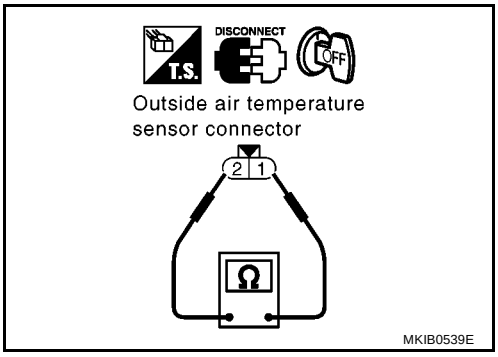
OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK OUTSIDE AIR TEMPERATURE

Check outside air temperature sensor harness connector E52 terminals 1 and 2.

Temperature °C	Resistance [kΩ]
–20	16.53
–10	9.93
0	6.19
10	3.99
20	2.65
30	1.81
40	1.27
50	0.91



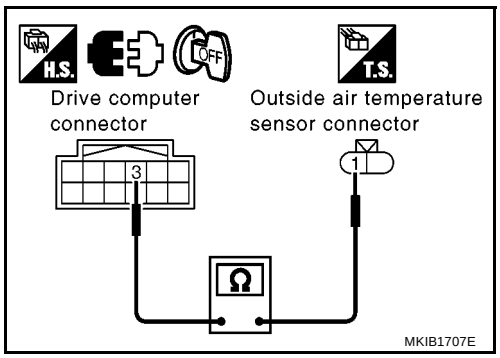
OK or NG

OK >> Replace drive computer.
NG >> Replace outside air temperature sensor.

4. CHECK OUTSIDE AIR TEMPERATUE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect drive computer connector.
3. Check continuity between outside air temperature harness connector E52 terminal 1 (LG) and drive computer harness connector M28 terminal 3 (LG).

1 (LG) - 3 (LG) : Continuity should exist.



OK or NG

OK >> Replace drive computer.
NG >> Repair harness or connector.

All of Display is not Displayed Properly

EKS0082Z

1. DISPLAY SELF-DIAGNOSIS

1. Perform self-diagnosis drive computer. Refer to DI-59, "Performing Self-Diagnosis Mode" .
2. All display segments are ON.

OK or NG

OK >> Power supply and ground circuit check. Refer to DI-60, "Power Supply and Ground Circuit Check" .
NG >> Replace drive computer.

Drive Computer of Display Items are not Displayed. (ex, “– –.– km”)

EKS00830

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery cable.
3. Check the terminals and connector of drive computer for damage, bend and loose connection (control unit-side and harness-side).

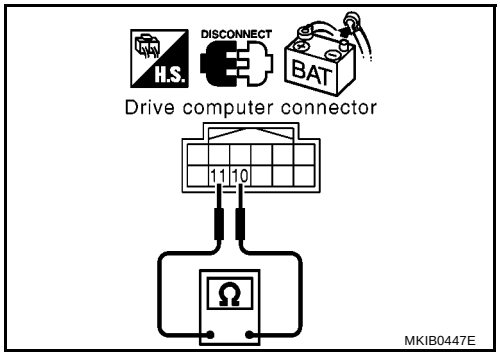
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect drive computer connector.
2. Check resistance between drive computer harness connector M28 terminals 11 (R) and 10 (W).

11 (R) – 10 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace drive computer.
NG >> Repair harness between drive computer and data link connector.

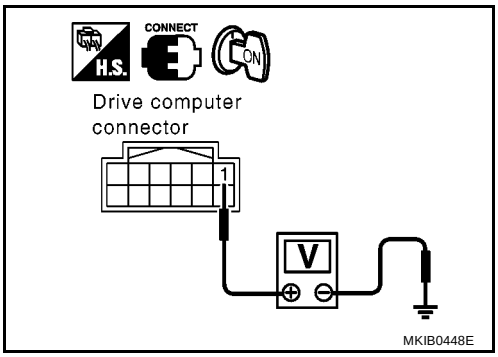
Steering Wheel Switch Does Not Operate

EKS0088R

1. CHECK DRIVE COMPUTER INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between drive computer and ground.

Connector	Terminals (Wire color)		Condition	Voltage [V] (Approx.)
	(+)	(-)		
M28	1 (G)	Ground	Steering wheel switch is pushed.	0
			Steering wheel switch is released.	Battery voltage



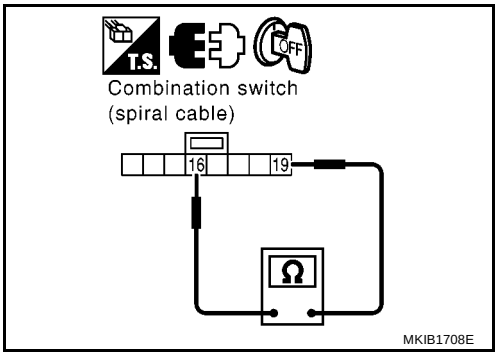
OK or NG

OK >> Replace drive computer.
NG >> GO TO 2.

2. CHECK STEERING WHEEL SWITCH

1. Turn ignition switch OFF.
2. Disconnect steering wheel switch.
3. Check steering wheel switch (drive computer).

Connector	Terminals (Wire color)		Condition	Continuity
	(+)	(-)		
M502	16	19	Steering wheel switch is pushed.	No
			Steering wheel switch is released.	Yes



OK or NG

OK >> GO TO 3.
NG >> Replace steering wheel switch.

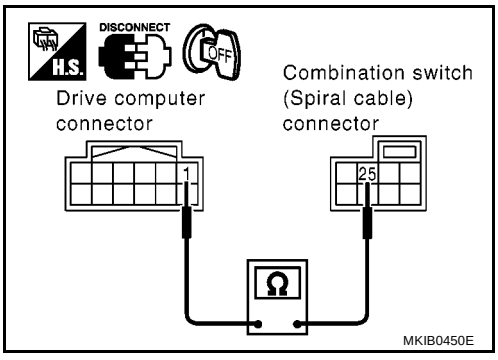
3. CHECK STEERING WHEEL SWITCH CIRCUIT

1. Disconnect drive computer connector.
2. Check continuity between drive computer harness connector M28 terminal 1(G) and combination switch (spiral cable) harness connector M29 terminal 25 (G).

1 (G) - 25 (G) : Continuity should exist.

OK or NG

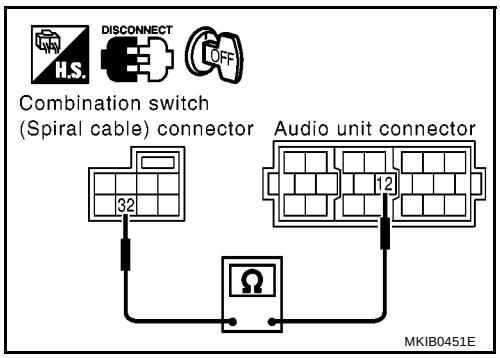
OK >> GO TO 4.
NG >> Replace harness or connector.



4. CHECK STEERING WHEEL SWITCH GROUND CIRCUIT

1. Disconnect audio unit connector.
2. Check continuity between combination switch harness connector M29 terminal 32 (L) and audio unit harness connector M26 terminal 12 (L).

32 (L) - 12 (L) : Continuity should exist.



OK or NG

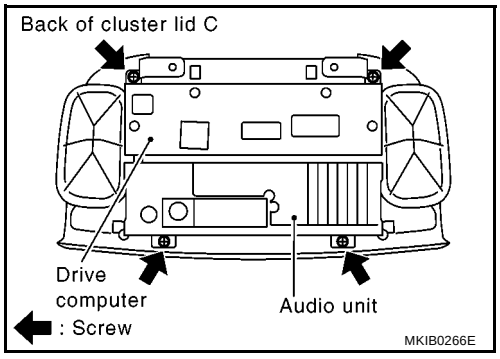
OK >> Check audio unit ground circuit. Refer to AV-11, "Power Supply Circuit Inspection" .

NG >> Repair harness or connector.

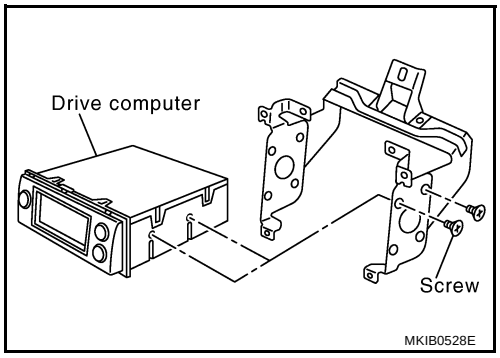
Removal and Installation of Drive Computer

EKS00832

1. Remove cluster lid C. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove screws and remove drive computer and bracket.



3. Remove screws and remove bracket.

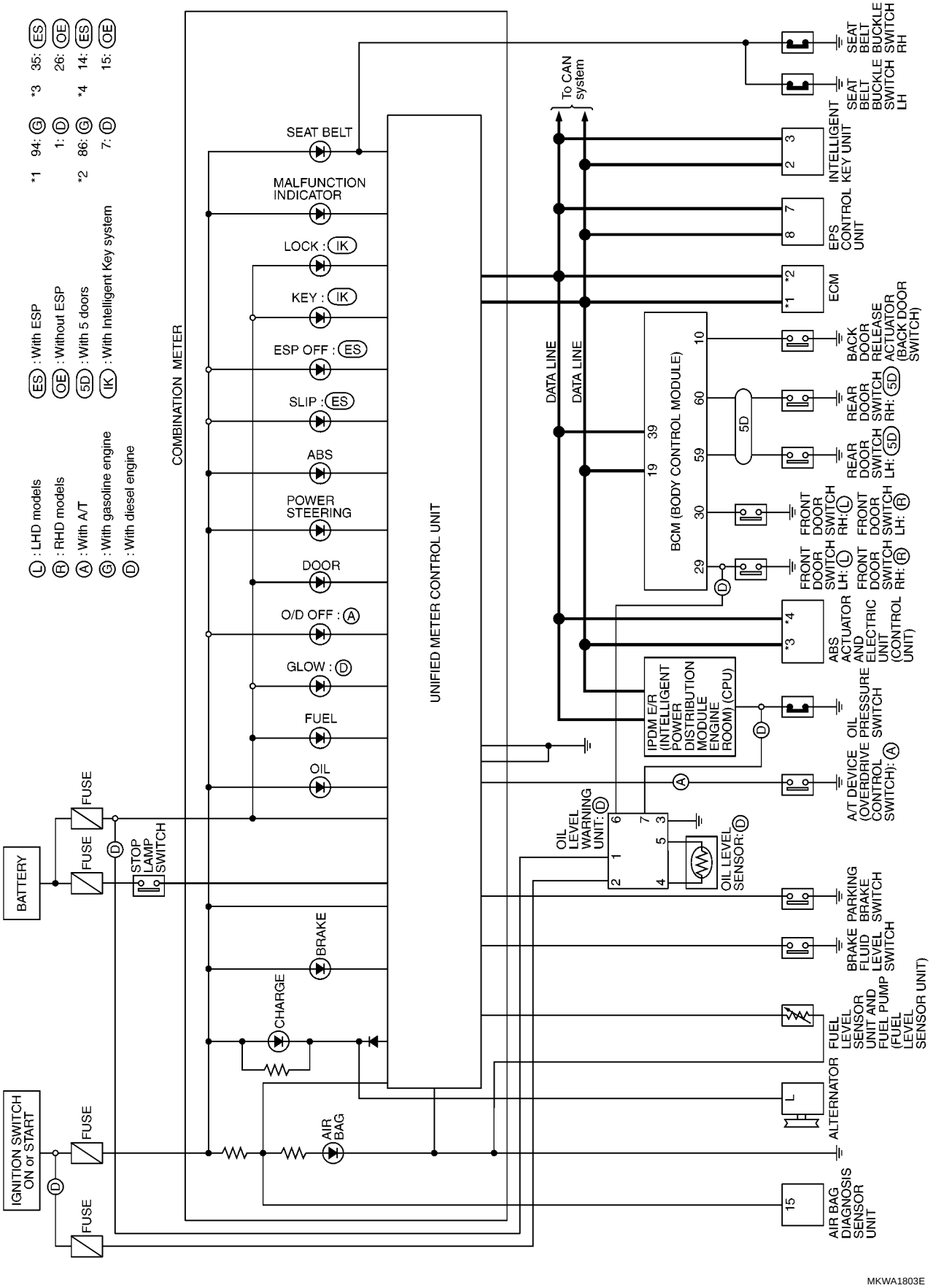


WARNING LAMPS

PFP:24814

Schematic

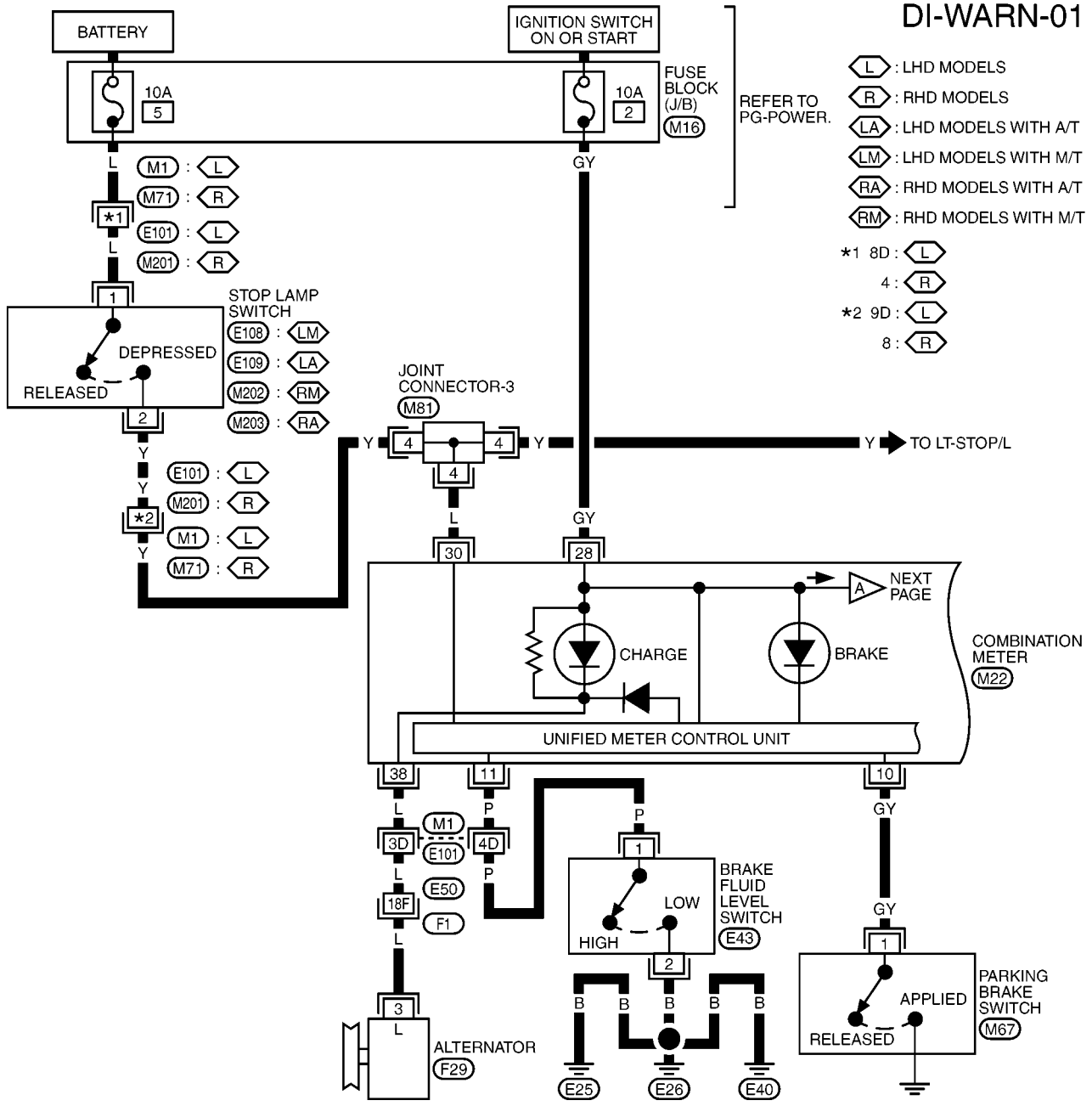
EKS0072G

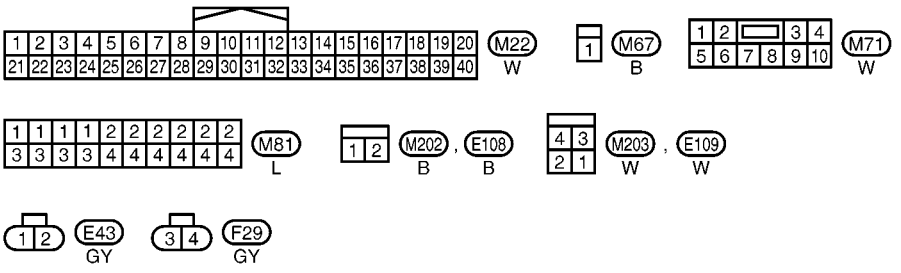


MKWA1803E

Wiring Diagram — WARN — CR Engine Models

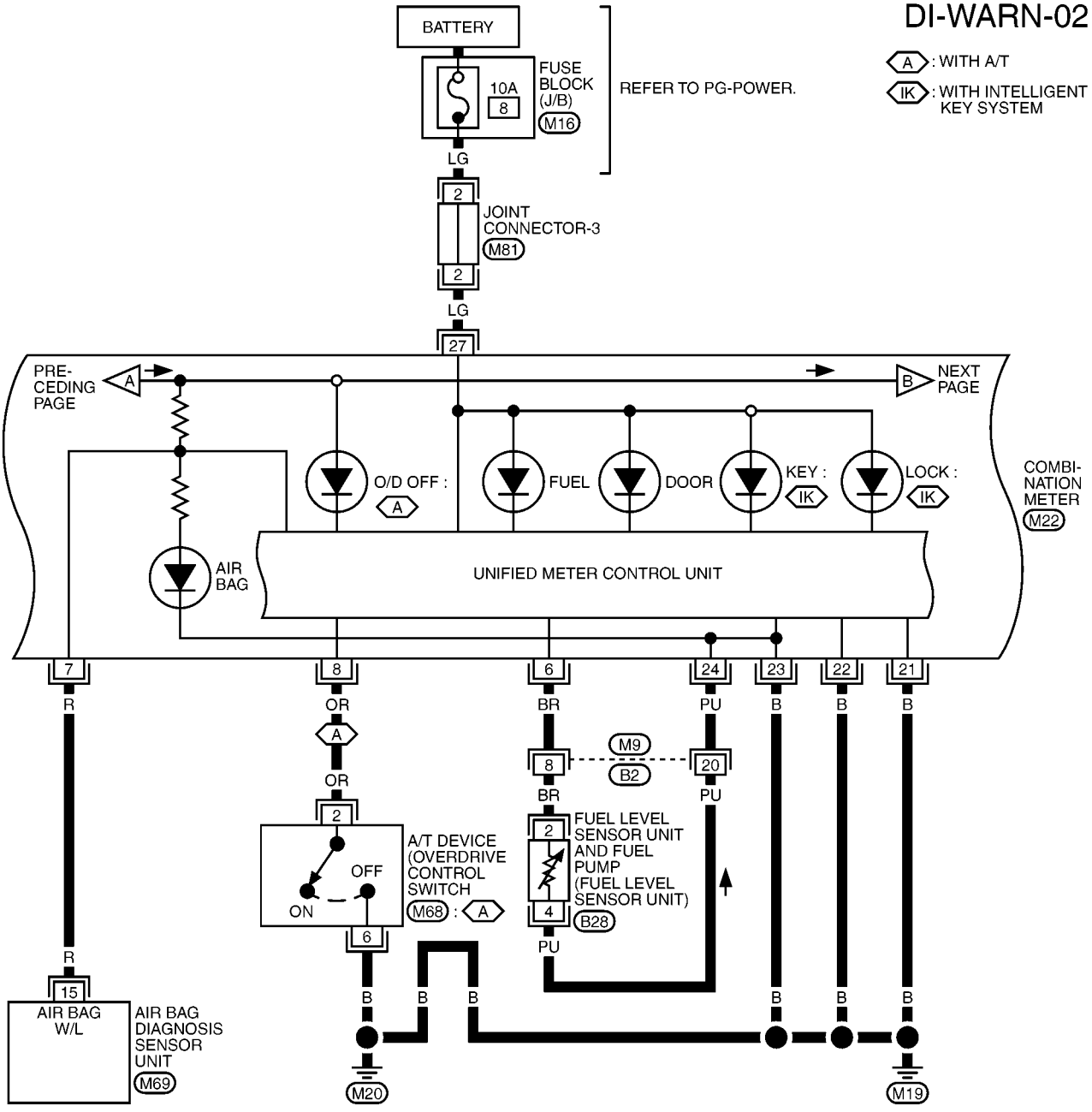
EKS0072H



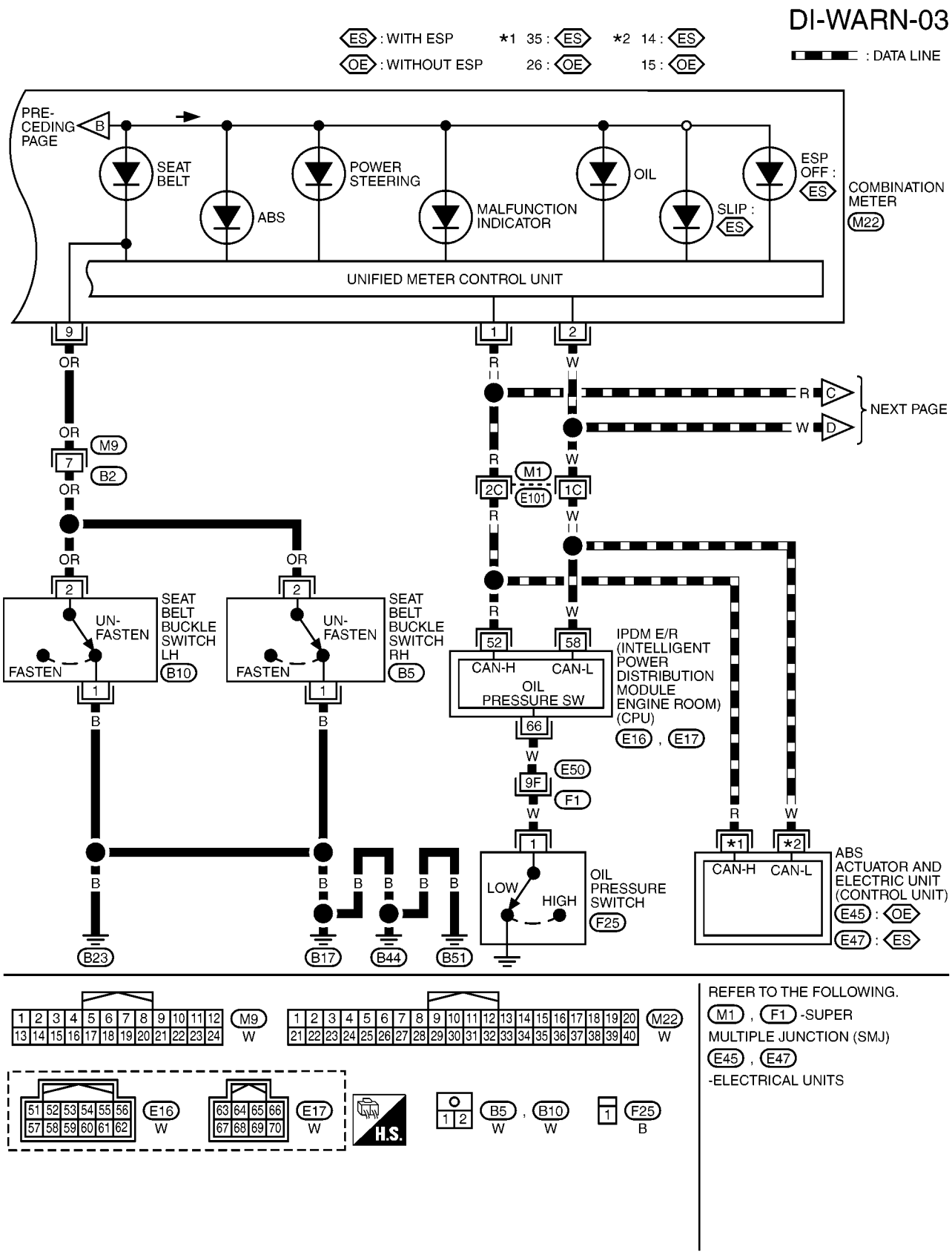


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1804E

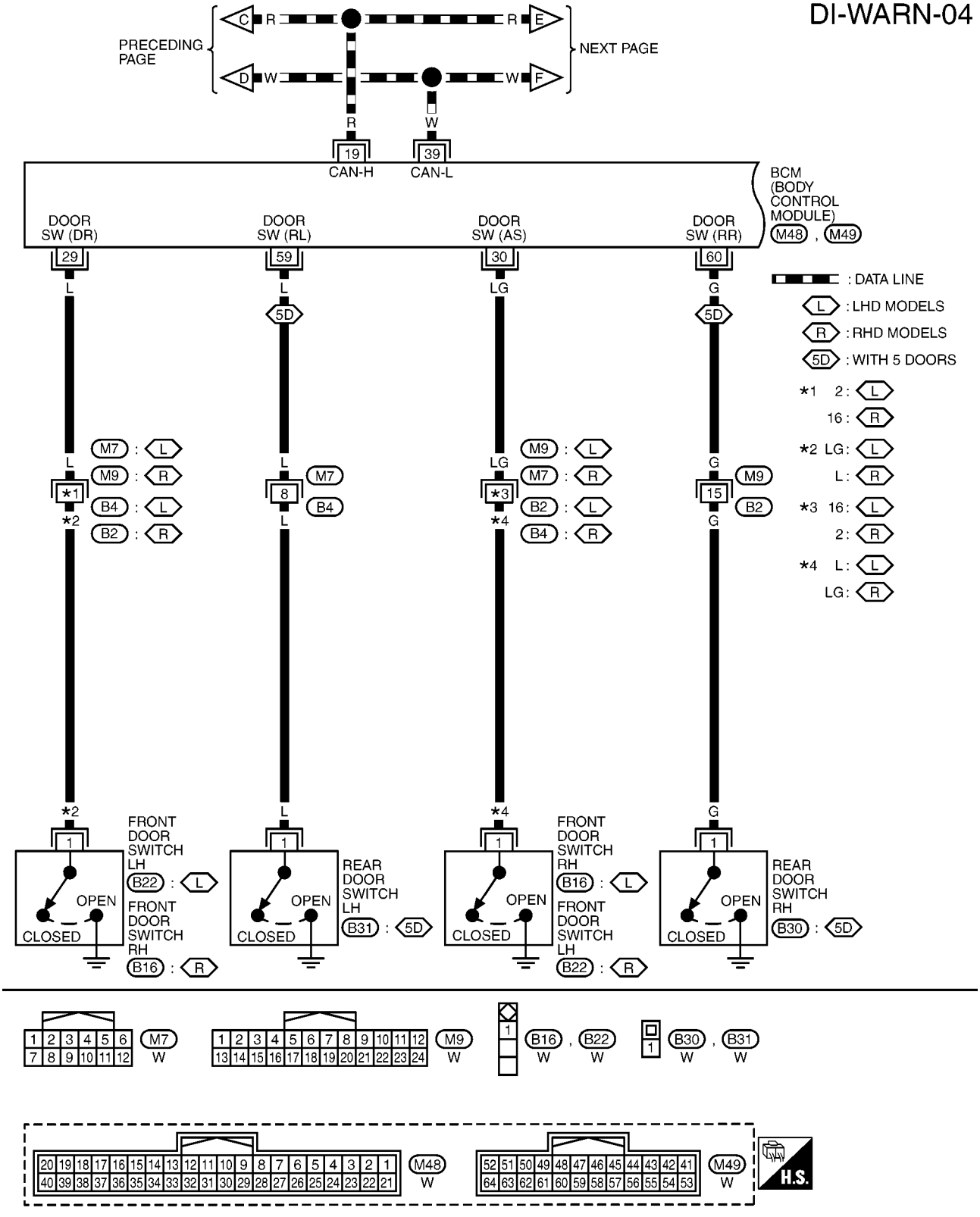

DI-WARN-02
A : WITH A/T
IK : WITH INTELLIGENT KEY SYSTEM
BATTERY
FUSE BLOCK (J/B)
M16
10A
8
REFER TO PG-POWER.
LG
JOINT CONNECTOR-3
M81
27
PRE-CEDING PAGE
NEXT PAGE
O/D OFF :
FUEL
DOOR
KEY :
LOCK :
COMBI-NATION METER
M22
AIR BAG
UNIFIED METER CONTROL UNIT
7
8
6
24
23
22
21
R
OR
BR
PU
B
M9
B2
20
A/T DEVICE (OVERDRIVE CONTROL SWITCH)
M68 : A
OFF
ON
FUEL LEVEL SENSOR UNIT AND FUEL PUMP (FUEL LEVEL SENSOR UNIT)
B28
15
AIR BAG W/L
AIR BAG DIAGNOSIS SENSOR UNIT
M69
M20
M19
M9 W
M22 W
M68 W
M69 Y
M81 L
B28 GY
REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1805E


DI-WARN-03
ES : WITH ESP
OE : WITHOUT ESP
*1 35 : ES
26 : OE
*2 14 : ES
15 : OE
: DATA LINE
PRE-CEDING PAGE
B
SEAT BELT
ABS
POWER STEERING
MALFUNCTION INDICATOR
OIL
SLIP : ES
ESP OFF : ES
COMBINATION METER
M22
UNIFIED METER CONTROL UNIT
NEXT PAGE
C
D
M9
B2
M1
E101
SEAT BELT BUCKLE SWITCH LH
B10
SEAT BELT BUCKLE SWITCH RH
B5
UN-FASTEN
FASTEN
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) (CPU)
CAN-H
CAN-L
OIL PRESSURE SW
E16 , E17
E50
F1
OIL PRESSURE SWITCH
F25
LOW
HIGH
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E45 : OE
E47 : ES
B23
B17
B44
B51
H.S.
B5 , B10
F25
REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
E45 , E47
-ELECTRICAL UNITS

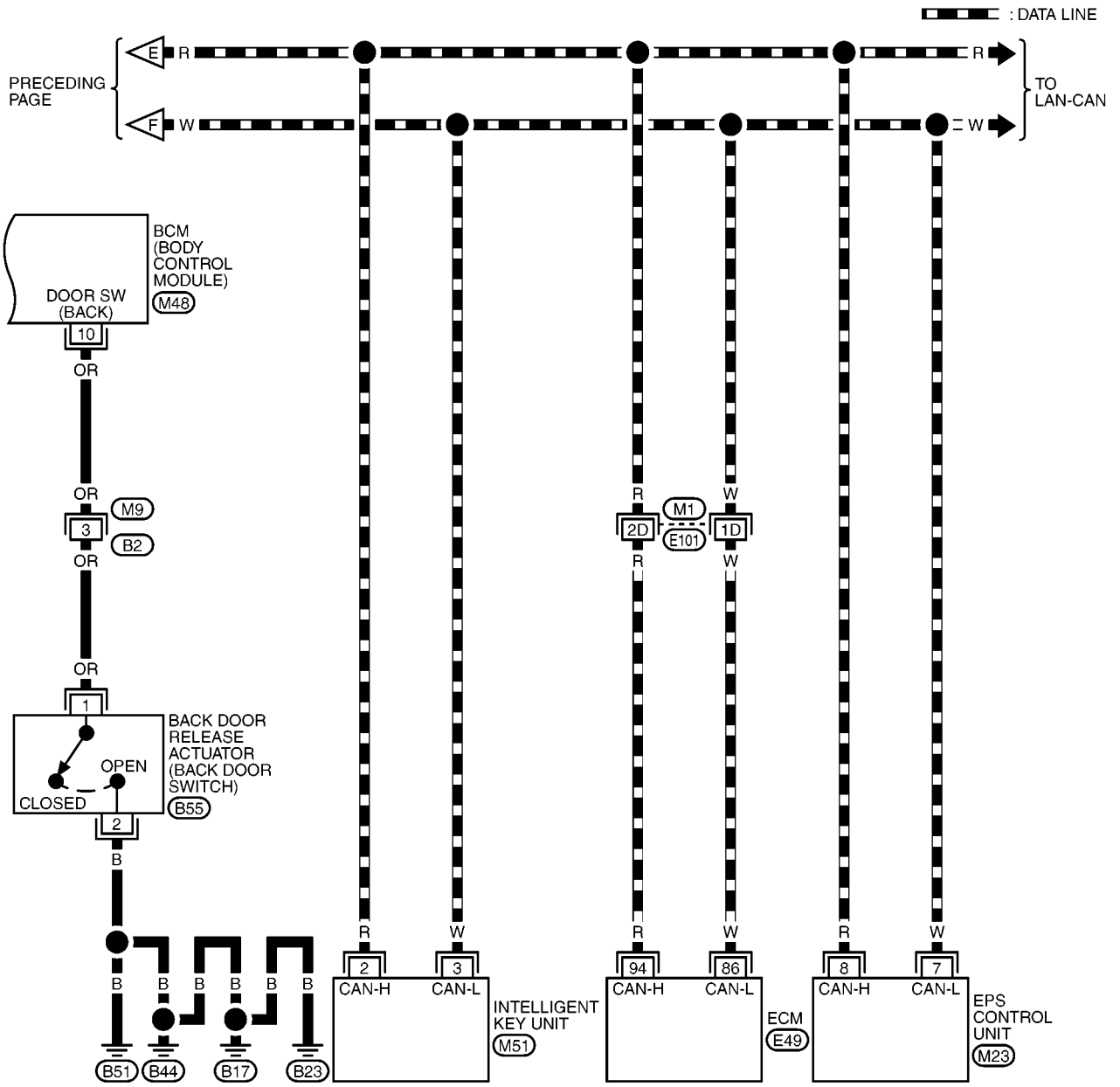
MKWA1806E

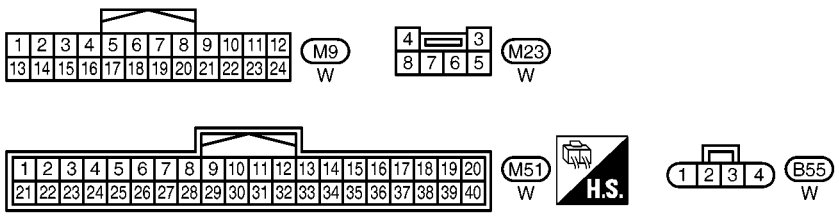
DI-WARN-04



MKWA1374E

DI-WARN-05



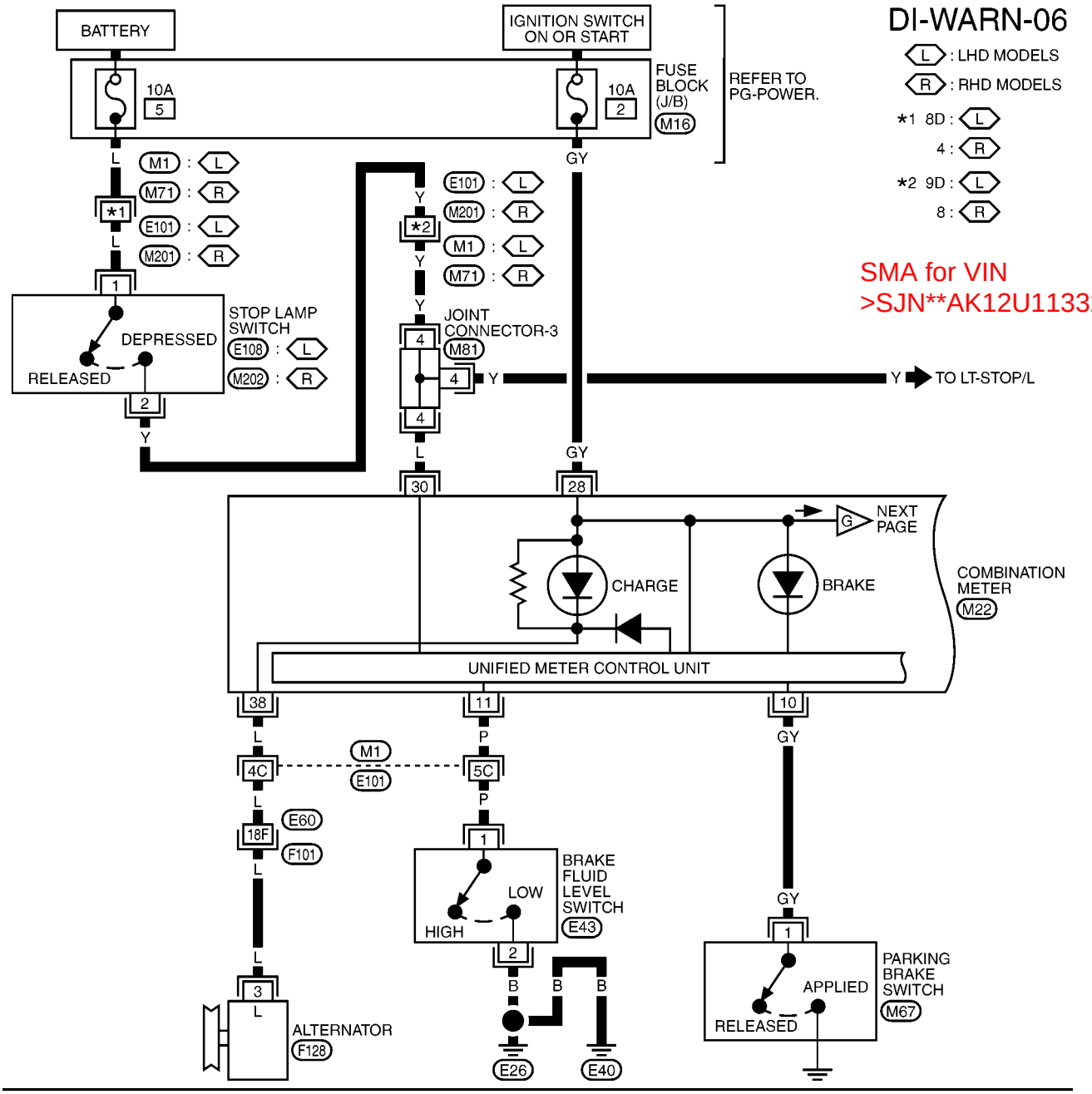


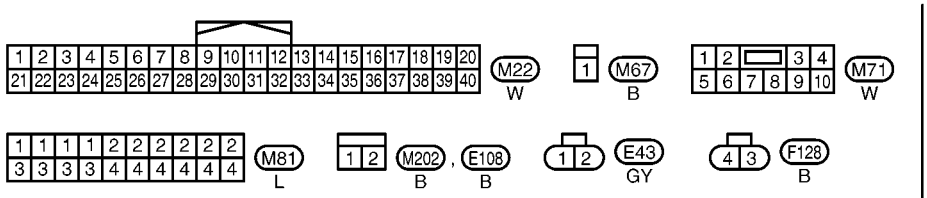
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M48 , E49 -ELECTRICAL UNITS

MKWA1807E

Wiring Diagram — WARN — K9K Engine Models

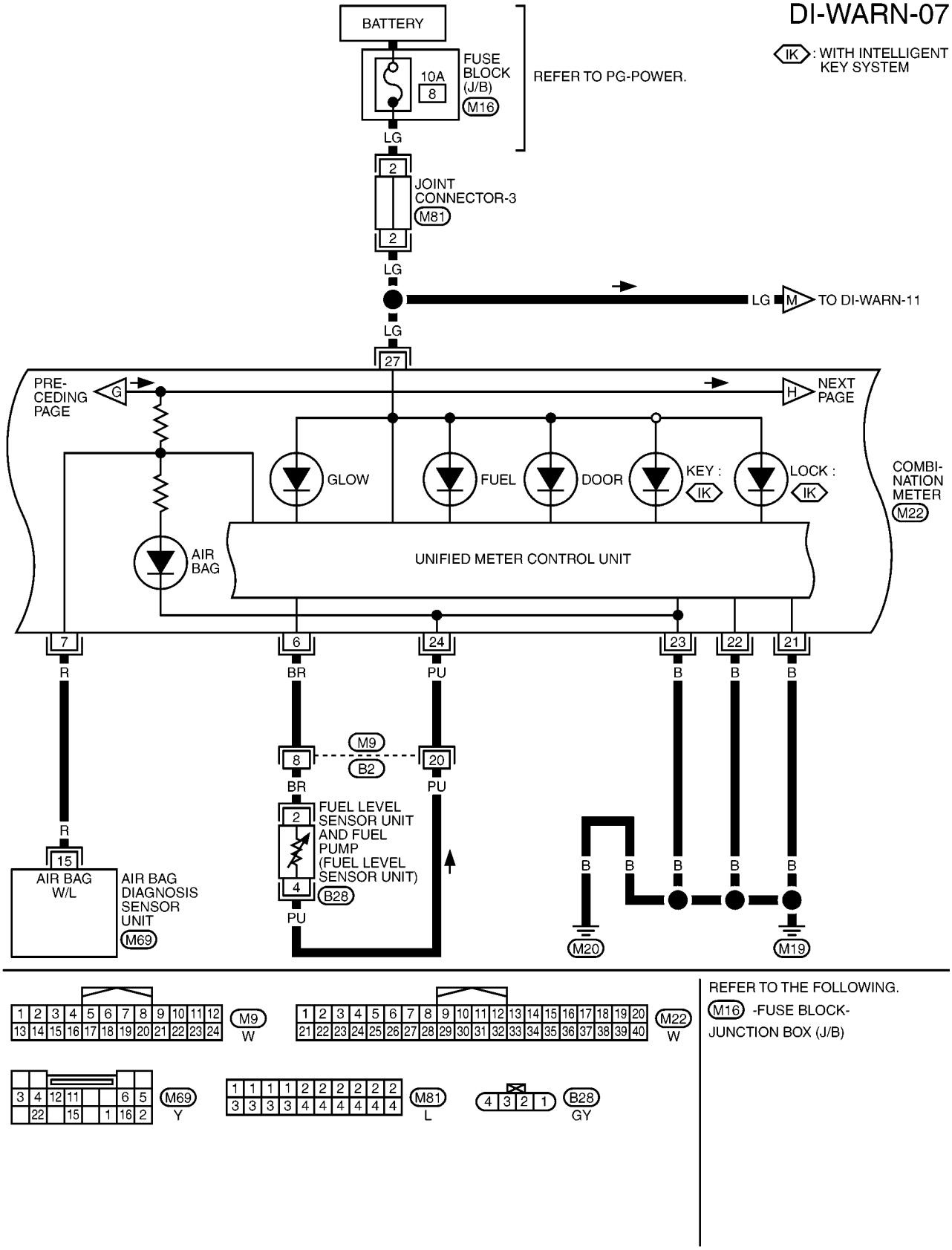
EKS00K3F





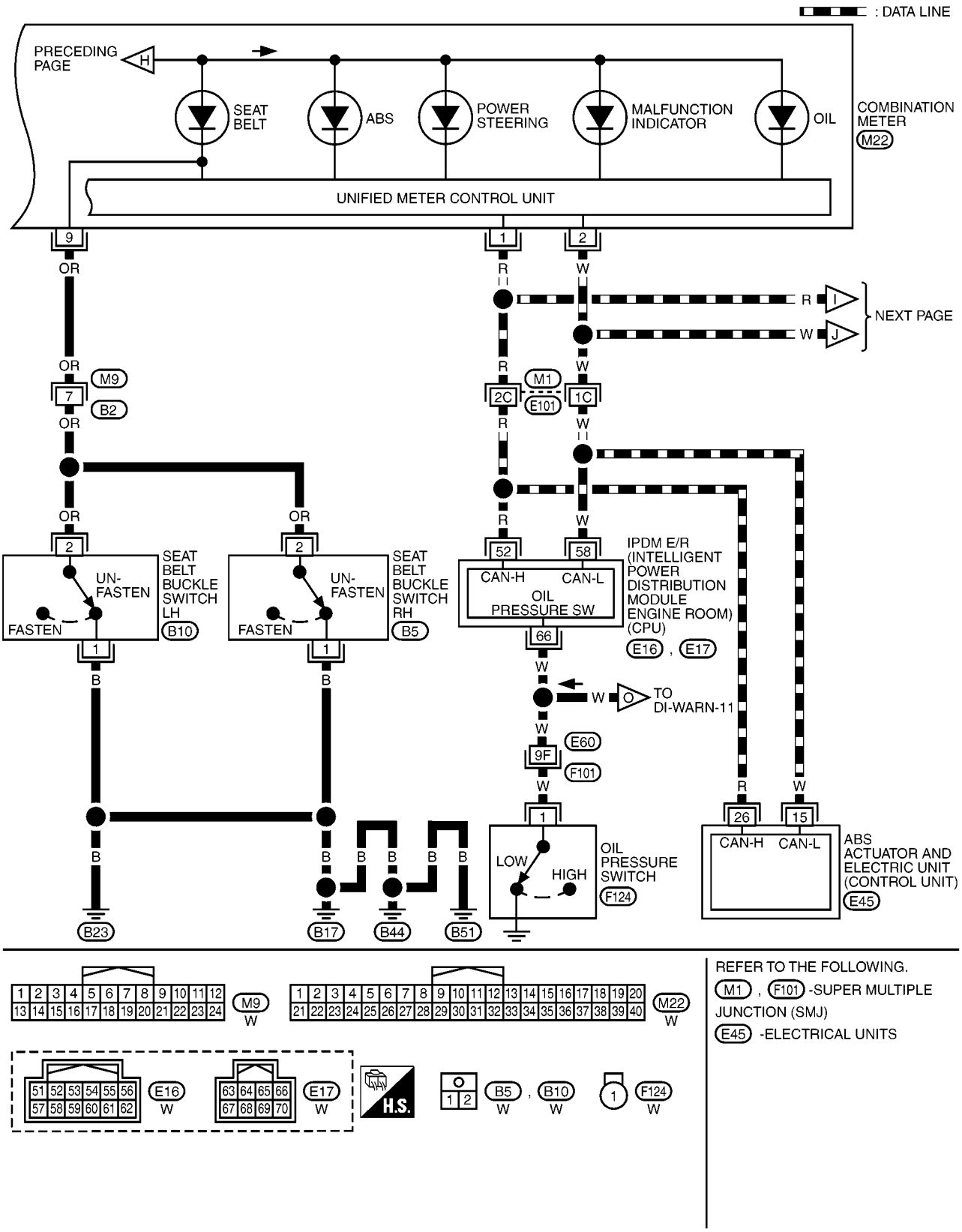
REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1808E

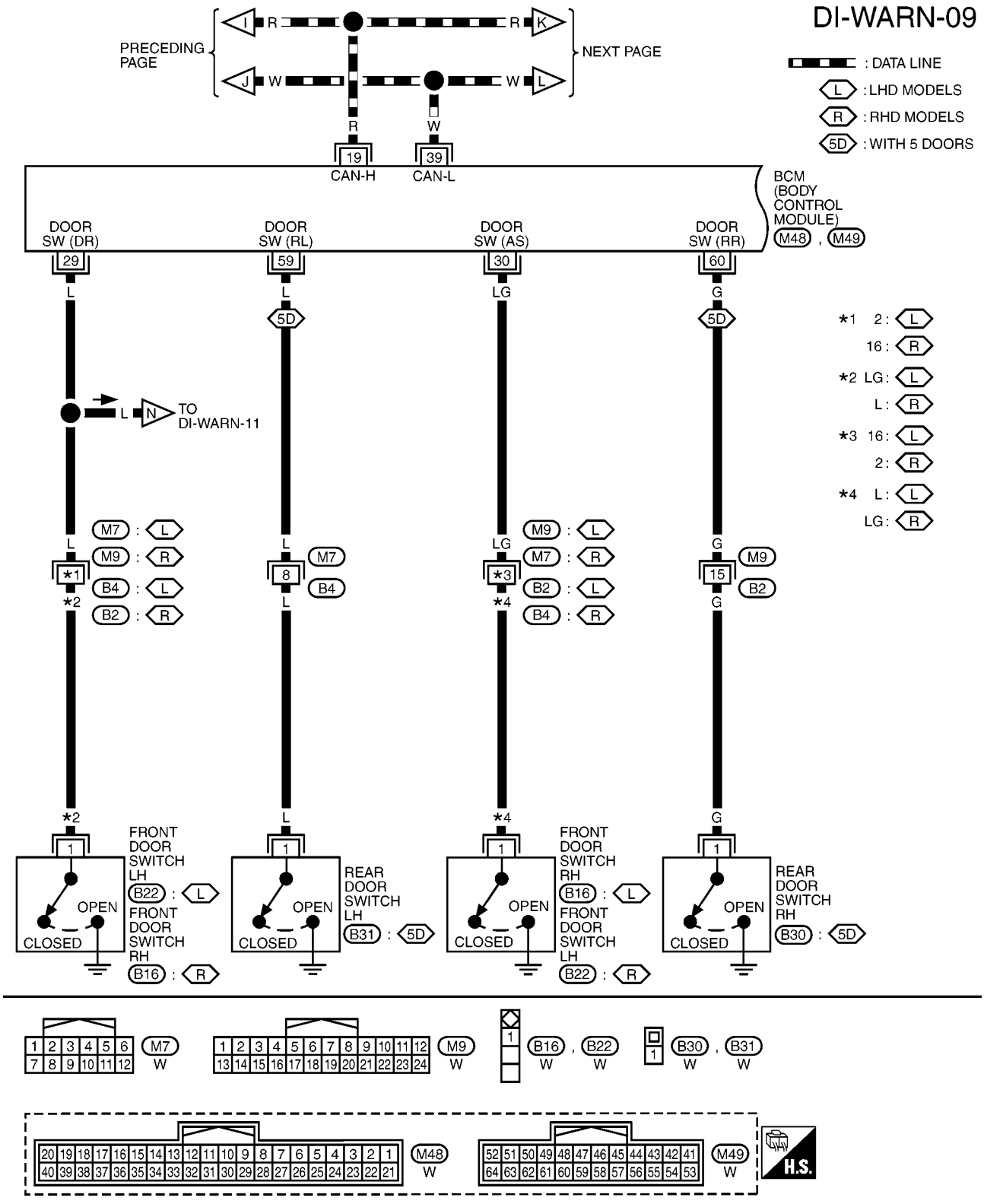

DI-WARN-07
IK : WITH INTELLIGENT KEY SYSTEM
BATTERY
FUSE BLOCK (J/B)
M16
10A
8
REFER TO PG-POWER.
LG
2
JOINT CONNECTOR-3
M81
2
LG
LG
M
TO DI-WARN-11
LG
27
PRE-CEDING PAGE
G
H
NEXT PAGE
GLOW
FUEL
DOOR
KEY :
IK
LOCK :
IK
COMBI-NATION METER
M22
AIR BAG
UNIFIED METER CONTROL UNIT
7
6
24
23
22
21
R
BR
PU
B
B
B
M9
8
20
B2
BR
PU
FUEL LEVEL SENSOR UNIT AND FUEL PUMP (FUEL LEVEL SENSOR UNIT)
2
4
B28
PU
R
15
AIR BAG W/L
AIR BAG DIAGNOSIS SENSOR UNIT
M69
B
B
B
B
B
M20
M19
M9
W
M22
W
M69
Y
M81
L
B28
GY
REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)

MKWA1809E

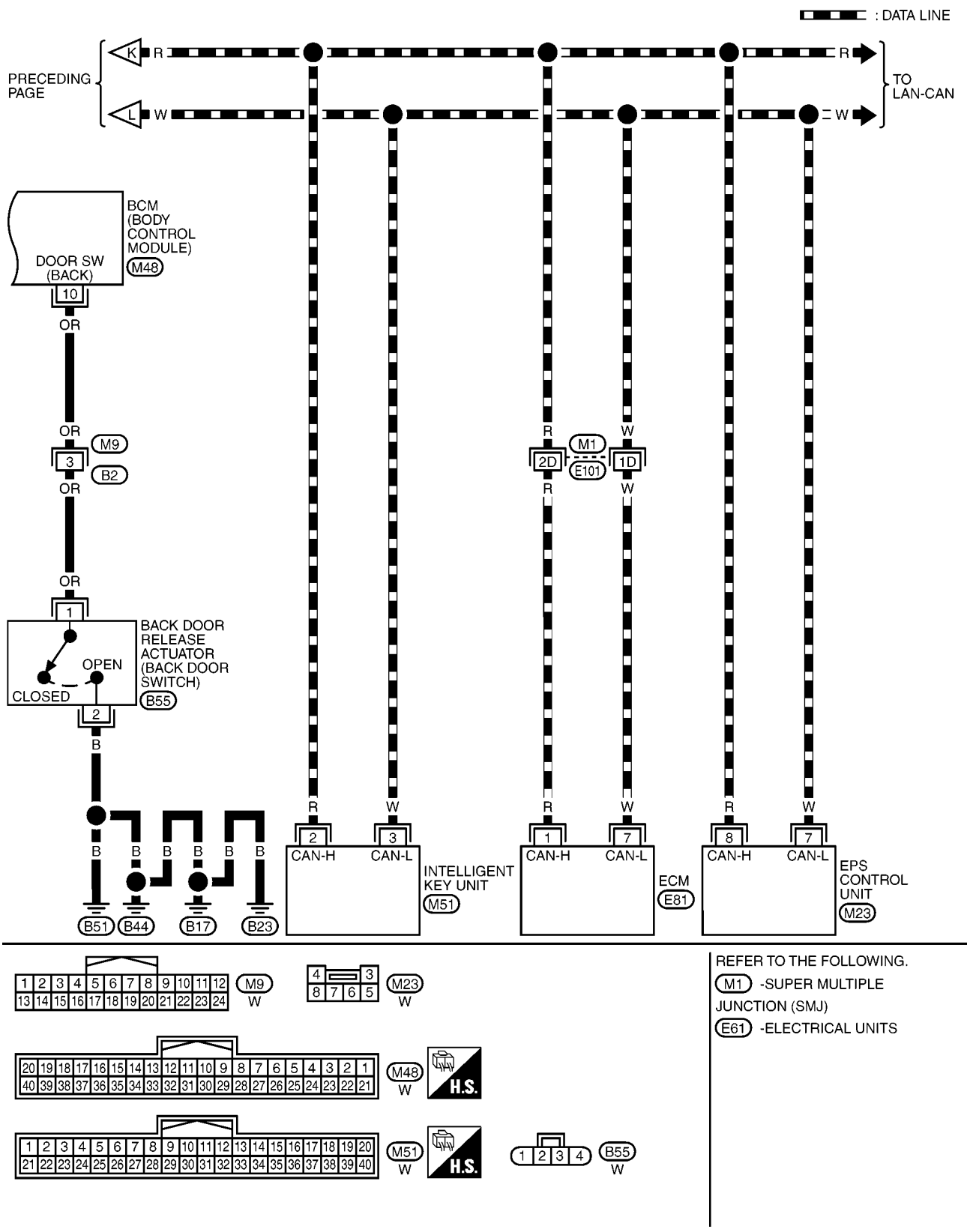
DI-WARN-08



MKWA1810E

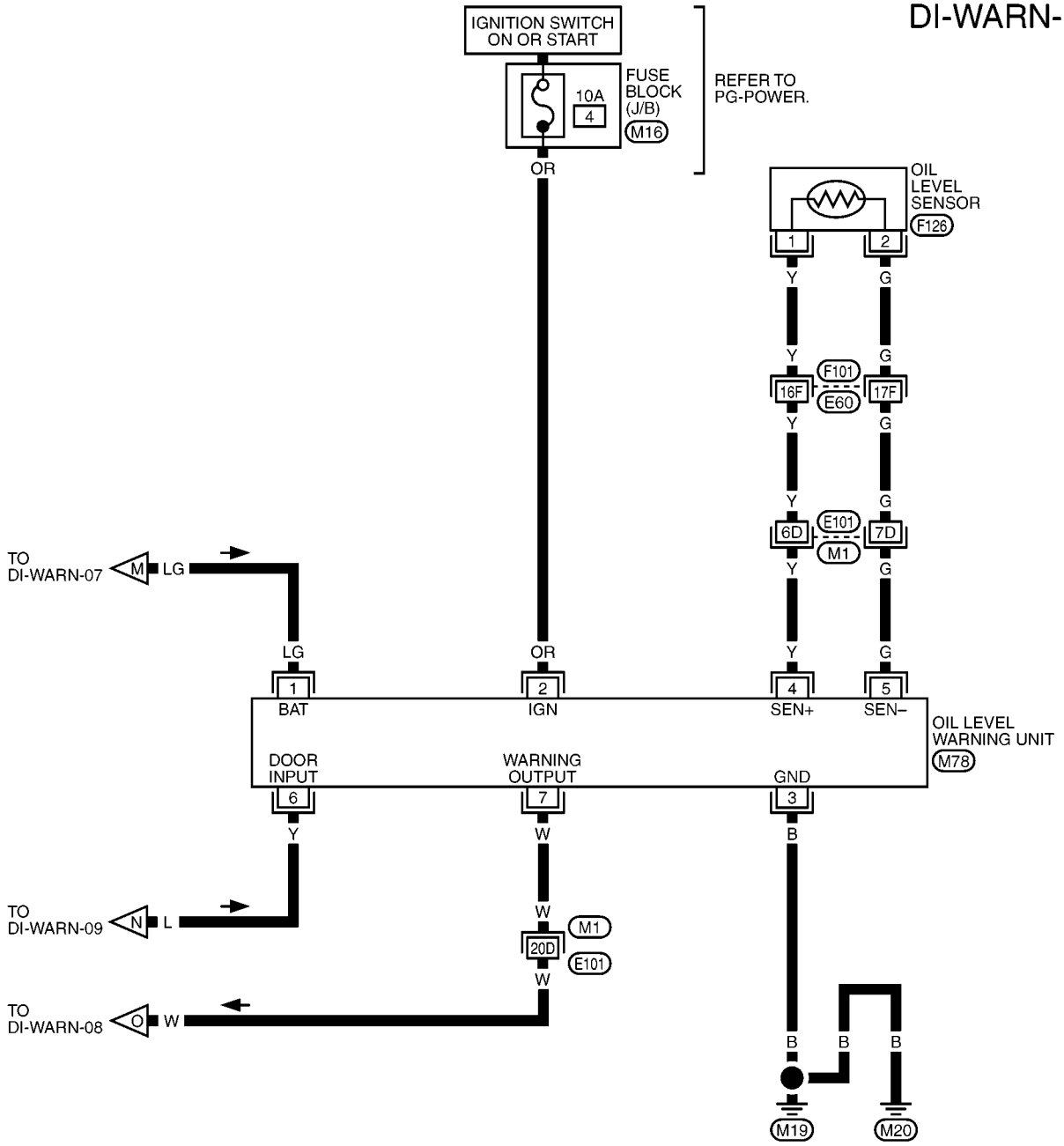

DI-WARN-09
PRECEDING PAGE
NEXT PAGE
: DATA LINE
: LHD MODELS
: RHD MODELS
: WITH 5 DOORS
CAN-H
CAN-L
BCM (BODY CONTROL MODULE)
M48 , M49
DOOR SW (DR)
DOOR SW (RL)
DOOR SW (AS)
DOOR SW (RR)
TO DI-WARN-11
FRONT DOOR SWITCH LH
FRONT DOOR SWITCH RH
REAR DOOR SWITCH LH
REAR DOOR SWITCH RH
OPEN
CLOSED
*1 2 : L
16 : R
*2 LG : L
L : R
*3 16 : L
2 : R
*4 L : L
LG : R
H.S.
MKWA1811E

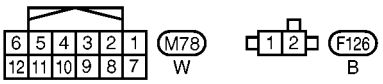
DI-WARN-10



MKWA3238E

DI-WARN-11





REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1813E

CONSULT-II Functions

EKS00870

CONSULT-II performs the following functions with combination of data receiving, command and transmission using the CAN communication line from the IPDM E/R.

Inspection Item, Diagnosis Mode	Description
SELF-DIAG RESULTS	The IPDM E/R performs diagnosis of the CAN communication and self-diagnosis.
DATA MONITOR	The input/output data of the IPDM E/R is displayed in real time.
ACTIVE TEST	The IPDM E/R sends a drive signal to electronic components to check their operation.

Oil Pressure Warning Lamp Stays Off (Ignition Switch ON)

EKS00833

1. CHECK IPDM SELF-DIAGNOSIS

1. Perform IPDM E/R self-diagnosis. Refer to PG-33, "CONSULT-II Function (IPDM E/R)" .

self-diagnostic results content

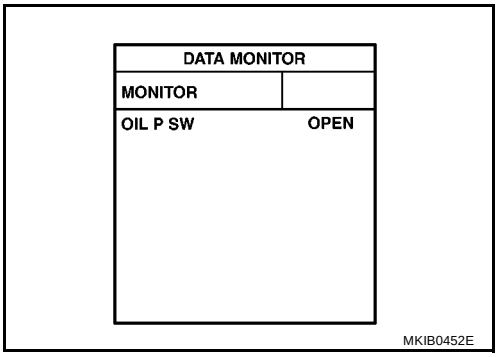
NON DTC IS DETECTED >>GO TO 2.
CAN COMMUNICATION CIRCUIT >>Check IPDM. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" .

2. CHECK IPDM E/R DATA MONITOR

With CONSULT-II

Check oil pressure switch (“OIL PSW”) in “DATA MONITOR” mode with CONSULT-II.

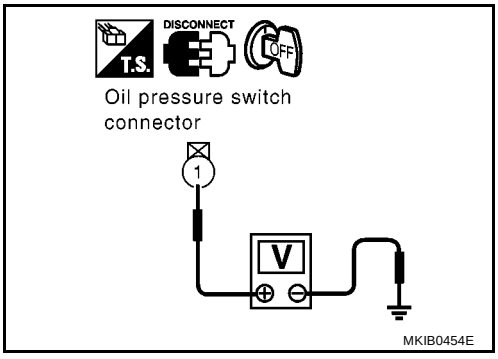
Engine is stopped (IGN ON) : OIL P SW CLOSE
Engine is running : OIL P SW OPEN



Without CONSULT-II

1. Disconnect oil pressure switch.
2. Turn the ignition switch ON.
3. Check voltage between oil pressure switch harness connector F25 terminal 1 (W) and ground.

1 (W) - Ground : Battery voltage should exist.



OK or NG

OK >> Replace combination meter.
NG >> GO TO 3.

3. CHECK OIL PRESSURE SWITCH

1. Check oil pressure switch. Refer to DI-80, "OIL PRESSURE SWITCH CHECK" .

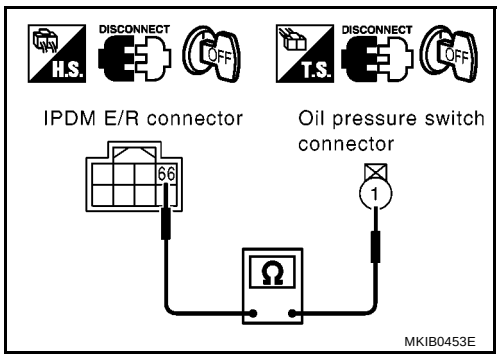
OK or NG

OK >> GO TO 4.
NG >> Replace the oil pressure switch.

4. CHECK OIL PRESSURE SWITCH CIRCUIT

1. Disconnect IPDM E/R connector and oil pressure switch connector.
2. Check continuity between IPDM E/R harness connector E17 terminal 66 (W) and oil pressure switch harness connector F25 terminal 1 (W).

66 (W) - 1 (W) : Continuity should exist.



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness or connector.

Oil Pressure Warning Lamp Does Not Turn Off (Oil Pressure Is Normal)

EKS00834

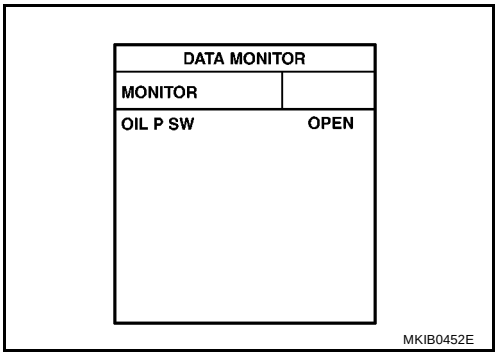
NOTE:
For oil pressure inspection, refer to LU-4, "OIL PRESSURE CHECK" (CR engine models) or LU-12, "OIL PRESSURE CHECK" (K9K engine models).

1. CHECK OIL PRESSURE SWITCH INPUT

With CONSULT-II

Check oil pressure switch ("OIL PSW") in "DATA MONITOR" mode with CONSULT-II.

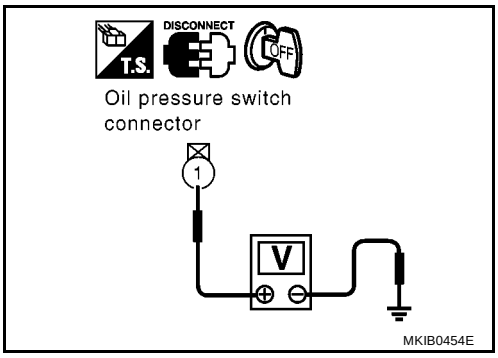
Engine is stopped (IGN ON) : OIL P SW CLOSE
Engine is running : OIL P SW OPEN



Without CONSULT-II

1. Disconnect oil pressure switch.
2. Turn the ignition switch ON.
3. Check voltage between oil pressure switch harness connector F25 terminal 1 (W) and ground.

1 (W) - Ground : Battery voltage should exist.



OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK OIL PRESSURE SWITCH

1. Check oil pressure switch. Refer to DI-80, "OIL PRESSURE SWITCH CHECK" .

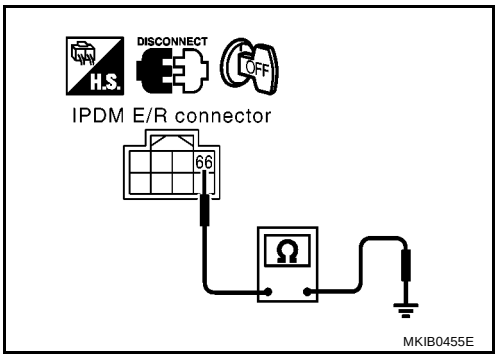
OK or NG

OK >> Replace combination meter.
NG >> Replace the oil pressure switch.

3. CHECK OIL PRESSURE SWITCH CIRCUIT

1. Disconnect IPDM E/R connector turn ignition switch OFF.
2. Check continuity between IPDM E/R harness connector E17 terminal 66 (W) and ground.

66 (W) - Ground : Continuity should not exist.



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness or connector.

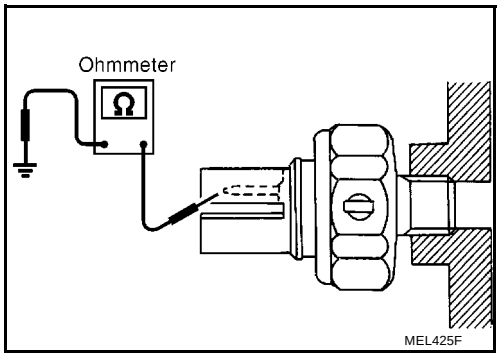
Electrical Components Inspection

EKS0072J

OIL PRESSURE SWITCH CHECK

	Oil pressure kPa (bar, kg/cm^2 , psi)	Continuity
Engine running	More than 10 - 20 (0.10 - 0.20, 0.1 - 0.2, 1 - 3)	No
Engine not running	Less than 10 - 20 (0.10 - 0.20, 0.1 - 0.2, 1 - 3)	Yes

Check the continuity between the terminals of oil pressure switch and body ground.



WARNING CHIME

PFP:24814

System Description

EKS0072L

The warning chime is controlled by the BCM.
The warning chime is located in the combination meter.

POWER SUPPLY AND GROUND CIRCUIT

Power is supplied at all times

- through 40A fusible link (letter **J** , located in fuse and fusible link box)
- to BCM terminals 74 and 79
- through 10A fuse [No. 8, located in fuse block (J/B)]
- to combination meter terminal 27
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to key switch terminal 1 (without Intelligent Key system)
- through 10A fuse [No. 17, located in the fuse block (J/B)]
- to key switch and ignition knob terminals 1 and 3 (with Intelligent Key system).

With ignition switch in ON or START position, power is supplied

- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to BCM terminal 24.
- through 10 A fuse [No. 2, located in the fuse block (J/B)]
- to combination meter terminals 28

Ground is supplied

- to BCM terminals 2 and 70, and
- to combination meter terminals 21, 22 and 23,
- through body grounds, M19 and M20.

IGNITION KEY WARNING CHIME

With the key in the ignition key cylinder, the ignition switch in OFF or ACC position, and the driver's door open, the warning chime will sound. Power is supplied

- through key switch terminal 2 (without Intelligent Key system) or
- through key switch and ignition knob terminal 2 (with Intelligent Key system)
- to BCM terminal 3.

Ground is supplied

- from front door switch LH (LHD models) or RH (RHD models) terminal 1
- to BCM terminal 29.

Ground is supplied through the case of the front door switch LH (LHD models) or RH (RHD models).
BCM sends buzzer output signal to combination meter via CAN communication line.
When combination meter receives buzzer output signal, it sounds warning chime.

IGNITION SWITCH OFF WARNING CHIME (WITH INTELLIGENT KEY SYSTEM)

When ignition knob switch is pushed (ignition switch is OFF position), and the driver's door open, the earning chime will sound. Power is supplied

- through key switch and ignition knob terminal 4
- to Intelligent Key unit terminal 7.

Ground is supplied

- from front door switch LH (LHD models) or RH (RHD models) terminal 1
- to BCM terminal 29.

Ground is supplied through the case of the front door switch LH (LHD models) or RH (RHD models).
BCM sends door switch signal (driver side) to Intelligent Key unit via CAN communication line.
Then, Intelligent Key unit sends buzzer output signal to combination meter via CAN communication line.
When combination meter receives buzzer output signal, it sounds warning chime.

LIGHT WARNING CHIME

With ignition switch OFF position, driver's door open, and lighting switch in 1ST or 2ND position, warning chime will sound. [Except when headlamp battery saver control operates (for 5 minutes after ignition switch is turned to OFF or ACC position) and headlamps do not illuminate.]
Signal is supplied

- from combination switch (lighting switch) terminals 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10
- to BCM terminals 7, 8, 9, 13, 14, 15, 27, 28, 33 and 34

NOTE:
BCM detection lighting switch in 1st or 2nd position, refer to LT-189, "COMBINATION SWITCH READING FUNCTION" .
Ground is supplied

- from front door switch LH (LHD models) or RH (RHD models) terminal 1
- to BCM terminal 29.

Ground is supplied through the case of the front door switch LH (LHD models) or RH (RHD models).
BCM sends buzzer output signal to combination meter via CAN communication line. when combination meter receives buzzer output signal, it sounds warning chime.

CAN Communication

EKS00K3B

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K3C

Go to CAN system, when selecting your car model from the following table.

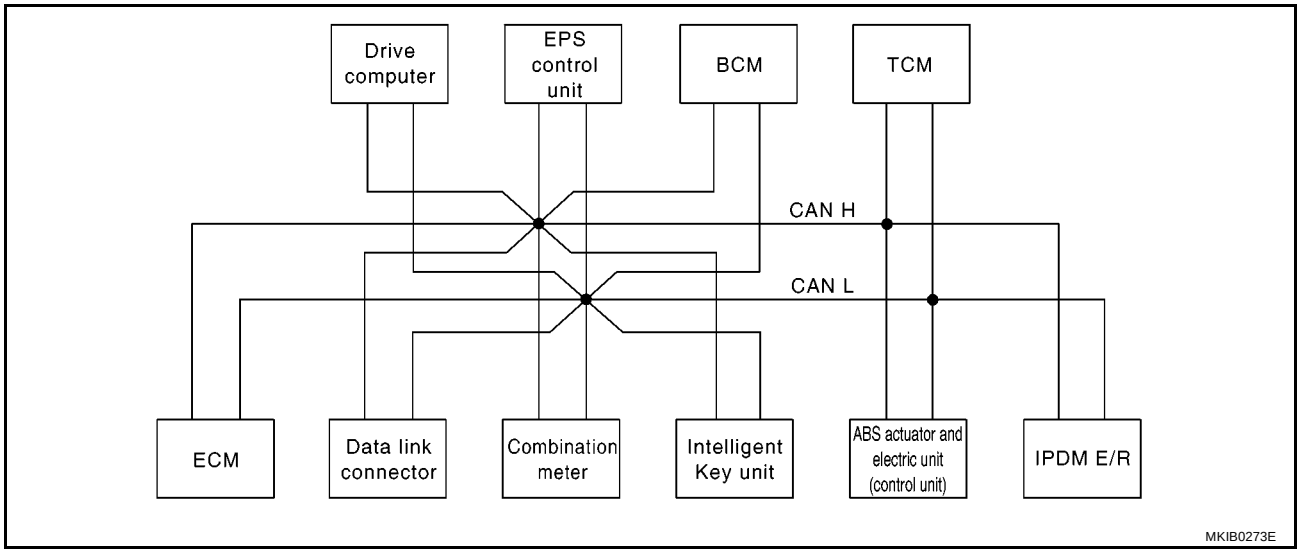
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	DI-84, "TYPE 1/ TYPE 2"				DI-87, "TYPE 3/ TYPE 4"				DI-89, "TYPE 5/ TYPE 6"				DI-92, "TYPE 7/ TYPE 8"				DI-94, "TYPE 9/ TYPE 10"			

×: Applicable

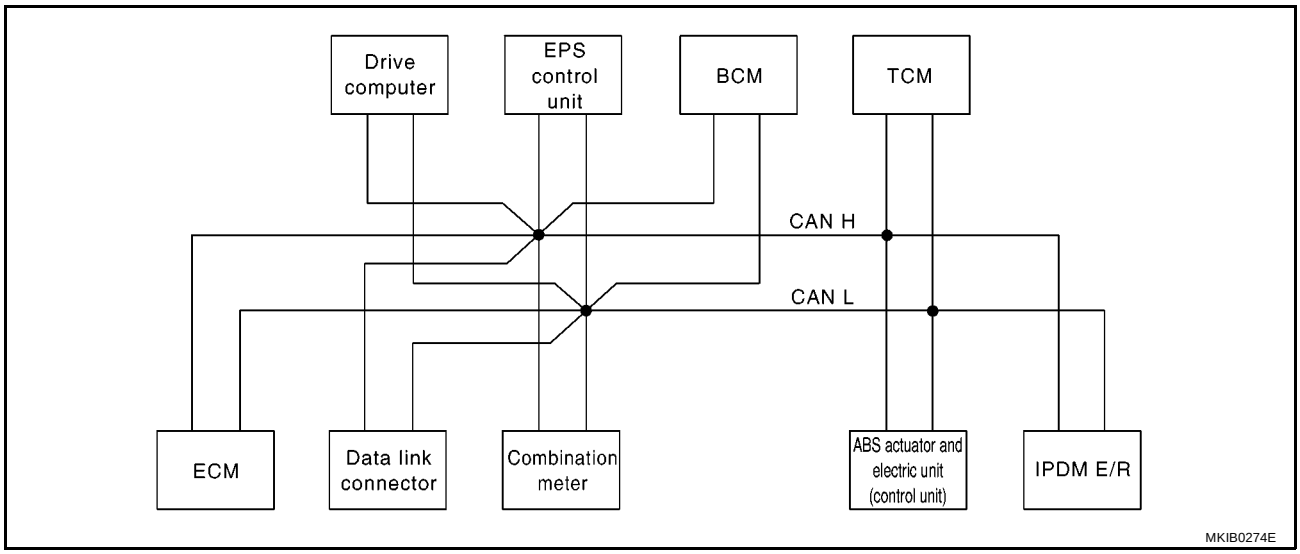
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

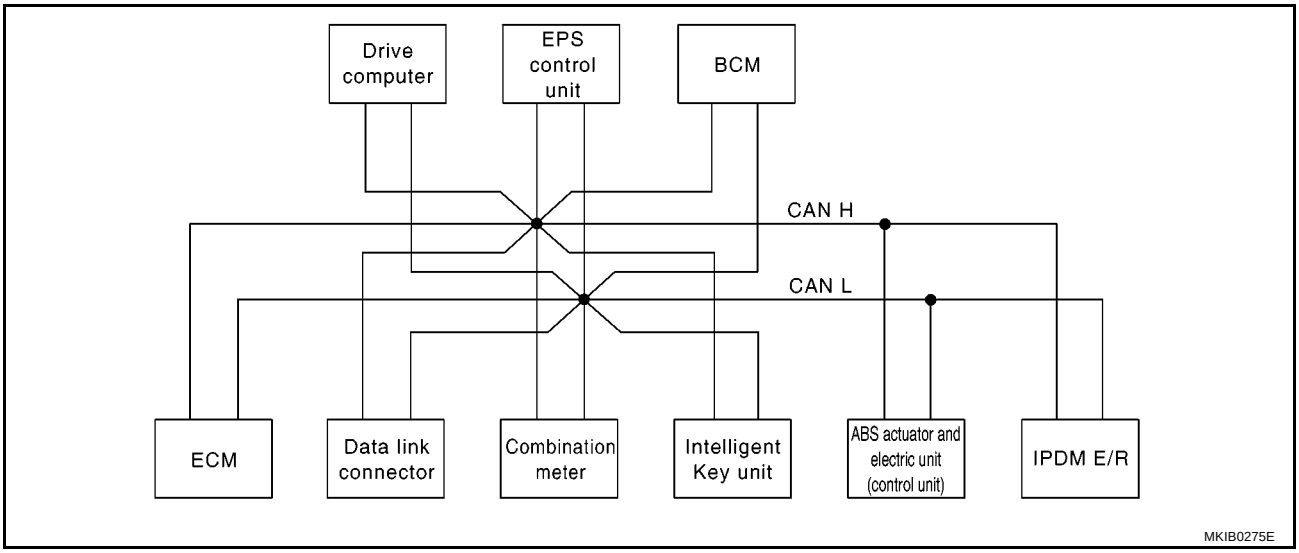
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

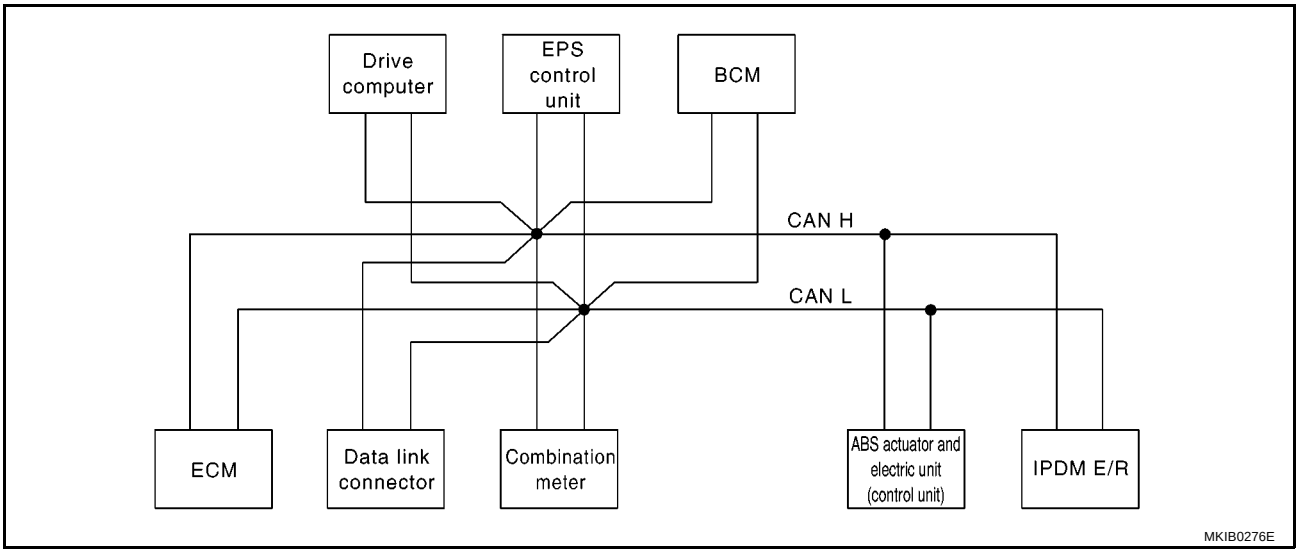
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

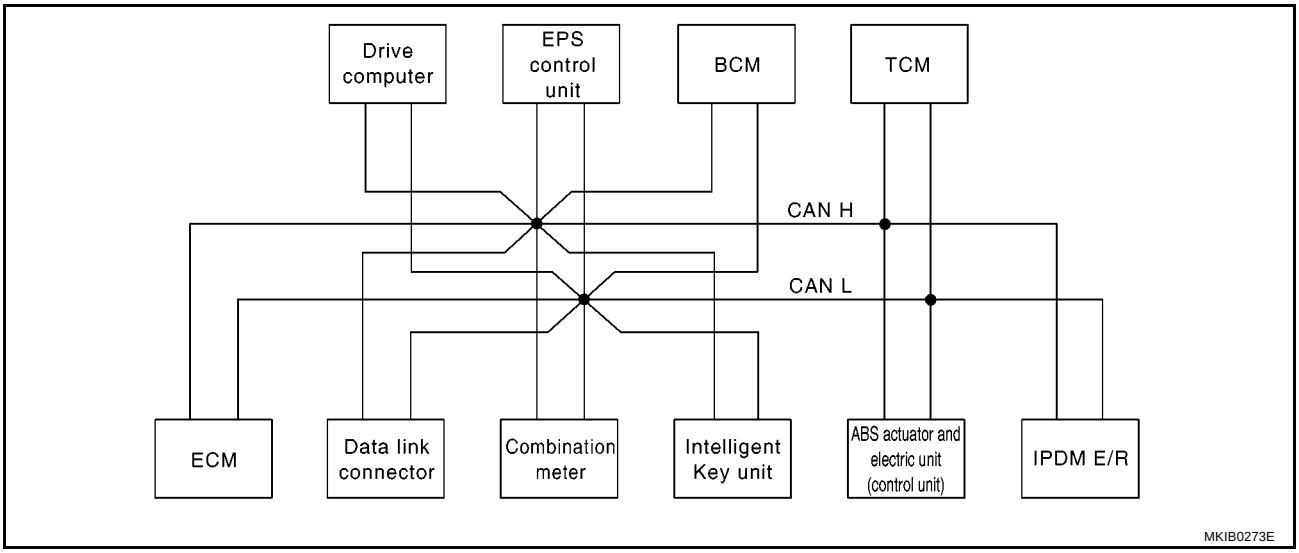
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

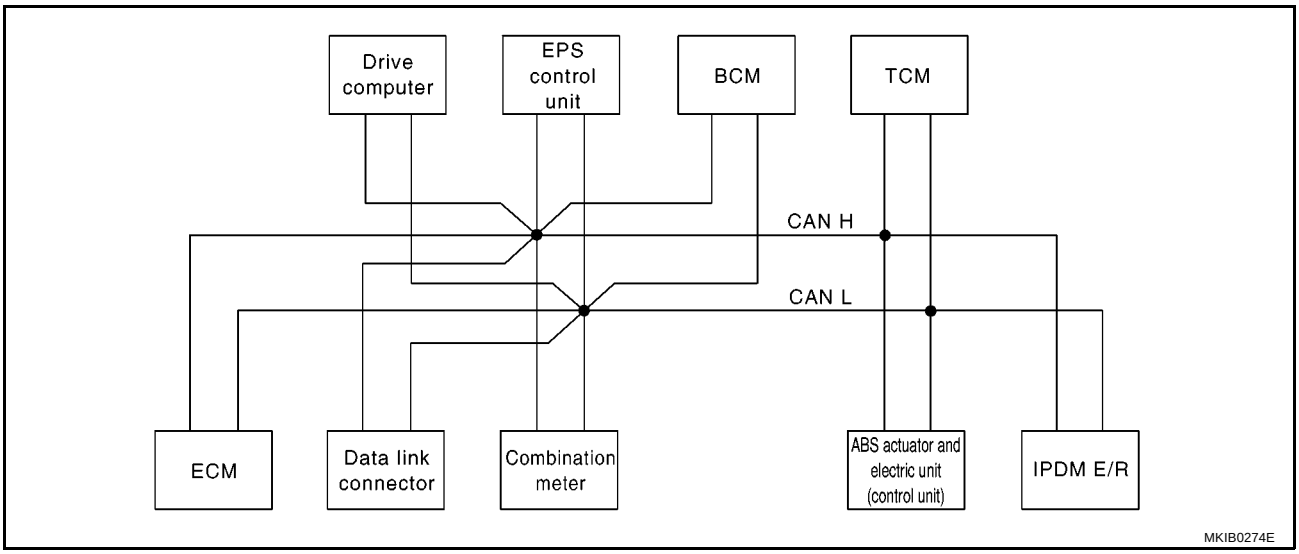
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

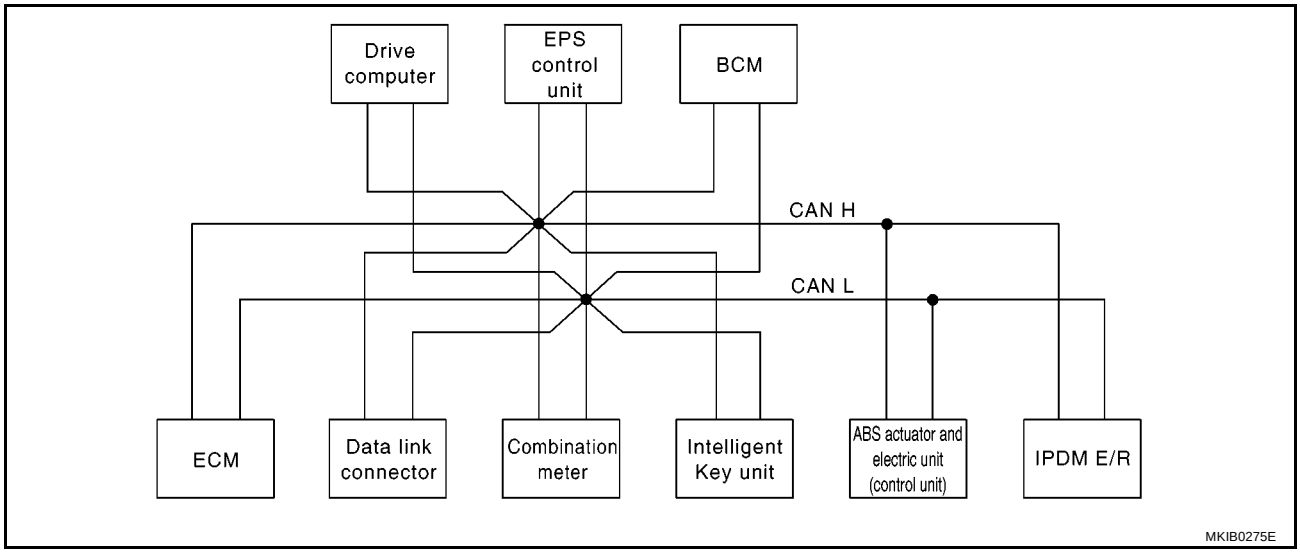
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

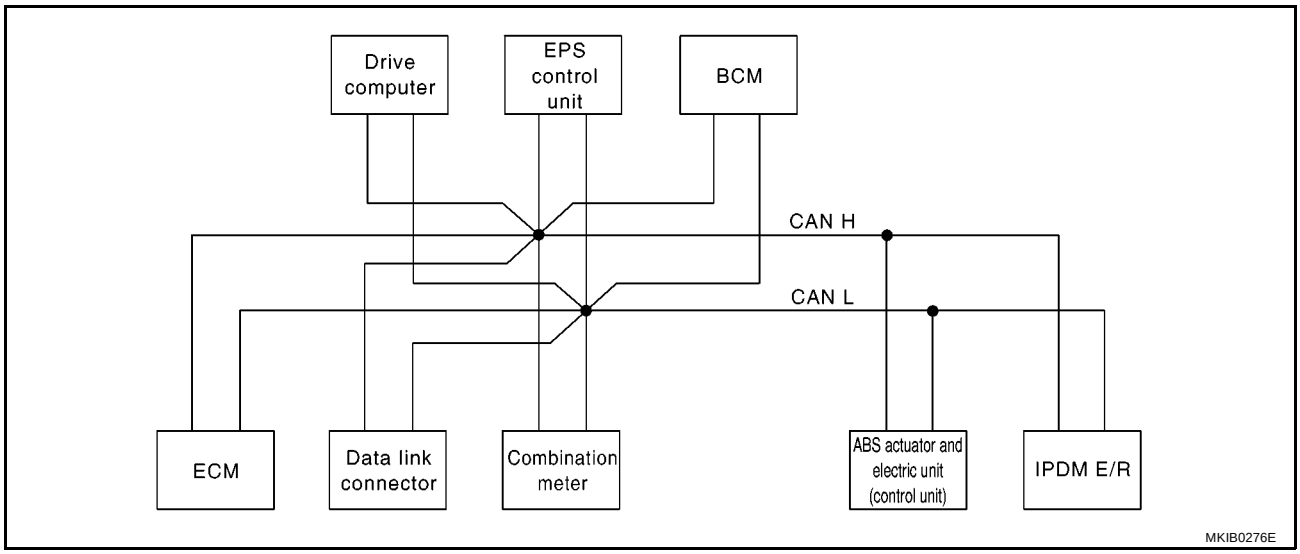
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

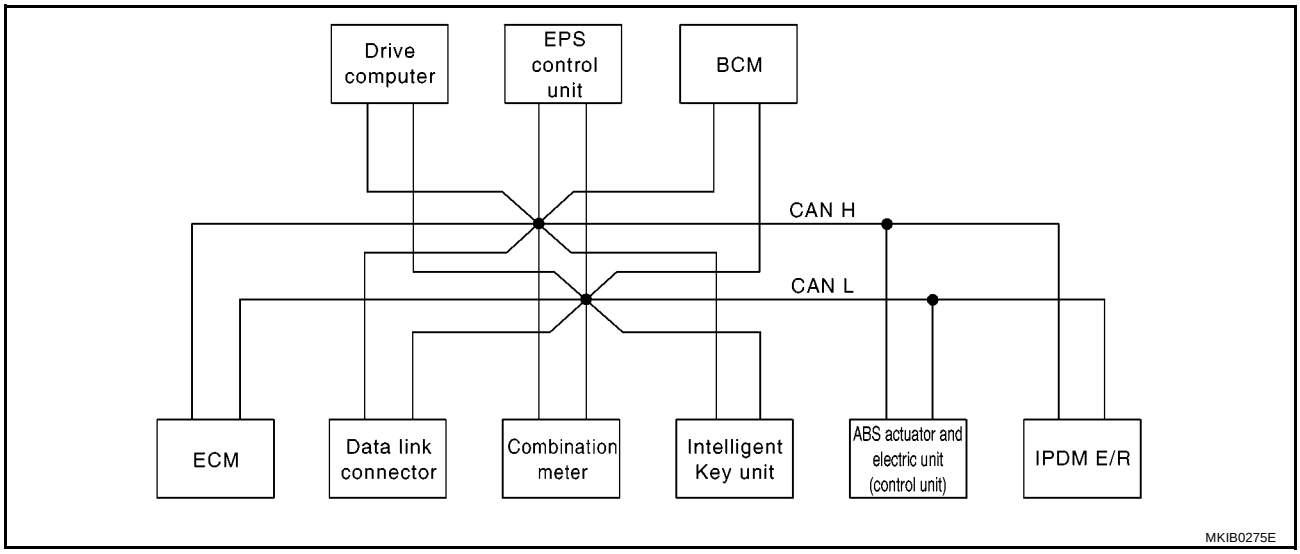
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

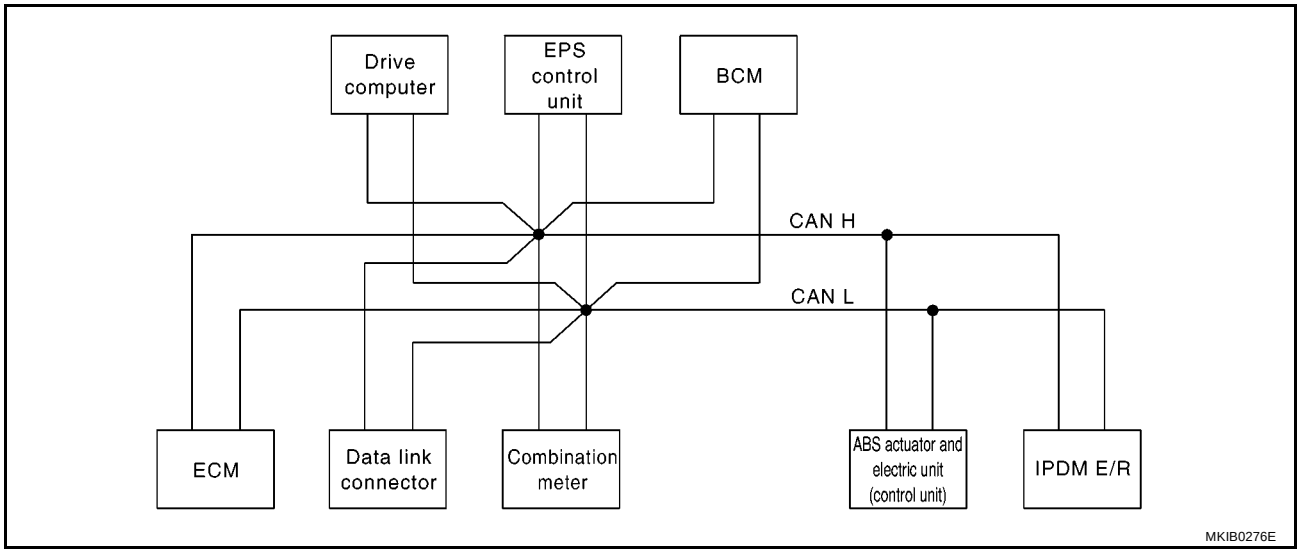
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

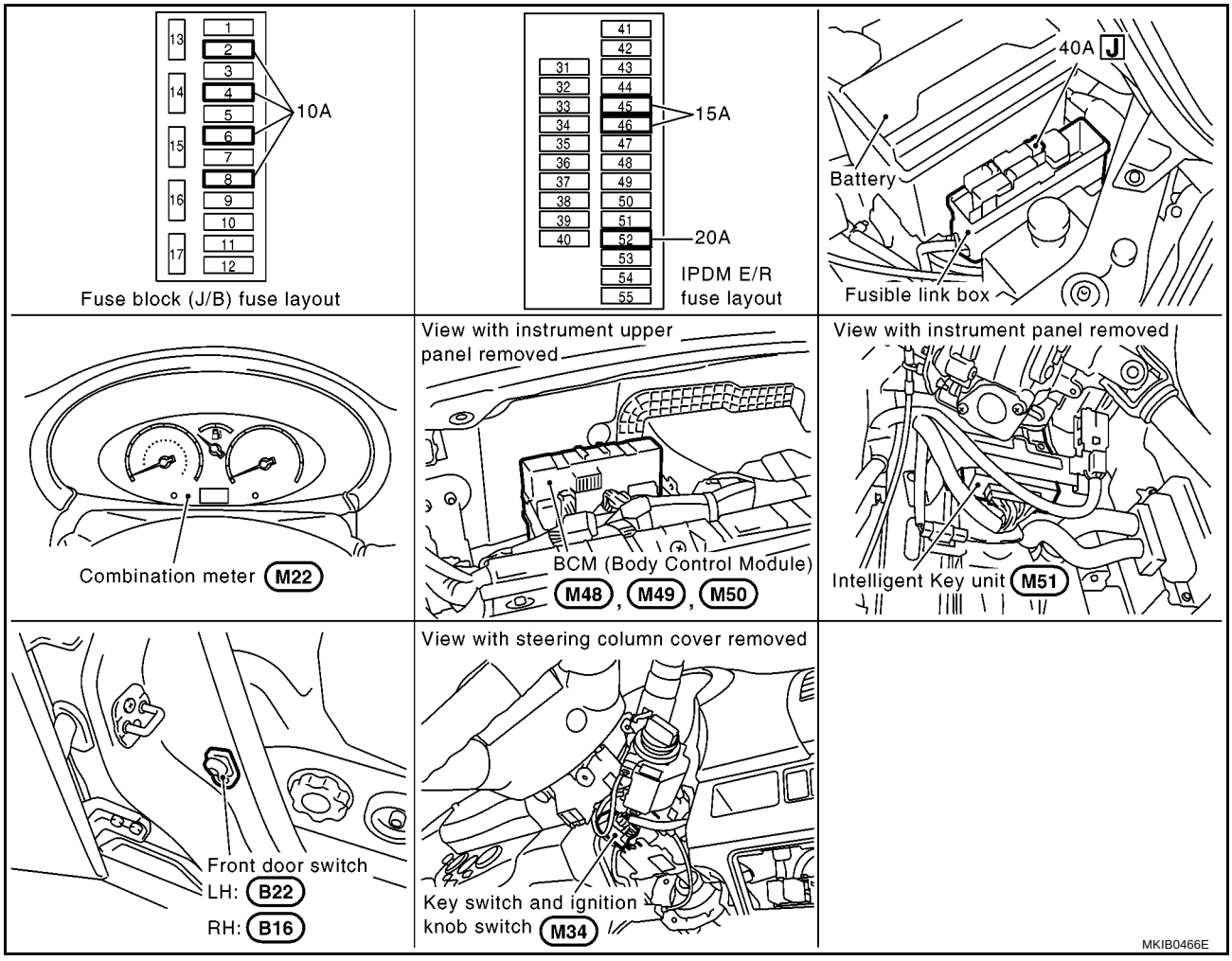
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

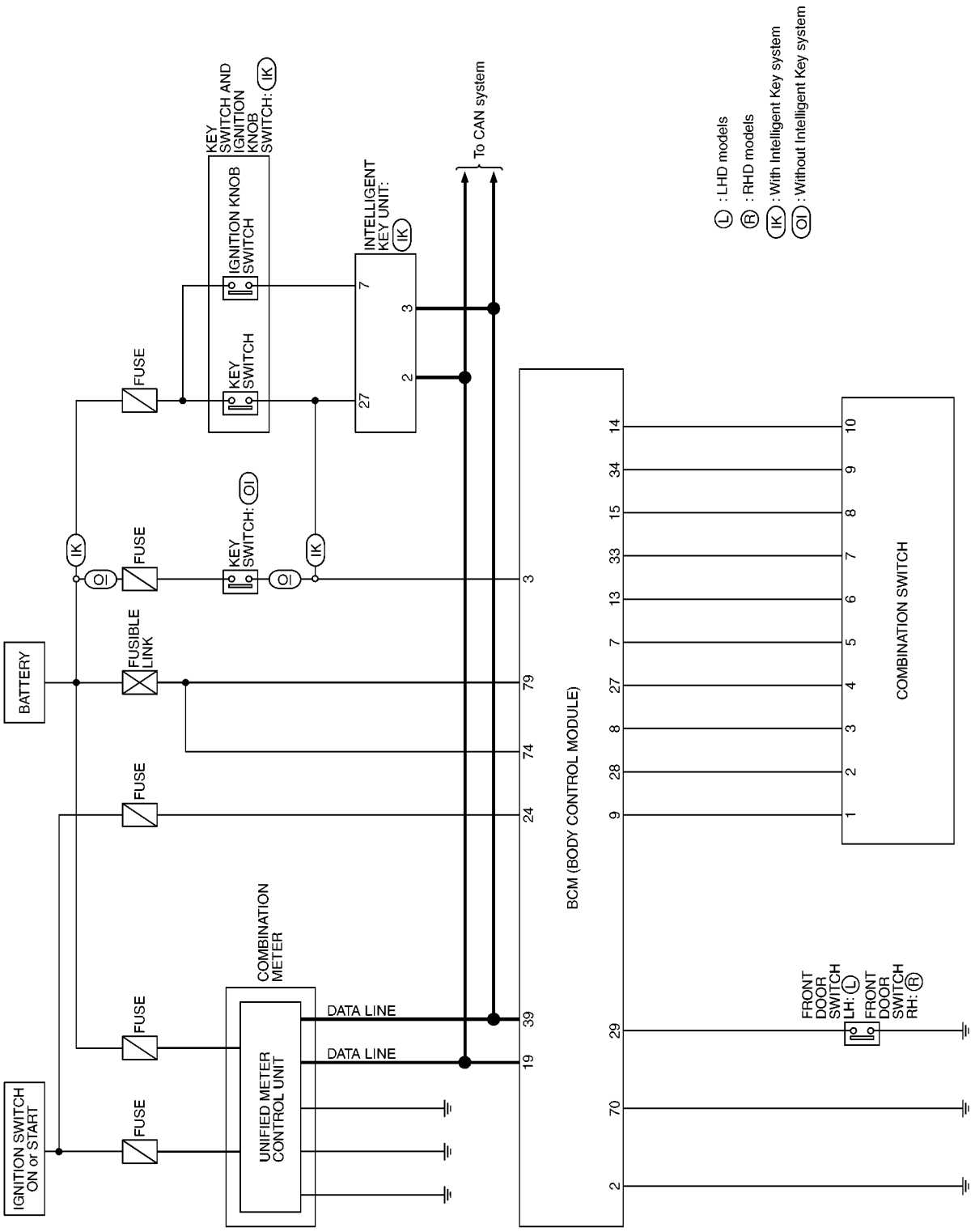
Component Parts and Harness Connector Location

EKS0072M



Schematic

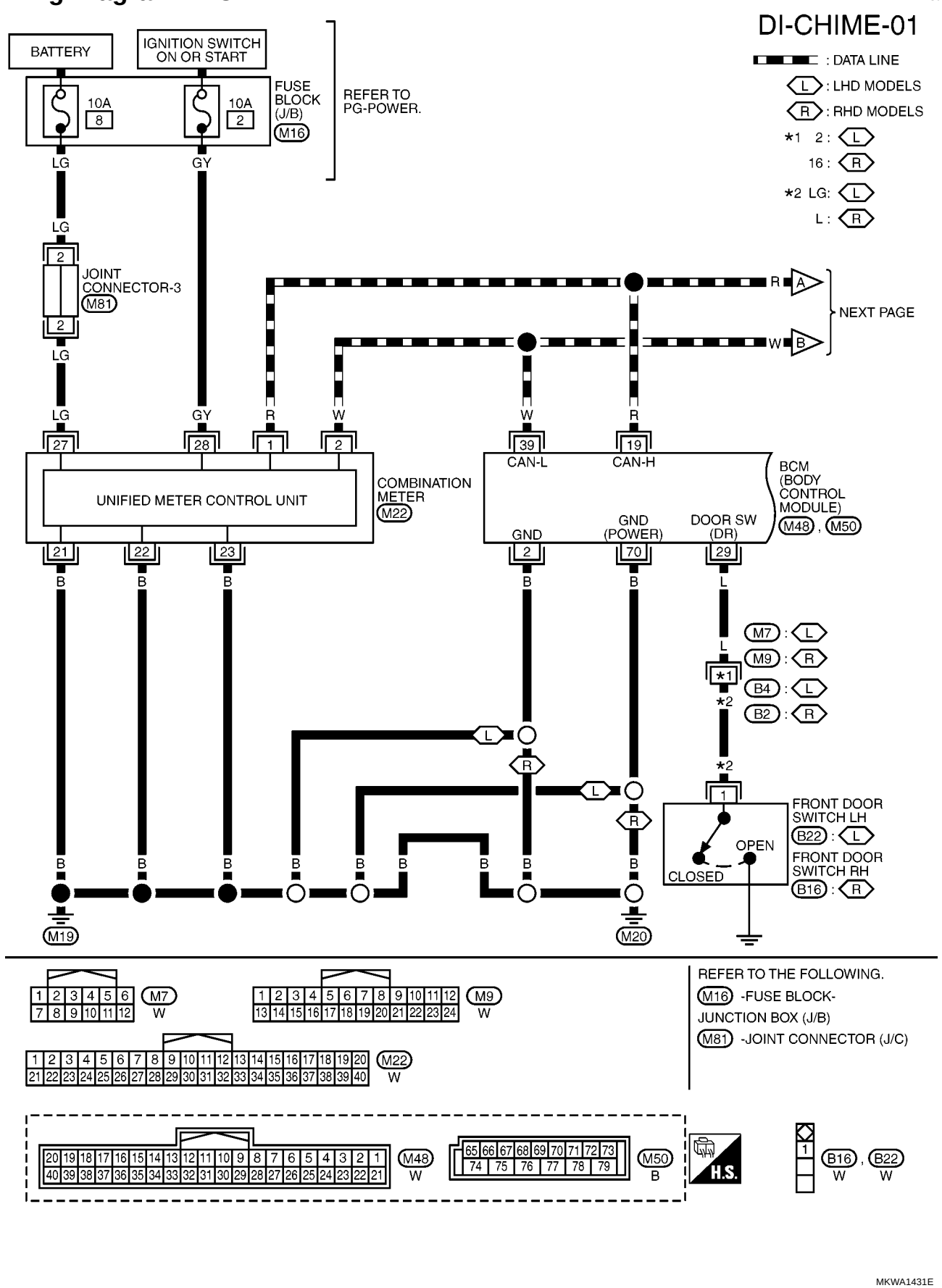
EKS00EKJ



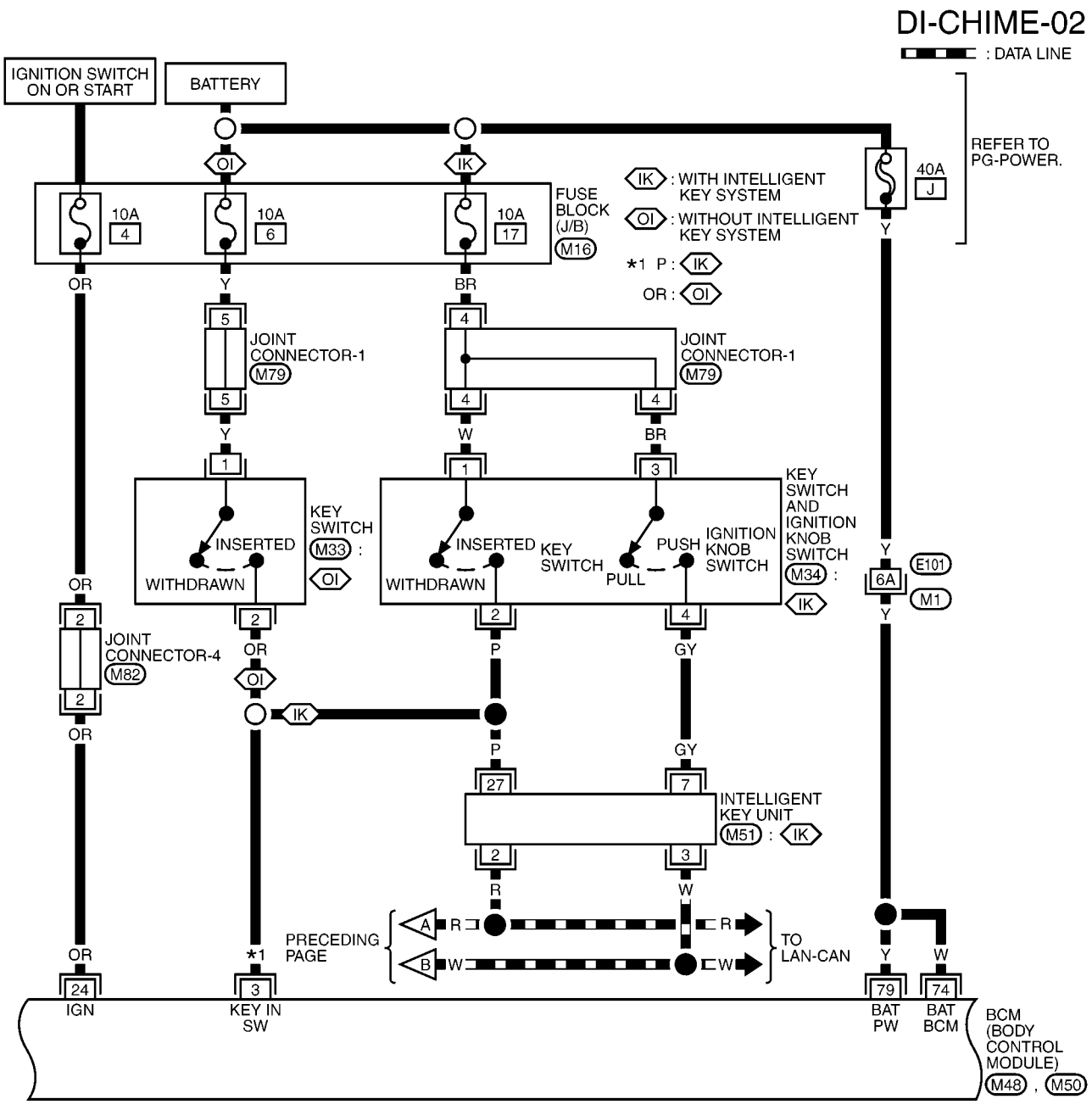
MKWA1430E

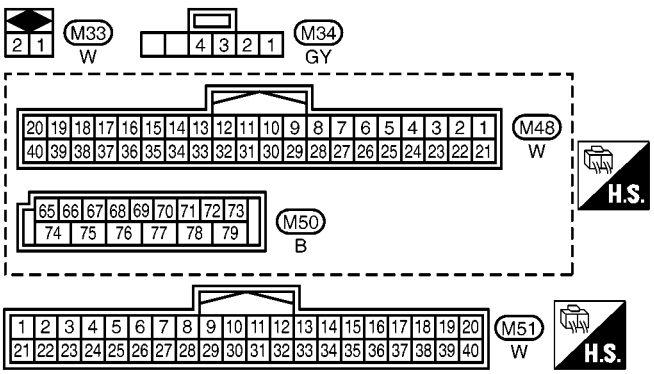
Wiring Diagram — CHIME —

EKS0072N



MKWA1431E

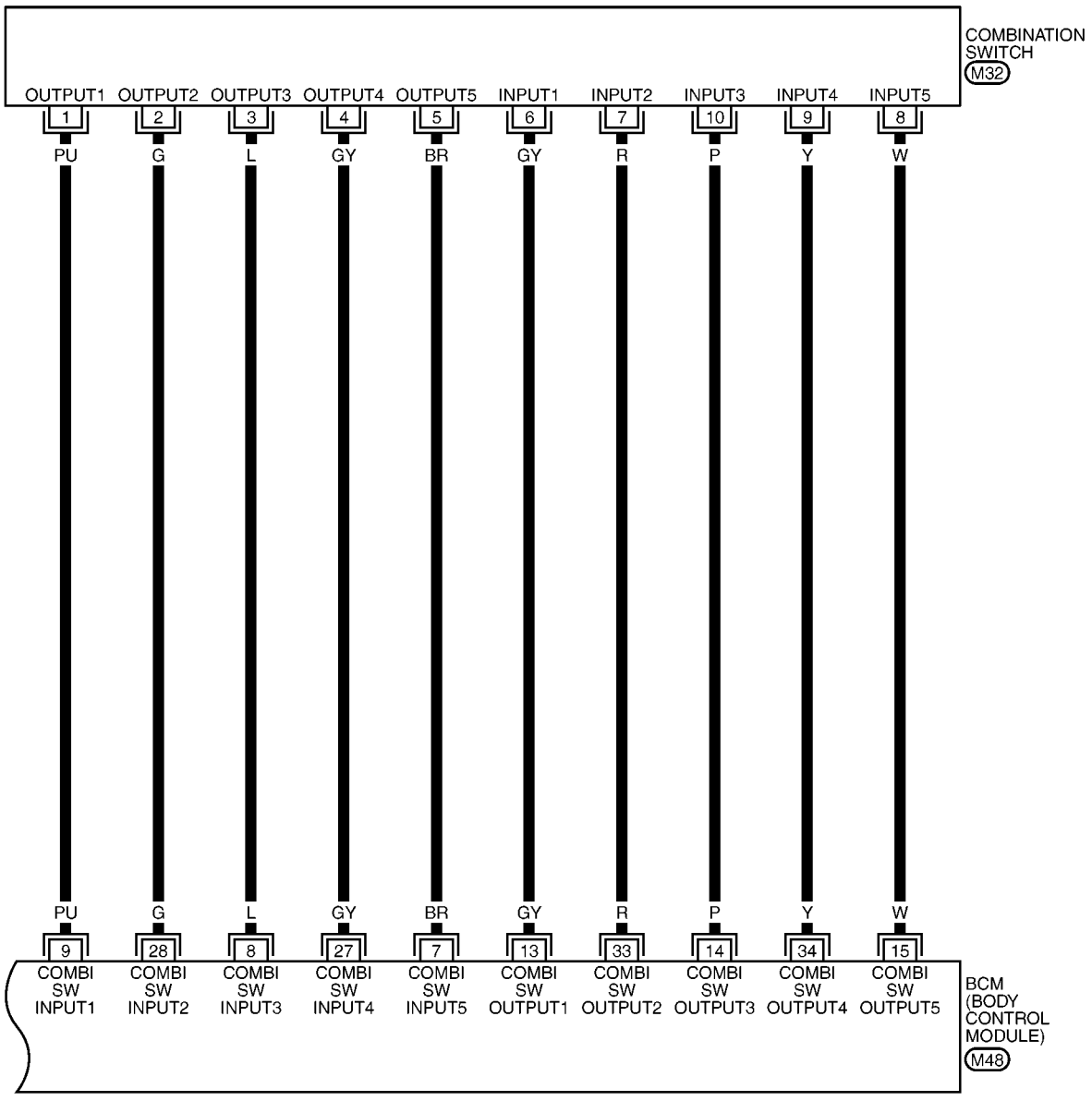


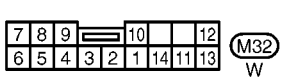


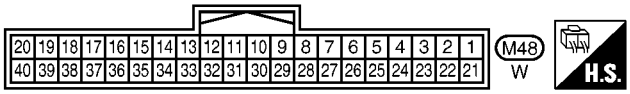
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M79 , M82
-JOINT CONNECTOR (J/C)

MKWA1432E

DI-CHIME-03



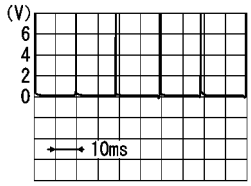
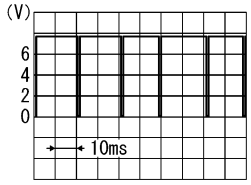
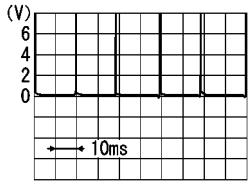




MKWA1378E

Terminals and Reference Value for BCM

EKS00837

Terminal No.	Wire color	Item	Condition		Reference value (V)
			Ignition switch	Measurement method	
2	B	Ground	ON	—	Approx. 0
3	*1	Key switch signal	OFF	key is withdrawn.	Approx. 0
				Key is inserted.	Battery voltage
7	BR	Combination switch output 5	ON	—	 SKIA2167J
8	L	Combination switch output 3			
9	PU	Combination switch output 1			
27	GY	Combination switch output 4			
28	G	Combination switch output 2			
13	GY	Combination switch input 1	ON	Headlamp, turn signal and wipers are OFF. (wiper INT volume is 1 or 7)	 SKIA2166J
14	P	Combination switch input 3			
15	W	Combination switch input 5		Headlamp, turn signal and wipers are OFF. (wiper INT volume is other than 1 and 7)	 SKIA2167J
33	R	Combination switch input 2			
34	Y	Combination switch input 4			
19	R	CAN H	OFF	—	—
24	OR	Ignition switch (ON)	ON	—	Battery voltage
29	L	Front door switch (driver side)	OFF	ON (open)	Approx. 0
				OFF (closed)	Battery voltage
39	W	CAN L	OFF	—	—
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	OFF	—	Battery voltage
79	Y	Battery power supply	OFF	—	Battery voltage

*1: P (with Intelligent Key system)
OR (without Intelligent Key system)

CONSULT-II Inspection Procedure

EKS0072O

CONSULT-II executes the following functions by combining data reception and command transmission via the communication line from BCM. And data monitor, Active test and self-diagnostic display.

DIAGNOSTIC ITEMS DESCRIPTION

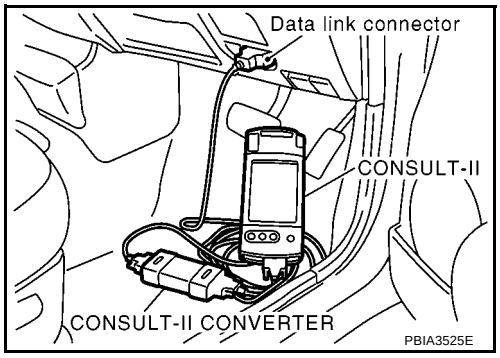
BCM diagnosis position	Diagnosis mode	Description
BUZZER	Data monitor	The input data to the BCM is displayed in real time.
	Active test	Operation of electrical loads can be checked by sending driving signal to them.
BCM	Self-diagnosis	BCM performs self-diagnosis of CAN communication.

CONSULT-II BASIC OPERATION

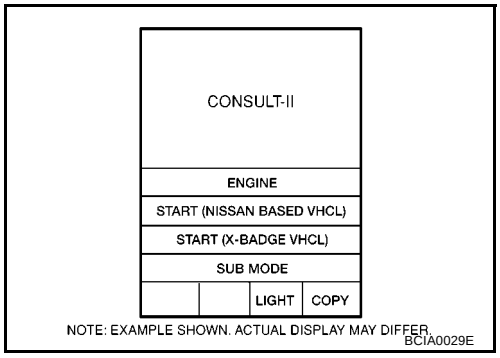
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

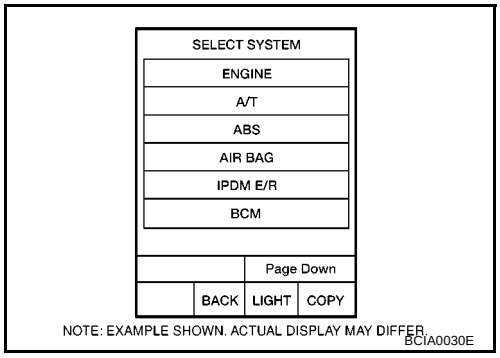
1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to the data link connector.



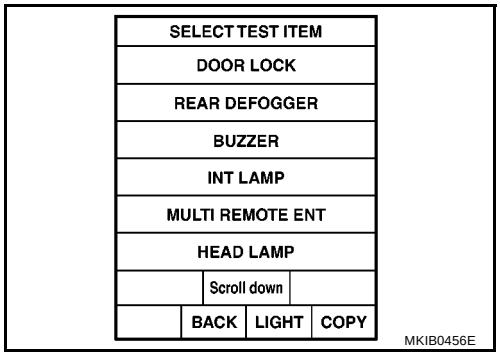
3. Turn ignition switch “ON”.
4. Touch “START” (NISSAN BASED VHCL).



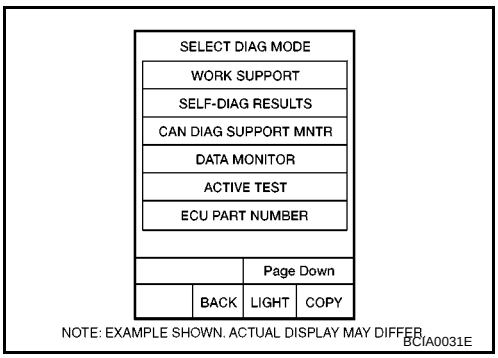
5. Touch “BCM” on “SELECT SYSTEM” screen. If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “BUZZER” on “SELECT TEST ITEM”.



7. Touch “DATA MONITOR” or “ACTIVE TEST” on “SETECT DIAG MODE” screen.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0031E

CONSULT- II Application Items

EKS008WL

DATA MONITOR

Monitored item	Description
IGN ON SW	Indicates [ON/OFF] condition of ignition switch.
PUSH SW (*1)	Indicates [ON/OFF] condition of ignition knob switch.
KEY IN SW (*2)	Indicates [ON/OFF] condition of key switch.
DOOR SW-DR	Indicates [ON/OFF] condition of front door switch (driver side).
DOOR SW-AS	Indicates [ON/OFF] condition of front door switch (passenger side).
DOOR SW-RR	Indicates [ON/OFF] condition of rear door switch RH.
DOOR SW-RL	Indicates [ON/OFF] condition of rear door switch LH.
BACKDOOR SW	Indicates [ON/OFF] condition of back door switch.
CDL LOCK SW	Indicates [ON/OFF] condition of door lock/unlock switch.
CDL UNLOCK SW	Indicates [ON/OFF] condition of door lock/unlock switch.
LIGHTING SW	Indicates [ON/OFF] condition of lighting switch.
TRANK OPNR SW	Indicates [ON/OFF] condition of back door release actuator.

*1: displayed for models with Intelligent Key System.
*2: displayed for models without Intelligent Key System.

ACTIVE TEST

Test item	Description
LIGHT WARN ALM	This test is check light warning chime operation. Light warning chime sounds for 2 seconds after touching “ON” on CONSULT-II screen.
KEY REMINDER WARN	This test is check key warning chime operation. Key warning chime sounds for 2 seconds after touching “ON” on CONSULT-II screen.
BACK DR OPEN WARN	This test is check back door open warning chime operation. Back door open warning chime sounds for 2 seconds after touching “ON” on CONSULT-II screen.
DOOR WARNIG IND	This test is check door warning chime operation. Door warning chime sounds for 2 seconds after touching “ON” on CONSULT-II screen.

Symptom Chart

EKS0072P

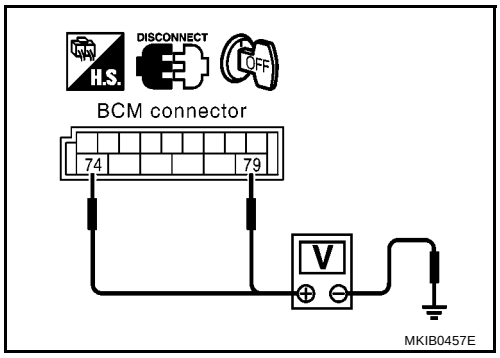
Symptom	Diagnoses/Service procedure	Reference page
Light warning chime does not activate.	● Power supply and ground circuit check	DI-104
	● Lighting switch check	DI-105
	● Front door switch (driver side) check	DI-111
	● Ignition ON signal check	DI-110
Key warning chime does not activate.	● Power supply and ground circuit check	DI-104
	● Key switch signal check/with Intelligent Key system	DI-107
	● Key switch signal check/without Intelligent Key system	DI-105
	● Front door switch (driver side) check	DI-111
	● Ignition ON signal check	DI-110
Ignition switch OFF warning chime does not activate./With Intelligent Key system	● Power supply and ground circuit check	DI-104
	● Ignition knob switch signal check	DI-108
	● Front door switch (driver side) check	DI-111
	● Ignition ON signal check	DI-110
All warning chimes do not activate.	● Power supply and ground circuit check	DI-104
	● BCM self-diagnosis check	BCS-22

Power Supply and Ground Circuit Check

EKS0072Q

1. CHECK POWER SUPPLY CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check the following.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
	79 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage

OK or NG

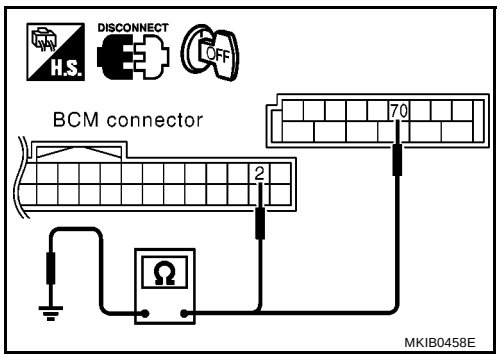
OK >> GO TO 2.
NG >> Check the following.

- 40A fusible link [letter **J** , located in fuse and fusible link box.]
- Harness for open or short between BCM and fuse

2. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector M48 terminal 2 (B), M50 terminal 70 (B) and ground.

2 (B) - Ground : Continuity should exist.
70 (B) - Ground : Continuity should exist.



OK or NG

OK >> INSPECTION END
NG >> Repair ground harness.

Lighting Switch Input Signal Check

EKS0072R

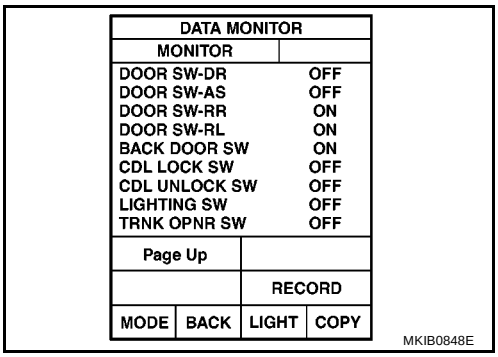
1. CHECK LIGHTING SWITCH INPUT SIGNAL

With CONSULT-II

Check lighting switch (“LIGHTING SW”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 1st or 2nd position : LIGHTING SW ON

When lighting switch is in OFF position : LIGHTING SW OFF



OK or NG

OK >> GO TO 2.

NG >> Check combination switch. Refer to LT-196, "Check Combination Switch" .

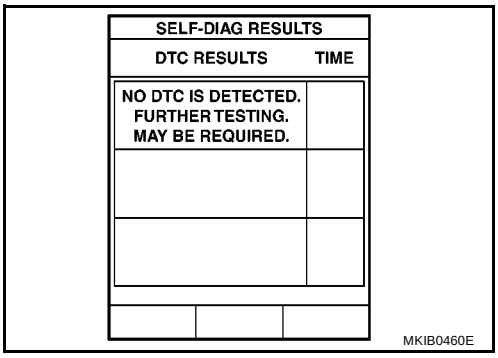
2. CHECK BCM SELF-DAIAGNOSIS

Perform BCM self-diagnosis. Refer to BCS-22, "CONSULT-II Function (BCM)" in BCS section.

Self-diagnosis result contents

NO DTC DETECTED>>Replace BCM.

CAN communication circuit>>Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .



Key Switch Signal Check/Without Intelligent Key System

EKS0072S

1. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check key switch (“KEY IN SW”) in “DATA MONITOR” mode with CONSULT-II.

When key is inserted to ignition key cylinder : KEY IN SW ON

When key is withdrawn from ignition key cylinder : KEY IN SW OFF

Without CONSULT-II

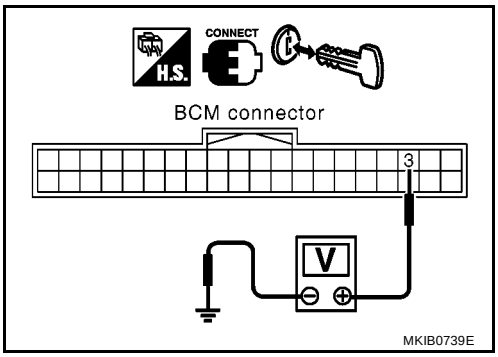
Check voltage between BCM and ground.

Connector	Terminal (Wire color)		Condition	Voltage [V]
	(+)	(-)		
M48	3 (OR)	Ground	Key is inserted	Battery voltage
			key is withdrawn	Approx. 0

OK or NG

OK >> Key switch is OK.

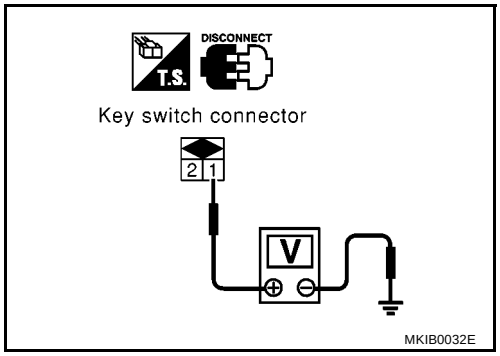
NG >> GO TO 2.



2. CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Disconnect key switch harness connector.
2. Check voltage between key switch harness connector M33 terminal 1 (Y) and ground.

1 (Y) – Ground : Battery voltage should exist.



OK or NG

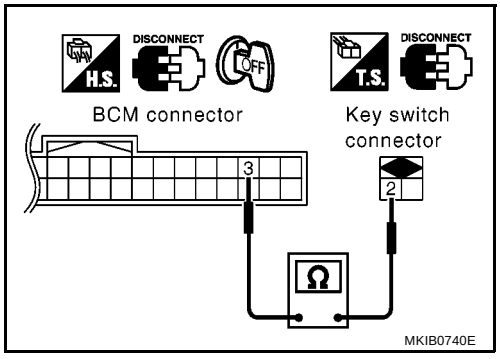
OK >> GO TO 3.
NG >> Check the following.

- 10A fuse [No. 6, located in fuse block (J/B)]
- Harness for open or short between key switch and fuse

3. CHECK KEY SWITCH INPUT SIGNAL CIRCUIT

Check harness continuity between key switch harness connector M33 terminal 2 (OR) and BCM harness connector M48 terminal 3 (OR).

2 (OR) – 3 (OR) : Continuity should exist.



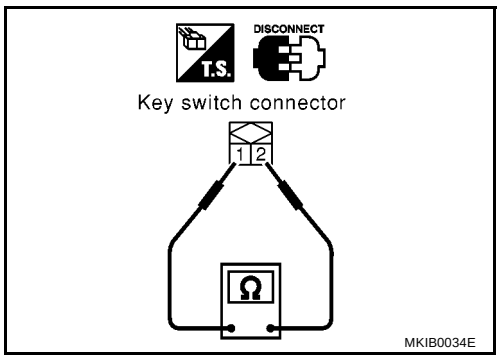
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4. CHECK KEY SWITCH

Check continuity between key switch harness connector M33 terminals 1 and 2.

Terminals			Condition	Continuity
(+)		(–)		
Connector	Terminal	Terminal		
M33	1	2	Key is inserted.	Yes
			key is withdrawn.	No



OK or NG

OK >> Key switch is OK.
NG >> Replace key switch.

Key Switch Signal Check/With Intelligent Key System

EKS008IH

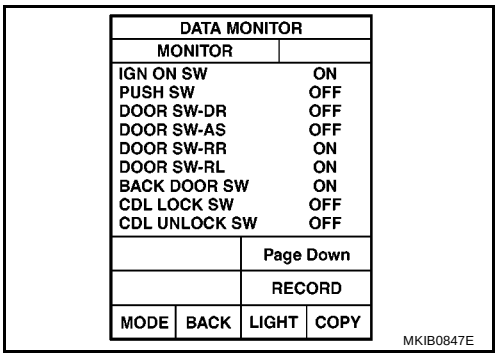
1. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check ignition knob switch (“PUSH SW”) in “DATA MONITOR” mode with CONSULT-II.

When ignition knob is pushed : PUSH SW ON

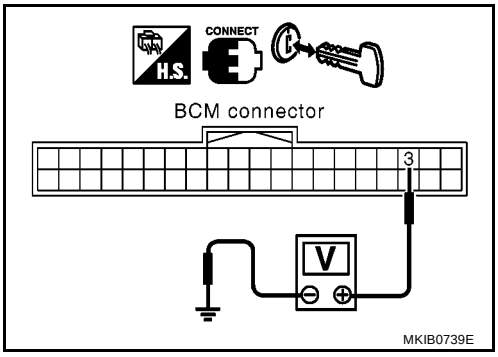
When ignition knob is released : PUSH SW OFF



Without CONSULT-II

Check voltage between BCM and ground.

Connector	Terminal (wire color)		Condition	Voltage [V]
	(+)	(-)		
M48	3 (P)	Ground	Key is inserted.	Battery voltage
			key is with-drawn.	Approx. 0



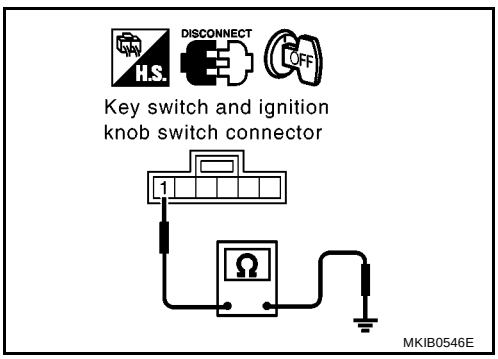
OK or NG

OK >> Key switch and ignition knob switch is OK.
NG >> GO TO 2.

2. CHECK KEY SWITCH POWER SUPPLY CIRCUIT

1. Disconnect key switch and ignition knob switch harness connector.
2. Check voltage between key switch and ignition knob switch harness connector M34 terminal 1 (W) and ground.

1 (W) – Ground : Battery voltage should exist.



OK or NG

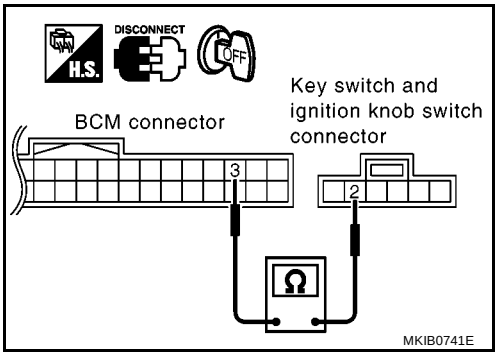
OK >> GO TO 3.
NG >> Check the following.

- 10A fuse [No. 6 located in fuse block (J/B)]
- Harness for open or short between key switch and ignition knob switch and fuse

3. CHECK KEY SWITCH INPUT SIGNAL CIRCUIT

Check harness continuity between key switch and ignition knob switch harness connector M34 terminal 2 (P) and BCM harness connector M48 terminal 3 (P).

2 (P) – 3 (P) : Continuity should exist.



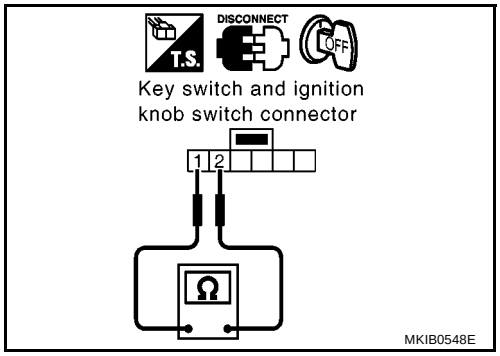
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

4. CHECK KEY SWITCH AND IGNITION KNOB SWITCH

Check continuity between key switch and ignition knob switch harness connector M34 terminals 1 and 2.

Terminals			Condition	Continuity
(+)		(–)		
Connector	Terminal	Terminal		
M34	1	2	Key is inserted.	Yes
			key is withdrawn.	No



OK or NG

OK >> Key switch and ignition knob switch is OK.
NG >> Replace key switch and ignition knob switch.

Ignition Knob Switch Signal Check

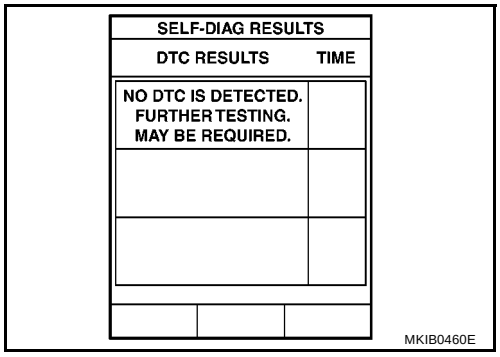
EKS008II

1. PERFORM INTELLIGENT KEY UNIT SELF-DAIAGNOSIS

Perform Intelligent Key unit self-diagnosis, Refer to BL-185, "CONSULT-II Function (INTELLIGENT KEY)" .

Self-diagnosis result contents

NO DTC DETECTED>>GO TO 2.
CAN communication circuit>>Refer to BL-191, "Check CAN Communication System" .



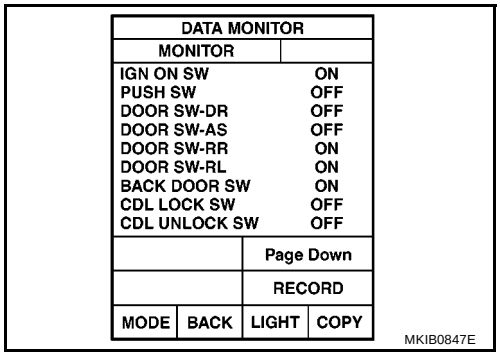
2. CHECK KEY SWITCH INPUT SIGNAL

With CONSULT-II

Check ignition knob switch (“PUSH SW”) in “DATA MONITOR” mode with CONSULT-II.

When ignition knob switch is pushed : PUSH SW ON

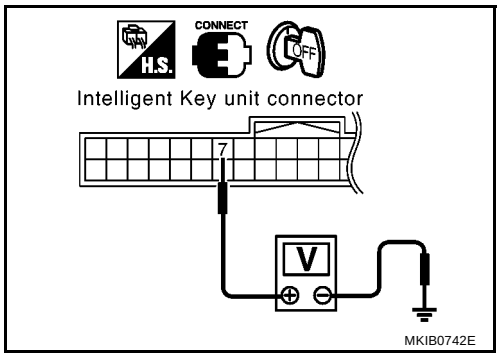
When ignition knob switch is leaved : PUSH SW OFF



Without CONSULT-II

Check voltage between Intelligent Key unit and ground.

Connector	Terminal (Wire color)		Condition	Voltage [V]
	(+)	(-)		
M51	7 (GY)	Ground	Ignition knob switch is pushed.	Battery voltage
			Ignition knob switch is leaved.	Approx. 0



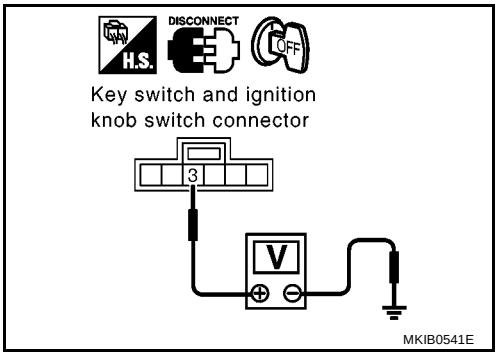
OK or NG

OK >> Key switch and ignition knob switch is OK.
NG >> GO TO 3.

3. CHECK IGNITION KNOB SWITCH POWER SUPPLY CIRCUIT

1. Disconnect key switch and ignition knob switch harness connector.
2. Check voltage between key switch and ignition knob switch harness connector M34 terminal 3 (BR) and ground.

3 (BR) – Ground : Battery voltage should exist.



OK or NG

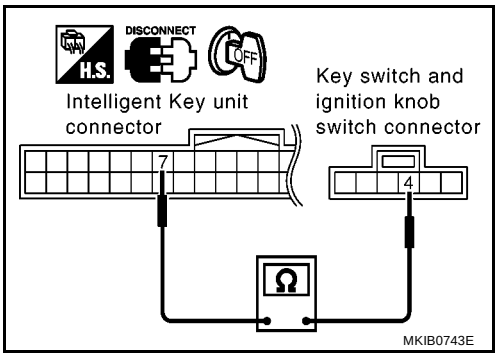
OK >> GO TO 4.
NG >> Check the following.

- 10A fuse [No. 17, located in fuse block (J/B)]
- Harness for open or short between key switch and ignition knob switch and fuse

4. CHECK KEY SWITCH AND IGNITION KNOB SWITCH INPUT SIGNAL CIRCUIT

Check harness continuity between key switch and ignition knob switch harness connector M34 terminal 4 (GY) and Intelligent Key unit harness connector M51 terminal 7 (GY).

4 (GY) – 7 (GY) : Continuity should exist.



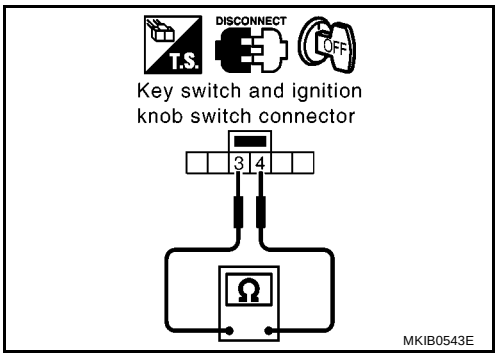
OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness.

5. CHECK KEY SWITCH AND IGNITION KNOB SWITCH

Check continuity between key switch and ignition knob switch harness connector M34 terminals 3 and 4.

Terminals			Condition	Continuity
(+)		(–)		
Connector	Terminal	Terminal		
M34	3	4	Ignition knob switch is pushed.	Yes
			Ignition knob switch is leaved.	No



OK or NG

OK >> Key switch and ignition knob switch is OK.
NG >> Replace key switch and ignition knob switch.

Ignition ON Signal Check

EKS0087C

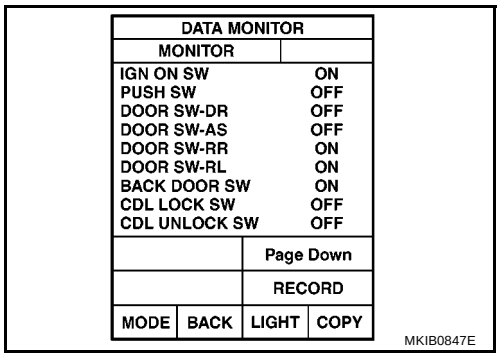
1. CHECK IGNITION ON SIGNAL

With CONSULT-II

Check ignition switch “ON” signal (“IGN ON SW”) in “DATA MONITOR” mode with CONSULT-II.

When ignition switch is ON : IGN ON SW ON

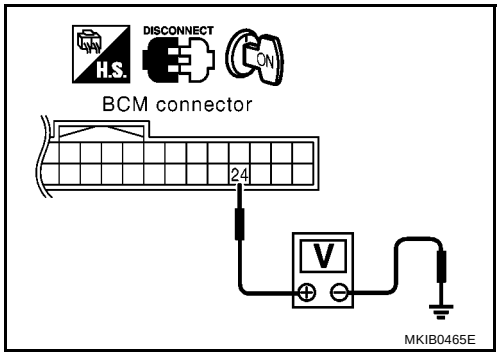
When ignition switch is OFF : IGN ON SW OFF



Without CONSULT-II

Check voltage between BCM harness connector M48 terminal 24 (OR) and ground.

Terminal		Ignition switch position		
(+)	(-)	OFF	ACC	ON
24	Ground	0V	0V	Battery voltage



OK or NG

OK >> INSPECTION END

NG >> Check the following.

- 10A fuse [No. 4, located in fuse block (J/B)].
- Harness for open or short between BCM and fuse.

Front Door Switch (Driver side) Check

EKS0072T

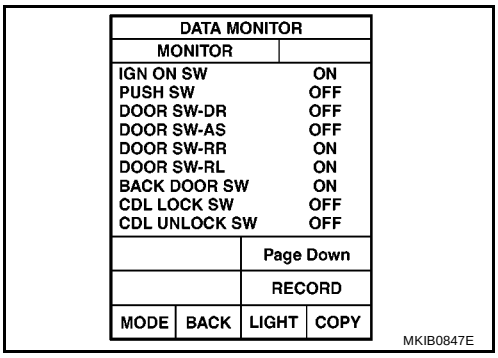
1. CHECK FRONT DOOR SWITCH (DRIVER SIDE) INPUT SIGNAL

With CONSULT-II

Check front door switch (“DOOR SW-DR”) in “DATA MONITOR” mode with CONSULT-II.

When driver's door is open : DOOR SW-DR ON

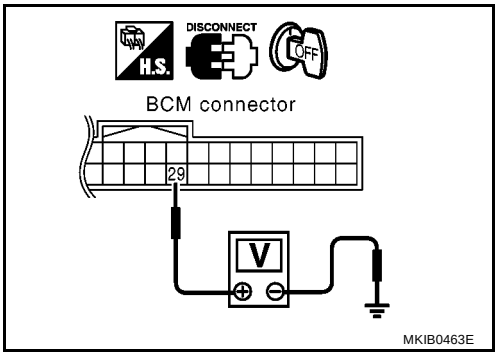
When driver's door is closed : DOOR SW-DR OFF



Without CONSULT-II

Check voltage between BCM harness and ground.

Connector	Terminal (wire color)		Condition (Driver's door)	Voltage [V]
	(+)	(–)		
M48	29 (L)	Ground	Door is opened.	0
			Door is closed.	Battery voltage



OK or NG

OK >> INSPECTION END

NG >> GO TO 2.

2. CHECK DOOR SWITCH OPEN OR SHORT CIRCUIT

1. Disconnect BCM connector and front door switch (driver side) connector.
2. Check the following.

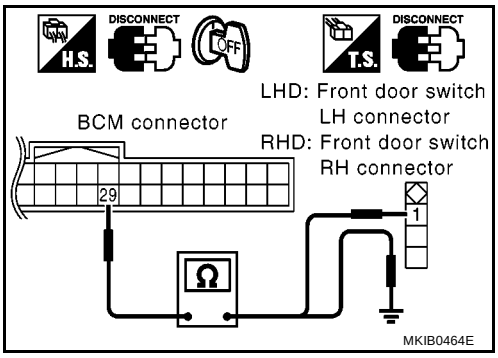
– Harness continuity between BCM harness connector M48 terminal 29 (L) and front door switch (driver side) connector B22 (LHD models) terminal 1 (LG) or B16 (RHD models) terminal 1 (L).

29 (L) - 1 (*) : Continuity should exist.

*** LG: LHD models**
L: RHD models

– Harness continuity between BCM harness connector M48 terminal 29 (L) and ground.

29 (L) - Ground : Continuity should not exist.



OK or NG

OK >> Check front door switch (driver side) ground condition.

NG >> Repair harness or connector.

SECTION EC
ENGINE CONTROL SYSTEM

CONTENTS

CR (WITH EURO-OBD)

INDEX FOR DTC 11
Alphabetical Index 11
DTC No. Index 13
PRECAUTIONS 16
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 16
Maintenance Information 16
On Board Diagnostic (OBD) System of Engine and A/T 16
Precaution 17
Wiring Diagrams and Trouble Diagnosis 19
PREPARATION 20
Special Service Tools 20
Commercial Service Tools 20
ENGINE CONTROL SYSTEM 22
System Diagram 22
Vacuum Hose Drawing 23
System Chart 24
Multiport Fuel Injection (MFI) System 24
Electronic Ignition (EI) System 26
Air Conditioning Cut Control 27
Fuel Cut Control (at No Load and High Engine Speed) 28
CAN Communication 29
BASIC SERVICE PROCEDURE 41
Idle Speed and Ignition Timing Check 41
Accelerator Pedal Released Position Learning 42
Throttle Valve Closed Position Learning 42
Idle Air Volume Learning 42
Fuel Pressure Check 44
ON BOARD DIAGNOSTIC (OBD) SYSTEM 47
Introduction 47
Two Trip Detection Logic 47
Emission-related Diagnostic Information 48
NATS (Nissan Anti-theft System) 60
Malfunction Indicator (MI) 60
OBD System Operation Chart 63
TROUBLE DIAGNOSIS 69
Trouble Diagnosis Introduction 69
DTC Inspection Priority Chart 73
Fail-safe Chart 75
Basic Inspection 77
Symptom Matrix Chart 82
Engine Control Component Parts Location 87
Circuit Diagram 92
ECM Harness Connector Terminal Layout 94
ECM Terminals and Reference Value 94
CONSULT-II Function (ENGINE) 101
Generic Scan Tool (GST) Function 112
CONSULT-II Reference Value in Data Monitor Mode 113
Major Sensor Reference Graph in Data Monitor Mode 116
TROUBLE DIAGNOSIS - SPECIFICATION VALUE 119
Description 119
Testing Condition 119
Inspection Procedure 119
Diagnostic Procedure 120
TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT 124
Description 124
Diagnostic Procedure 124
POWER SUPPLY CIRCUIT FOR ECM 125
Wiring Diagram 125
Diagnostic Procedure 126
DTC U1000, U1001 CAN COMMUNICATION LINE 130
Description 130
On Board Diagnosis Logic 130
DTC Confirmation Procedure 130
Wiring Diagram 131
Diagnostic Procedure 132
DTC P0011 IVT CONTROL 133
Description 133
CONSULT-II Reference Value in Data Monitor Mode 133
On Board Diagnosis Logic 134

DTC Confirmation Procedure 134
Diagnostic Procedure 135
DTC P0031, P0032 HO2S1 HEATER 136
Description 136
CONSULT-II Reference Value in Data Monitor Mode 136
On Board Diagnosis Logic 136
DTC Confirmation Procedure 136
Wiring Diagram 138
Diagnostic Procedure 139
Component Inspection 141
Removal and Installation 141
DTC P0037, P0038 HO2S2 HEATER 142
Description 142
CONSULT-II Reference Value in Data Monitor Mode 142
On Board Diagnosis Logic 142
DTC Confirmation Procedure 142
Wiring Diagram 144
Diagnostic Procedure 145
Component Inspection 147
Removal and Installation 147
DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR 148
Component Description 148
On Board Diagnosis Logic 148
DTC Confirmation Procedure 148
Wiring Diagram 149
Diagnostic Procedure 150
Component Inspection 151
Removal and Installation 152
DTC P0112, P0113 IAT SENSOR 153
Component Description 153
On Board Diagnosis Logic 153
DTC Confirmation Procedure 153
Wiring Diagram 155
Diagnostic Procedure 156
Component Inspection 157
Removal and Installation 157
DTC P0117, P0118 ECT SENSOR 158
Component Description 158
On Board Diagnosis Logic 158
DTC Confirmation Procedure 159
Wiring Diagram 160
Diagnostic Procedure 161
Component Inspection 162
Removal and Installation 162
DTC P0122, P0123 TP SENSOR 163
Component Description 163
CONSULT-II Reference Value in Data Monitor Mode 163
On Board Diagnosis Logic 163
DTC Confirmation Procedure 163
Wiring Diagram 165
Diagnostic Procedure 166
Component Inspection 168
Remove and Installation 168
DTC P0132 HO2S1 169
Component Description 169
CONSULT-II Reference Value in Data Monitor Mode 169
On Board Diagnosis Logic 169
DTC Confirmation Procedure 170
Wiring Diagram 171
Diagnostic Procedure 172
Component Inspection 173
Removal and Installation 174
DTC P0133 HO2S1 175
Component Description 175
CONSULT-II Reference Value in Data Monitor Mode 175
On Board Diagnosis Logic 175
DTC Confirmation Procedure 176
Overall Function Check 177
Wiring Diagram 178
Diagnostic Procedure 179
Component Inspection 182
Removal and Installation 184
DTC P0134 HO2S1 185
Component Description 185
CONSULT-II Reference Value in Data Monitor Mode 185
On Board Diagnosis Logic 185
DTC Confirmation Procedure 186
Overall Function Check 186
Wiring Diagram 188
Diagnostic Procedure 189
Component Inspection 190
Removal and Installation 191
DTC P0138 HO2S2 192
Component Description 192
CONSULT-II Reference Value in Data Monitor Mode 192
On Board Diagnosis Logic 192
DTC Confirmation Procedure 192
Wiring Diagram 194
Diagnostic Procedure 195
Component Inspection 196
Removal and Installation 198
DTC P0139 HO2S2 199
Component Description 199
CONSULT-II Reference Value in Data Monitor Mode 199
On Board Diagnosis Logic 199
DTC Confirmation Procedure 200
Overall Function Check 201
Wiring Diagram 202
Diagnostic Procedure 203
Component Inspection 205
Removal and Installation 207
DTC P0171 FUEL INJECTION SYSTEM FUNCTION 208
On Board Diagnosis Logic 208
DTC Confirmation Procedure 208
Wiring Diagram 210
Diagnostic Procedure 211
DTC P0172 FUEL INJECTION SYSTEM FUNCTION 215
On Board Diagnosis Logic 215
DTC Confirmation Procedure 215

Wiring Diagram 217
Diagnostic Procedure 218
DTC P0221 TP SENSOR 221
Component Description 221
CONSULT-II Reference Value in Data Monitor Mode 221
On Board Diagnosis Logic 221
DTC Confirmation Procedure 221
Wiring Diagram 223
Diagnostic Procedure 224
Component Inspection 226
Remove and Installation 226
DTC P0222, P0223 TP SENSOR 227
Component Description 227
CONSULT-II Reference Value in Data Monitor Mode 227
On Board Diagnosis Logic 227
DTC Confirmation Procedure 227
Wiring Diagram 229
Diagnostic Procedure 230
Component Inspection 232
Remove and Installation 232
DTC P0226 APP SENSOR 233
Component Description 233
CONSULT-II Reference Value in Data Monitor Mode 233
On Board Diagnosis Logic 233
DTC Confirmation Procedure 233
Wiring Diagram 235
Diagnostic Procedure 238
Component Inspection 241
Remove and Installation 241
DTC P0227, P0228 APP SENSOR 242
Component Description 242
CONSULT-II Reference Value in Data Monitor Mode 242
On Board Diagnosis Logic 242
DTC Confirmation Procedure 242
Wiring Diagram 244
Diagnostic Procedure 247
Component Inspection 249
Remove and Installation 250
DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE 251
On Board Diagnosis Logic 251
DTC Confirmation Procedure 251
Diagnostic Procedure 252
DTC P0327, P0328 KS 257
Component Description 257
On Board Diagnosis Logic 257
DTC Confirmation Procedure 257
Wiring Diagram 258
Diagnostic Procedure 259
Component Inspection 260
Removal and Installation 260
DTC P0335 CKP SENSOR (POS) 261
Component Description 261
CONSULT-II Reference Value in Data Monitor Mode 261
On Board Diagnosis Logic 261
DTC Confirmation Procedure 261
Wiring Diagram 262
Diagnostic Procedure 263
Component Inspection 265
Removal and Installation 266
DTC P0340 CMP SENSOR (PHASE) 267
Component Description 267
On Board Diagnosis Logic 267
DTC Confirmation Procedure 267
Wiring Diagram 268
Diagnostic Procedure 269
Component Inspection 271
Removal and Installation 272
DTC P0420 THREE WAY CATALYST FUNCTION 273
On Board Diagnosis Logic 273
DTC Confirmation Procedure 273
Overall Function Check 274
Diagnostic Procedure 275
DTC P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 278
Description 278
CONSULT-II Reference Value in Data Monitor Mode 278
On Board Diagnosis Logic 278
DTC Confirmation Procedure 279
Wiring Diagram 280
Diagnostic Procedure 281
Component Inspection 283
Removal and Installation 283
DTC P0500 VSS 284
Description 284
On Board Diagnosis Logic 284
DTC Confirmation Procedure 284
Overall Function Check 284
Diagnostic Procedure 285
DTC P0605 ECM 286
Component Description 286
On Board Diagnosis Logic 286
DTC Confirmation Procedure 286
Diagnostic Procedure 287
DTC P1065 ECM POWER SUPPLY 289
Component Description 289
On Board Diagnosis Logic 289
DTC Confirmation Procedure 289
Wiring Diagram 290
Diagnostic Procedure 291
DTC P1111 IVT CONTROL SOLENOID VALVE 293
Component Description 293
CONSULT-II Reference Value in Data Monitor Mode 293
On Board Diagnosis Logic 293
DTC Confirmation Procedure 293
Wiring Diagram 294
Diagnostic Procedure 295
Component Inspection 296
Removal and Installation 296
DTC P1121 ELECTRIC THROTTLE CONTROL

ACTUATOR 297
Component Description 297
On Board Diagnosis Logic 297
DTC Confirmation Procedure 297
Diagnostic Procedure 298
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION 299
Description 299
On Board Diagnosis Logic 299
DTC Confirmation Procedure 299
Wiring Diagram 300
Diagnostic Procedure 301
Component Inspection 304
Remove and Installation 304
DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY 305
Component Description 305
CONSULT-II Reference Value in Data Monitor Mode 305
On Board Diagnosis Logic 305
DTC Confirmation Procedure 305
Wiring Diagram 307
Diagnostic Procedure 308
DTC P1128 THROTTLE CONTROL MOTOR 310
Component Description 310
On Board Diagnosis Logic 310
DTC Confirmation Procedure 310
Wiring Diagram 311
Diagnostic Procedure 312
Component Inspection 313
Remove and Installation 314
DTC P1143 HO2S1 315
Component Description 315
CONSULT-II Reference Value in Data Monitor Mode 315
On Board Diagnosis Logic 315
DTC Confirmation Procedure 316
Overall Function Check 316
Diagnostic Procedure 317
Component Inspection 319
Removal and Installation 320
DTC P1144 HO2S1 321
Component Description 321
CONSULT-II Reference Value in Data Monitor Mode 321
On Board Diagnosis Logic 321
DTC Confirmation Procedure 322
Overall Function Check 322
Diagnostic Procedure 323
Component Inspection 325
Removal and Installation 326
DTC P1146 HO2S2 327
Component Description 327
CONSULT-II Reference Value in Data Monitor Mode 327
On Board Diagnosis Logic 327
DTC Confirmation Procedure 329
Overall Function Check 330
Wiring Diagram 331
Diagnostic Procedure 332
Component Inspection 334
Removal and Installation 336
DTC P1147 HO2S2 337
Component Description 337
CONSULT-II Reference Value in Data Monitor Mode 337
On Board Diagnosis Logic 337
DTC Confirmation Procedure 338
Overall Function Check 339
Wiring Diagram 340
Diagnostic Procedure 341
Component Inspection 343
Removal and Installation 345
DTC P1171 INTAKE ERROR 346
On Board Diagnosis Logic 346
DTC Confirmation Procedure 346
Wiring Diagram 347
Diagnostic Procedure 348
DTC P1211 TCS CONTROL UNIT 350
Description 350
On Board Diagnosis Logic 350
DTC Confirmation Procedure 350
Diagnostic Procedure 350
DTC P1212 TCS COMMUNICATION LINE 351
Description 351
On Board Diagnosis Logic 351
DTC Confirmation Procedure 351
Diagnostic Procedure 351
DTC P1217 ENGINE OVER TEMPERATURE 352
System Description 352
CONSULT-II Reference Value in Data Monitor Mode 353
On Board Diagnosis Logic 353
Overall Function Check 354
Wiring Diagram 356
Diagnostic Procedure 358
Main 12 Causes of Overheating 365
Component Inspection 365
DTC P1223, P1224 TP SENSOR 366
Component Description 366
CONSULT-II Reference Value in Data Monitor Mode 366
On Board Diagnosis Logic 366
DTC Confirmation Procedure 366
Wiring Diagram 368
Diagnostic Procedure 369
Component Inspection 371
Remove and Installation 371
DTC P1225 TP SENSOR 372
Component Description 372
On Board Diagnosis Logic 372
DTC Confirmation Procedure 372
Diagnostic Procedure 373
Remove and Installation 373
DTC P1226 TP SENSOR 374
Component Description 374
On Board Diagnosis Logic 374
DTC Confirmation Procedure 374

Diagnostic Procedure 375
Remove and Installation 375
DTC P1227, P1228 APP SENSOR 376
Component Description 376
CONSULT-II Reference Value in Data Monitor Mode 376
On Board Diagnosis Logic 376
DTC Confirmation Procedure 376
Wiring Diagram 378
Diagnostic Procedure 381
Component Inspection 383
Remove and Installation 384
DTC P1229 SENSOR POWER SUPPLY 385
On Board Diagnosis Logic 385
DTC Confirmation Procedure 385
Wiring Diagram 386
Diagnostic Procedure 387
DTC P1706 PNP SWITCH 389
Component Description 389
CONSULT-II Reference Value in Data Monitor Mode 389
On Board Diagnosis Logic 389
DTC Confirmation Procedure 389
Overall Function Check 390
Wiring Diagram 391
Diagnostic Procedure 392
DTC P1805 BRAKE SWITCH 395
Description 395
CONSULT-II Reference Value in Data Monitor Mode 395
On Board Diagnosis Logic 395
FAIL-SAFE MODE 395
DTC Confirmation Procedure 395
Wiring Diagram 397
Diagnostic Procedure 398
Component Inspection 401
DTC P2122, P2123 APP SENSOR 402
Component Description 402
CONSULT-II Reference Value in Data Monitor Mode 402
On Board Diagnosis Logic 402
DTC Confirmation Procedure 402
Wiring Diagram 404
Diagnostic Procedure 407
Component Inspection 409
Remove and Installation 410
DTC P2127, P2128 APP SENSOR 411
Component Description 411
CONSULT-II Reference Value in Data Monitor Mode 411
On Board Diagnosis Logic 411
DTC Confirmation Procedure 411
Wiring Diagram 413
Diagnostic Procedure 416
Component Inspection 418
Remove and Installation 419
DTC P2135 TP SENSOR 420
Component Description 420
CONSULT-II Reference Value in Data Monitor Mode 420
On Board Diagnosis Logic 420
DTC Confirmation Procedure 420
Wiring Diagram 422
Diagnostic Procedure 423
Component Inspection 425
Remove and Installation 425
DTC P2138 APP SENSOR 426
Component Description 426
CONSULT-II Reference Value in Data Monitor Mode 426
On Board Diagnosis Logic 426
DTC Confirmation Procedure 426
Wiring Diagram 428
Diagnostic Procedure 431
Component Inspection 434
Remove and Installation 434
IGNITION SIGNAL 435
Component Description 435
Wiring Diagram 436
Diagnostic Procedure 439
Component Inspection 442
Removal and Installation 443
INJECTOR CIRCUIT 444
Component Description 444
CONSULT-II Reference Value in Data Monitor Mode 444
Wiring Diagram 445
Diagnostic Procedure 446
Component Inspection 449
Removal and Installation 449
FUEL PUMP CIRCUIT 450
Description 450
CONSULT-II Reference Value in Data Monitor Mode 450
Wiring Diagram 451
Diagnostic Procedure 452
Component Inspection 454
Removal and Installation 454
REFRIGERANT PRESSURE SENSOR 455
Component Description 455
Wiring Diagram 456
Diagnostic Procedure 457
Removal and Installation 459
ELECTRICAL LOAD SIGNAL 460
Description 460
CONSULT-II Reference Value in Data Monitor Mode 460
Diagnostic Procedure 460
MI & DATA LINK CONNECTORS 462
Wiring Diagram (LHD Models) 462
Wiring Diagram (RHD Models) 463
EVAPORATIVE EMISSION SYSTEM 464
Description 464
Component Inspection 467
POSITIVE CRANKCASE VENTILATION 468
Description 468
Component Inspection 468

SERVICE DATA AND SPECIFICATIONS (SDS) ... 470
Fuel Pressure ... 470
Idle Speed and Ignition Timing ... 470
Calculated Load Value ... 470
Manifold absolute pressure sensor ... 470
Intake Air Temperature Sensor ... 470
Engine Coolant Temperature Sensor ... 470
Heated Oxygen Sensor 1 Heater ... 470
Heated Oxygen sensor 2 Heater ... 470
Crankshaft Position Sensor (POS) ... 470
Camshaft Position Sensor (PHASE) ... 470
Throttle Control Motor ... 470
Injector ... 471
Fuel Pump ... 471

CR (WITHOUT EURO-OBD)

INDEX FOR DTC ... 472
Alphabetical Index ... 472
DTC No. Index ... 474
PRECAUTIONS ... 476
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” ... 476
Maintenance Information ... 476
On Board Diagnostic (OBD) System of Engine and A/T ... 476
Precaution ... 477
Wiring Diagrams and Trouble Diagnosis ... 479
PREPARATION ... 480
Special Service Tools ... 480
Commercial Service Tools ... 480
ENGINE CONTROL SYSTEM ... 482
System Diagram ... 482
Vacuum Hose Drawing ... 483
System Chart ... 484
Multiport Fuel Injection (MFI) System ... 484
Electronic Ignition (EI) System ... 486
Air Conditioning Cut Control ... 487
Fuel Cut Control (at No Load and High Engine Speed) ... 488
CAN Communication ... 489
BASIC SERVICE PROCEDURE ... 502
Idle Speed and Ignition Timing Check ... 502
Accelerator Pedal Released Position Learning ... 503
Throttle Valve Closed Position Learning ... 503
Idle Air Volume Learning ... 503
Fuel Pressure Check ... 505
ON BOARD DIAGNOSTIC (OBD) SYSTEM ... 508
Introduction ... 508
Two Trip Detection Logic ... 508
Emission-related Diagnostic Information ... 508
NATS (Nissan Anti-theft System) ... 511
Malfunction Indicator (MI) ... 511
TROUBLE DIAGNOSIS ... 515
Trouble Diagnosis Introduction ... 515
DTC Inspection Priority Chart ... 519
Fail-safe Chart ... 520
Basic Inspection ... 522
Symptom Matrix Chart ... 527
Engine Control Component Parts Location ... 532
Circuit Diagram ... 537
ECM Harness Connector Terminal Layout ... 539
ECM Terminals and Reference Value ... 539
CONSULT-II Function (ENGINE) ... 546
CONSULT-II Reference Value in Data Monitor Mode ... 555
Major Sensor Reference Graph in Data Monitor Mode ... 558
TROUBLE DIAGNOSIS - SPECIFICATION VALUE ... 561
Description ... 561
Testing Condition ... 561
Inspection Procedure ... 561
Diagnostic Procedure ... 562
TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT ... 566
Description ... 566
Diagnostic Procedure ... 566
POWER SUPPLY CIRCUIT FOR ECM ... 567
Wiring Diagram ... 567
Diagnostic Procedure ... 568
DTC U1000, U1001 CAN COMMUNICATION LINE ... 572
Description ... 572
On Board Diagnosis Logic ... 572
DTC Confirmation Procedure ... 572
Wiring Diagram ... 573
Diagnostic Procedure ... 574
DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR ... 575
Component Description ... 575
On Board Diagnosis Logic ... 575
DTC Confirmation Procedure ... 575
Wiring Diagram ... 576
Diagnostic Procedure ... 577
Component Inspection ... 578
Removal and Installation ... 579
DTC P0117, P0118 ECT SENSOR ... 580
Component Description ... 580
On Board Diagnosis Logic ... 580
DTC Confirmation Procedure ... 581
Wiring Diagram ... 582
Diagnostic Procedure ... 583
Component Inspection ... 584
Removal and Installation ... 584
DTC P0122, P0123 TP SENSOR ... 585
Component Description ... 585
CONSULT-II Reference Value in Data Monitor Mode ... 585
On Board Diagnosis Logic ... 585
DTC Confirmation Procedure ... 585
Wiring Diagram ... 587
Diagnostic Procedure ... 588
Component Inspection ... 590
Remove and Installation ... 590
DTC P0132 HO2S1 ... 591
Component Description ... 591
CONSULT-II Reference Value in Data Monitor Mode ... 591

On Board Diagnosis Logic 591
DTC Confirmation Procedure 592
Wiring Diagram 593
Diagnostic Procedure 594
Component Inspection 595
Removal and Installation 596
DTC P0134 HO2S1 597
Component Description 597
CONSULT-II Reference Value in Data Monitor Mode 597
On Board Diagnosis Logic 597
Overall Function Check 598
Wiring Diagram 599
Diagnostic Procedure 600
Component Inspection 601
Removal and Installation 602
DTC P0138 HO2S2 603
Component Description 603
CONSULT-II Reference Value in Data Monitor Mode 603
On Board Diagnosis Logic 603
DTC Confirmation Procedure 603
Wiring Diagram 605
Diagnostic Procedure 606
Component Inspection 607
Removal and Installation 608
DTC P0221 TP SENSOR 609
Component Description 609
CONSULT-II Reference Value in Data Monitor Mode 609
On Board Diagnosis Logic 609
DTC Confirmation Procedure 609
Wiring Diagram 611
Diagnostic Procedure 612
Component Inspection 614
Remove and Installation 614
DTC P0222, P0223 TP SENSOR 615
Component Description 615
CONSULT-II Reference Value in Data Monitor Mode 615
On Board Diagnosis Logic 615
DTC Confirmation Procedure 615
Wiring Diagram 617
Diagnostic Procedure 618
Component Inspection 620
Remove and Installation 620
DTC P0226 APP SENSOR 621
Component Description 621
CONSULT-II Reference Value in Data Monitor Mode 621
On Board Diagnosis Logic 621
DTC Confirmation Procedure 621
Wiring Diagram 623
Diagnostic Procedure 626
Component Inspection 629
Remove and Installation 629
DTC P0227, P0228 APP SENSOR 630
Component Description 630
CONSULT-II Reference Value in Data Monitor Mode 630
On Board Diagnosis Logic 630
DTC Confirmation Procedure 630
Wiring Diagram 632
Diagnostic Procedure 635
Component Inspection 637
Remove and Installation 638
DTC P0327, P0328 KS 639
Component Description 639
On Board Diagnosis Logic 639
DTC Confirmation Procedure 639
Wiring Diagram 640
Diagnostic Procedure 641
Component Inspection 642
Removal and Installation 642
DTC P0335 CKP SENSOR (POS) 643
Component Description 643
CONSULT-II Reference Value in Data Monitor Mode 643
On Board Diagnosis Logic 643
DTC Confirmation Procedure 643
Wiring Diagram 645
Diagnostic Procedure 646
Component Inspection 648
Removal and Installation 649
DTC P0340 CMP SENSOR (PHASE) 650
Component Description 650
On Board Diagnosis Logic 650
DTC Confirmation Procedure 650
Wiring Diagram 652
Diagnostic Procedure 653
Component Inspection 655
Removal and Installation 656
DTC P0605 ECM 657
Component Description 657
On Board Diagnosis Logic 657
DTC Confirmation Procedure 657
Diagnostic Procedure 659
DTC P1065 ECM POWER SUPPLY 660
Component Description 660
On Board Diagnosis Logic 660
DTC Confirmation Procedure 660
Wiring Diagram 661
Diagnostic Procedure 662
DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR 664
Component Description 664
On Board Diagnosis Logic 664
DTC Confirmation Procedure 664
Diagnostic Procedure 665
DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION 667
Description 667
On Board Diagnosis Logic 667
DTC Confirmation Procedure 667
Wiring Diagram 668
Diagnostic Procedure 669
Component Inspection 672
Remove and Installation 672

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY 673
Component Description 673
CONSULT-II Reference Value in Data Monitor Mode 673
On Board Diagnosis Logic 673
DTC Confirmation Procedure 673
Wiring Diagram 675
Diagnostic Procedure 676
DTC P1128 THROTTLE CONTROL MOTOR 678
Component Description 678
On Board Diagnosis Logic 678
DTC Confirmation Procedure 678
Wiring Diagram 679
Diagnostic Procedure 680
Component Inspection 681
Remove and Installation 682
DTC P1171 INTAKE ERROR 683
On Board Diagnosis Logic 683
DTC Confirmation Procedure 683
Wiring Diagram 684
Diagnostic Procedure 685
DTC P1211 TCS CONTROL UNIT 687
Description 687
On Board Diagnosis Logic 687
DTC Confirmation Procedure 687
Diagnostic Procedure 687
DTC P1212 TCS COMMUNICATION LINE 688
Description 688
On Board Diagnosis Logic 688
DTC Confirmation Procedure 688
Diagnostic Procedure 688
DTC P1217 ENGINE OVER TEMPERATURE 689
System Description 689
CONSULT-II Reference Value in Data Monitor Mode 690
On Board Diagnosis Logic 690
Overall Function Check 691
Wiring Diagram 693
Diagnostic Procedure 695
Main 12 Causes of Overheating 702
Component Inspection 702
DTC P1223, P1224 TP SENSOR 703
Component Description 703
CONSULT-II Reference Value in Data Monitor Mode 703
On Board Diagnosis Logic 703
DTC Confirmation Procedure 703
Wiring Diagram 705
Diagnostic Procedure 706
Component Inspection 708
Remove and Installation 708
DTC P1225 TP SENSOR 709
Component Description 709
On Board Diagnosis Logic 709
DTC Confirmation Procedure 709
Diagnostic Procedure 710
Remove and Installation 710
DTC P1226 TP SENSOR 711
Component Description 711
On Board Diagnosis Logic 711
DTC Confirmation Procedure 711
Diagnostic Procedure 712
Remove and Installation 712
DTC P1227, P1228 APP SENSOR 713
Component Description 713
CONSULT-II Reference Value in Data Monitor Mode 713
On Board Diagnosis Logic 713
DTC Confirmation Procedure 713
Wiring Diagram 715
Diagnostic Procedure 718
Component Inspection 720
Remove and Installation 721
DTC P1229 SENSOR POWER SUPPLY 722
On Board Diagnosis Logic 722
DTC Confirmation Procedure 722
Wiring Diagram 723
Diagnostic Procedure 724
DTC P1805 BRAKE SWITCH 726
Description 726
CONSULT-II Reference Value in Data Monitor Mode 726
On Board Diagnosis Logic 726
FAIL-SAFE MODE 726
DTC Confirmation Procedure 726
Wiring Diagram 728
Diagnostic Procedure 729
Component Inspection 732
DTC P2122, P2123 APP SENSOR 733
Component Description 733
CONSULT-II Reference Value in Data Monitor Mode 733
On Board Diagnosis Logic 733
DTC Confirmation Procedure 733
Wiring Diagram 735
Diagnostic Procedure 738
Component Inspection 740
Remove and Installation 741
DTC P2127, P2128 APP SENSOR 742
Component Description 742
CONSULT-II Reference Value in Data Monitor Mode 742
On Board Diagnosis Logic 742
DTC Confirmation Procedure 742
Wiring Diagram 744
Diagnostic Procedure 747
Component Inspection 749
Remove and Installation 750
DTC P2135 TP SENSOR 751
Component Description 751
CONSULT-II Reference Value in Data Monitor Mode 751
On Board Diagnosis Logic 751
DTC Confirmation Procedure 751
Wiring Diagram 753
Diagnostic Procedure .....

Component Inspection 756
Remove and Installation 756
DTC P2138 APP SENSOR 757
Component Description 757
CONSULT-II Reference Value in Data Monitor Mode 757
On Board Diagnosis Logic 757
DTC Confirmation Procedure 757
Wiring Diagram 759
Diagnostic Procedure 762
Component Inspection 765
Remove and Installation 765
HO2S1 HEATER 766
Description 766
CONSULT-II Reference Value in Data Monitor Mode 766
Wiring Diagram 767
Diagnostic Procedure 768
Component Inspection 770
Removal and Installation 770
HO2S2 HEATER 771
Description 771
CONSULT-II Reference Value in Data Monitor Mode 771
Wiring Diagram 772
Diagnostic Procedure 773
Component Inspection 775
Removal and Installation 775
IAT SENSOR 776
Component Description 776
Wiring Diagram 777
Diagnostic Procedure 778
Component Inspection 779
Removal and Installation 779
HO2S1 780
Component Description 780
CONSULT-II Reference Value in Data Monitor Mode 780
Wiring Diagram 781
Diagnostic Procedure 782
Component Inspection 784
Removal and Installation 785
HO2S2 786
Component Description 786
CONSULT-II Reference Value in Data Monitor Mode 786
Wiring Diagram 787
Diagnostic Procedure 788
Component Inspection 790
Removal and Installation 791
IGNITION SIGNAL 792
Component Description 792
Wiring Diagram 793
Diagnostic Procedure 796
Component Inspection 799
Removal and Installation 800
EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE 801
Description 801
CONSULT-II Reference Value in Data Monitor Mode 801
Wiring Diagram 802
Diagnostic Procedure 804
Component Inspection 806
Removal and Installation 807
VSS 808
Description 808
Diagnostic Procedure 808
IVT CONTROL SOLENOID VALVE 809
Description 809
CONSULT-II Reference Value in Data Monitor Mode 810
Wiring Diagram 811
Diagnostic Procedure 812
Component Inspection 814
Removal and Installation 814
PNP SWITCH 815
Component Description 815
CONSULT-II Reference Value in Data Monitor Mode 815
Wiring Diagram 816
Diagnostic Procedure 817
INJECTOR CIRCUIT 820
Component Description 820
CONSULT-II Reference Value in Data Monitor Mode 820
Wiring Diagram 821
Diagnostic Procedure 822
Component Inspection 825
Removal and Installation 825
FUEL PUMP CIRCUIT 826
Description 826
CONSULT-II Reference Value in Data Monitor Mode 826
Wiring Diagram 827
Diagnostic Procedure 828
Component Inspection 830
Removal and Installation 830
REFRIGERANT PRESSURE SENSOR 831
Component Description 831
Wiring Diagram 832
Diagnostic Procedure 833
Removal and Installation 835
ELECTRICAL LOAD SIGNAL 836
Description 836
CONSULT-II Reference Value in Data Monitor Mode 836
Diagnostic Procedure 836
MI & DATA LINK CONNECTORS 838
Wiring Diagram (LHD Models) 838
Wiring Diagram (RHD Models) 839
EVAPORATIVE EMISSION SYSTEM 840
Description 840
Component Inspection 843
POSITIVE CRANKCASE VENTILATION 844
Description 844
Component Inspection 844

SERVICE DATA AND SPECIFICATIONS (SDS) ... 846
Fuel Pressure 846
Idle Speed and Ignition Timing 846
Calculated Load Value 846
Manifold absolute pressure sensor 846
Intake Air Temperature Sensor 846
Engine Coolant Temperature Sensor 846
Heated Oxygen Sensor 1 Heater 846
Heated Oxygen sensor 2 Heater 846
Crankshaft Position Sensor (POS) 846
Camshaft Position Sensor (PHASE) 846
Throttle Control Motor 846
Injector 847
Fuel Pump 847

INDEX FOR DTC

PFP:00024

Alphabetical Index

EBS00O2P

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-44, "IDENTIFICATION INFORMATION" .

NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

Items (CONSULT-II screen terms)	DTC*1		Trip	MI lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
ABSL PRES SEN/CIRC	P0107	0107	2	×	EC-148
ABSL PRES SEN/CIRC	P0108	0108	2	×	EC-148
APP SEN 1/CIRC	P0227	0227	1	×	EC-242
APP SEN 1/CIRC	P0228	0228	1	×	EC-242
APP SEN 1/CIRC	P2122	2122	1	×	EC-402
APP SEN 1/CIRC	P2123	2123	1	×	EC-402
APP SEN 2/CIRC	P1227	1227	1	×	EC-376
APP SEN 2/CIRC	P1228	1228	1	×	EC-376
APP SEN 2/CIRC	P2127	2127	1	×	EC-411
APP SEN 2/CIRC	P2128	2128	1	×	EC-411
APP SENSOR	P0226	0226	1	×	EC-233
APP SENSOR	P2138	2138	1	×	EC-426
ATF TEMP SEN/CIRC	P0710	0710	2	×	AT-120
A/T 1ST GR FNCTN	P0731	0731	2	×	AT-135
A/T 2ND GR FNCTN	P0732	0732	2	×	AT-141
A/T 3RD GR FNCTN	P0733	0733	2	×	AT-147
A/T 4TH GR FNCTN	P0734	0734	2	×	AT-153
BRAKE SW/CIRCUIT	P1805	1805	2	—	EC-395
CAN COMM CIRCUIT	U1000	1000*5	1	×	EC-130
CAN COMM CIRCUIT	U1001	1001*5	2	—	EC-130
CKP SEN/CIRCUIT	P0335	0335	2	×	EC-261
CMP SEN/CIRC-B1	P0340	0340	2	×	EC-267
CTP LEARNING	P1225	1225	2	—	EC-372
CTP LEARNING	P1226	1226	2	—	EC-374
CYL 1 MISFIRE	P0301	0301	2	×	EC-251
CYL 2 MISFIRE	P0302	0302	2	×	EC-251
CYL 3 MISFIRE	P0303	0303	2	×	EC-251
CYL 4 MISFIRE	P0304	0304	2	×	EC-251
ECM	P0605	0605	1 or 2	× or —	EC-286
ECM BACK UP/CIRC	P1065	1065	2	×	EC-289
ECT SEN/CIRCUIT	P0117	0117	1	×	EC-158
ECT SEN/CIRCUIT	P0118	0118	1	×	EC-158
ENGINE SPEED SIG	P0725	0725	2	×	AT-131
ENG OVER TEMP	P1217	1217	1	×	EC-352
ETC ACTR	P1121	1121	1	×	EC-297

Items (CONSULT-II screen terms)	DTC*1		Trip	MI lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
ETC FUNCTION/CIRC	P1122	1122	1	×	EC-299
ETC MOT	P1128	1128	1	×	EC-310
ETC MOT PWR	P1124	1124	1	×	EC-305
ETC MOT PWR	P1126	1126	1	×	EC-305
FUEL SYS-LEAN-B1	P0171	0171	2	×	EC-208
FUEL SYS-RICH-B1	P0172	0172	2	×	EC-215
HO2S1 (B1)	P0132	0132	2	×	EC-169
HO2S1 (B1)	P0133	0133	2	×	EC-175
HO2S1 (B1)	P0134	0134	2	×	EC-185
HO2S1 (B1)	P1143	1143	2	×	EC-315
HO2S1 (B1)	P1144	1144	2	×	EC-321
HO2S1 HTR (B1)	P0031	0031	2	×	EC-136
HO2S1 HTR (B1)	P0032	0032	2	×	EC-136
HO2S2 (B1)	P0138	0138	2	×	EC-192
HO2S2 (B1)	P0139	0139	2	×	EC-199
HO2S2 (B1)	P1146	1146	2	×	EC-327
HO2S2 (B1)	P1147	1147	2	×	EC-337
HO2S2 HTR (B1)	P0037	0037	2	×	EC-142
HO2S2 HTR (B1)	P0038	0038	2	×	EC-142
IAT SEN/CIRCUIT	P0112	0112	2	×	EC-153
IAT SEN/CIRCUIT	P0113	0113	2	×	EC-153
INTAKE ERROR	P1171	1171	1	×	EC-346
INT/V TIM CONT-B1	P0011	0011	2	—	EC-133
INT/V TIM V/CIR-B1	P1111	1111	2	×	EC-293
KNOCK SEN/CIRC-B1	P0327	0327	2	—	EC-257
KNOCK SEN/CIRC-B1	P0328	0328	2	—	EC-257
L/PRESS SOL/CIRC	P0745	0745	2	×	AT-166
MULTI CYL MISFIRE	P0300	0300	2	×	EC-251
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	2	—	EC-60
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	—	Flashing*4	EC-61
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	—	—	**—**
O/R CLTCH SOL/CIRC	P1760	1760	2	×	AT-188
PNP SW/CIRC	P0705	0705	2	×	AT-114
P-N POS SW/CIRCUIT	P1706	1706	2	×	EC-389
PURG VOLUME CONT/V	P0444	0444	2	×	EC-278
SFT SOL A/CIRC	P0750	0750	1	×	AT-173
SFT SOL B/CIRC	P0755	0755	1	×	AT-178
SENSOR POWER/CIRC	P1229	1229	1	×	EC-385
TCC SOLENOID/CIRC	P0740	0740	2	×	AT-161
TCS C/U FUNCTN	P1211	1211	2	—	EC-350

Items (CONSULT-II screen terms)	DTC*1		Trip	MI lighting up	Reference page
	CONSULT-II GST*2	ECM*3			
TCS/CIRC	P1212	1212	2	—	EC-351
TP SEN/CIRC A/T	P1705	1705	1	×	AT-183
TP SEN 1/CIRC	P0222	0222	1	×	EC-227
TP SEN 1/CIRC	P0223	0223	1	×	EC-227
TP SEN 2/CIRC	P0122	0122	1	×	EC-163
TP SEN 2/CIRC	P0123	0123	1	×	EC-163
TP SEN 2/CIRC	P1223	1223	1	×	EC-366
TP SEN 2/CIRC	P1224	1224	1	×	EC-366
TP SENSOR	P0221	0221	1	×	EC-221
TP SENSOR	P2135	2135	1	×	EC-420
TW CATALYST SYS-B1	P0420	0420	2	×	EC-273
VEH SPD SEN/CIRC	P0720	0720	2	×	AT-126
VEH SPEED SEN/CIRC	P0500	0500	2	×	EC-284

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by ISO 15031-5.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: When engine is running.
*5: The troubleshooting for this DTC needs CONSULT-II.

DTC No. Index

EBS00O2Q

NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

DTC*1		Items (CONSULT-II screen terms)	Trip	MI lighting up	Reference page
CONSULT-II GST*2	ECM*3				
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	Flashing*4	EC-61
U1000	1000*5	CAN COMM CIRCUIT	1	×	EC-130
U1001	1001*5	CAN COMM CIRCUIT	2	—	EC-130
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—	**—**
P0011	0011	INT/V TIM CONT-B1	2	—	EC-133
P0031	0031	HO2S1 HTR (B1)	2	×	EC-136
P0032	0032	HO2S1 HTR (B1)	2	×	EC-136
P0037	0037	HO2S2 HTR (B1)	2	×	EC-142
P0038	0038	HO2S2 HTR (B1)	2	×	EC-142
P0107	0107	ABSL PRES SEN/CIRC	2	×	EC-148
P0108	0108	ABSL PRES SEN/CIRC	2	×	EC-148
P0112	0112	IAT SEN/CIRCUIT	2	×	EC-153
P0113	0113	IAT SEN/CIRCUIT	2	×	EC-153
P0117	0117	ECT SEN/CIRCUIT	1	×	EC-158
P0118	0118	ECT SEN/CIRCUIT	1	×	EC-158
P0122	0122	TP SEN 2/CIRC	1	×	EC-163

DTC*1		Items (CONSULT-II screen terms)	Trip	MI lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P0123	0123	TP SEN 2/CIRC	1	×	EC-163
P0132	0132	HO2S1 (B1)	2	×	EC-169
P0133	0133	HO2S1 (B1)	2	×	EC-175
P0134	0134	HO2S1 (B1)	2	×	EC-185
P0138	0138	HO2S2 (B1)	2	×	EC-192
P0139	0139	HO2S2 (B1)	2	×	EC-199
P0171	0171	FUEL SYS-LEAN-B1	2	×	EC-208
P0172	0172	FUEL SYS-RICH-B1	2	×	EC-215
P0221	0221	TP SENSOR	1	×	EC-221
P0222	0222	TP SEN 1/CIRC	1	×	EC-227
P0223	0223	TP SEN 1/CIRC	1	×	EC-227
P0226	0226	APP SENSOR*6	1	×	EC-233
P0227	0227	APP SEN 1/CIRC*6	1	×	EC-242
P0228	0228	APP SEN 1/CIRC*6	1	×	EC-242
P0300	0300	MULTI CYL MISFIRE	2	×	EC-251
P0301	0301	CYL 1 MISFIRE	2	×	EC-251
P0302	0302	CYL 2 MISFIRE	2	×	EC-251
P0303	0303	CYL 3 MISFIRE	2	×	EC-251
P0304	0304	CYL 4 MISFIRE	2	×	EC-251
P0327	0327	KNOCK SEN/CIRC-B1	2	—	EC-257
P0328	0328	KNOCK SEN/CIRC-B1	2	—	EC-257
P0335	0335	CKP SEN/CIRCUIT	2	×	EC-261
P0340	0340	CMP SEN/CIRC-B1	2	×	EC-267
P0420	0420	TW CATALYST SYS-B1	2	×	EC-273
P0444	0444	PURG VOLUME CONT/V	2	×	EC-278
P0500	0500	VEH SPEED SEN/CIRC	2	×	EC-284
P0605	0605	ECM	1 or 2	× or —	EC-286
P0705	0705	PNP SW/CIRC	2	×	AT-114
P0710	0710	ATF TEMP SEN/CIRC	2	×	AT-120
P0720	0720	VEH SPD SEN/CIRC	2	×	AT-126
P0725	0725	ENGINE SPEED SIG	2	×	AT-131
P0731	0731	A/T 1ST GR FNCTN	2	×	AT-135
P0732	0732	A/T 2ND GR FNCTN	2	×	AT-141
P0733	0733	A/T 3RD GR FNCTN	2	×	AT-147
P0734	0734	A/T 4TH GR FNCTN	2	×	AT-153
P0740	0740	TCC SOLENOID/CIRC	2	×	AT-161
P0745	0745	L/PRESS SOL/CIRC	2	×	AT-166
P0750	0750	SFT SOL A/CIRC	1	×	AT-173
P0755	0755	SFT SOL B/CIRC	1	×	AT-178
P1065	1065	ECM BACK UP/CIRC	2	×	EC-289
P1111	1111	INT/V TIM V/CIR-B1	2	×	EC-293
P1121	1121	ETC ACTR	1	×	EC-297

DTC*1		Items (CONSULT-II screen terms)	Trip	MI lighting up	Reference page
CONSULT-II GST*2	ECM*3				
P1122	1122	ETC FUNCTION/CIRC	1	×	EC-299
P1124	1124	ETC MOT PWR	1	×	EC-305
P1126	1126	ETC MOT PWR	1	×	EC-305
P1128	1128	ETC MOT	1	×	EC-310
P1143	1143	HO2S1 (B1)	2	×	EC-315
P1144	1144	HO2S1 (B1)	2	×	EC-321
P1146	1146	HO2S2 (B1)	2	×	EC-327
P1147	1147	HO2S2 (B1)	2	×	EC-337
P1171	1171	INTAKE ERROR	1	×	EC-346
P1211	1211	TCS C/U FUNCTN	2	—	EC-350
P1212	1212	TCS/CIRC	2	—	EC-351
P1217	1217	ENG OVER TEMP	1	×	EC-352
P1223	1223	TP SEN 2/CIRC*6	1	×	EC-366
P1224	1224	TP SEN 2/CIRC*6	1	×	EC-366
P1225	1225	CTP LEARNING	2	—	EC-372
P1226	1226	CTP LEARNING	2	—	EC-374
P1227	1227	APP SEN 2/CIRC*6	1	×	EC-376
P1228	1228	APP SEN 2/CIRC*6	1	×	EC-376
P1229	1229	SENSOR POWER/CIRC	1	×	EC-385
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	2	—	EC-60
P1705	1705	TP SEN/CIRC A/T	1	×	AT-183
P1706	1706	P-N POS SW/CIRCUIT	2	×	EC-389
P1760	1760	O/R CLTCH SOL/CIRC	2	×	AT-188
P1805	1805	BRAKE SW/CIRCUIT	2	—	EC-395
P2122	2122	APP SEN 1/CIRC	1	×	EC-402
P2123	2123	APP SEN 1/CIRC	1	×	EC-402
P2127	2127	APP SEN 2/CIRC	1	×	EC-411
P2128	2128	APP SEN 2/CIRC	1	×	EC-411
P2135	2135	TP SENSOR	1	×	EC-420
P2138	2138	APP SENSOR	1	×	EC-426

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by ISO 15031-5.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: When engine is running.
*5: The troubleshooting for this DTC needs CONSULT-II.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EBS00OS5

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EBS011US

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

On Board Diagnostic (OBD) System of Engine and A/T

EBS00O2S

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MI) to warn the driver of a malfunction causing emission deterioration.

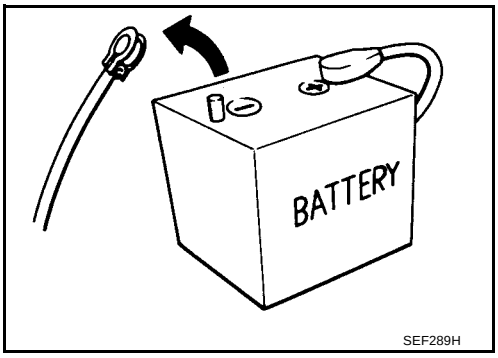
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-99, "HARNESS CONNECTOR" .**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

Precaution

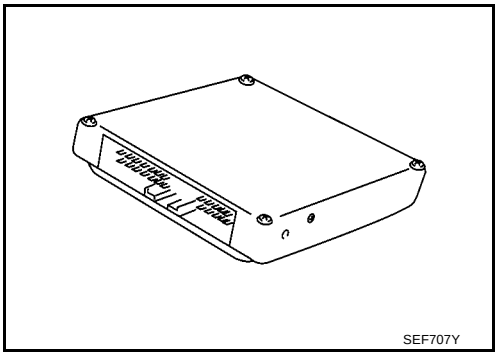
EBS00O2T

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect battery ground cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

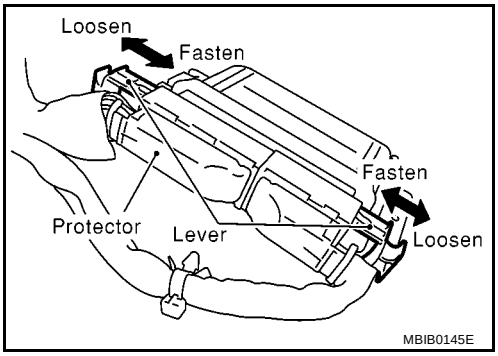


SEF289H

- **Do not disassemble ECM.**
- **If battery cable is disconnected, the memory will return to the initial ECM values.**
  The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.

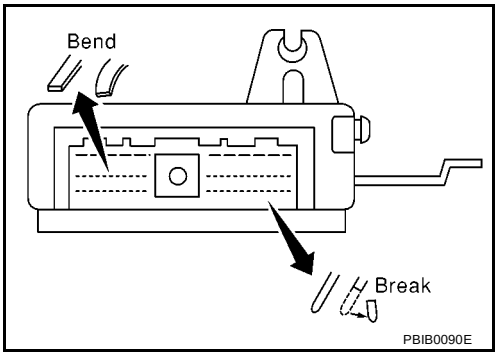

SEF707Y

- **When connecting ECM harness connector, fasten it securely with levers as far as they will go as shown in the figure.**



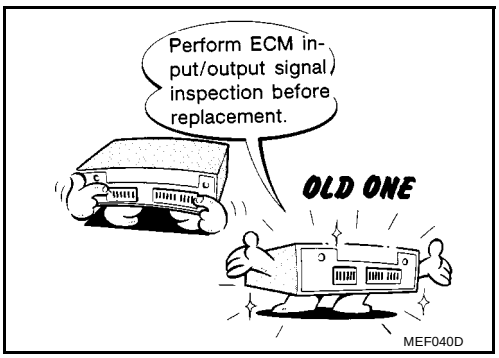
MBIB0145E

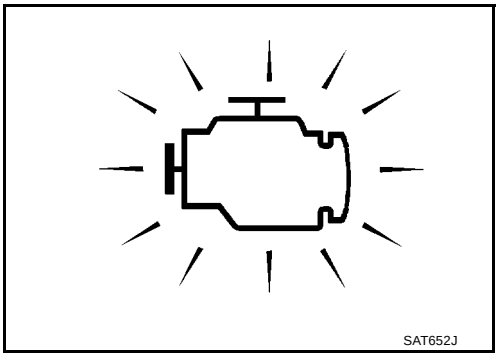
- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**



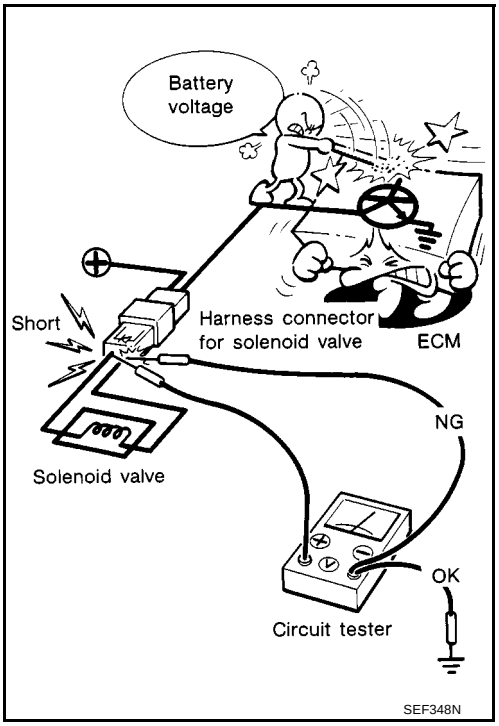
PBIB0090E

- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-94, "ECM Terminals and Reference Value" .**
- **Handle manifold absolute pressure sensor carefully to avoid damage.**
- **Do not clean air clear element with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**
- **After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check.**
  The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.

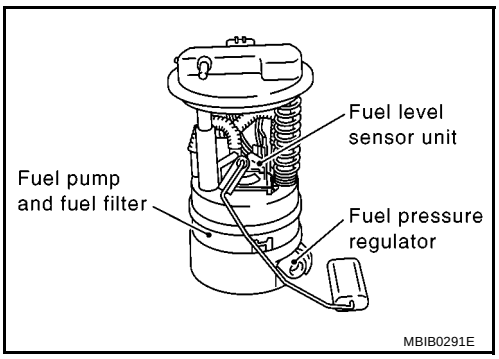




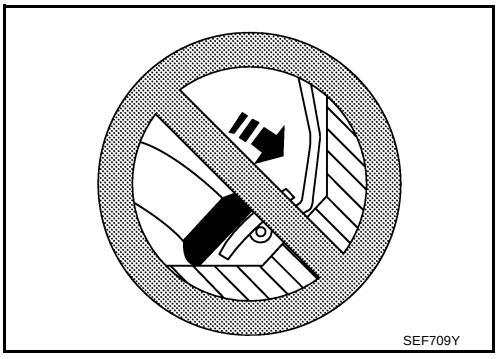
- **When measuring ECM signals with a circuit tester, connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.**
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**



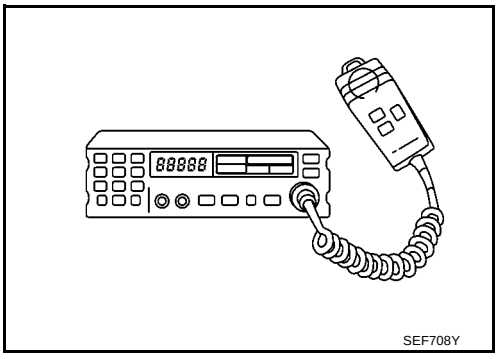
- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**



- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**


SEF709Y

- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
  - **Keep the antenna as far as possible from the electronic control units.**
  - **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
    Do not let them run parallel for a long distance.
  - **Adjust the antenna and feeder line so that the standing-wave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**


SEF708Y

Wiring Diagrams and Trouble Diagnosis

EBS00O2U

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

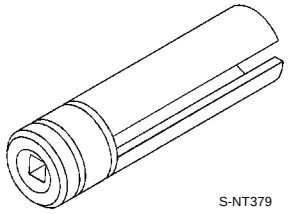
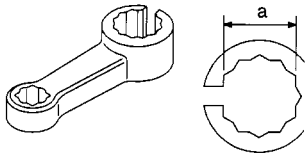
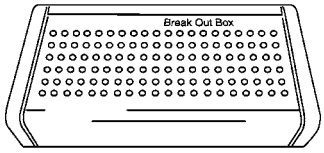
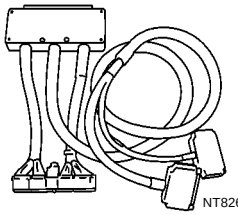
- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"

PREPARATION

PFP:00002

Special Service Tools

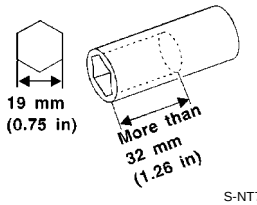
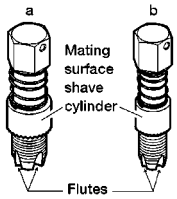
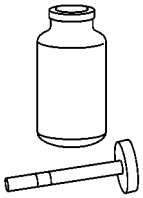
EBS00O2V

Tool number Tool name	Description	
KV10117100 Heated oxygen sensor wrench	 S-NT379	Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench	 S-NT636	Loosening or tightening heated oxygen sensors **a: 22 mm (0.87 in)**
KV109E0010 Break-out box	 NT825	Measuring ECM signals with a circuit tester
KV109E0080 Y-cable adapter	 NT826	Measuring ECM signals with a circuit tester

Commercial Service Tools

EBS00O2W

Tool name	Description	
Quick connector release	 PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)
Fuel filler cap adapter	 S-NT653	Checking fuel tank vacuum relief valve opening pressure

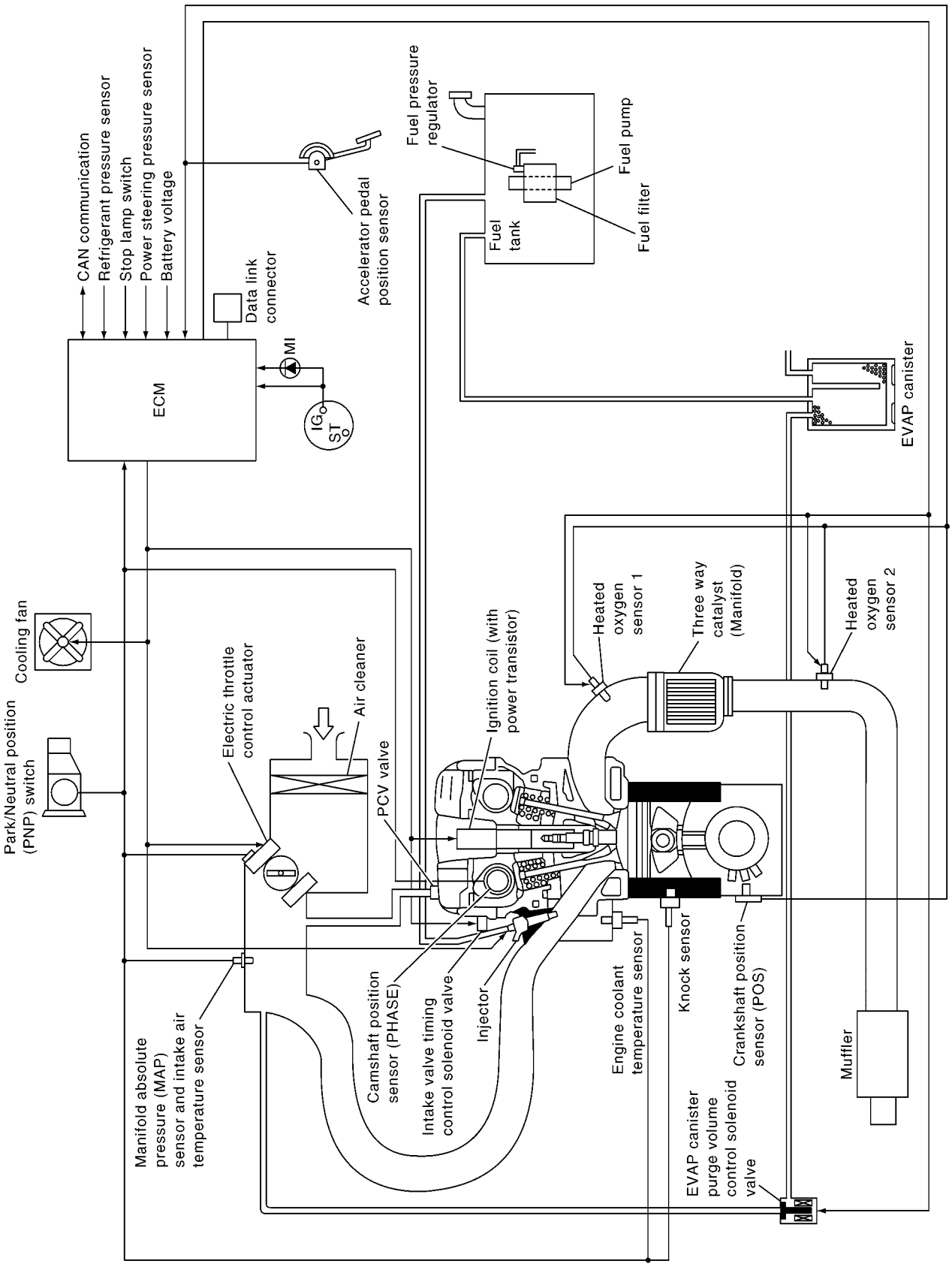
Tool name	Description	
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

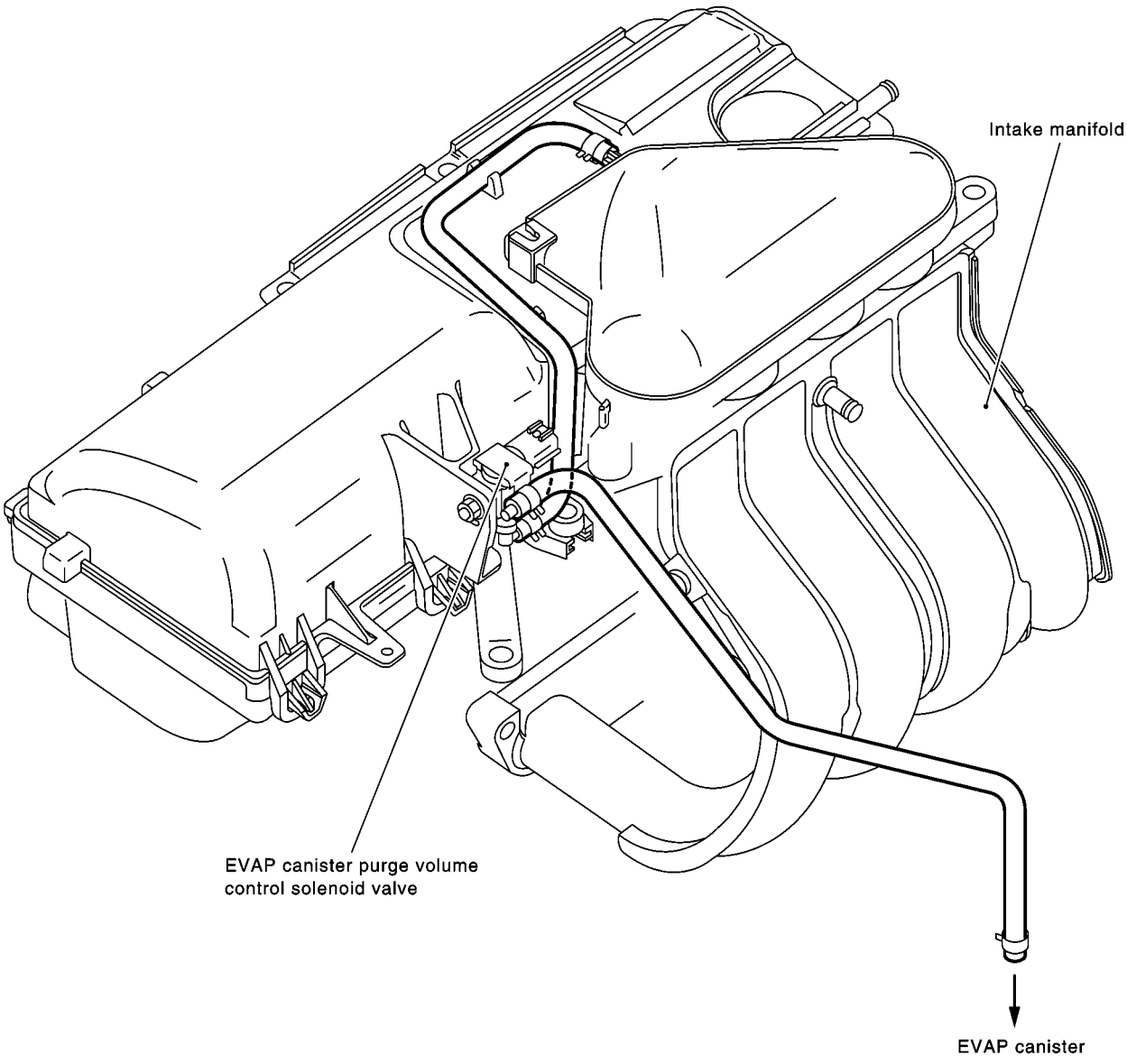
EBS00O2X



MBIB0266E

Vacuum Hose Drawing

EBS00O2Y



NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

MBIB0265E

Refer to EC-22, "System Diagram" for Vacuum Control System.

System Chart

EBS00O2Z

Input (Sensor)	ECM Function	Output (Actuator)
● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Manifold absolute pressure sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 ● Throttle position sensor ● Accelerator pedal position sensor ● Park/neutral position (PNP) switch ● Intake air temperature sensor ● Ignition switch ● Battery voltage ● Knock sensor ● Refrigerant pressure sensor ● Stop lamp switch ● Heated oxygen sensor 2*1 ● TCM (Transmission control module) ● ABS actuator and electric unit (control unit)*2 ● Air conditioner switch*2 ● Vehicle speed signal*2 ● Electrical load signal*2	Fuel injection & mixture ratio control	Fuel injectors
	Electronic ignition system	Power transistor
	Fuel pump control	Fuel pump relay
	Idle speed control	Electric throttle control actuator
	On board diagnostic system	MI (On the instrument panel)
	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
	Air conditioning cut control	Air conditioner relay*3
	Cooling fan control	Cooling fan relays*3

*1: This sensor is not used to control the engine system under normal conditions.
*2: This input signal is sent to the ECM through CAN communication line.
*3: This output signal is sent from the ECM through CAN communication line.

Multiport Fuel Injection (MFI) System

EBS00O30

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*3 and piston position	Fuel injection & mixture ratio control	Fuel injectors
Manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Knock sensor	Engine knocking condition		
Battery	Battery voltage*3		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Vehicle speed signal*2	Vehicle speed		
Air conditioner switch*2	Air conditioner operation		

*1: This sensor is not used to control the engine system under normal conditions.
*2: This signal is sent to the ECM through CAN communication line.
*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined

by input signals (for engine speed and intake air volume) from the crankshaft position sensor, the manifold absolute pressure sensor and intake air temperature sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

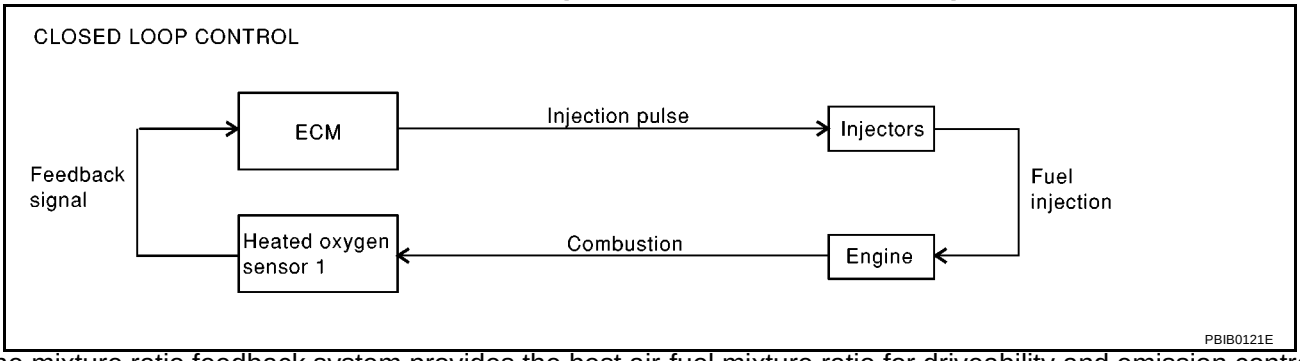
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (A/T models)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-169 . This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions.
Feedback control stops in order to maintain stabilized fuel combustion.

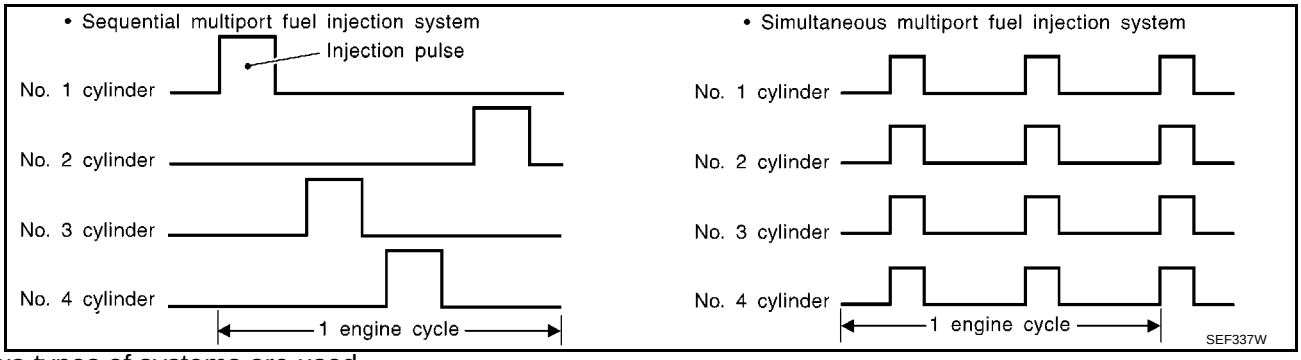
- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (A/T models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as orig-

inally designed. Both manufacturing differences (i.e., manifold absolute pressure sensor silicon diaphragm) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The four injectors will then receive the signals two times for each engine cycle.
This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Electronic Ignition (EI) System

EBS00O31

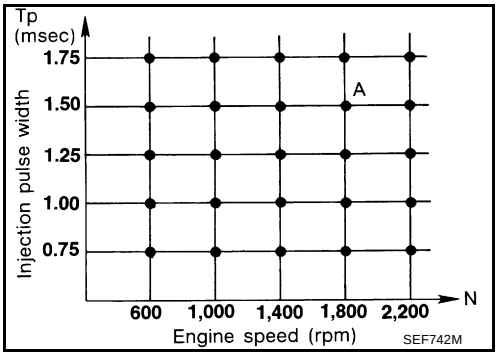
INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2 and piston position	Ignition timing control	Power transistor
manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*2		
Vehicle speed signal*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.
*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown.
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.
e.g., N: 1,800 rpm, Tp: 1.50 msec
A °BTDC
During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.



- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control

EBS00O32

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle valve opening angle		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Refrigerant pressure sensor	Refrigerant pressure		
Vehicle speed signal*1	Vehicle speed		
Battery	Battery voltage*2		

*1: This signal is sent to the ECM through CAN communication line.
*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

Fuel Cut Control (at No Load and High Engine Speed)

EBS00O33

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injectors
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Vehicle speed signal*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

If the engine speed is above 2,500 rpm with no load (for example, the shift position is neutral and engine speed is over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.
Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

NOTE:
This function is different from deceleration control listed under EC-24, "Multiport Fuel Injection (MFI) System" .

CAN Communication

EBS00O34

SYSTEM DESCRIPTION

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

CAN COMMUNICATION UNIT

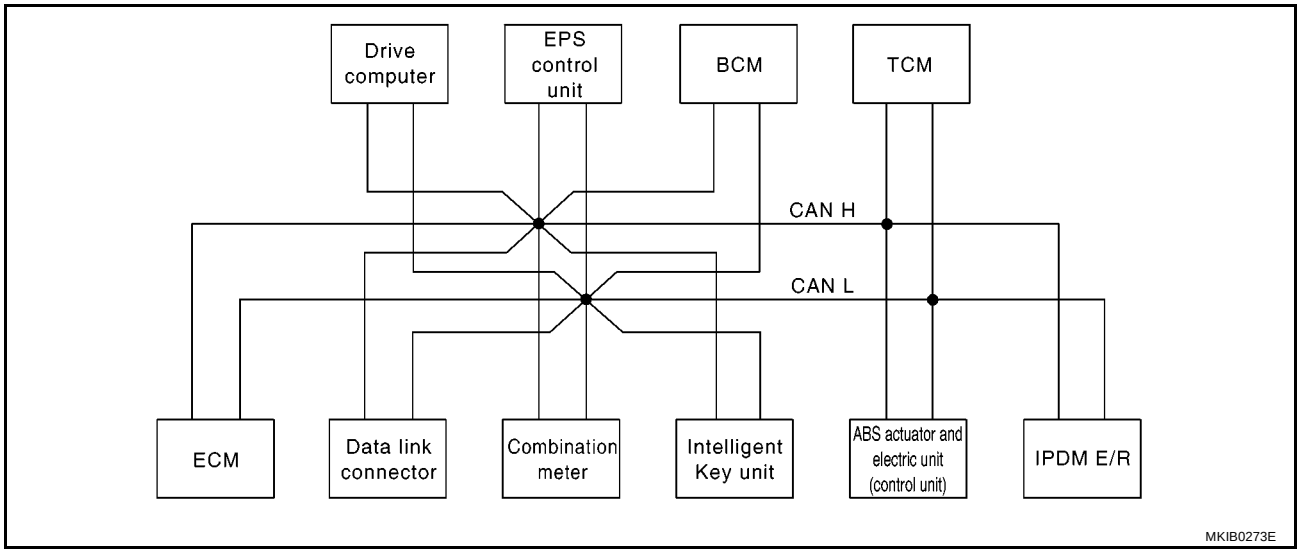
Body type	3door/5door															
Axle	2WD															
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE							
Handle	LHD/RHD															
Brake control	ABS system								ESP system							
Transmission	A/T				M/T				A/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×				
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	EC-30, "TYPE 1/ TYPE 2"				EC-33, "TYPE 3/ TYPE 4"				EC-35, "TYPE 5/ TYPE 6"				EC-38, "TYPE 7/ TYPE 8"			

×: Applicable

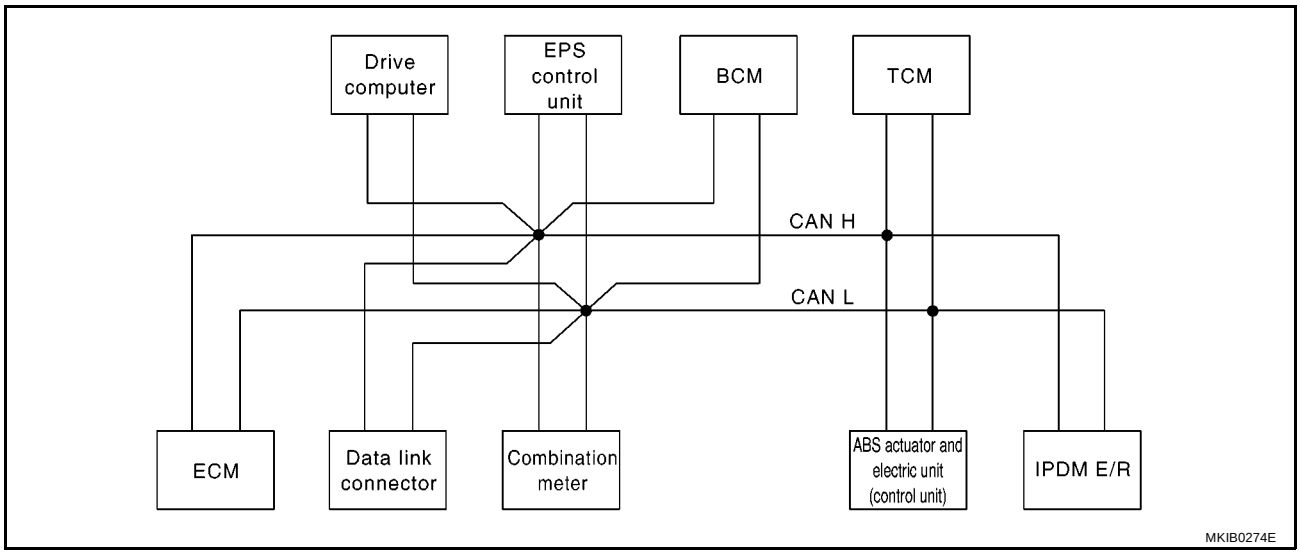
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

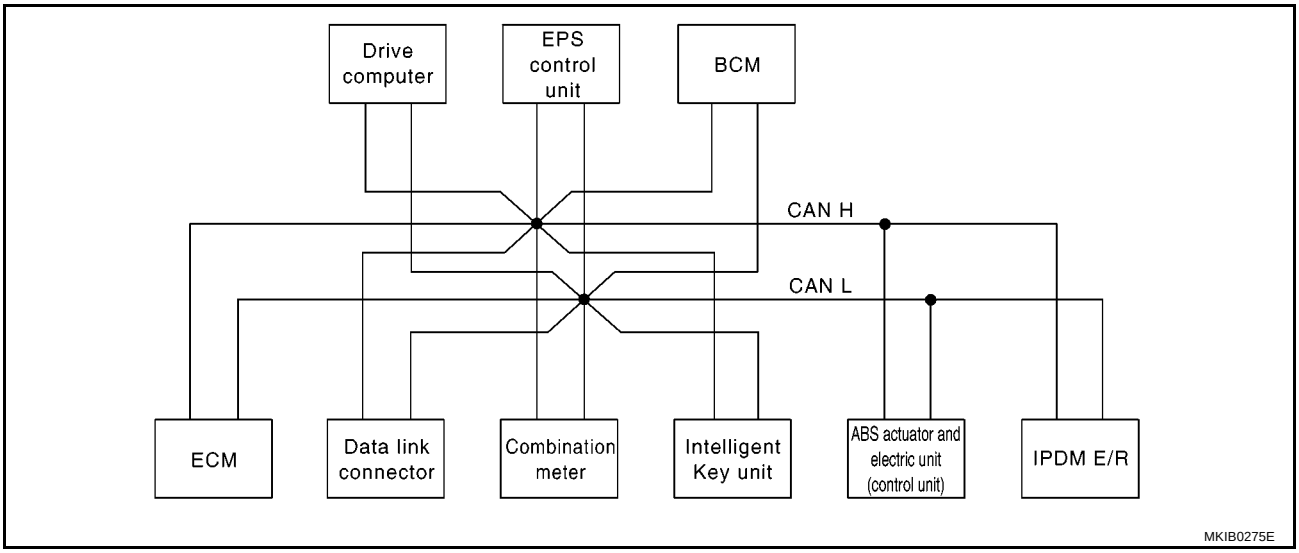
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

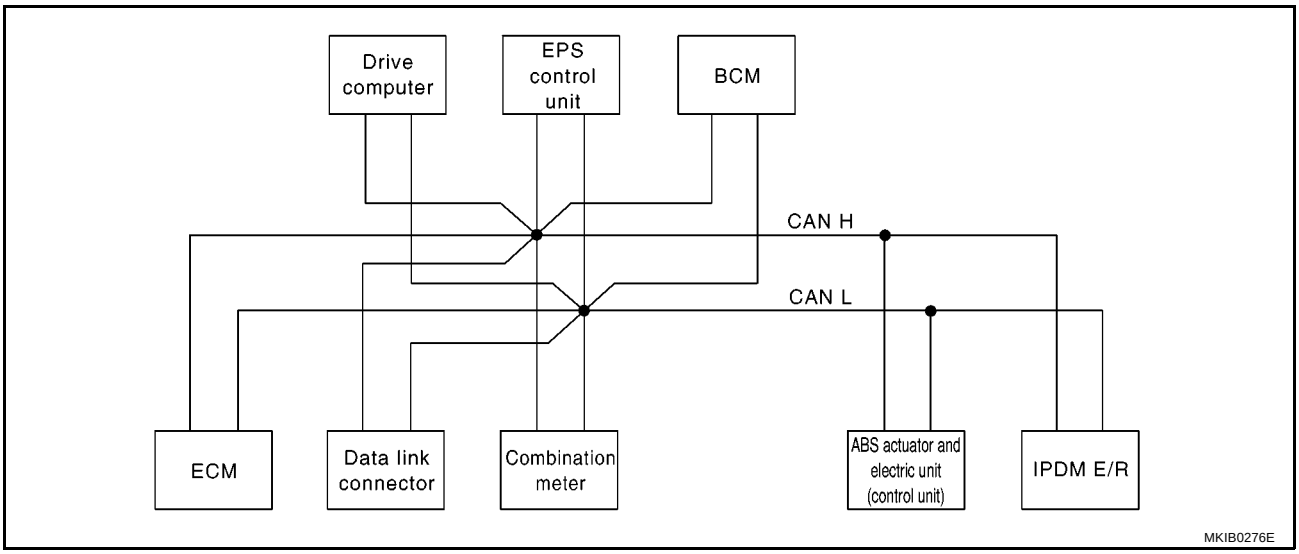
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

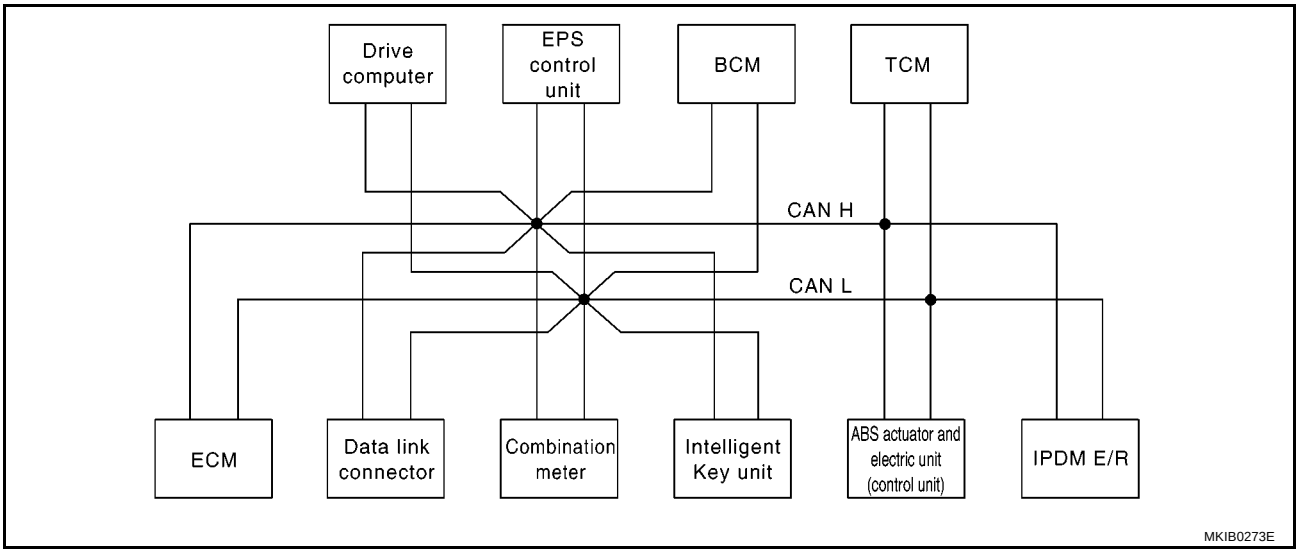
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

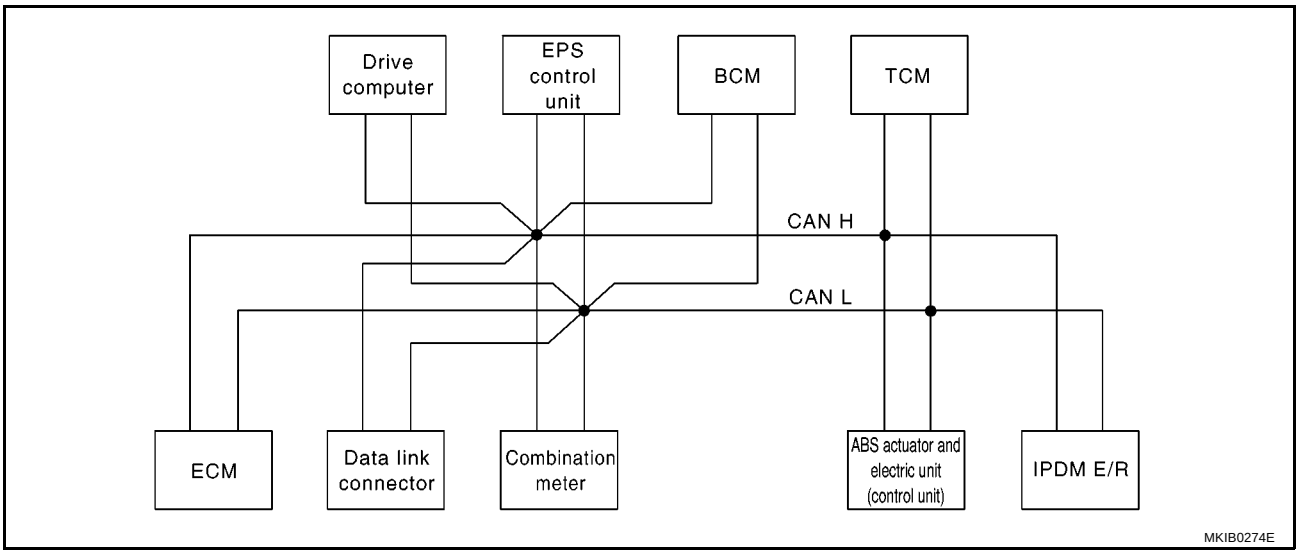
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

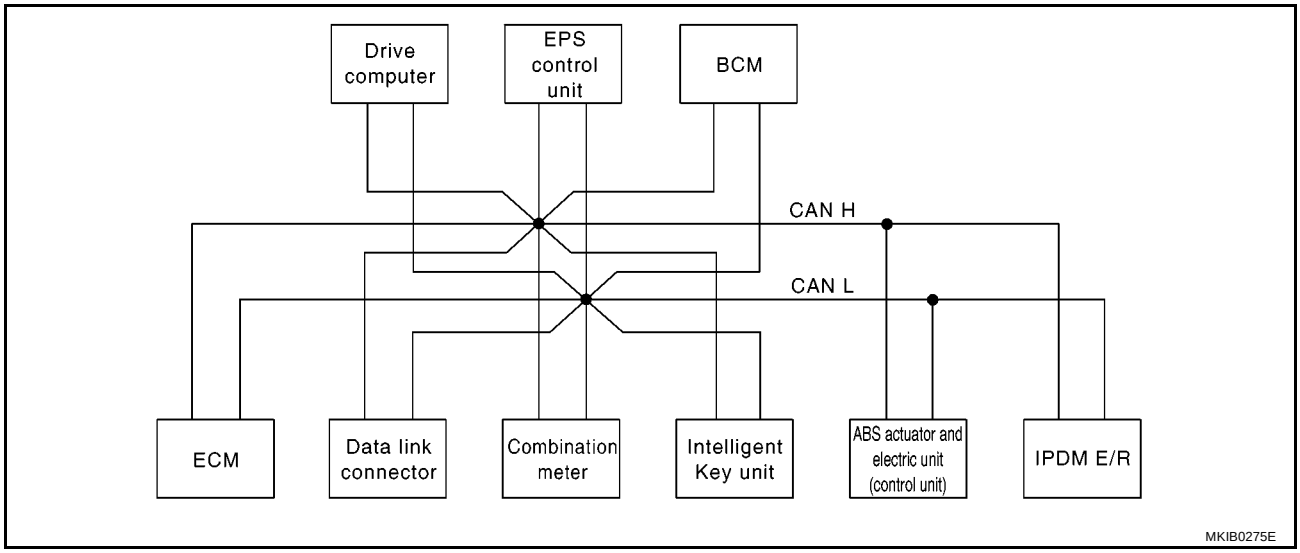
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

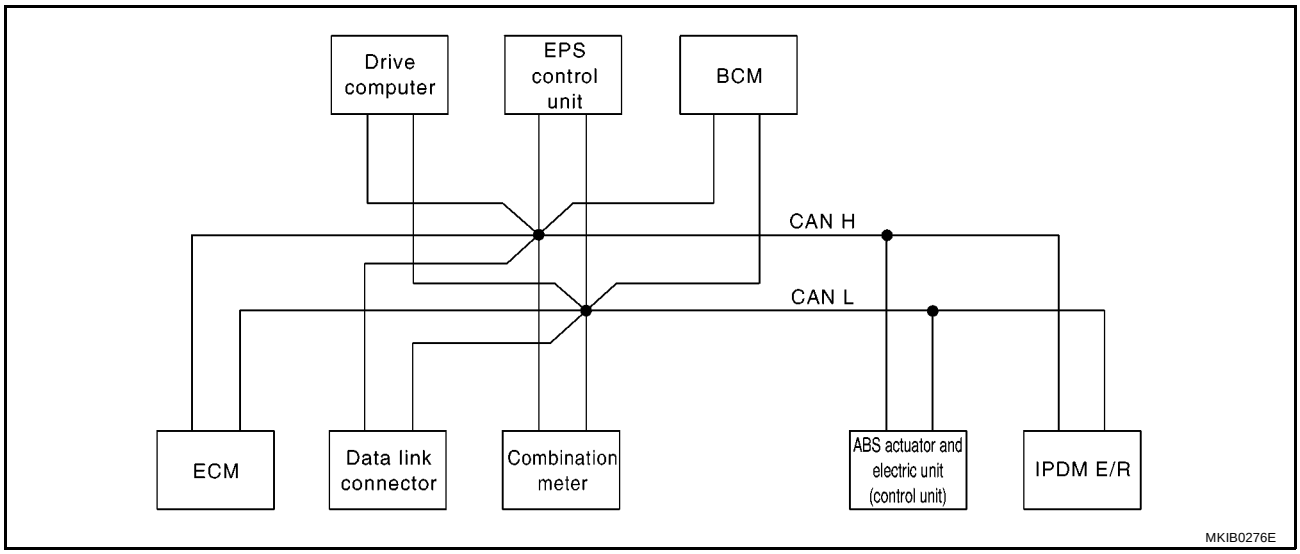
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

BASIC SERVICE PROCEDURE

PFP:00018

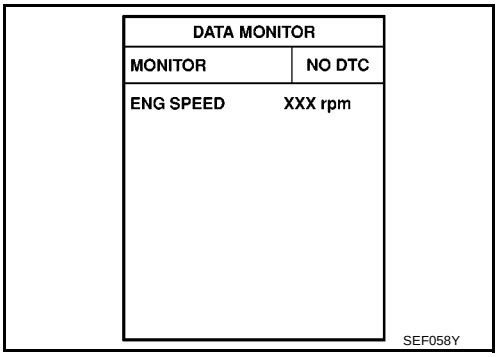
Idle Speed and Ignition Timing Check

EBS00O35

IDLE SPEED

With CONSULT-II

Check idle speed in “DATA MONITOR” mode with CONSULT-II.

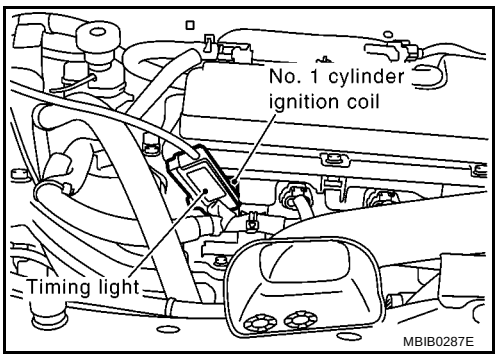


With GST

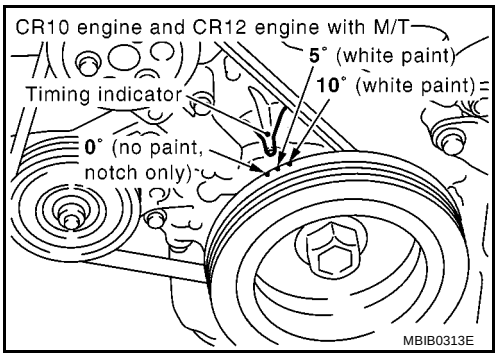
Check idle speed in “MODE 1" with GST.

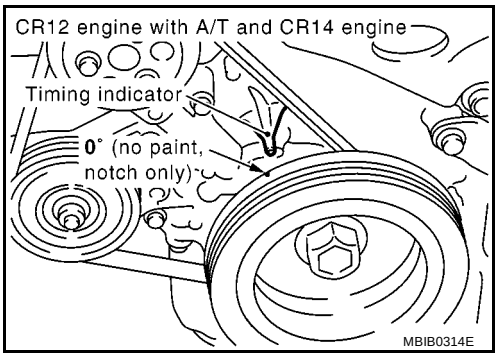
IGNITION TIMING

1. Slide the harness protector of ignition coil No.1 to clear the wires.
2. Attach timing light to the wires as shown in the figure.



3. Check ignition timing.





Accelerator Pedal Released Position Learning

EBS00O36

DESCRIPTION

Accelerator Pedal Released Position Learning is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF wait at least 10 seconds.

Throttle Valve Closed Position Learning

EBS00O37

DESCRIPTION

Throttle Valve Closed Position Learning is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

EBS00O38

DESCRIPTION

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.

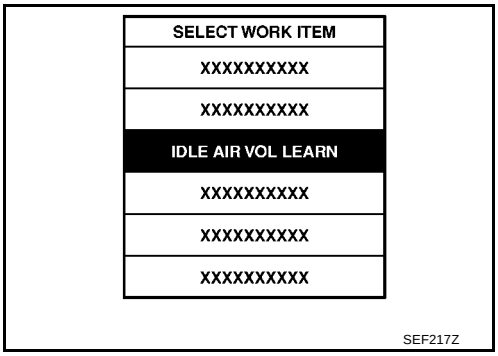
- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)
  On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
  For A/T models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.
  For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

OPERATION PROCEDURE

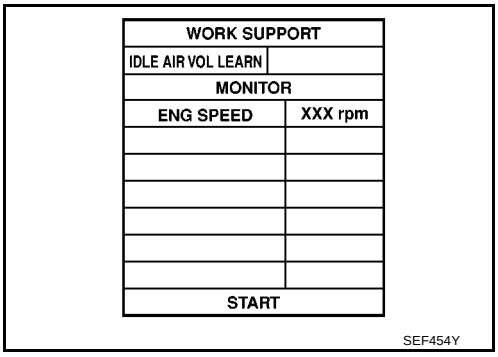
With CONSULT-II

1. Perform EC-42, "Accelerator Pedal Released Position Learning" .
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.

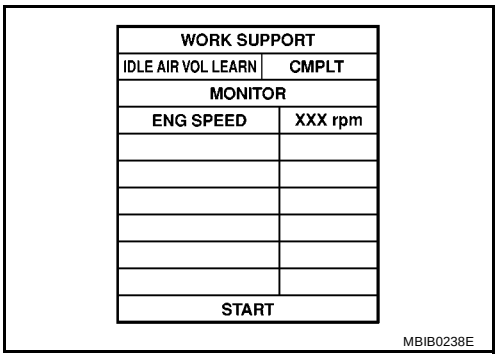
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.



6. Touch “START” and wait 20 seconds.



7. Make sure that “CMPLT” is displayed on CONSULT-II screen. If “CMPLT” is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.



ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 5±2° BTDC A/T: 5±2° BTDC (in P or N position)

Without CONSULT-II

NOTE:

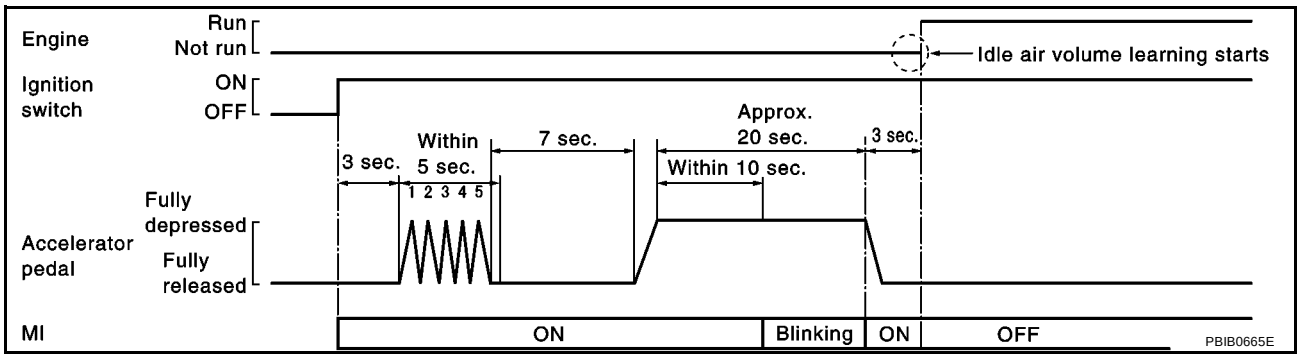
- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform EC-42, "Accelerator Pedal Released Position Learning" .
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.

8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
10. Start engine and let it idle.

11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 5±2° BTDC A/T: 5±2° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. **Check that throttle valve is fully closed.**
2. **Check PCV valve operation.**
3. **Check that downstream of throttle valve is free from air leakage.**
4. **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.**
   It is useful to perform EC-119, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle air volume learning all over again:**
   - **Engine stalls.**
   - **Erroneous idle.**

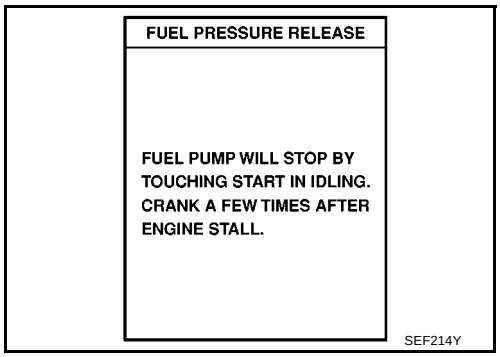
Fuel Pressure Check

EBS00O39

FUEL PRESSURE RELEASE

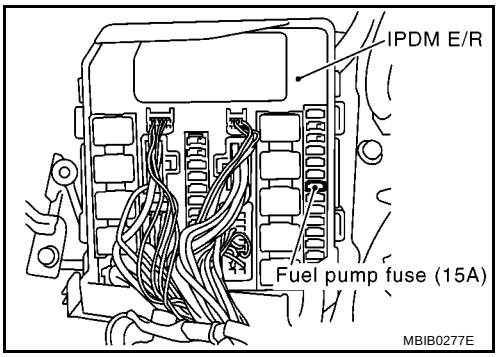
With CONSULT-II

1. Turn ignition switch ON.
2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
5. Turn ignition switch OFF.



Without CONSULT-II

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it 2 or 3 times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.



FUEL PRESSURE CHECK

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

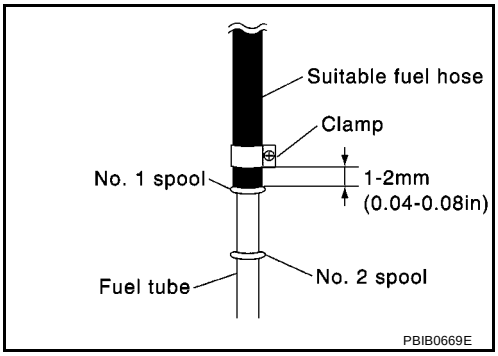
NOTE:

Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because CR engine models do not have fuel return system.

CAUTION:

- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **When installing fuel hose quick connector, refer to EM-16, "AIR CLEANER AND AIR DUCT" .**

1. Release fuel pressure to zero. Refer to EC-44, "FUEL PRESSURE RELEASE" .
2. Prepare fuel hose and fuel hose clamp for fuel pressure check, and connect fuel pressure gauge.
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.
3. Remove fuel hose. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
   - Do not twist or kink fuel hose because it is plastic hose.
   - Do not remove fuel hose from quick connector.
   - Keep the original fuel hose to be free from intrusion of dust or foreign substances with a suitable cover.
4. Install the fuel pressure gauge as shown in the figure.
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube and No.1 spool.
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
   - Use a torque driver to tighten clamps.

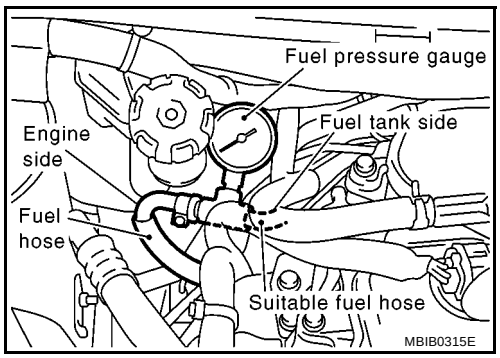


- Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).

Tightening torque:

1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

- Make sure that clamp screw does not contact adjacent parts.



5. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
6. Turn ignition switch ON, and check for fuel leakage.
7. Start engine and check for fuel leakage.
8. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2 , 51 psi)

9. If result is unsatisfactory, go to next step.
10. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

EBS00O3A

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	ISO Standard
Diagnostic Trouble Code (DTC)	Mode 3 of ISO 15031-5
Freeze Frame data	Mode 2 of ISO 15031-5
System Readiness Test (SRT) code	Mode 1 of ISO 15031-5
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of ISO 15031-5
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of ISO 15031-5
Calibration ID	Mode 9 of ISO 15031-5

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	×	×	×	×	×	—
GST	×	×*1	×	—	×	×
ECM	×	×*2	—	—	—	—

*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.
*2: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-75 .)

Two Trip Detection Logic

EBS00O3B

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>
If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>
The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MI, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MI				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-11)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is a malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system has malfunction and MI circuit is open by means of operating fail-safe function.

The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Emission-related Diagnostic Information

EBS00O3C

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test Valve/ Test Limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
CAN COMM CIRCUIT	U1000	1000*5	—	—	—	EC-130
CAN COMM CIRCUIT	U1001	1001*5	—	—	×	EC-130
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	—	—	—	—
INT/V TIM CONT-B1	P0011	0011	—	—	×	EC-133
HO2S1 HTR (B1)	P0031	0031	×	×	×*4	EC-136
HO2S1 HTR (B1)	P0032	0032	×	×	×*4	EC-136
HO2S2 HTR (B1)	P0037	0037	×	×	×*4	EC-142
HO2S2 HTR (B1)	P0038	0038	×	×	×*4	EC-142
ABSL PRES SEN/CIRC	P0107	0107	—	—	×	EC-148
ABSL PRES SEN/CIRC	P0108	0108	—	—	×	EC-148
IAT SEN/CIRCUIT	P0112	0112	—	—	×	EC-153
IAT SEN/CIRCUIT	P0113	0113	—	—	×	EC-153
ECT SEN/CIRCUIT	P0117	0117	—	—	—	EC-158
ECT SEN/CIRCUIT	P0118	0118	—	—	—	EC-158
TP SEN 2/CIRC	P0122	0122	—	—	—	EC-163
TP SEN 2/CIRC	P0123	0123	—	—	—	EC-163
HO2S1 (B1)	P0132	0132	×	×	×*4	EC-169
HO2S1 (B1)	P0133	0133	×	×	×*4	EC-175
HO2S1 (B1)	P0134	0134	×	×	×*4	EC-185
HO2S2 (B1)	P0138	0138	×	×	×*4	EC-192
HO2S2 (B1)	P0139	0139	×	×	×*4	EC-199
FUEL SYS-LEAN-B1	P0171	0171	—	—	×	EC-208
FUEL SYS-RICH-B1	P0172	0172	—	—	×	EC-215
TP SENSOR*6	P0221	0221	—	—	—	EC-221
TP SEN 1/CIRC	P0222	0222	—	—	—	EC-227
TP SEN 1/CIRC	P0223	0223	—	—	—	EC-227
APP SENSOR*6	P0226	0226	—	—	—	EC-233
APP SEN 1/CIRC *6	P0227	0227	—	—	—	EC-242
APP SEN 1/CIRC *6	P0228	0228	—	—	—	EC-242
MULTI CYL MISFIRE	P0300	0300	—	—	×	EC-251
CYL 1 MISFIRE	P0301	0301	—	—	×	EC-251
CYL 2 MISFIRE	P0302	0302	—	—	×	EC-251
CYL 3 MISFIRE	P0303	0303	—	—	×	EC-251
CYL 4 MISFIRE	P0304	0304	—	—	×	EC-251

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test Valve/ Test Limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
KNOCK SEN/CIRC-B1	P0327	0327	—	—	×	EC-257
KNOCK SEN/CIRC-B1	P0328	0328	—	—	×	EC-257
CKP SEN/CIRCUIT	P0335	0335	—	—	×	EC-261
CMP SEN/CIRC-B1	P0340	0340	—	—	×	EC-267
TW CATALYST SYS-B1	P0420	0420	×	×	×*4	EC-273
PURG VOLUME CONT/V	P0444	0444	—	—	×	EC-278
VEH SPEED SEN/CIRC	P0500	0500	—	—	×	EC-284
ECM	P0605	0605	—	—	—	EC-286
PNP SW/CIRC	P0705	0705	—	—	×	AT-114
ATF TEMP SEN/SIRC	P0710	0710	—	—	×	AT-120
VEH SPD SEN/CIRC	P0720	0720	—	—	×	AT-126
ENGINE SPEED SIG	P0725	0725	—	—	×	AT-131
A/T 1ST GR FNCTN	P0731	0731	—	—	×	AT-135
A/T 2ND GR FNCTN	P0732	0732	—	—	×	AT-141
A/T 3RD GR FNCTN	P0733	0733	—	—	×	AT-147
A/T 4TH GR FNCTN	P0734	0734	—	—	×	AT-153
TCC SOLENOID/CIRC	P0740	0740	—	—	×	AT-161
L/PRESS SOL/CIRC	P0745	0745	—	—	×	AT-166
SFT SOL A/CIRC	P0750	0750	—	—	—	AT-173
SFT SOL B/CIRC	P0755	0755	—	—	—	AT-178
ECM BACK UP/CIRC	P1065	1065	—	—	×	EC-289
INT/V TIM V/CIR-B1	P1111	1111	—	—	×	EC-293
ETC ACTR	P1121	1121	—	—	—	EC-297
ETC FUNCTION/CIRC	P1122	1122	—	—	—	EC-299
ETC MOT PWR	P1124	1124	—	—	—	EC-305
ETC MOT PWR	P1126	1126	—	—	—	EC-305
ETC MOT	P1128	1128	—	—	—	EC-310
HO2S1 (B1)	P1143	1143	×	×	×*4	EC-315
HO2S1 (B1)	P1144	1144	×	×	×*4	EC-321
HO2S2 (B1)	P1146	1146	×	×	×*4	EC-327
HO2S2 (B1)	P1147	1147	×	×	×*4	EC-337
INTAKE ERROR	P1171	1171	—	—	—	EC-346
TCS C/U FUNCTN	P1211	1211	—	—	×	EC-350
TCS/CIRC	P1212	1212	—	—	×	EC-351
ENG OVER TEMP	P1217	1217	—	—	—	EC-352
TP SEN 2/CIRC	P1223	1223	—	—	—	EC-366
TP SEN 2/CIRC	P1224	1224	—	—	—	EC-366
CTP LEARNING	P1225	1225	—	—	×	EC-372
CTP LEARNING	P1226	1226	—	—	×	EC-374
APP SEN 2/CIRC	P1227	1227	—	—	—	EC-376
APP SEN 2/CIRC	P1228	1228	—	—	—	EC-376
SENSOR POWER/CIRC	P1229	1229	—	—	—	EC-385

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test Valve/ Test Limit (GST only)	1st trip DTC	Reference page
	CONSULT-II GST*2	ECM*3				
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	—	—	×	EC-60
TP SEN/CIRC A/T	P1705	1705	—	—	—	AT-183
P-N POS SW/CIRCUIT	P1706	1706	—	—	×	EC-389
O/R CLTCH SOL/CIRC	P1760	1760	—	—	×	AT-188
BRAKE SW/CIRCUIT	P1805	1805	—	—	×	EC-395
APP SEN 1/CIRC	P2122	2122	—	—	—	EC-402
APP SEN 1/CIRC	P2123	2123	—	—	—	EC-402
APP SEN 2/CIRC	P2127	2127	—	—	—	EC-411
APP SEN 2/CIRC	P2128	2128	—	—	—	EC-411
TP SENSOR	P2135	2135	—	—	—	EC-420
APP SENSOR	P2138	2138	—	—	—	EC-426

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by ISO 15031-5.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: This is not displayed with GST.
*5: The troubleshooting for this DTC needs CONSULT-II.

DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.
If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MI during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.
Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
For malfunctions in which 1st trip DTCs are displayed, refer to EC-48, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" . These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.
1st trip DTC is specified in Mode 7 of ISO 15031-5. 1st trip DTC detection occurs without lighting up the MI and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step II, refer to EC-70, "WORK FLOW" . Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

With CONSULT-II

With GST

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P0740, P0745, etc.
These DTCs are prescribed by ISO 15031-5.
(CONSULT-II also displays the malfunctioning component or system.)

No Tools

The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0102, 0340 etc.

These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].

DTC display

SELF DIAG RESULTS	
DTC RESULTS	TIME
CKP SEN/CIRCUIT [P0335]	0

1st trip DTC display

SELF DIAG RESULTS	
DTC RESULTS	TIME
CKP SEN/CIRCUIT [P0335]	1t

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FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-105, "Freeze Frame Data and 1st Trip Freeze Frame Data" .
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Mode 1 of ISO 15031-5.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.
If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.
In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.
Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:
The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.
If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:
If MI is ON during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to “CMPLT”.

SRT item (CONSULT-II indication)	Performance Priority*	Required self-diagnostic items to set the SRT to “CMPLT”	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
HO2S	1	Heated oxygen sensor 1	P0132
		Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P0134
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0138
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	1	Heated oxygen sensor 1 heater	P0031, P0032
		Heated oxygen sensor 2 heater	P0037, P0038

*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example				
		Diagnosis	Ignition cycle ← ON → OFF ← ON → OFF ← ON → OFF ← ON →			
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)
		P0402	OK (1)	— (1)	— (1)	OK (2)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)
		P0402	— (0)	— (0)	OK (1)	— (1)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”
NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MI “ON”)
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”

OK: Self-diagnosis is carried out and the result is OK.
NG: Self-diagnosis is carried out and the result is NG.
—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above
When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

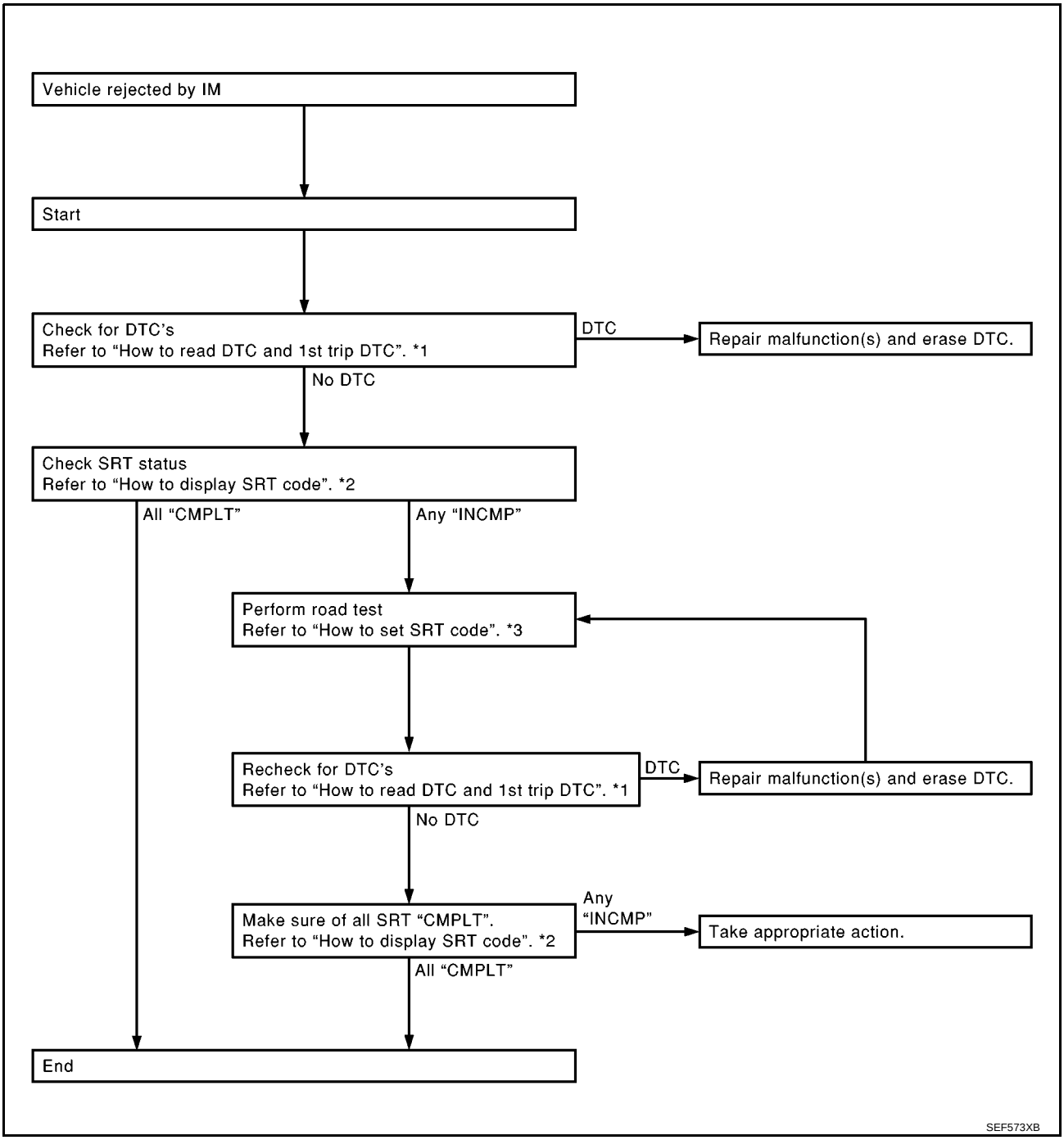
If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above
The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

  NOTE:
  SRT can be set as “CMPLT” together with the DTC (s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.



*1 EC-50 *2 EC-55 *3 EC-56

How to Display SRT Code

WITH CONSULT-II

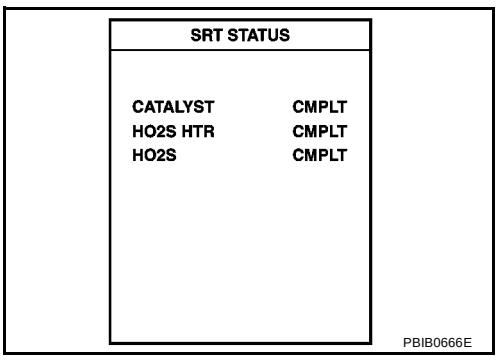
Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

A sample of CONSULT-II display for SRT code is shown at right.

"INCMP" means the self-diagnosis is incomplete and SRT is not set.

"CMPLT" means the self-diagnosis is complete and SRT is set.



WITH GST

Selecting Mode 1 with GST (Generic Scan Tool)

How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

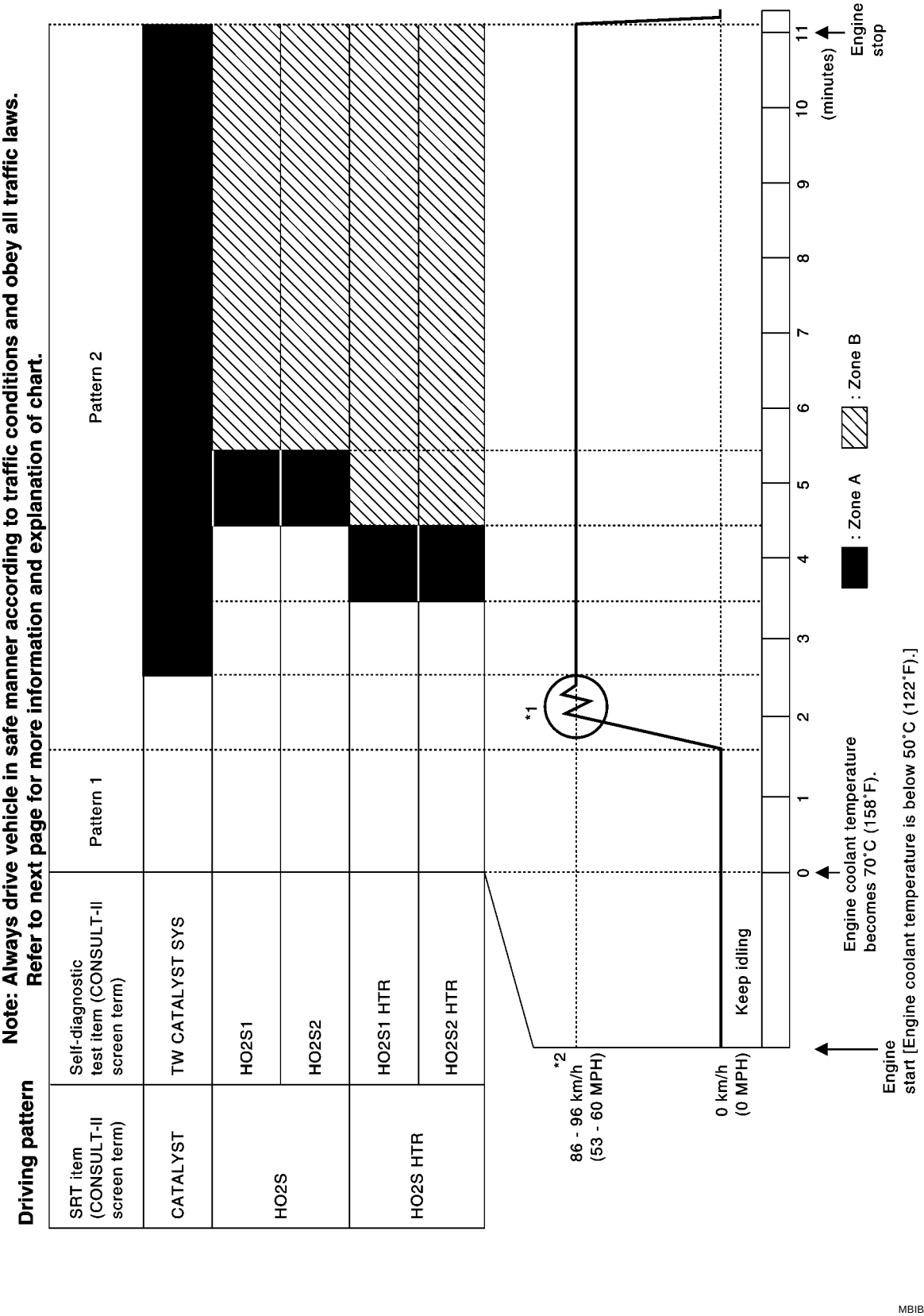
WITH CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on Performance Priority in the table on EC-53 .

WITHOUT CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

Driving Pattern



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- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
  Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
  Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
  Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of −10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 72 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 72 and ground is lower than 1.4V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.
*2: Checking the vehicle speed with GST is advised.

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Mode 6 of ISO 15031-5.
The test value is a parameter used to determine whether a system/circuit diagnostic test is OK or NG while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.
Items for which these data (test value and test limit) are displayed are the same as SRT code items.
These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

×: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	×
HO2S	Heated oxygen sensor 1	09H	04H	Max.	×
		0AH	84H	Min.	×
		0BH	04H	Max.	×
		0CH	04H	Max.	×
		0DH	04H	Max.	×
	Heated oxygen sensor 2	19H	86H	Min.	×
		1AH	86H	Min.	×
		1BH	06H	Max.	×
		1CH	06H	Max.	×
HO2S HTR	Heated oxygen sensor 1 heater	29H	08H	Max.	×
		2AH	88H	Min.	×
	Heated oxygen sensor 2 heater	2DH	0AH	Max.	×
		2EH	8AH	Min.	×

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

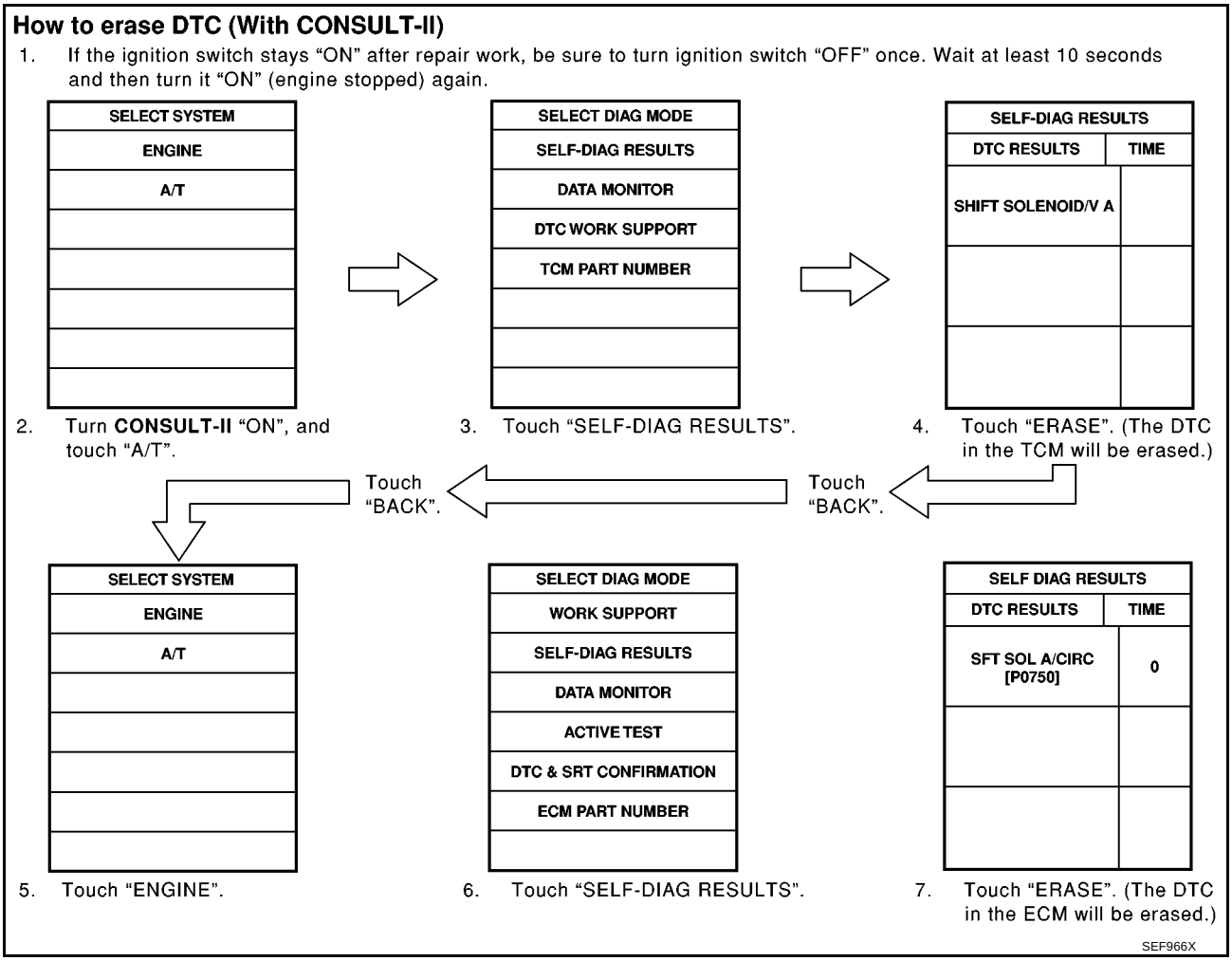
How to Erase DTC

With CONSULT-II

The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.
If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

NOTE:
If the DTC is not for A/T related items (see EC-11), skip steps 2 through 4.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT-II ON and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control module) will be erased.] Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)



With GST

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

NOTE:
If the DTC is not for A/T related items (see EC-11), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

2. Perform SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II) in A/T section titled TROUBLE DIAGNOSIS, Self-diagnosis. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

No Tools

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.
2. Wait at least 10 seconds and then turn it ON (engine stopped) again.
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to EC-62, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**

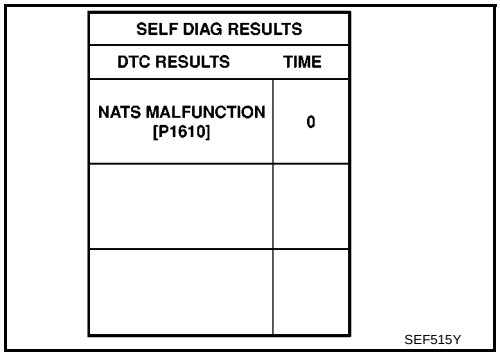
– Diagnostic trouble codes
– 1st trip diagnostic trouble codes
– Freeze frame data
– 1st trip freeze frame data
– System readiness test (SRT) codes
– Test values
– Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NATS (Nissan Anti-theft System)

EBS00O3D

- **If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to BL-223, "NATS(Nissan Anti-Theft System)" .**
- **Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NATS system and registration of all NATS ignition key IDs must be carried out with CONSULT-II using NATS program card.**
  Therefore, be sure to receive all keys from vehicle owner.
  Regarding the procedures of NATS initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS.



Malfunction Indicator (MI)

EBS00O3E

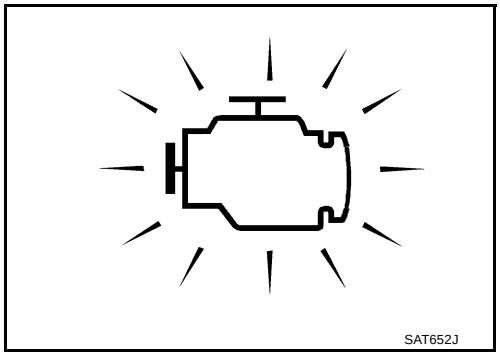
DESCRIPTION

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.

- If the MI does not light up, refer to DI-65, "WARNING LAMPS" or see EC-462 .

2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MI in the 1st trip. ● Misfire (Possible three way catalyst damage) ● One trip detection diagnoses
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system has a malfunction and MI circuit is open by means of operating fail-safe function.
The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the a malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

MI Flashing without DTC

If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. EC-62, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
How to switch the diagnostic test (function) modes, and details of the above functions are described later, EC-62, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

HOW TO SWITCH DIAGNOSTIC TEST MODE

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

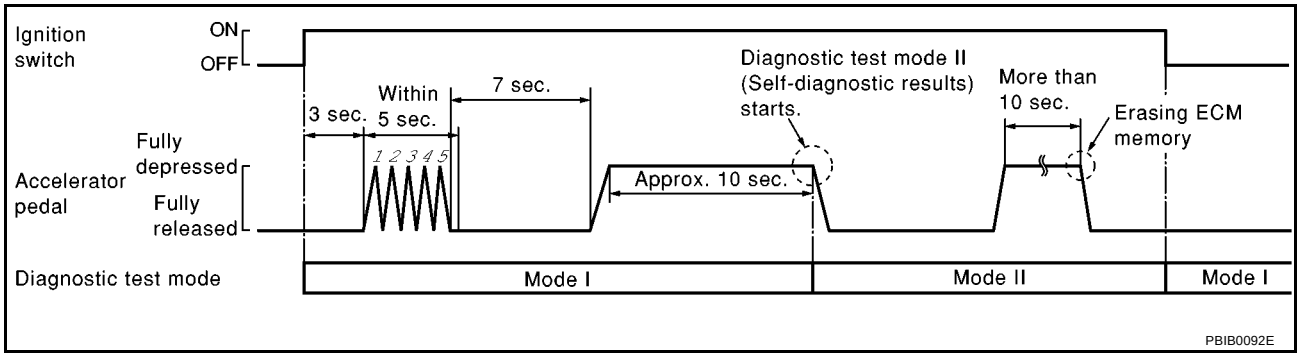
How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.

b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
4. Fully release the accelerator pedal.
   ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to EC-62, "How to Set Diagnostic Test Mode II (Self-diagnostic Results)" .
2. Start Engine.
   ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to EC-62, "How to Erase Diagnostic Test Mode II (Self-diagnostic Results)" .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to DI-65, "WARNING LAMPS" or see EC-462 .

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

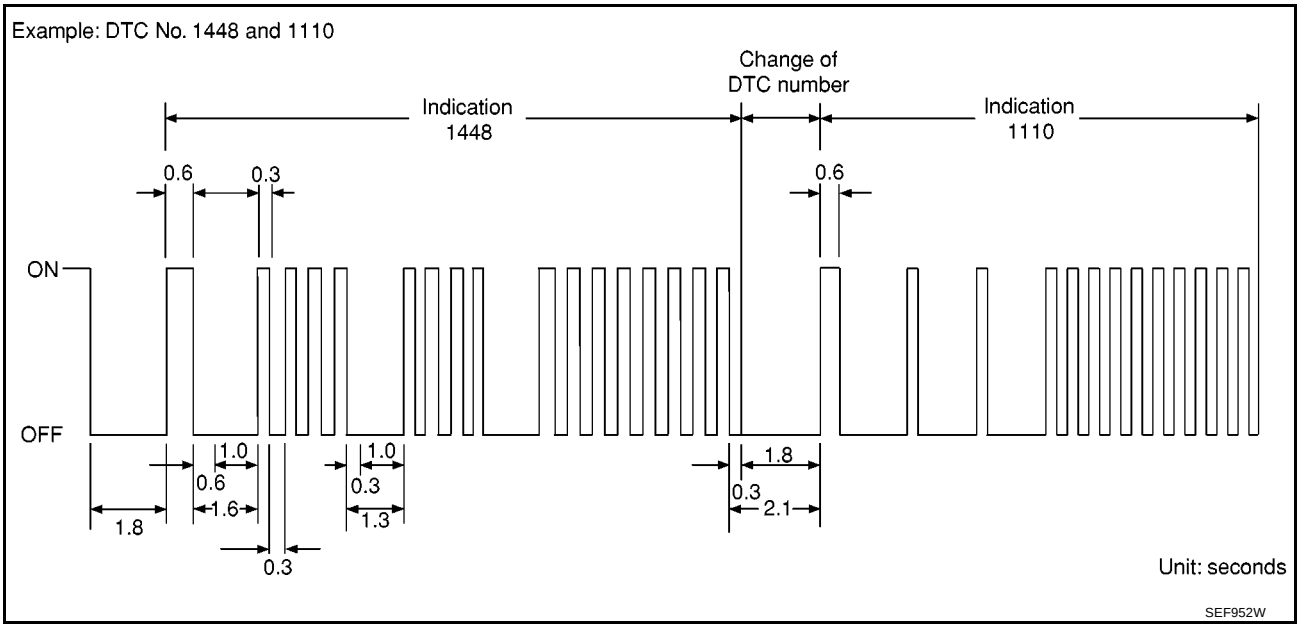
MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

- These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified

codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-11, "INDEX FOR DTC")

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to EC-62, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .

- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air-fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.

OBD System Operation Chart

EBS00O3F

RELATIONSHIP BETWEEN MI, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MI will come on. For details, refer to EC-47, "Two Trip Detection Logic" .

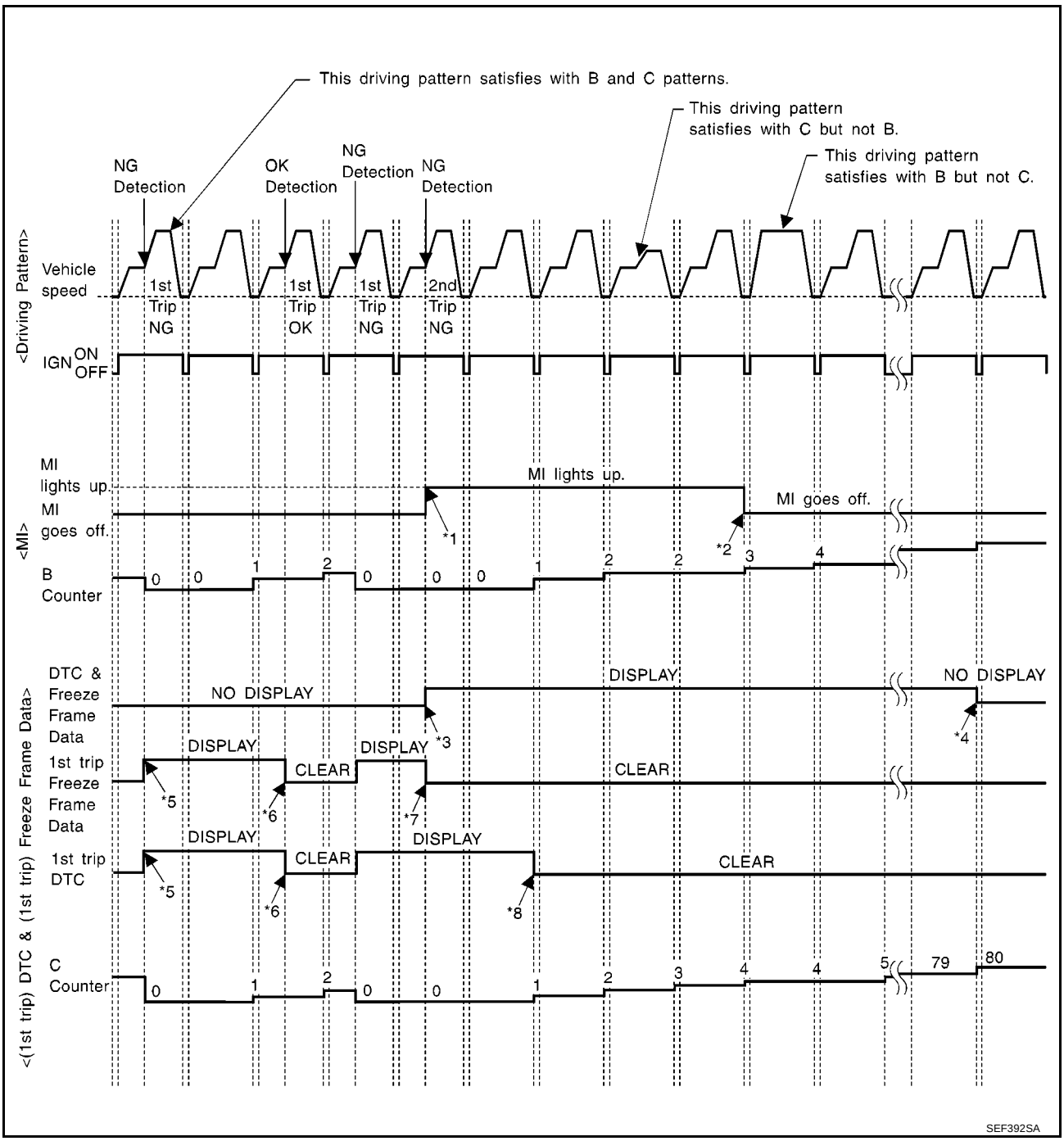
- The MI will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MI (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1 , *2	*1 , *2	1 (pattern B)

For details about patterns “B” and “C” under “Fuel Injection System” and “Misfire”, see EC-66 .
For details about patterns “A” and “B” under “Other”, see EC-68 .
*1: Clear timing is at the moment OK is detected.
*2: Clear timing is when the same malfunction is detected in the 2nd trip.

RELATIONSHIP BETWEEN MI, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MI will go off when the B counter reaches 3. (*2 in OBD SYSTEM OPERATION CHART)

<Driving Pattern C>

Driving pattern C means the vehicle operation as follows:

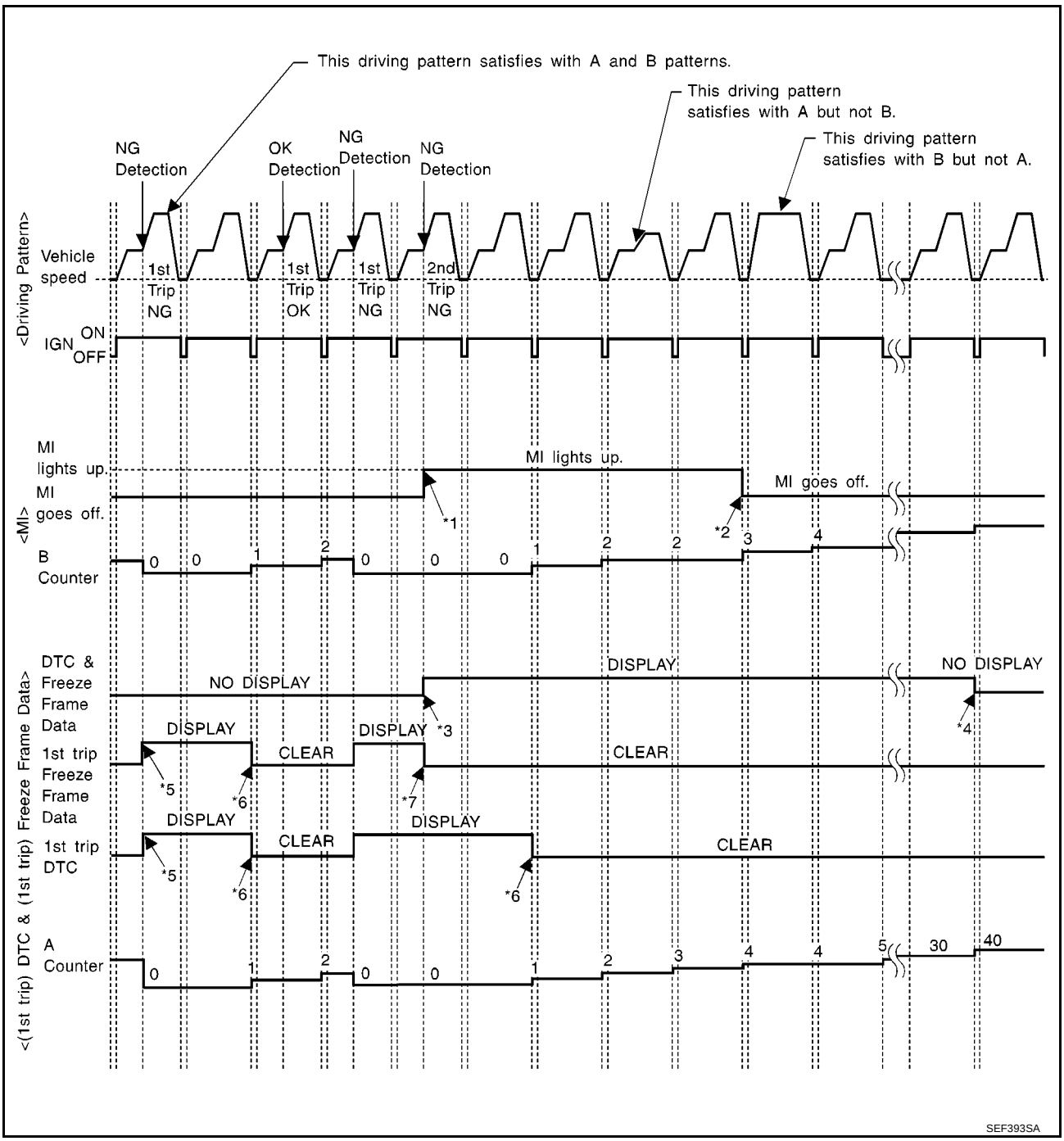
1. The following conditions should be satisfied at the same time:
   Engine speed: (Engine speed in the freeze frame data) ±375 rpm
   Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]
   Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

Example:
If the stored freeze frame data is as follows:
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)
To be satisfied with driving pattern C, the vehicle should run under the following conditions:
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

RELATIONSHIP BETWEEN MI, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"



*1: When the same malfunction is detected in two consecutive trips, MI will light up.

*2: MI will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

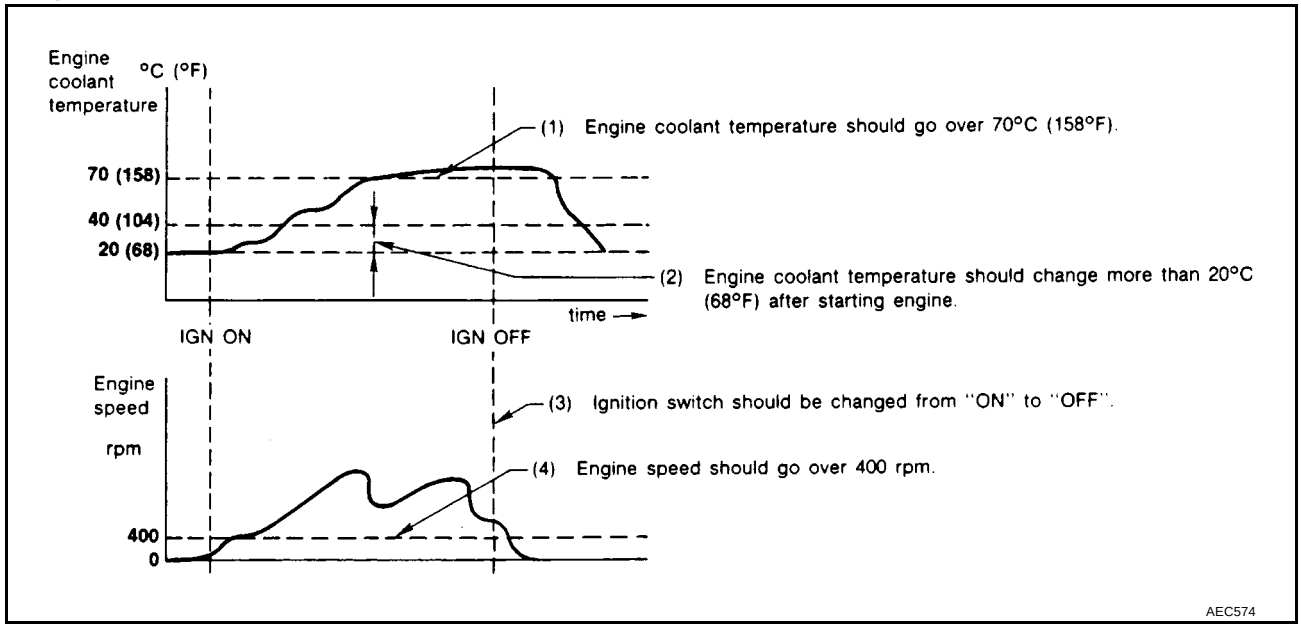
*5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MI will go off when the B counter reaches 3 (*2 in OBD SYSTEM OPERATION CHART).

TROUBLE DIAGNOSIS

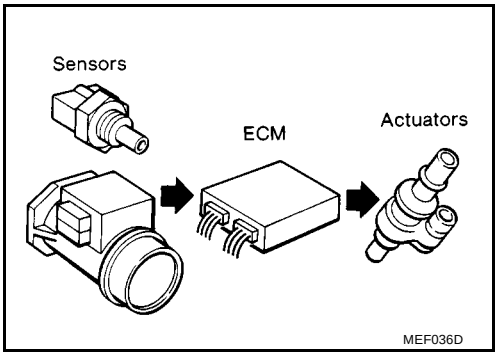
PFP:00004

Trouble Diagnosis Introduction

EBS00O3G

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the Work Flow on EC-70 .
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on EC-73 should be used.
Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.



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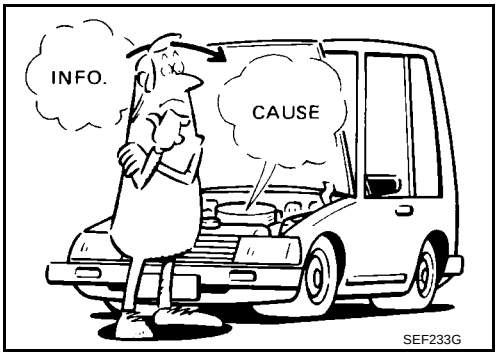

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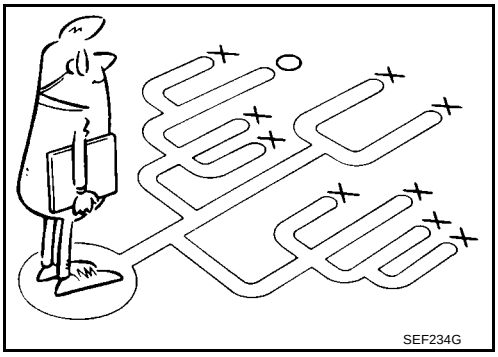
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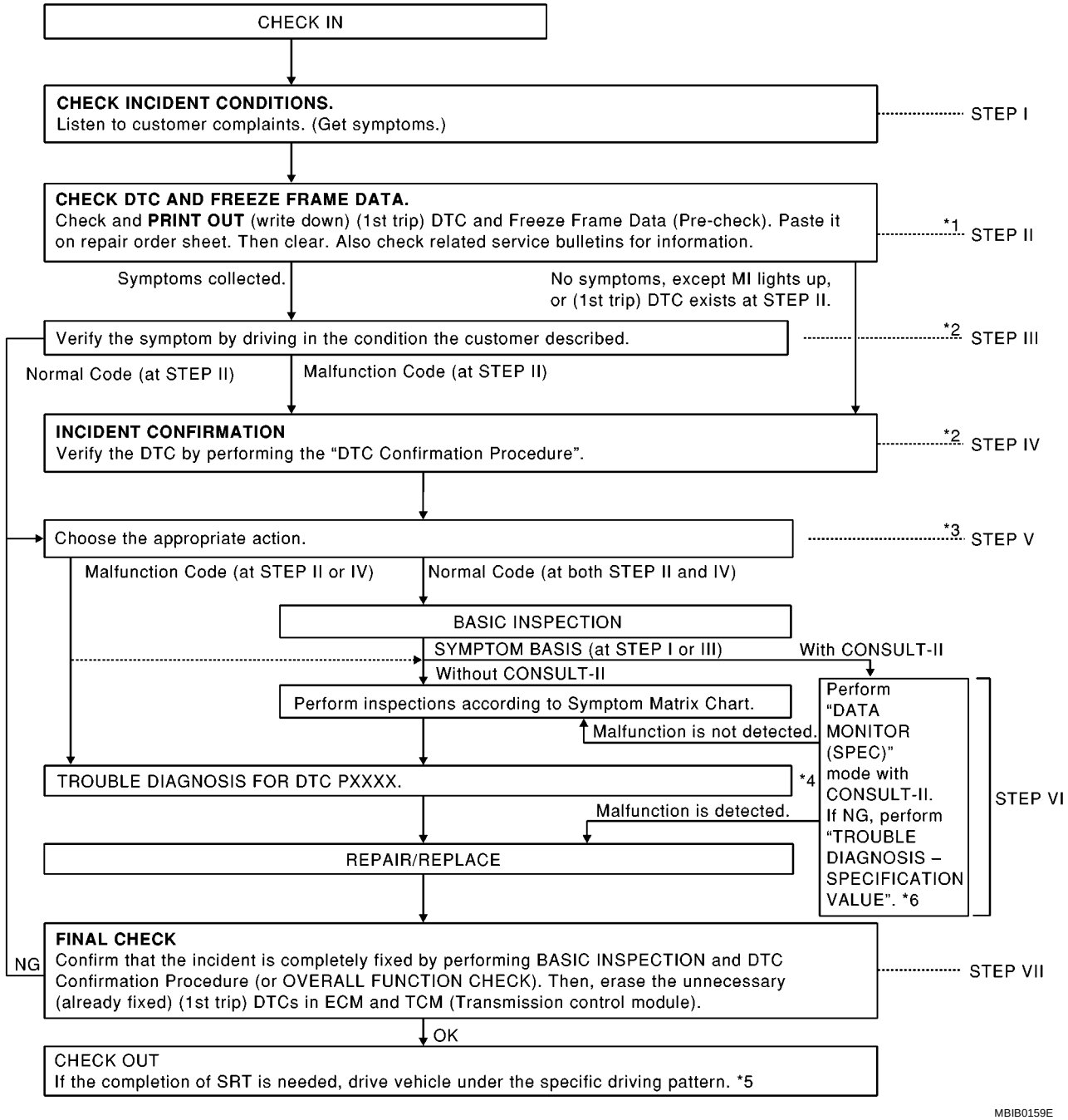
WORK FLOW
Flow Chart



MBIB0159E

*1 If time data of "SELF-DIAG RESULTS" is other than [0] or [1t], perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*2 If the incident cannot be verified, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to EC-125, "POWER SUPPLY CIRCUIT FOR ECM" .

*4 If malfunctioning part cannot be detected, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*5 EC-57

*6 EC-119

Description for Work Flow

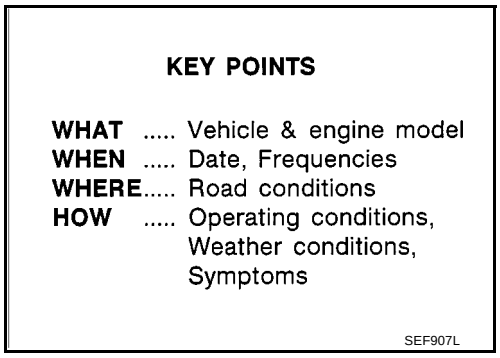
STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the DIAGNOSTIC WORK SHEET, EC-72 .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or GST) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to EC-59 .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The Symptom Matrix Chart will be useful. See EC-82 .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The DIAGNOSTIC WORK SHEET and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or GST. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in “DATA MONITOR (AUTO TRIG)” mode and check real time diagnosis results. If the incident cannot be verified, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified check is an effective alternative. The NG result of the Overall Function Check is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-77 .) If COSULT-II is available, perform “DATA MONITOR (SPEC)” mode with CONSULT-II and proceed to the TOROUBLE DIAGNOSIS – SPECIFICATION VALUE. (Refer to EC-119 .) (If malfunction is detected, proceed to PERAIR/REPLACE.) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-82 .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) Harness Layouts. Gently shake the related connectors, components or wiring harness with CONSULT-II set in “DATA MONITOR (AUTO TRIG)” mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-94 , EC-113 . The Diagnostic Procedure in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to Circuit Inspection in GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the DTC Confirmation Procedure and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-37, "HOW TO ERASE DTC" .)

DIAGNOSTIC WORKSHEET

Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.
Some conditions may cause the MI to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.



Worksheet Sample

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions		☐ Not affected	
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp		☐ Turned on ☐ Not turned on	

MTBL0017

DTC Inspection Priority Chart

EBS00O3H

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC U1000 and/or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000 and U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

Priority	Detected items (DTC)
1	● U1000 U1001 CAN communication line ● P0107 P0108 Manifold absolute pressure sensor ● P0112 P0113 Intake air temperature sensor ● P0117 P0118 Engine coolant temperature sensor ● P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor ● P0221 P0222 P0223 P1223 P1224 P1225 P1226 Throttle position sensor ● P0226 P0227 P0228 P1227 P1228 Accelerator pedal position sensor ● P0327 P0328 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0500 Vehicle speed sensor ● P0605 ECM ● P0705 Park/Neutral position (PNP) switch ● P1171 Intake error ● P1229 Sensor power supply ● P1610-P1615 NATS ● P1706 Park/Neutral position (PNP) switch ● P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	● P0031 P0032 Heated oxygen sensor 1 heater ● P0037 P0038 Heated oxygen sensor 2 heater ● P0132 P0133 P0134 P1143 P1144 Heated oxygen sensor 1 ● P0138 P0139 P1146 P1147 Heated oxygen sensor 2 ● P0444 EVAP canister purge volume control solenoid valve ● P0710 P0720 P0725 P0731 P0732 P0733 P0734 P0740 P0745 P0750 P0755 P1705 P1760 A/T related sensors, solenoid valves and switches ● P1065 ECM power supply ● P1111 Intake valve timing control solenoid valve ● P1122 Electric throttle control function ● P1124 P1126 Throttle control motor relay ● P1128 Throttle control mother ● P1805 Brake switch
3	● P0011 Intake valve timing control ● P0171 P0172 Fuel injection system function ● P0300 - P0304 Misfire ● P0420 Three way catalyst function ● P1121 Electric throttle control actuator ● P1211 ESP control unit ● P1212 ESP communication line ● P1217 Engine over temperature (OVERHEAT)

Fail-safe Chart

EBS00O3I

- When the DTC listed bellow is detected, the ECM enters fail-safe mode and the MI lights up.

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0107 P0108	Manifold absolute pressure sensor circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.
P0112 P0113	Intake air temperature sensor circuit	Intake air temperature is deter mined as 30° (86°F).
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-II displays the engine coolant temperature decided by ECM.
		Condition: Just as ignition switch is turned ON or Start — Engine coolant temperature decided (CONSULT-II display): 40°C (104°F)
		Condition: More than approx. 4 minutes after ignition ON or Start — Engine coolant temperature decided (CONSULT-II display): 80°C (176°F)
		Condition: Except as shown above — Engine coolant temperature decided (CONSULT-II display): 40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P0221 P0222 P0223 P1223 P1224	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P0226 P0227 P0228 P1227 P1228	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle control actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1171	Intake air	When accelerator pedal is depressed, engine speed will not rise more than 2,500 rpm due to fuel cut.

DTC No.	Detected items	Engine operating condition in fail-safe mode
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

- When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is a malfunction on engine control system.
  Therefore, when electrical controlled throttle and part of ECM related diagnoses is continuously detected as NG for 5 trips, ECM warns the driver that engine control system has a malfunction and MI circuit is open by means of operating fail-safe function.
  The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the malfunction.

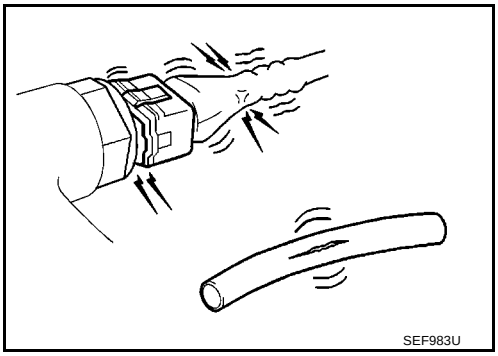
Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

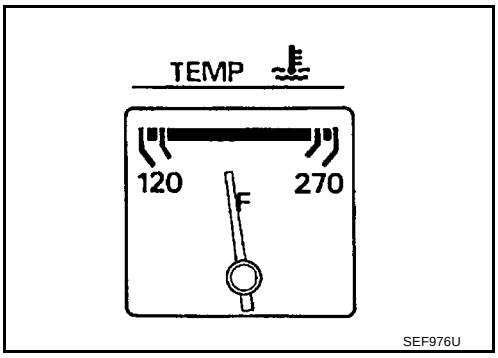
Basic Inspection

EBS00O3J

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
   - Harness connectors for improper connections
   - Wiring harness for improper connections, pinches and cut
   - Vacuum hoses for splits, kinks and improper connections
   - Hoses and ducts for leaks
   - Air cleaner clogging
   - Gasket
3. Confirm that electrical or mechanical loads are not applied.
   - Headlamp switch is OFF.
   - Air conditioner switch is OFF.
   - Rear window defogger switch is OFF.
   - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.


SEF983U

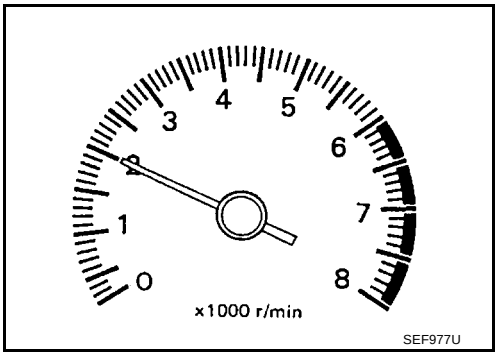


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



SEF977U

2. REPAIR OR REPLACE

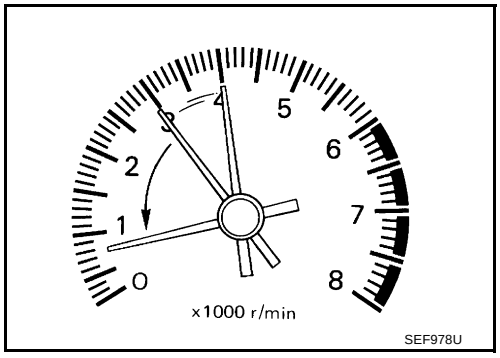
Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3

3. CHECK TARGET IDLE SPEED

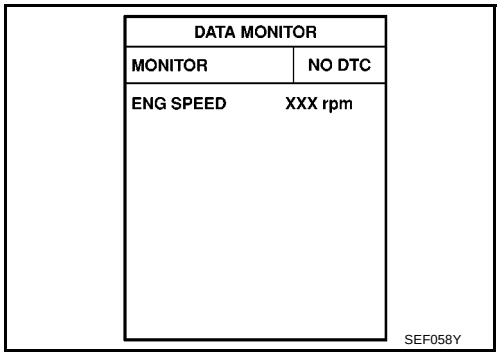
With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)



Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-42, "Throttle Valve Closed Position Learning" .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-42, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-267 .
- Check crankshaft position sensor (POS) and circuit. Refer to EC-261 .

OK or NG

OK >> GO TO 9.
NG >> 1. Repair or replace.
2. GO TO 4.

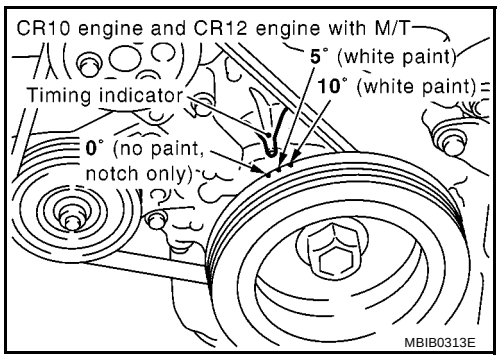
9. CHECK ECM FUNCTION

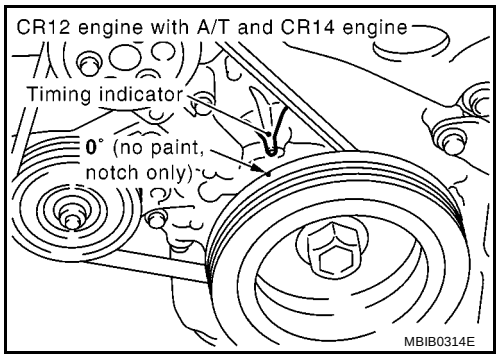
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to EC-60 .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.





M/T: 5 ± 2° BTDC
A/T: 5 ± 2° BTDC (in P or N position)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-42, "Throttle Valve Closed Position Learning" .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-42, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

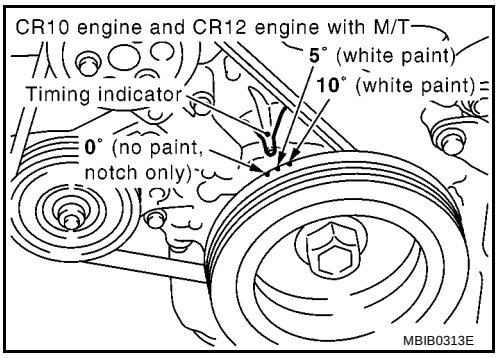
M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

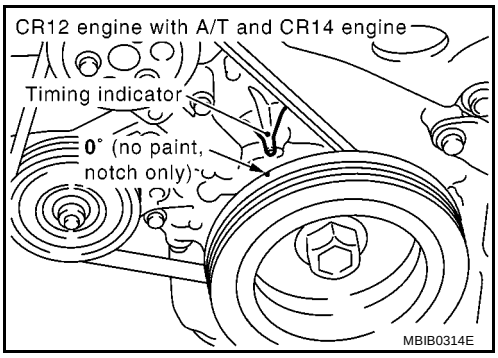
OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.





M/T: 5 ± 2° BTDC
A/T: 5 ± 2° BTDC (in P or N position)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-48, "TIMING CHAIN" .

OK or NG

OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-267 .
- Check crankshaft position sensor (POS) and circuit. Refer to EC-261 .

OK or NG

OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to EC-60 .

>> GO TO 4.

Symptom Matrix Chart

EBS00O3K

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-450
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-45
	Injector circuit	1	1	2	3	2		2	2			2			EC-444
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-464

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-468
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-77
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-297, EC-299, EC-305, EC-310
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-77
	Ignition circuit	1	1	2	2	2		2	2			2			EC-435
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-125
Manifold absolute pressure sensor circuit		1	1	2	2	2		2	2			2			EC-148
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			EC-158
Throttle position sensor circuit			1	2		2	2	2	2	2		2			EC-163, EC-221, EC-227, EC-366, EC-372, EC-374, EC-385, EC-420
Accelerator pedal position sensor circuit				3	2	1	2			2					EC-233, EC-242, EC-376, EC-402, EC-411, EC-426
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-169, EC-175, EC-185, EC-315, EC-321
Knock sensor circuit				2	2							3			EC-257
Crankshaft position sensor (POS) circuit		2	2												EC-261
Camshaft position sensor (PHASE) circuit		2	2												EC-267
Vehicle speed signal circuit			2	3		3						3			EC-284
ECM		2	2	3	3	3	3	3	3	3	3	3			EC-286, EC-289
Intake valve timing control solenoid valve circuit		3	3	2		1	3	2	2	3		3			EC-293

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
PNP switch circuit			3		3	3	3	3	3		3			EC-389
Refrigerant pressure sensor circuit		2				3	3	3	3		4			EC-455
Electrical load signal circuit						3	3	3	3					EC-460
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	ATC-17, MTC-17
ABS actuator and electric unit (control unit)			4											BRC-8 or BRC-61

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5	5												FL-8
	Fuel piping			5	5	5		5	5			5			FL-3, EM-30
	Vapor lock														—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—

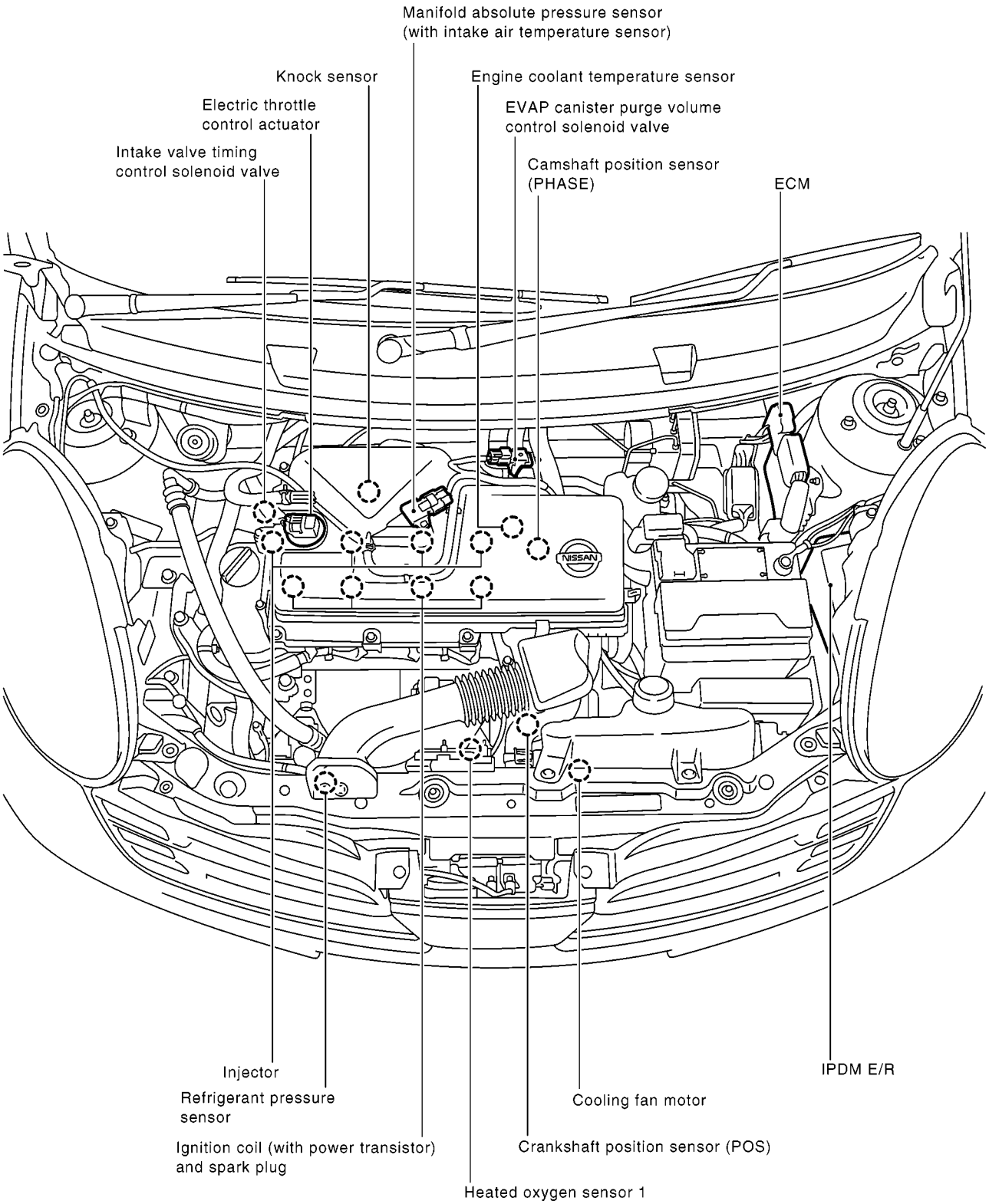
		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Air duct		5	5		5		5	5			5			EM-16
	Air cleaner														
	Air leakage from air duct (Manifold absolute pressure sensor —electric throttle control actuator)	5			5		5			5					
	Electric throttle control actuator														
	Air leakage from intake manifold/ Collector/Gasket														EM-20
Cranking	Battery	1	1	1		1		1	1			1		1	SC-5
	Alternator circuit														SC-15
	Starter circuit	3													SC-39
	Signal plate/Flywheel/Drive plate	6													EM-73
	PNP switch	4													AT-114
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-59
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-73
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			EM-48
	Camshaft														EM-36
	Intake valve timing control														EM-48
	Intake valve												3		EM-59
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			EM-22, EX-3
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		EM-24, LU-6 , LU-7 , LU-3
	Oil level (Low)/Filthy oil														LU-4

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		2	5			CO-11
	Thermostat									5					CO-23
	Water pump														CO-21
	Water gallery														CO-7
	Cooling fan									5					CO-11
	Coolant level (low)/Contaminated coolant														CO-8
NATS (Nissan Anti-theft System)		1	1												EC-60 or BL-223

1 - 6: The numbers refer to the order of inspection.

Engine Control Component Parts Location

EBS00O3L



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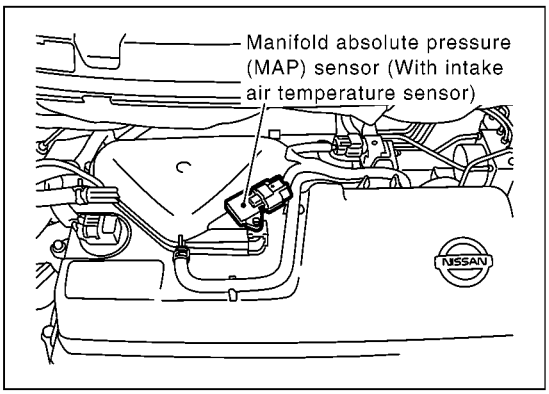
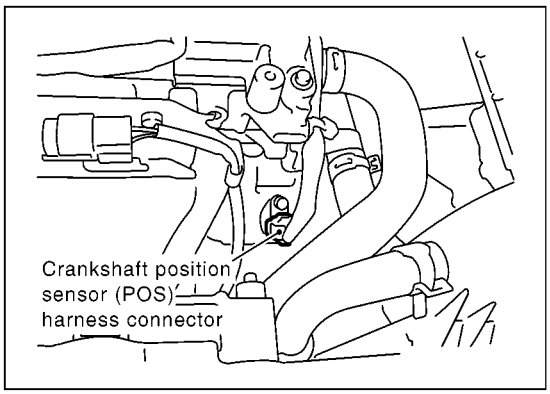
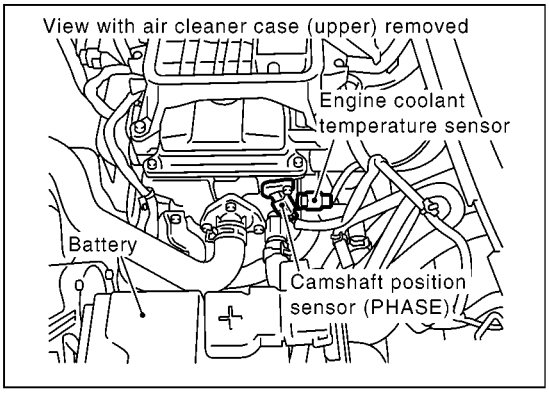
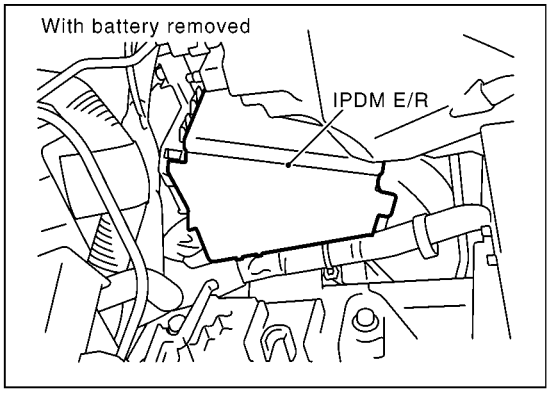
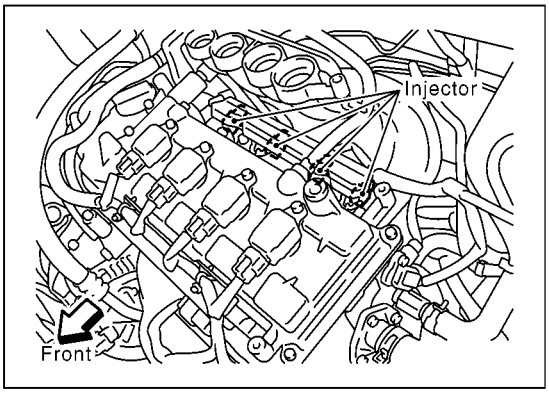
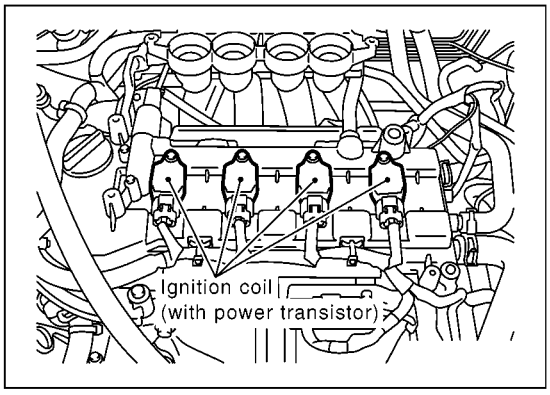

Manifold absolute pressure (MAP) sensor (With intake air temperature sensor)
NISSAN

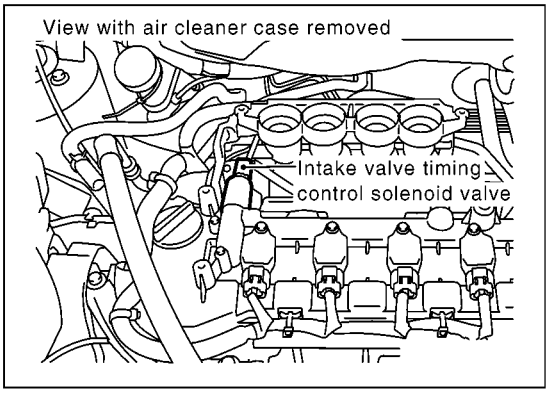

Crankshaft position sensor (POS) harness connector

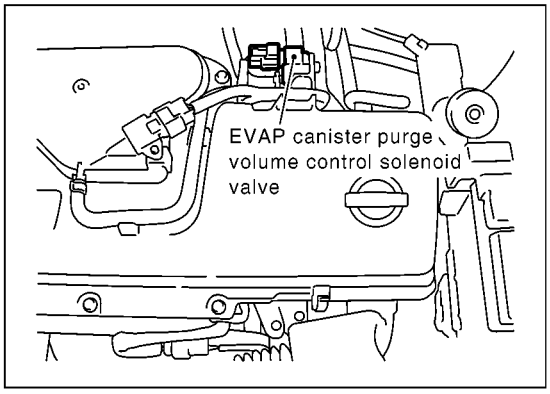

View with air cleaner case (upper) removed
Engine coolant temperature sensor
Battery
Camshaft position sensor (PHASE)


With battery removed
IPDM E/R

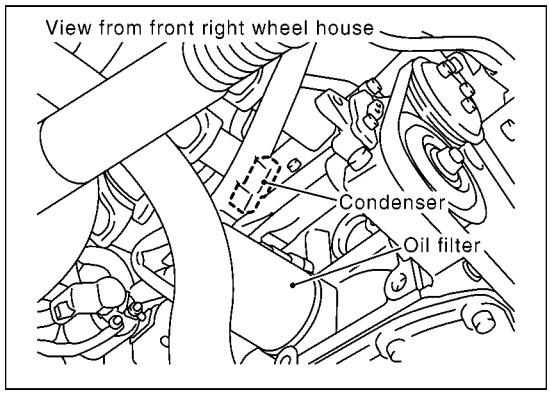

Injector
Front

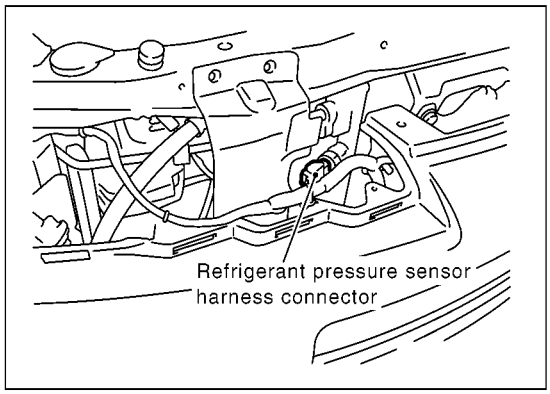

Ignition coil (with power transistor)

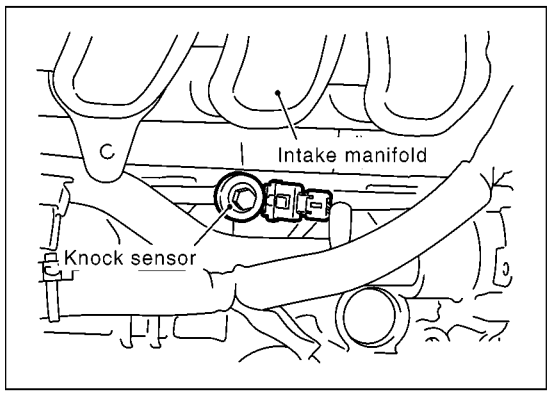

View with air cleaner case removed
Intake valve timing control solenoid valve

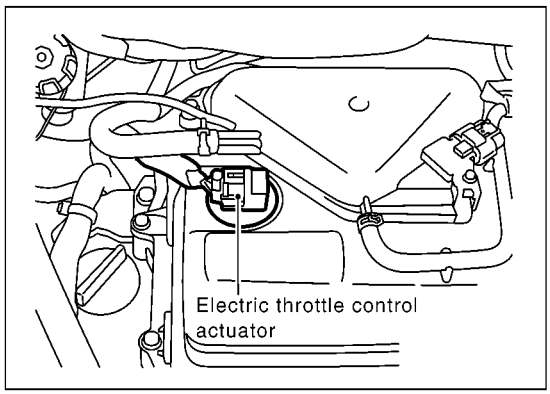

EVAP canister purge volume control solenoid valve

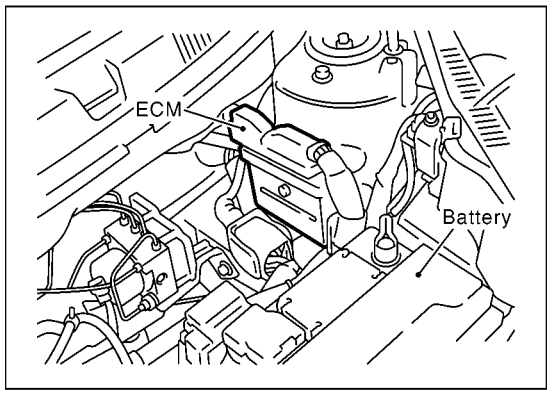
MBIB1070E

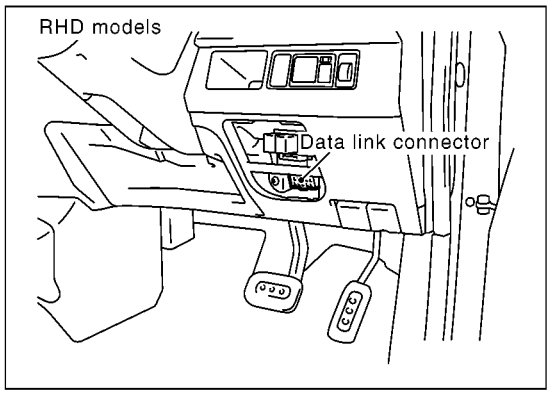

View from front right wheel house
Condenser
Oil filter

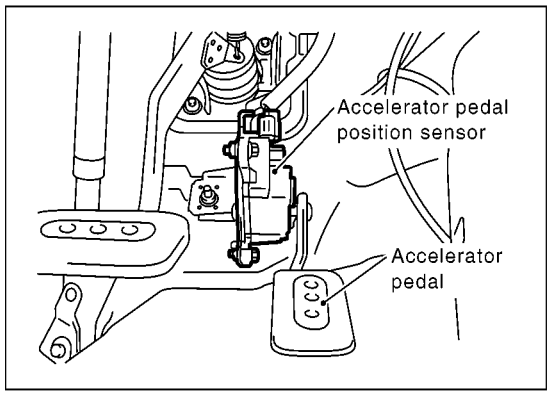

Refrigerant pressure sensor
harness connector

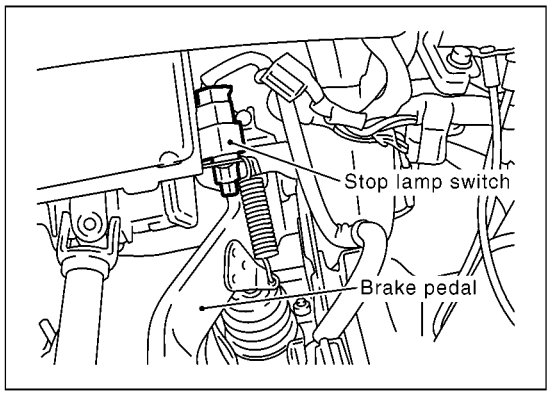

Intake manifold
Knock sensor


Electric throttle control
actuator

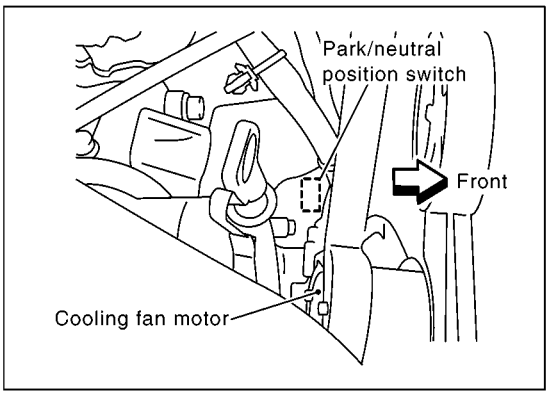

ECM
Battery

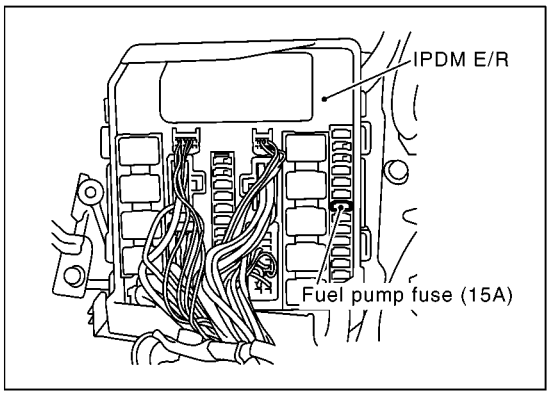

RHD models
Data link connector

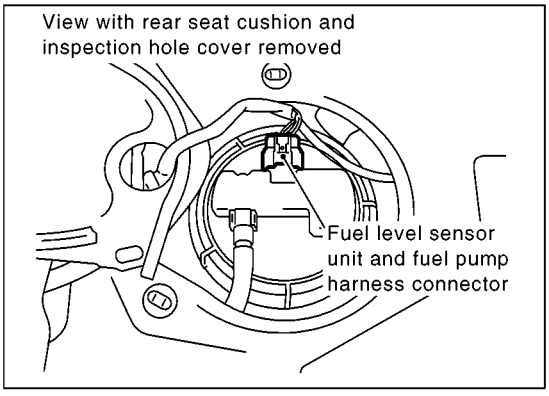

Accelerator pedal
position sensor
Accelerator
pedal

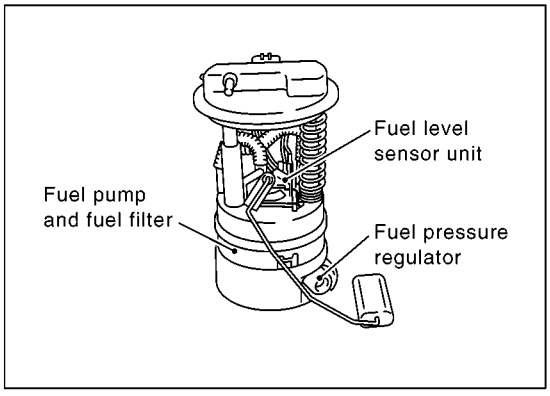

Stop lamp switch
Brake pedal

MBIB1071E

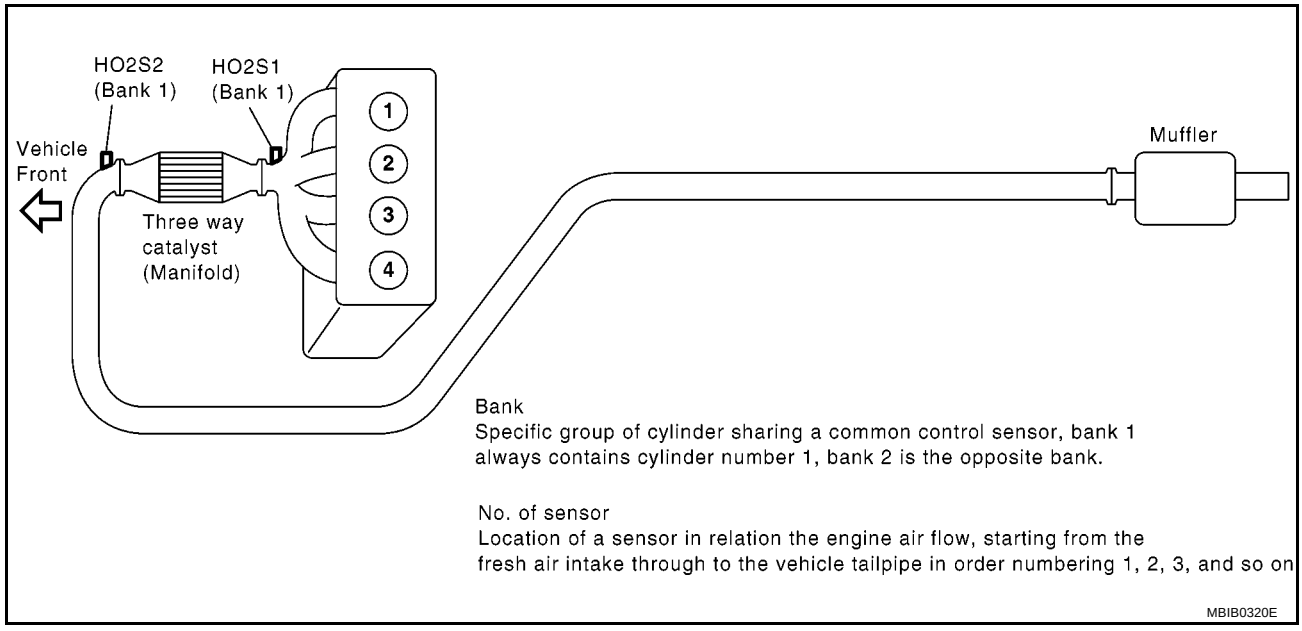

Park/neutral
position switch
Front
Cooling fan motor

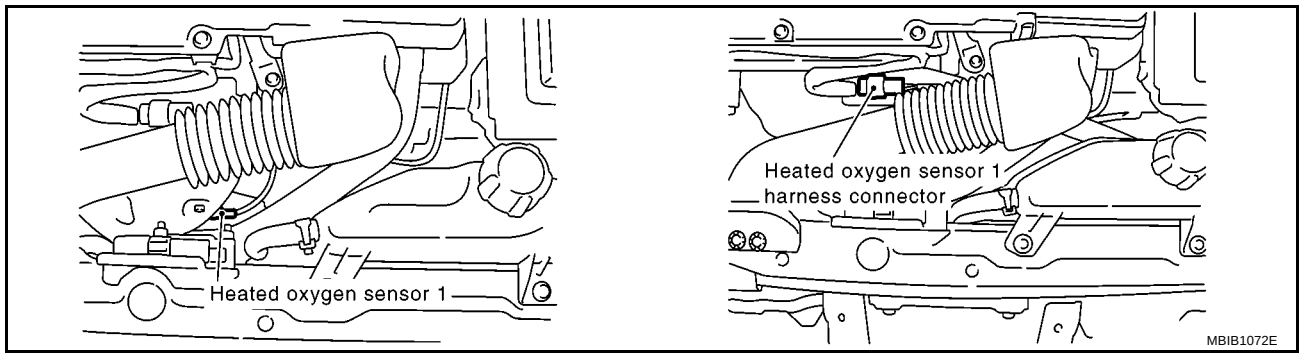

IPDM E/R
Fuel pump fuse (15A)

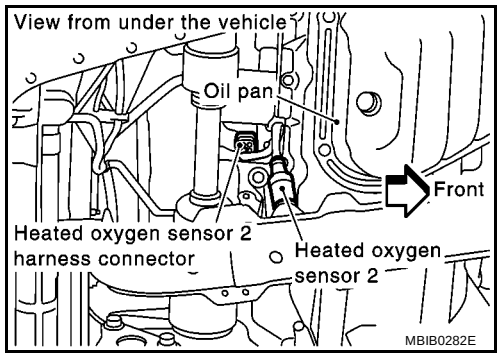

View with rear seat cushion and
inspection hole cover removed
Fuel level sensor
unit and fuel pump
harness connector


Fuel level
sensor unit
Fuel pump
and fuel filter
Fuel pressure
regulator

MBIB0318E

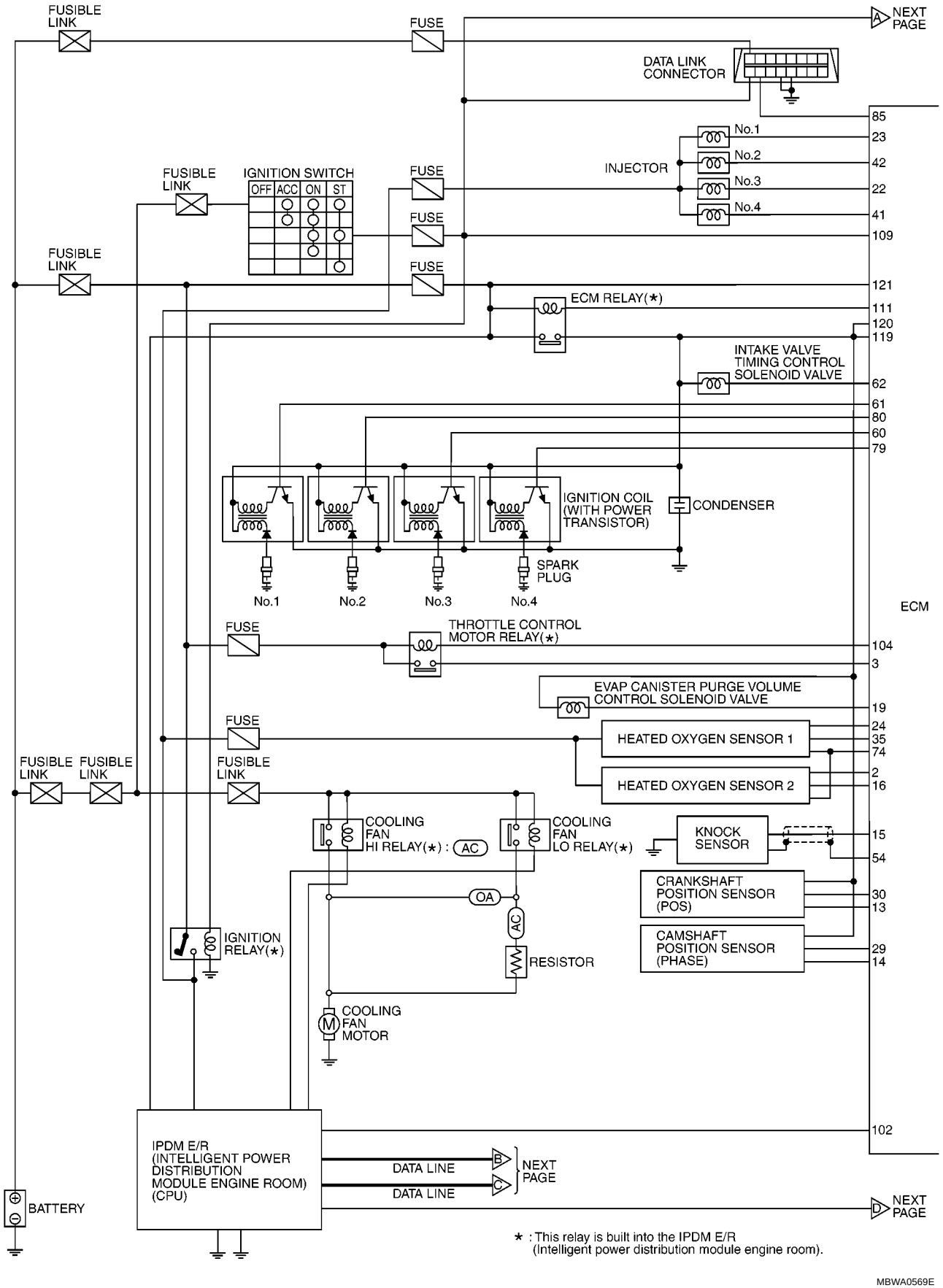

HO2S2
(Bank 1)
HO2S1
(Bank 1)
Vehicle
Front
Three way
catalyst
(Manifold)
1
2
3
4
Muffler
Bank
Specific group of cylinder sharing a common control sensor, bank 1
always contains cylinder number 1, bank 2 is the opposite bank.
No. of sensor
Location of a sensor in relation the engine air flow, starting from the
fresh air intake through to the vehicle tailpipe in order numbering 1, 2, 3, and so on
MBIB0320E

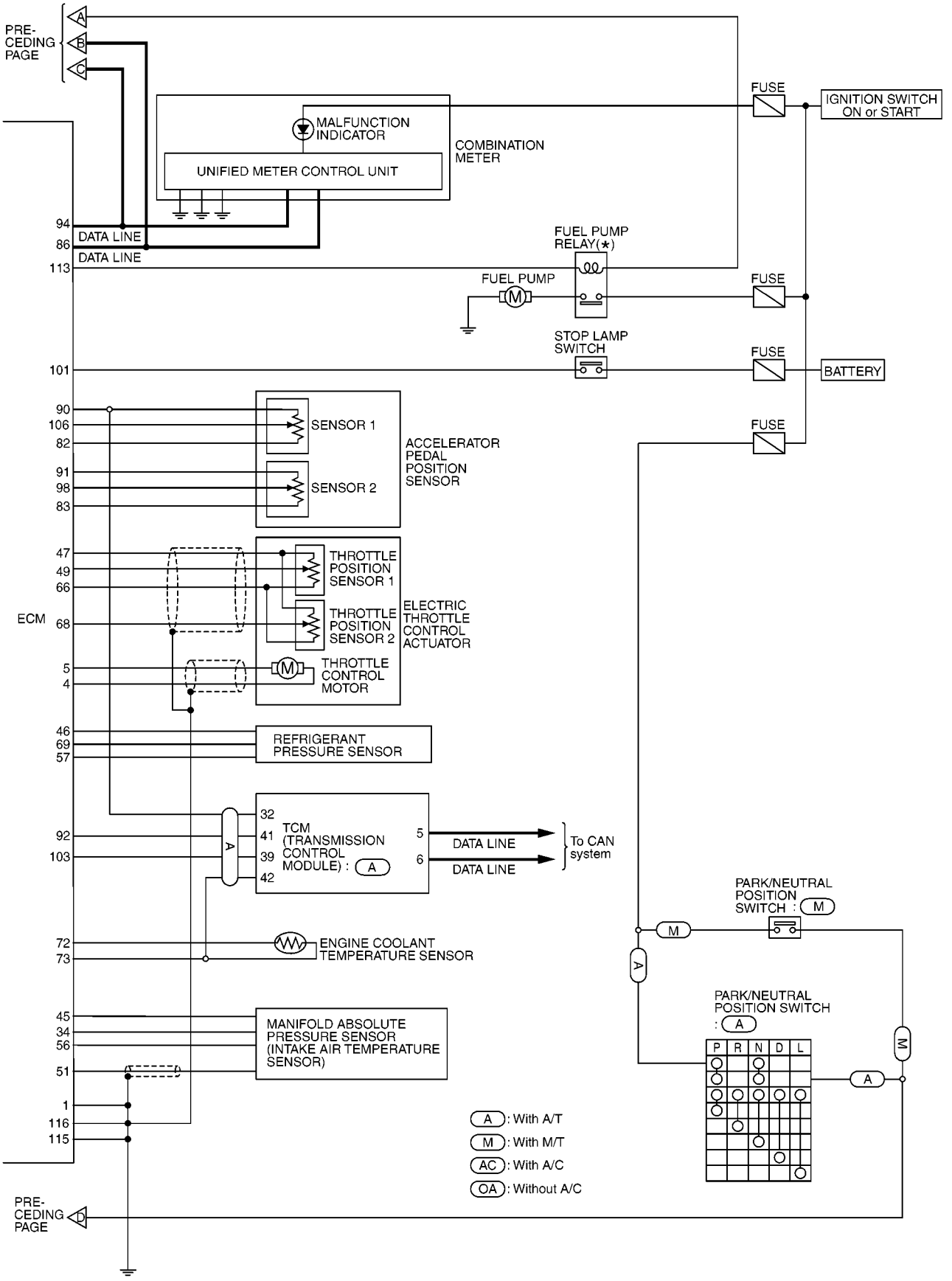

Heated oxygen sensor 1
Heated oxygen sensor 1
harness connector
MBIB1072E


View from under the vehicle
Oil pan
Front
Heated oxygen sensor 2
harness connector
Heated oxygen
sensor 2
MBIB0282E

Circuit Diagram

EBS00O3M

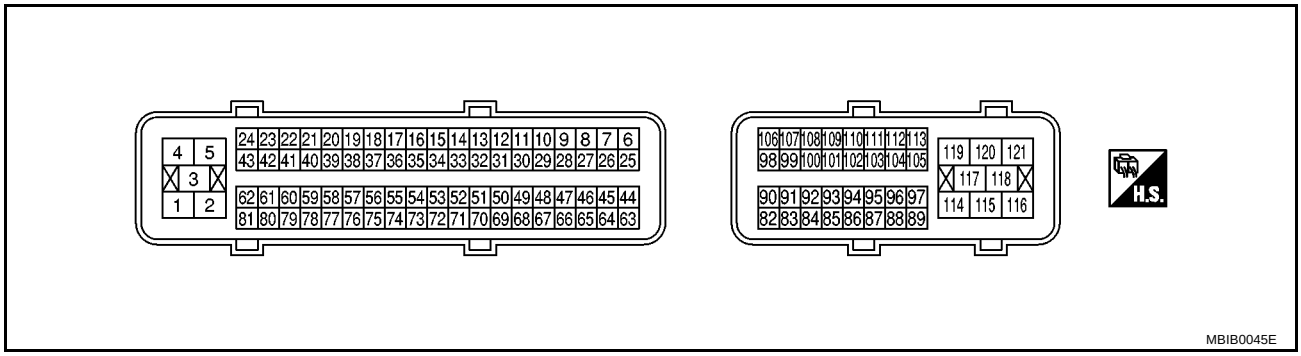



PRE-CEDING PAGE
A
B
C
MALFUNCTION INDICATOR
UNIFIED METER CONTROL UNIT
COMBINATION METER
FUSE
IGNITION SWITCH ON or START
94
86
113
DATA LINE
DATA LINE
FUEL PUMP RELAY(★)
FUEL PUMP
FUSE
STOP LAMP SWITCH
FUSE
BATTERY
101
90
106
82
SENSOR 1
91
98
83
SENSOR 2
ACCELERATOR PEDAL POSITION SENSOR
FUSE
47
49
66
THROTTLE POSITION SENSOR 1
ECM
68
THROTTLE POSITION SENSOR 2
5
4
THROTTLE CONTROL MOTOR
ELECTRIC THROTTLE CONTROL ACTUATOR
46
69
57
REFRIGERANT PRESSURE SENSOR
32
92
41
103
39
42
TCM (TRANSMISSION CONTROL MODULE) : A
5
6
DATA LINE
DATA LINE
To CAN system
PARK/NEUTRAL POSITION SWITCH : M
M
A
72
73
ENGINE COOLANT TEMPERATURE SENSOR
PARK/NEUTRAL POSITION SWITCH : A
45
34
56
51
MANIFOLD ABSOLUTE PRESSURE SENSOR (INTAKE AIR TEMPERATURE SENSOR)
P R N D L
M
A
1
116
115
A : With A/T
M : With M/T
AC : With A/C
OA : Without A/C
PRE-CEDING PAGE
D

MBWA0266E

ECM Harness Connector Terminal Layout

EBS00O3N

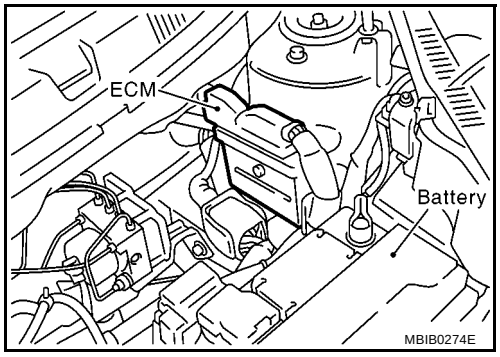


ECM Terminals and Reference Value

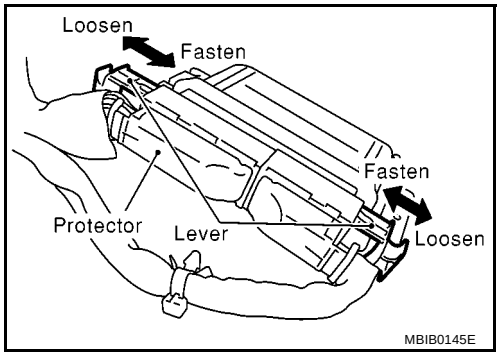
EBS00O3O

PREPARATION

1. ECM is located left hand side of the engine room.
2. Remove ECM harness protector.



3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown at right.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
   - Use extreme care not to touch 2 pins at one time.
   - Data is for comparison and may not be exact.



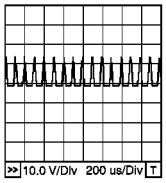
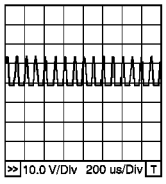
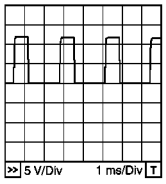
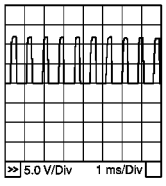
ECM INSPECTION TABLE

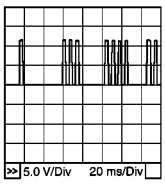
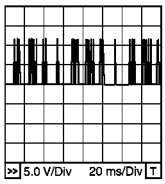
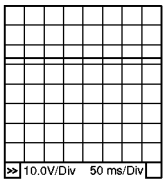
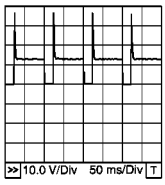
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

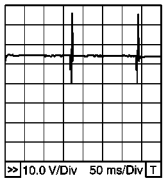
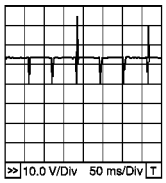
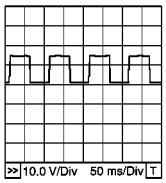
CAUTION:

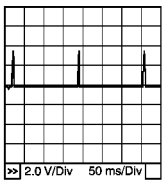
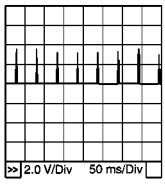
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

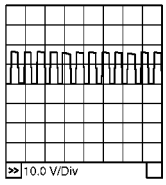
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground

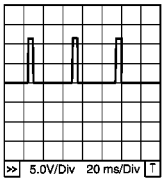
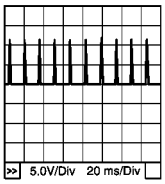
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	GY	Heated oxygen sensor 2 heater	**[Engine is running]** ● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - 1.0V
			[Ignition switch ON] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm (A/T models), 3,800 rpm (M/T models)	BATTERY VOLTAGE (11 - 14V)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
13	Y	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 3.0V★  PBIB0528E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	R	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  PBIB0526E
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
19	LG	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	OR L R GY	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E
24	Y	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed is below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
29	B	Sensor ground (Camshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
30	B	Sensor ground (Crankshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
34	OR	Intake air temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
45	L	Sensor power supply	**[Ignition switch ON]**	Approximately 5V
46	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch ON]**	Approximately 5V
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V
54	—	Sensor ground (Knock sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
56	B	Sensor ground (Manifold absolute pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
57	Y	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
60 61 79 80	Y PU G BR	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - 0.2V★  PBIB0522E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	LG	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★
			[Engine is running] ● **Warm-up condition** ● When revving engine up to 2,000 rpm quickly	Approximately 4V - BATTERY VOLTAGE (11 - 14V)★  PBIB1790E
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V
69	BR	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are ON (Compressor operates.)	1.0 - 4.0V
72	P	Engine coolant temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
73	B	Sensor ground (Engine coolant temperature sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
85	LG	DATA link connector	**[Ignition switch ON]** ● CONSULT-II or GST is disconnected.	BATTERY VOLTAGE (11 - 14V)
86	W	CAN communication line	**[Ignition switch ON]**	1.0 - 2.5V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
92	GY	Throttle position sensor signal output (A/T models)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position is D (A/T models) ● Accelerator pedal: Fully released	Approximately 0.5V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Accelerator pedal: Fully depressed	Approximately 4.2V
94	R	CAN communication line	**[Ignition switch ON]**	2.5 - 4.0V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
101	W	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal: Depressed	BATTERY VOLTAGE (11 - 14V)
102	GY	PNP switch	**[Ignition switch ON]** ● Gear position: P or N (A/T models), Neutral (M/T models)	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
103	L/OR	Tachometer signal output (A/T models)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	10 - 11V★  MBIB0053E
			[Engine is running] ● Engine speed is 2,000 rpm	10 - 11V★  MBIB0054E
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V
109	PU	Ignition switch	**[Ignition switch OFF]**	0V
			[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
113	R	Fuel pump relay	**[Ignition switch ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
119 120	G G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	BR	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT-II Function (ENGINE)

EBS00O3P

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output of the specification for Basic fuel schedule, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes

- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- Others

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE						
			WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×			
		Camshaft position sensor (PHASE)		×		×	×			
		Manifold absolute pressure sensor		×		×	×			
		Engine coolant temperature sensor		×	×	×	×	×		
		Heated oxygen sensor 1		×		×	×		×	×
		Heated oxygen sensor 2		×		×	×		×	×
		Vehicle speed signal		×	×	×	×			
		Accelerator pedal position sensor		×		×	×			
		Throttle position sensor		×		×	×			
		Intake air temperature sensor		×		×	×			
		Knock sensor		×						
		Refrigerant pressure sensor				×	×			
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×			
		Air conditioner switch				×	×			
		Park/neutral position (PNP) switch		×		×	×			
		Stop lamp switch		×		×	×			
		Battery voltage				×	×			
		Electrical load signal				×	×			
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Injectors				×	×	×		
		Power transistor (Ignition timing)				×	×	×		
		Throttle control motor relay		×		×	×			
		Throttle control motor		×						
		EVAP canister purge volume control solenoid valve		×		×	×	×		
		Air conditioner relay				×	×			
		Fuel pump relay	×			×	×	×		
		Cooling fan relay		×		×	×	×		
		Heated oxygen sensor 1 heater		×		×	×		×	
		Heated oxygen sensor 2 heater		×		×	×		×	
		Intake valve timing control solenoid valve		×		×	×	×		
		Calculated load value			×	×	×			

X: Applicable

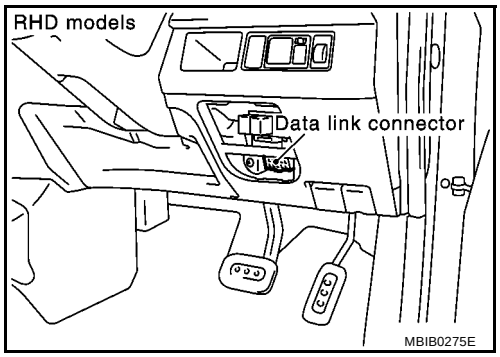
*1: This item includes 1st trip DTCs.
*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-51 .

INSPECTION PROCEDURE

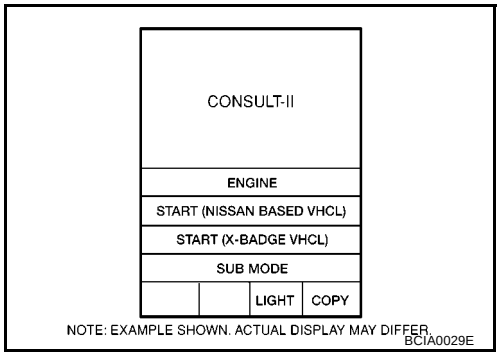
CAUTION:

If CONSULT-II is used with no connection to CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

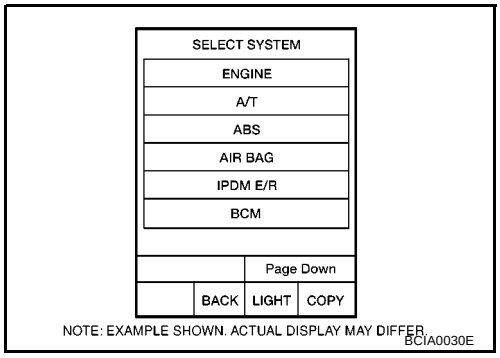
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector, which is located under drivers side dash panel.
3. Turn ignition switch ON.



4. Touch “START(NISSAN BASED VHCL)”.

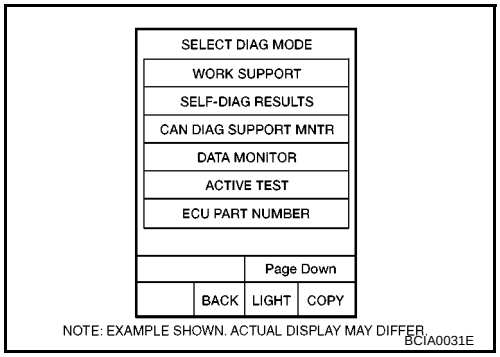


5. Touch “ENGINE”.
   If “ENGINE” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.



WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING “START” DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing the coefficient of self-learning control value
TARGET IGN TIM ADJ*	● IDLE CONDITION	When adjusting target ignition timing
TARGET IDLE RPM ADJ*	● IDLE CONDITION	When setting target idle speed

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to EC-11, "INDEX FOR DTC" .

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to EC-11, "INDEX FOR DTC" .)
FUEL SYS-B1	● Fuel injection system status at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	● “Long-term fuel trim” at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	● “Short-term fuel trim” at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	● The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	● The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE
Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
ENG SPEED [rpm]	×	×	● Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	● Accuracy becomes poor if engine speed drops below the idle rpm. ● If the signal is interrupted while the engine is running, an abnormal value may be indicated.
COOLAN TEMP/S [°C] or [°F]	×	×	● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	● When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2S1 (B1) [V]	×	×	● The signal voltage of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1) [V]	×		● The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR (B1) [RICH/LEAN]	×	×	● Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became “rich”, and control is being affected toward a leaner mixture. LEAN ... means the mixture became “lean”, and control is being affected toward a rich mixture.	● After turning ON the ignition switch, “RICH” is displayed until air-fuel mixture ratio feedback control begins. ● When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR (B1) [RICH/LEAN]	×		● Display of heated oxygen sensor 2 signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large.	● When the engine is stopped, a certain value is indicated.
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When the engine is stopped, a certain value is indicated. ● This data also includes the data for the air-fuel ratio learning control.
VHCL SPEED SE [km/h] or [mph]	×	×	● The vehicle speed computed from the vehicle speed signal is displayed.	
BATTERY VOLT [V]	×	×	● The power supply voltage of ECM is displayed.	
B/FUEL SCHDL [msec]		×	● “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
ACCEL SEN 1 [V]	×	×	● The accelerator pedal position sensor signal voltage is displayed.	
ACCEL SEN 2 [V]	×			
THRTL SEN 1 [V]	×	×	● The throttle position sensor signal voltage is displayed.	
THRTL SEN 2 [V]	×			
INT/A TEMP SE [°C] or [°F]	×	×	● The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
TURBO BST SEN [V]	×		● The signal voltage of the manifold absolute pressure sensor is displayed.	

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
START SIGNAL [ON/OFF]	×	×	● Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	● After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	×	×	● Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG [ON/OFF]	×	×	● Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL [ON/OFF]	×	×	● [ON/OFF] condition of the power steering oil pressure switch as determined by the power steering oil pressure signal is indicated.	
LOAD SIGNAL [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the electrical load signal. ON ... Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF ... Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW [ON/OFF]	×		● Indicates [ON/OFF] condition from ignition switch.	
HEATER FAN SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]		×	● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	● When the engine is stopped, a certain computed value is indicated.
IGN TIMING [BTDC]		×	● Indicates the ignition timing computed by ECM according to the input signals.	● When the engine is stopped, a certain value is indicated.
CAL/LD VALUE [%]			● “Calculated load value” indicates the value of the current airflow divided by peak airflow.	
MASS AIRFLOW [g·m/s]			● Indicates the mass air flow computed by ECM according to the signal voltage of manifold absolute pressure sensor.	
PURG VOL C/V [%]			● Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. ● The opening becomes larger as the value increases.	
INT/V TIM (B1) [°CA]			● Indicates [°CA] of intake camshaft advanced angle.	
INT/V SOL (B1) [%]			● The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. ● The advance angle becomes larger as the value increases.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
AIR COND RLY [ON/OFF]		×	● The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY [ON/OFF]		×	● Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY [ON/OFF]		×	● Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN [HI/LOW/OFF]		×	● Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI ... High speed operation LOW ... Low speed operation OFF ... Stop	
HO2S1 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.	
HO2S2 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
IDL A/V LEARN [YET/CMPLT]			● Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully.	
TRVL AFTER MIL [km] or [mile]			● Distance traveled while MI is activated.	
O2 SEN HTR DTY [%]			● Indicates the heated oxygen sensor 1 heater control valve computed by the ECM according to the input signals.	
AC PRESS SEN [V]	×		● The signal voltage from the refrigerant pressure sensor is displayed.	
Voltage [V]			● Voltage, frequency, duty cycle or pulse width measured by the probe.	● Only “#” is displayed if item is unable to be measured. ● Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]				
DUTY-HI				
DUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		● Indicates the engine speed computed from the signal of the crankshaft position sensor (POS).	
B/FUEL SCHDL [msec]			● “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	● When engine is running specification range is indicated.
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When engine is running specification range is indicated. ● This data also includes the data for the air-fuel ratio learning control.

NOTE:
- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	● Engine: Return to the original trouble condition ● Change the amount of fuel injection using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Fuel injectors ● Heated oxygen sensor 1
IGNITION TIMING	● Engine: Return to the original trouble condition ● Timing light: Set ● Retard the ignition timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Perform Idle Air Volume Learning.
POWER BALANCE	● Engine: After warming up, idle the engine. ● A/C switch: OFF ● Shift lever: N ● Cut off each injector signal one at a time using CONSULT-II.	Engine runs rough or dies.	● Harness and connectors ● Compression ● Fuel injectors ● Power transistor ● Spark plugs ● Ignition coils
COOLING FAN*1	● Ignition switch: ON ● Turn the cooling fan ON and OFF with CONSULT-II.	Cooling fan moves and stops.	● Harness and connectors ● Cooling fan relay ● Cooling fan motor
ENG COOLANT TEMP	● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Engine coolant temperature sensor ● Fuel injectors
FUEL PUMP RELAY	● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay ON and OFF using CONSULT-II and listen to operating sound.	Fuel pump relay makes the operating sound.	● Harness and connectors ● Fuel pump relay

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
PURG VOL CONT/V	● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.	Engine speed changes according to the opening percent.	● Harness and connectors ● Solenoid valve
V/T ASSIGN ANGLE	● Engine: Return to the original trouble condition ● Change intake valve timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Intake valve timing control solenoid valve

*1:Leaving cooling fan OFF with CONSULT-II while engine is running may cause the engine to overheat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to EC-51, "SYSTEM READINESS TEST (SRT) CODE" .

SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC Work Support Mode

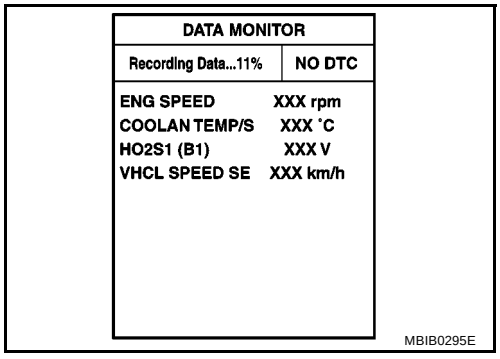
Test mode	Test item	Condition	Reference page
HO2S1	HO2S1 (B1) P0133	Refer to corresponding trouble diagnosis for DTC.	EC-175
	HO2S1 (B1) P0134		EC-185
	HO2S1 (B1) P1143		EC-315
	HO2S1 (B1) P1144		EC-321
H02S2	HO2S2 (B1) P0139		EC-199
	HO2S2 (B1) P1146		EC-327
	HO2S2 (B1) P1147		EC-337

REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

Description

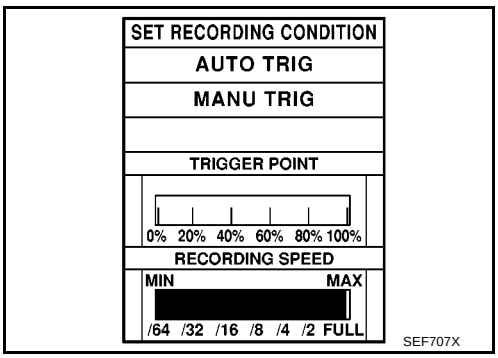
CONSULT-II has two kinds of triggers and they can be selected by touching “SETTING” in “DATA MONITOR” mode.

1. “AUTO TRIG” (Automatic trigger):
   - The malfunction will be identified on the CONSULT-II screen in real time.
     In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.
     At the moment a malfunction is detected by ECM, “MONITOR” in “DATA MONITOR” screen is changed to “Recording Data ... xx%” as shown in the figure, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, “REAL-TIME DIAG” screen is displayed. If “STOP” is touched on the screen during “Recording Data ... xx%”, “REAL-TIME DIAG” screen is also displayed.
     The recording time after the malfunction detection and the



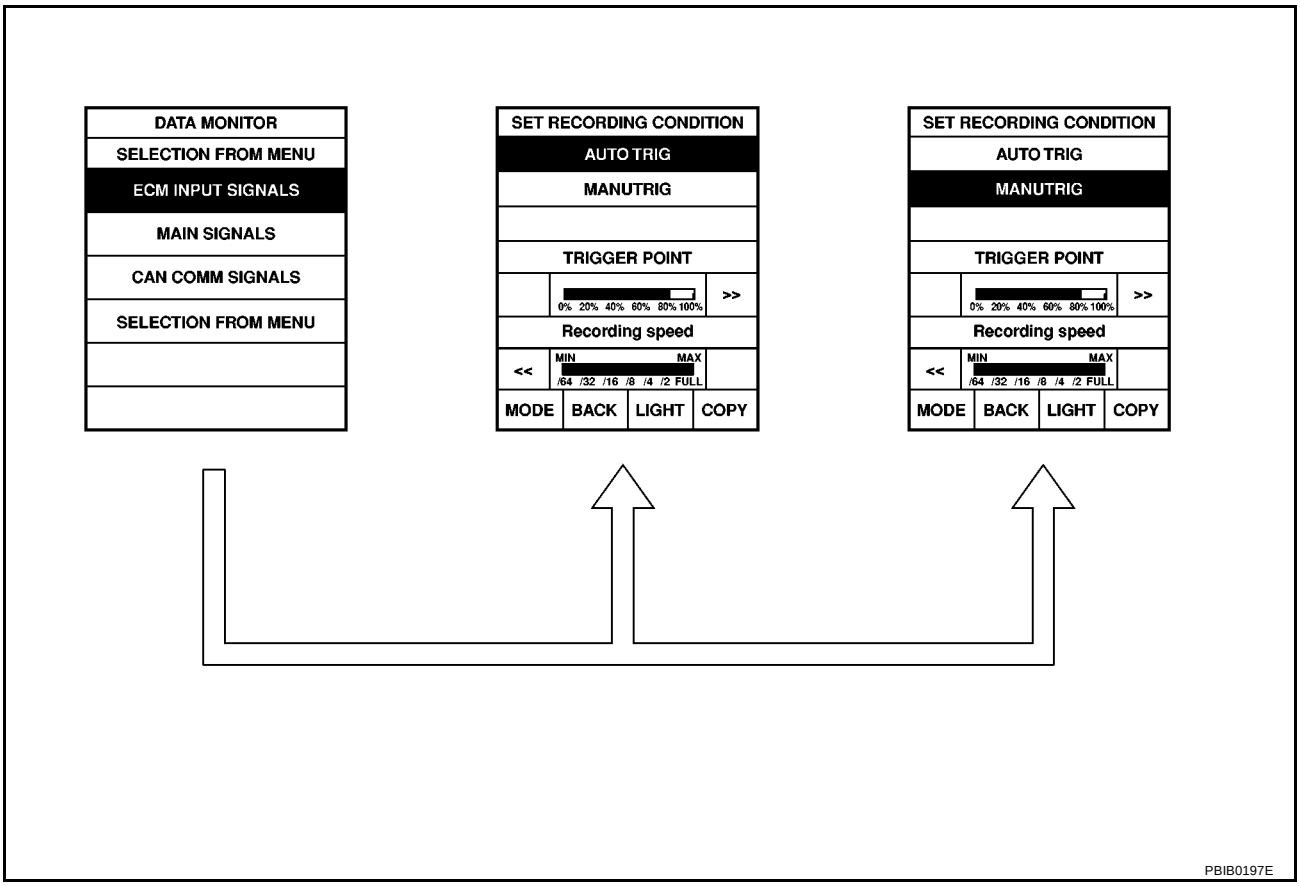
recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II OPERATION MANUAL.

2. “MANU TRIG” (Manual trigger):
   - DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.
     DATA MONITOR can be performed continuously even though a malfunction is detected.



Operation

1. “AUTO TRIG”
   - While trying to detect the DTC/1st trip DTC by performing the DTC Confirmation Procedure, be sure to select to “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
   - While narrowing down the possible causes, CONSULT-II should be set in “DATA MONITOR (AUTO TRIG)” mode, especially in case the incident is intermittent.
     When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the DTC Confirmation Procedure, the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to Incident Simulation Tests in GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" .)
2. “MANU TRIG”
   - If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.

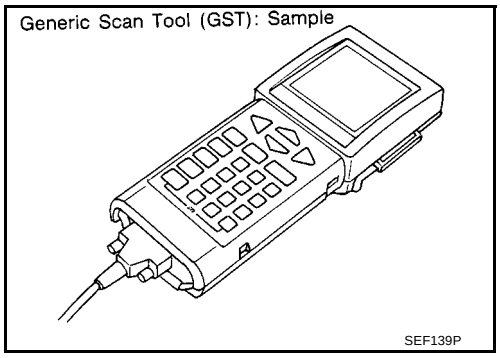


Generic Scan Tool (GST) Function

EBS00O3Q

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with ISO 15031 has 8 different functions explained below.
ISO9141 is used as the protocol.
The name GST or Generic Scan Tool is used in this service manual.

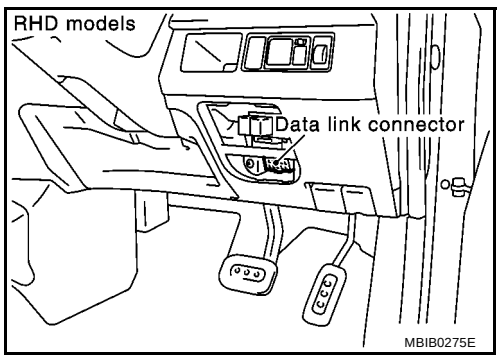


FUNCTION

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-51, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode is not applicable on this vehicle.
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

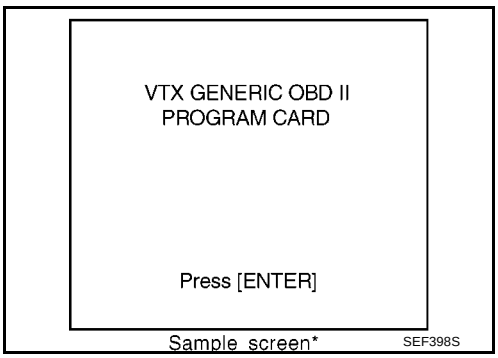
INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect GST to data link connector, which is located under drivers side dash panel near the fuse box cover.
3. Turn ignition switch ON.



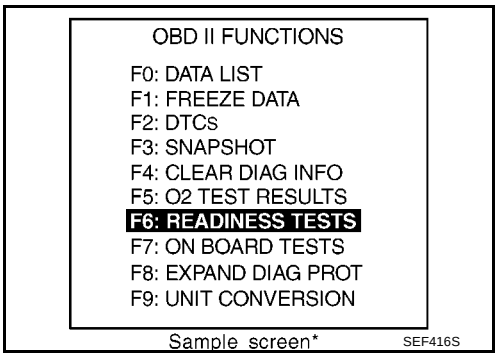
4. Enter the program according to instruction on the screen or in the operation manual.

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O3R

Remarks:
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
  * Specification data may not be directly related to their components signals/values/operations.
  i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION
ENG SPEED	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.		Almost the same speed as the tachometer indication.
B/FUEL SCHDL	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
A/F ALPHA-B1	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	54% - 155%
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 MNTR (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	LEAN ←→ RICH
VEH SPEED SE	● Turn drive wheels and compare CONSULT-II value with the speedometer indication.		Almost the same speed as the speedometer indication.
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRTL SEN1 THRTL SEN2*1	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
TURBO BST SEN	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	At idle	Approximately 1.5V
		At 2,500 rpm	Approximately 1.2V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T models) Neutral (M/T models)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	● Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0° - 10° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s
PURG VOL C/V	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	–5° - 5°CA
		When revving up to 2,000 rpm quickly	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving up to 2,000 rpm quickly	Approx. 0% - 50%
AIR COND RLY	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking		ON
	● Except above conditions		OFF
THRTL RELAY	● Ignition switch: ON		ON

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (210°F)	LOW*2
		Engine coolant temperature is 105°C (212°F) or more	HIGH*2
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm		ON
	● Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	● Engine speed is below 3,800 rpm (M/T models), 3,600 rpm (A/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.		ON
	● Engine speed: Above 3,800 rpm (M/T models), 3,600 rpm (A/T models)		OFF
TRVL AFTER MIL	● Ignition switch: ON	Vehicle has traveled after MI has turned ON.	0 - 65,535 km (0 - 40,723 mile)
O2SEN HTR DTY	● Engine coolant temperature when engine started: More than 80°C (176°F) ● Engine speed: below 3,600 rpm		Approx. 50%
AC PRESS SEN	● Ignition switch: ON (Engine stopped)		Approx. 0V
	● Engine: Idle ● Air conditioner switch: OFF		1.0 - 4.0V

*1 : Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.
*2: Models without air conditioner, cooling fan operates only ON and OFF operation, but CONSULT-II display will change OFF, LOW and HI depends on engine coolant temperature.

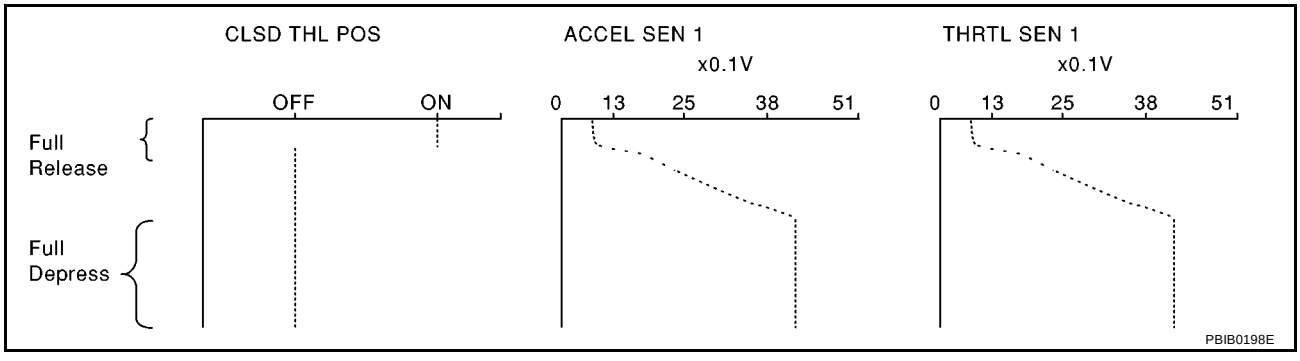
Major Sensor Reference Graph in Data Monitor Mode

EBS00O3S

The following are the major sensor reference graphs in “DATA MONITOR” mode.

CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

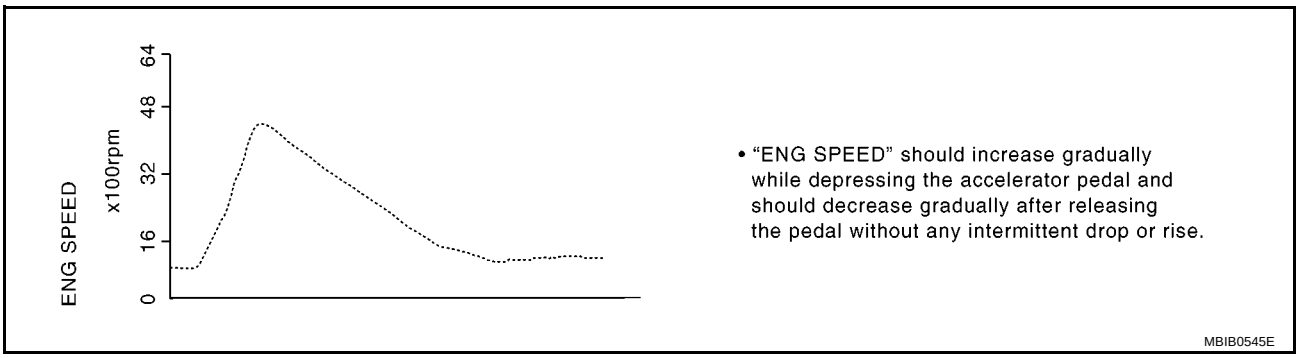
Below is the data for “CLSD THL POS”, “ACCEL SEN 1” and “THRTL SEN 1” when depressing the accelerator pedal with the ignition switch ON and with selector lever in D position (A/T models) or with shift lever in 1st position (M/T models).
The signal of “ACCEL SEN 1” and “THRTL SEN 1” should rise gradually without any intermittent drop or rise after “CLSD THL POS” is changed from “ON” to “OFF”.

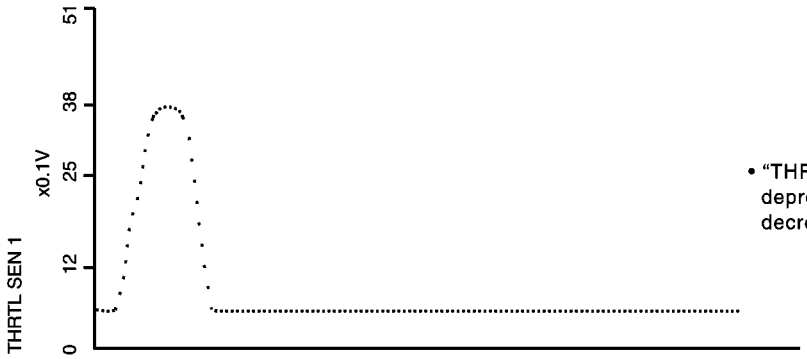


ENG SPEED, THRTL SEN 1, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

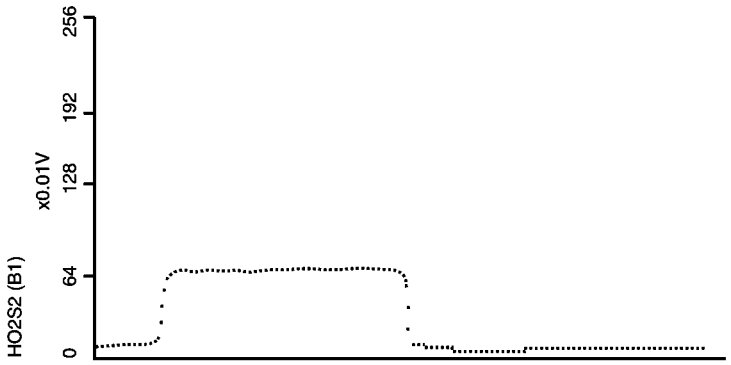
Below is the data for “ENG SPEED”, “THRTL SEN 1”, “HO2S2 (B1)”, “HO2S1 (B1)” and “INJ PULSE-B1” when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

Each value is for reference, the exact value may vary.

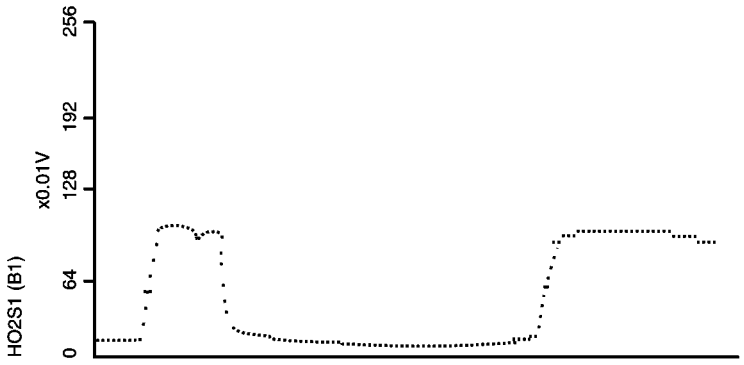




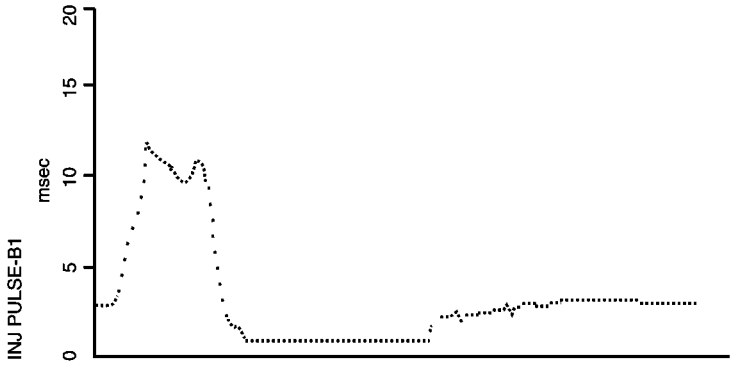
• "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



• "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



• "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



• "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

PBIB0668E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

EBS00O3T

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of the Engine Control System. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)

Testing Condition

EBS00O3U

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2 , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up*1
- Electrical load: Not applied*2
- Engine speed: Idle

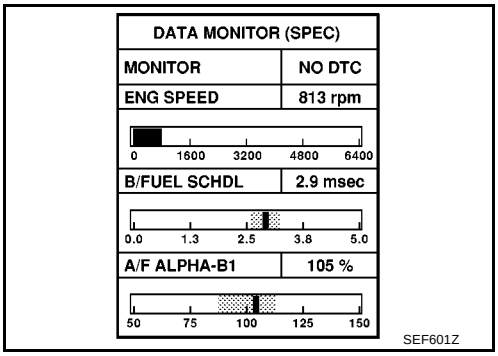
*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates more than 60°C (140°F).
For M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Steering wheel is straight ahead.

Inspection Procedure

EBS00O3V

NOTE:
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

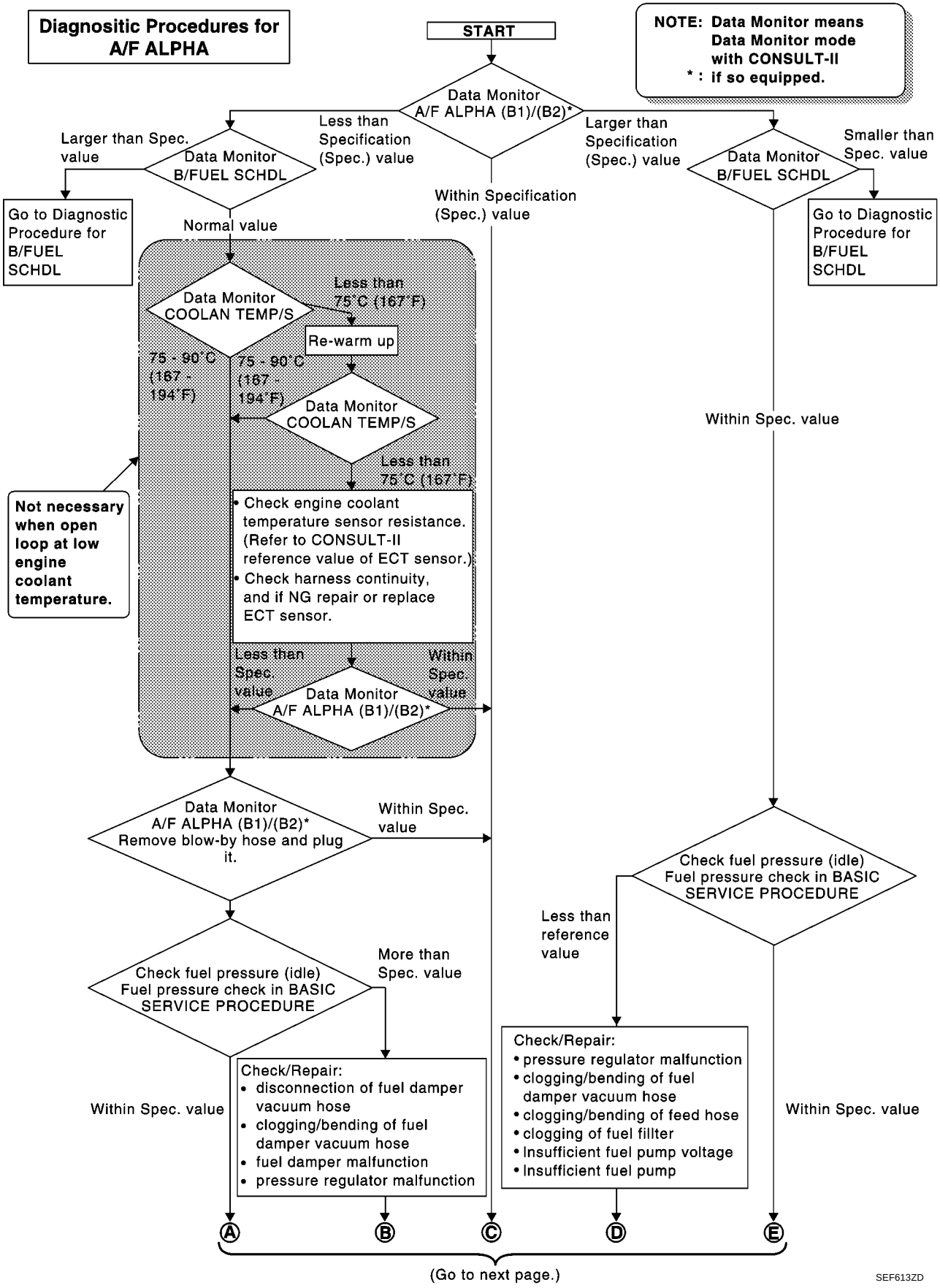
1. Perform EC-77, "Basic Inspection" .
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL” and “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to EC-120, "Diagnostic Procedure" .

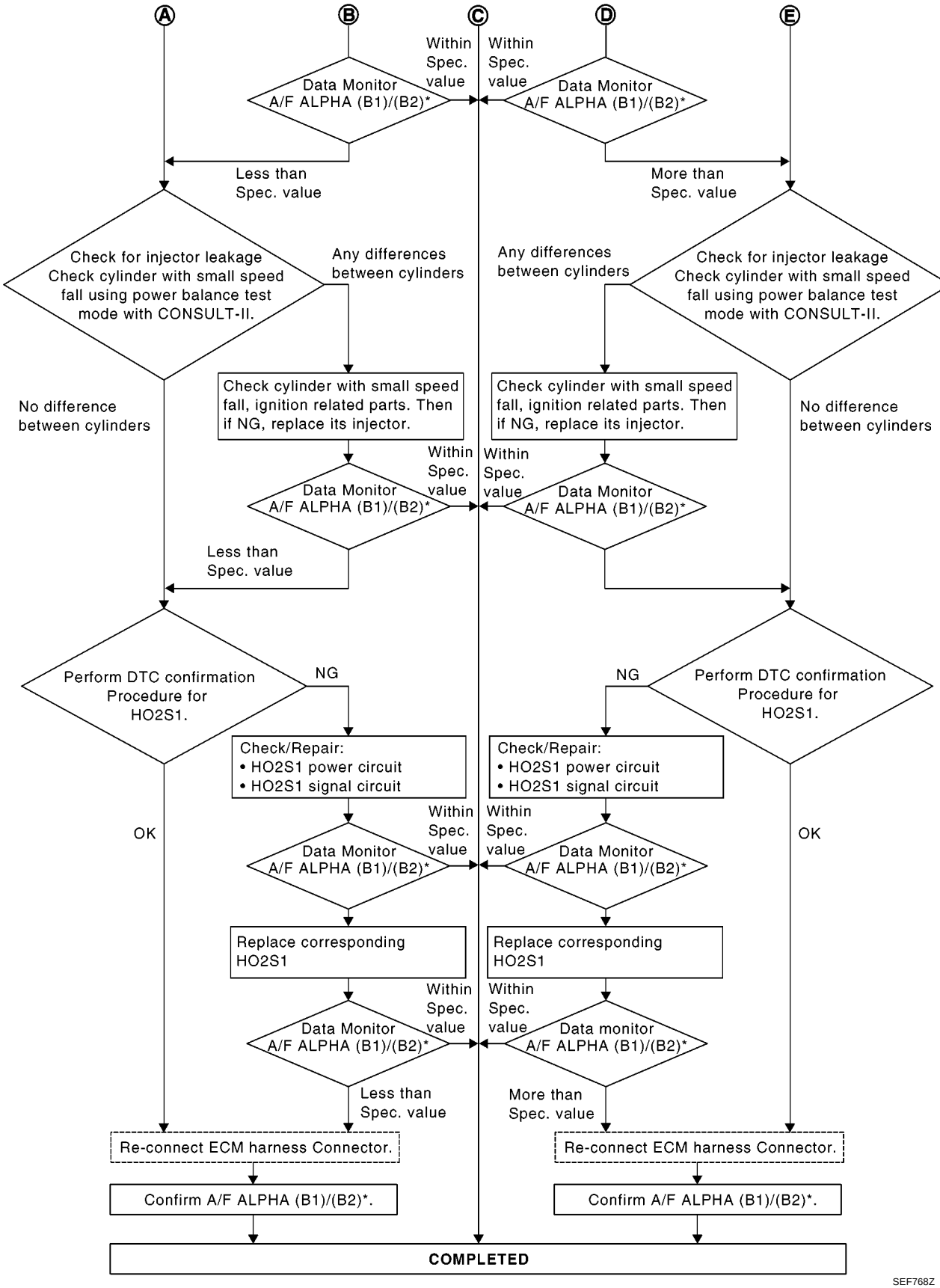


Diagnostic Procedure

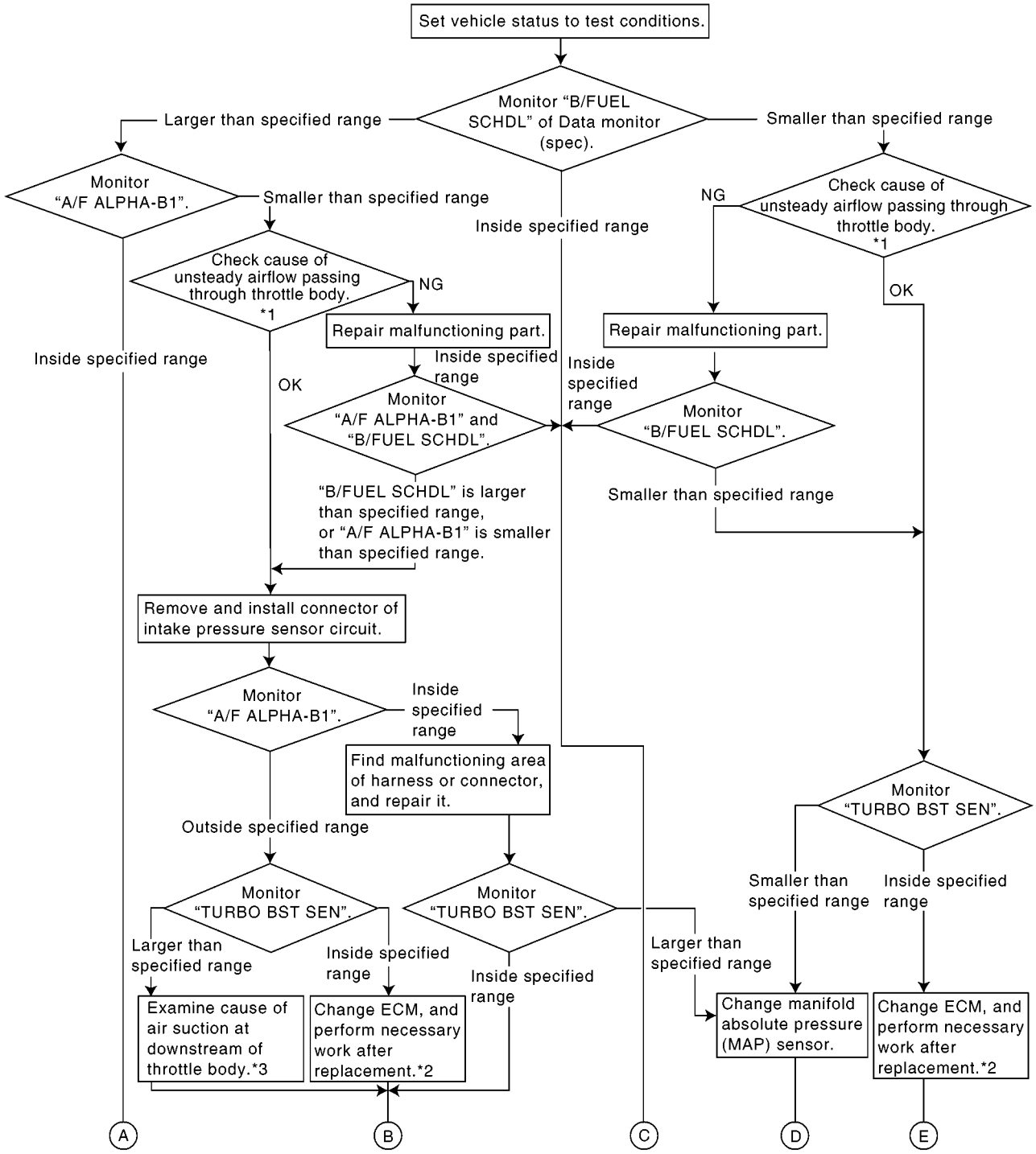
EBS00O3W

CHECK A/F ALPHA–B1




Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Within Spec. value
Data Monitor A/F ALPHA (B1)/(B2)*
Less than Spec. value
More than Spec. value
Check for injector leakage Check cylinder with small speed fall using power balance test mode with CONSULT-II.
Any differences between cylinders
No difference between cylinders
Check cylinder with small speed fall, ignition related parts. Then if NG, replace its injector.
Perform DTC confirmation Procedure for HO2S1.
NG
OK
Check/Repair:
• HO2S1 power circuit
• HO2S1 signal circuit
Replace corresponding HO2S1
Data monitor A/F ALPHA (B1)/(B2)*
Re-connect ECM harness Connector.
Confirm A/F ALPHA (B1)/(B2)*.
COMPLETED
SEF768Z

CHECK B/FUEL SCHDL



*1
Inspection Location
- Crushed air duct
- Improper sealing of air cleaner element
- Unevenly dirty air cleaner element
- Different specification of intake air system part

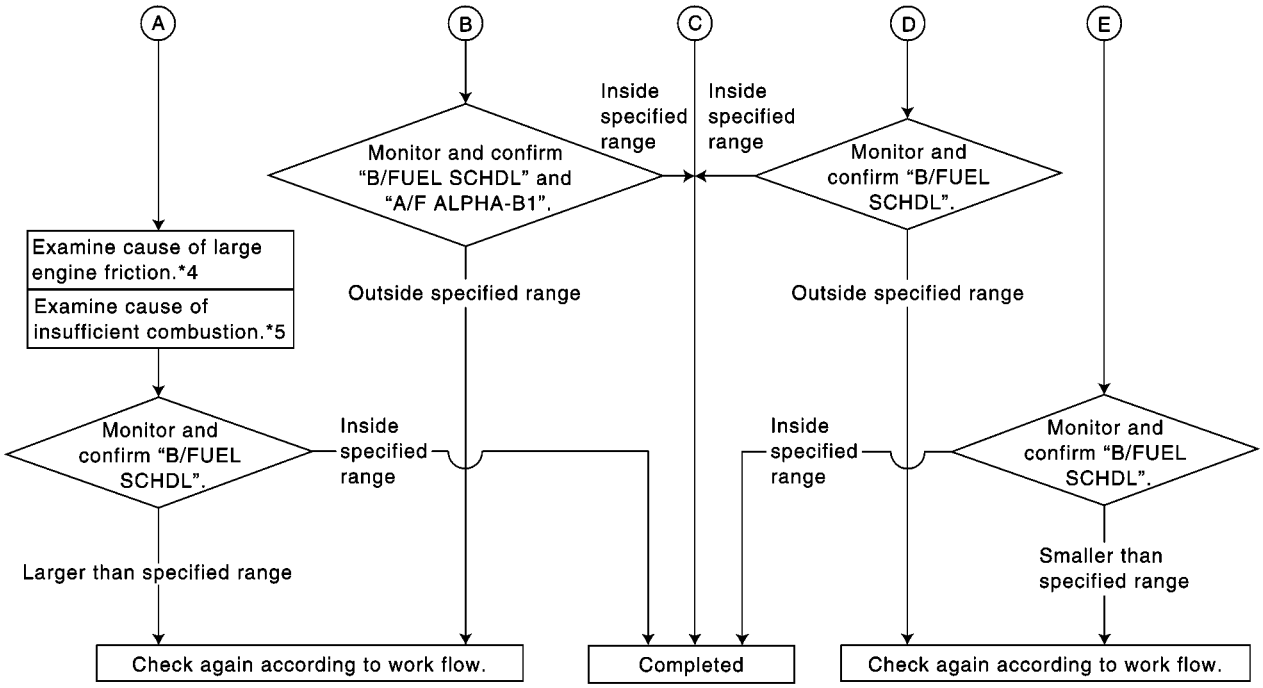
etc.

*2
Refer to ECM Removal and Installation procedure in Service Manual.

*3
Inspection Location
- Disconnection, looseness, or cracks of air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open sticking, breakage, hose disconnection, or cracks of blow-by gas control valve
- Disconnection or cracks of EVAP canister purge hose, open sticking of EVAP canister purge volume control valve
- Improper sealing of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts.
- Improper sealing of intake air system part gasket

etc.

PBIA1516E



*4
Inspection Location
- Overhigh engine oil level
- Engine oil viscosity
- Over-tensioned belt of power steering, alternator, and air conditioner compressor, unusual noise, or binding of pulley
- Unusual noise of engine
- Unusual noise of gear change

etc.

*5
Inspection Location
- EGR valve sticking
- Improper valve clearance
- Malfunction of intake valve timing control function
- Improper installation of camshaft sprocket

etc.

MBIB0658E

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

EBS00O3X

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common I/I Report Situations

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than “0” or “[1t]”.
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnostic Procedure

EBS00O3Y

1. INSPECTION START

Erase (1st trip) DTCs. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.
Refer to GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “Incident Simulation Tests”, “Ground Inspection”.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “Incident Simulation Tests”.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace.

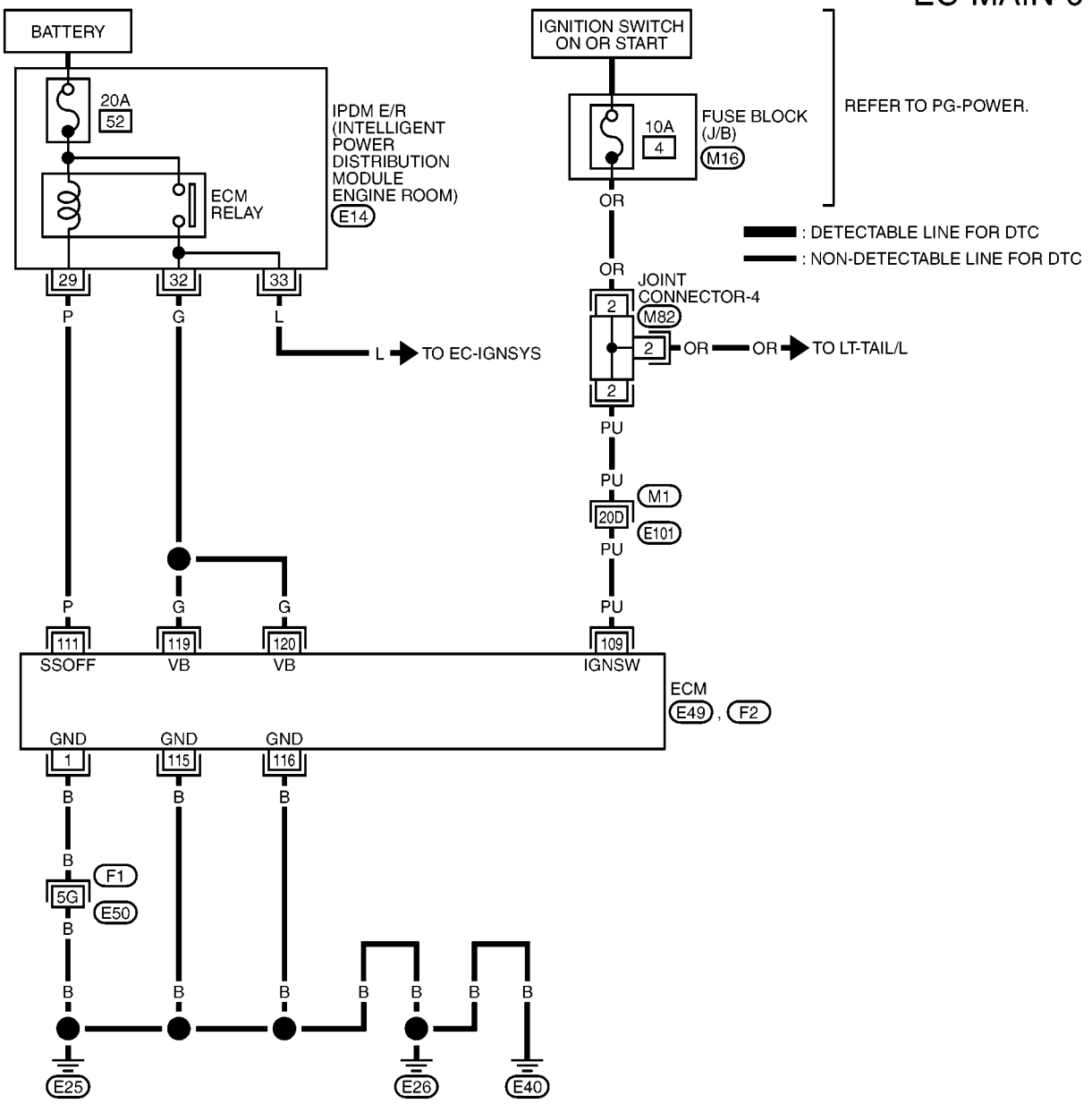
POWER SUPPLY CIRCUIT FOR ECM

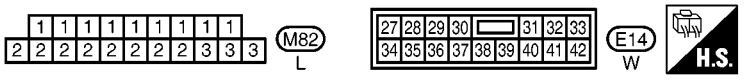
PFP:24110

Wiring Diagram

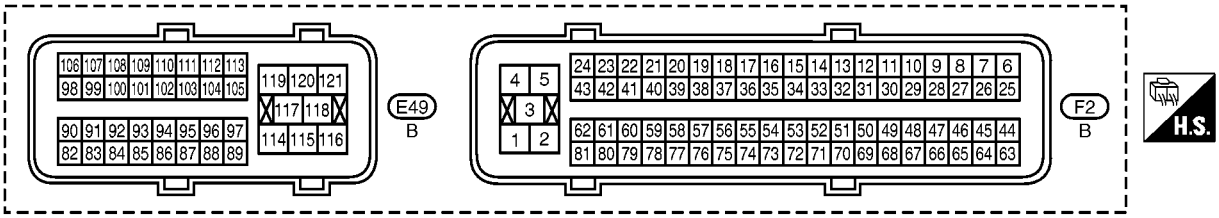
EBS00O3Z

EC-MAIN-01





REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)



MBWA0570E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1 115 116	B B B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
109	PU	Ignition switch	**[Ignition switch OFF]**	0V
			[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	G G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

EBS00O40

1. INSPECTION START

Start engine.

Is engine running?

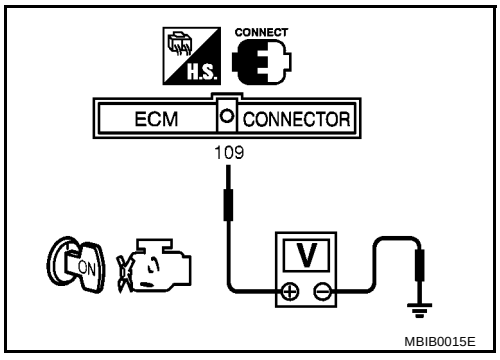
Yes or No

Yes >> GO TO 8.
No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101
- Fuse block (J/B) connector M16
- Joint connector-4
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

4. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between ECM and engine ground

>> Repair open circuit or short to power in harness or connectors.

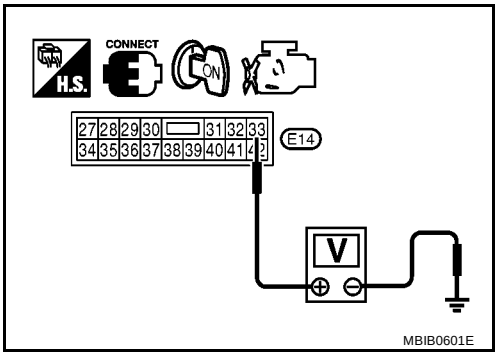
6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check voltage between IPDE E/R harness connector E14 terminal 33 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

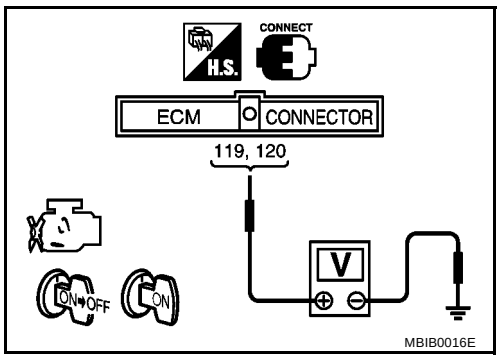
OK >> Go to EC-435, "IGNITION SIGNAL" .
NG >> GO TO 7.



7. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch ON and then OFF.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.



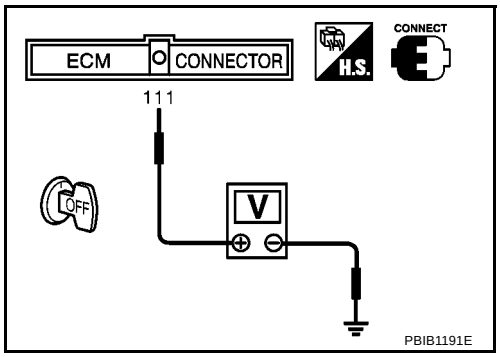
OK or NG

OK >> GO TO 13.
NG (Battery voltage does not exist.)>>GO TO 8.
NG (Battery voltage exists for more than a few seconds.)>>GO TO 13.

8. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 9.

9. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminal 111 and IPDM E/R terminal 29. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK 20A FUSE

1. Disconnect 20A fuse from IPDM E/R.
2. Check 20A fuse.

OK or NG

OK >> GO TO 13.
NG >> Replace 20A fuse.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminals 119, 120 and IPDM E/R terminal 32. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R.
NG >> Repair open circuit or short to power in harness or connectors.

DTC U1000, U1001 CAN COMMUNICATION LINE

PFP:23710

Description

EBS00O42

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

On Board Diagnosis Logic

EBS00O43

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*1 1000*1	CAN communication line	● ECM cannot communicate to other control units. ● ECM cannot communicate for more than the specified time.	● Harness or connectors (CAN communication line is open or shorted.)
U1001*2 1001*2			

*1:This self-diagnosis has the one trip detection logic.
*2:The MI will not light up for this self-diagnosis.

DTC Confirmation Procedure

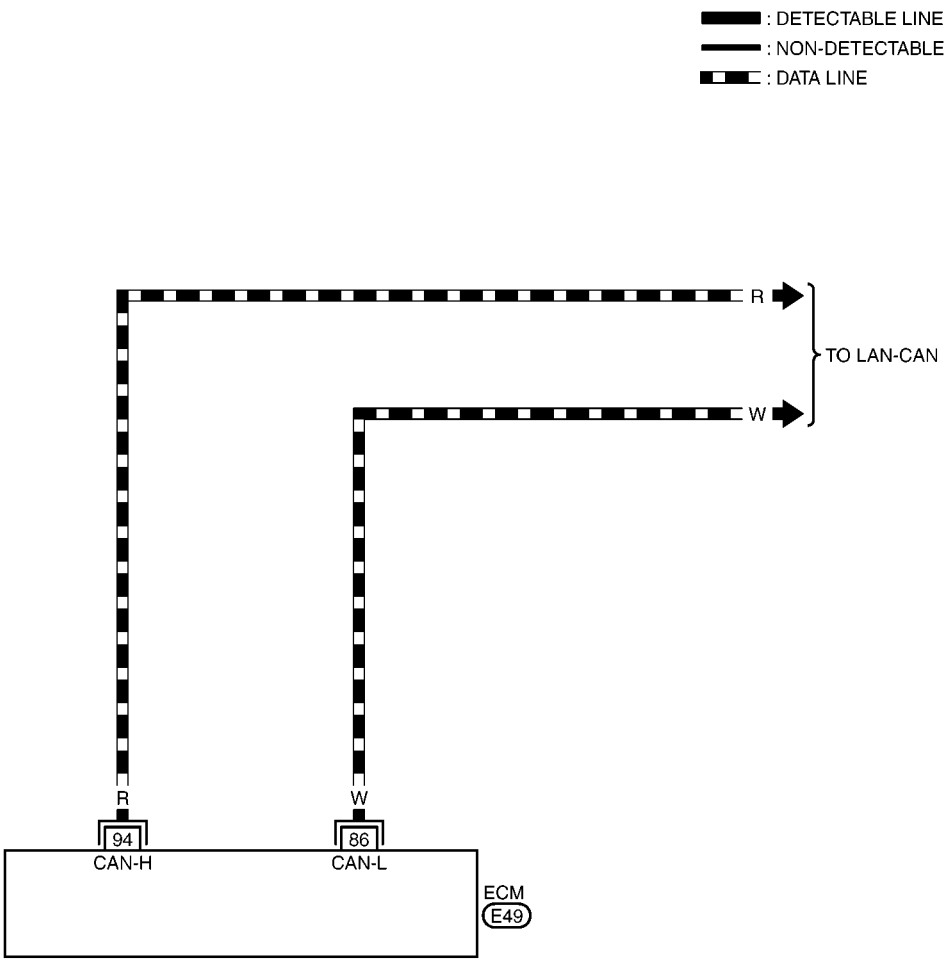
EBS00O44

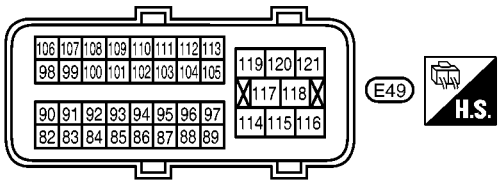
1. Turn ignition switch ON and wait at least 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If 1st trip DTC or DTC is detected, go to EC-132, "Diagnostic Procedure" .

Wiring Diagram

EBS00O45

EC-CAN-01





MBWA0268E

Diagnostic Procedure

EBS00O46

Go to LAN-4, "Precautions When Using CONSULT-II" .

DTC P0011 IVT CONTROL

PFP:23796

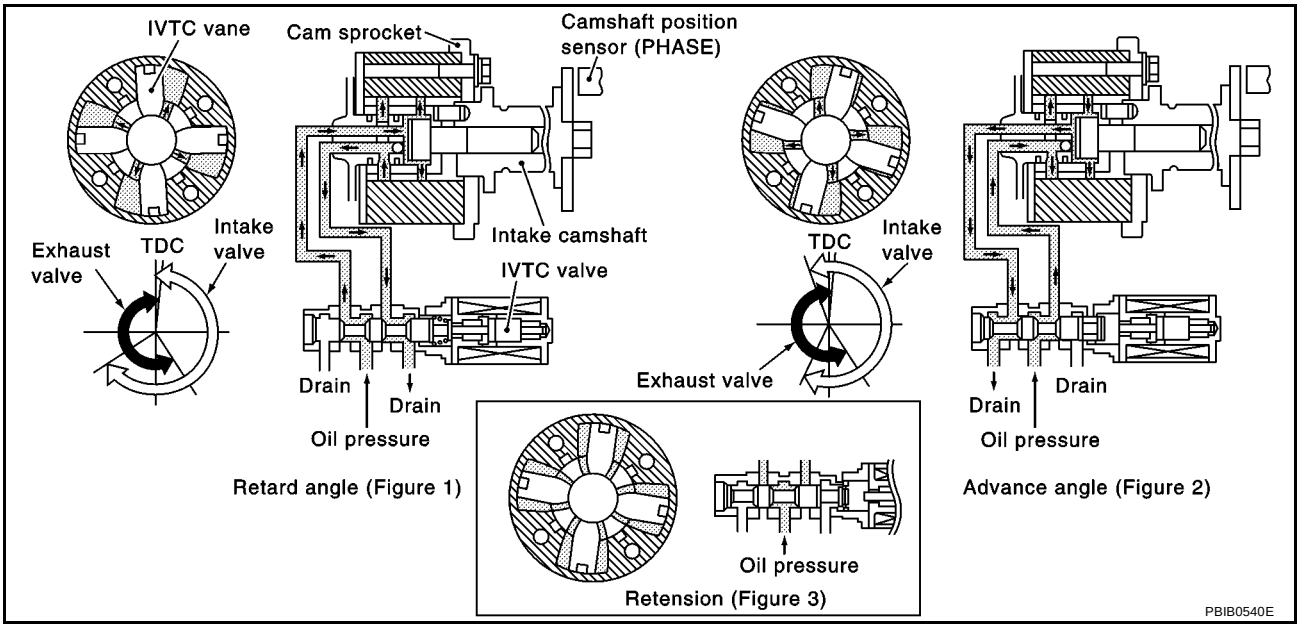
Description

EBS00O47

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

EBS00O48

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	–5° - 5°CA
		When revving up to 2,000 rpm quickly	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving up to 2,000 rpm quickly	Approx. 0% - 50%

On Board Diagnosis Logic

EBS00O49

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	● Crankshaft position sensor (POS) ● Camshaft position sensor (PHASE) ● Accumulation of debris to the signal pick-up portion of the camshaft

FAIL-SAFE MODE

ECM enters fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

EBS00O4A

CAUTION:
Always drive at a safe speed.

NOTE:

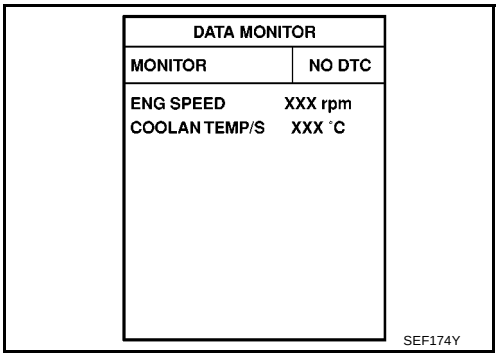
- **If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for DTC P1111. See EC-293 .**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (148 - 221°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)



4. If 1st trip DTC is detected, go to EC-135, "Diagnostic Procedure" .

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS00O4B

1. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-265, "Component Inspection" .

OK or NG

OK >> GO TO 2.
NG >> Replace crankshaft position sensor (POS).

2. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-271, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace camshaft position sensor (PHASE).

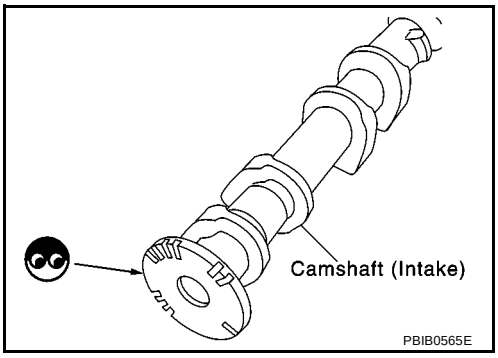
3. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 4.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



4. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
For wiring diagram refer to CKP sensor (POS) EC-262 and CMP sensor (PHASE) EC-268 .

>> **INSPECTION END**

DTC P0031, P0032 HO2S1 HEATER

PFP:22690

Description

EBS00O4C

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 after warming up	ON

CONSULT-II Reference Value in Data Monitor Mode

EBS00O4D

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm	ON
	● Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

EBS00O4E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) ● Heater oxygen sensor 1 heater
P0032 0032	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) ● Heater oxygen sensor 1 heater

DTC Confirmation Procedure

EBS00O4F

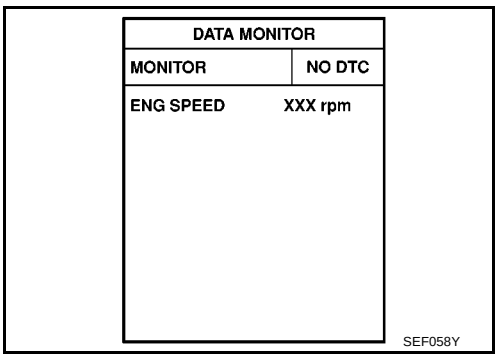
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.

3. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to EC-139, "Diagnostic Procedure" .



WITH GST

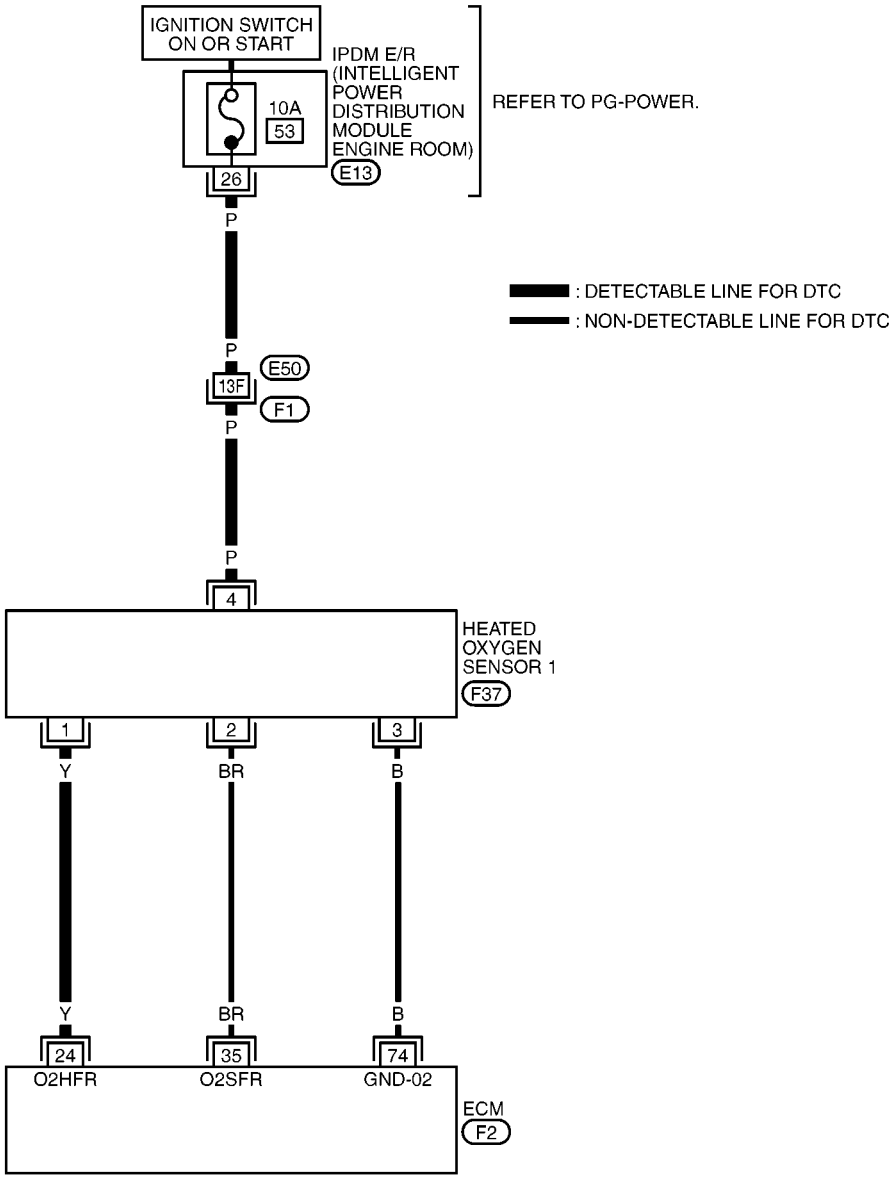
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and run it for at least 6 seconds at idle speed.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Start engine and run it for at least 6 seconds at idle speed.
6. Select “MODE 3” with GST.
7. If DTC is detected, go to EC-139, "Diagnostic Procedure" .

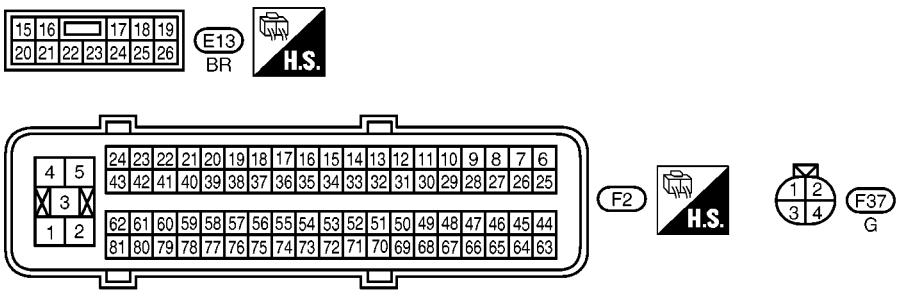
- **When using GST, DTC Confirmation Procedure should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EBS00O4G

EC-HO2S1H-01



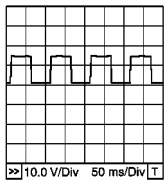


REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0269E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	Y	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition.** ● Engine speed is below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

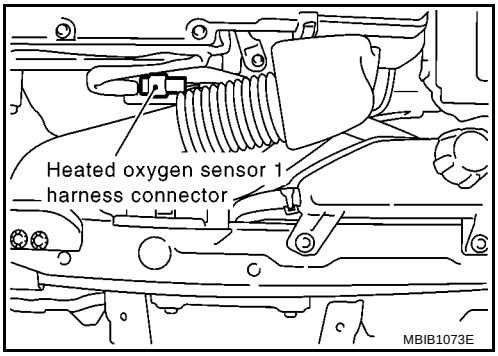
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00O4H

1. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Turn ignition switch ON.



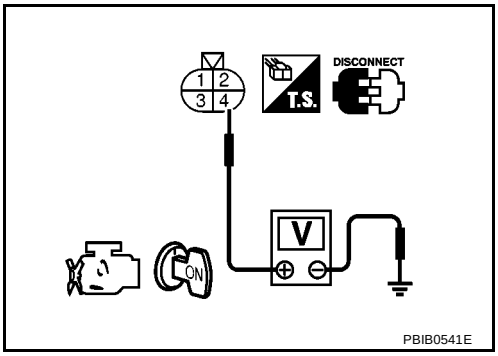
MBIB1073E

4. Check voltage between HO2S1 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



PBIB0541E

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

3. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 24 and HO2S1 terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-141, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace malfunctioning heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

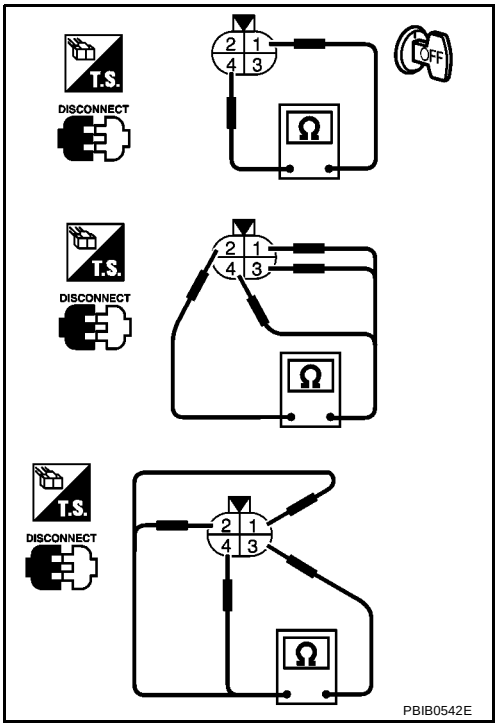
EBS00O4I

HEATED OXYGEN SENSOR 1 HEATER

1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
1 and 4	3.3 - 4.0 Ω at 25°C (77°F)
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 1.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O4J

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

DTC P0037, P0038 HO2S2 HEATER

PFP:226A0

Description

EBS00O4K

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Manifold absolute pressure (MAP) sensor	Amount of intake air		

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600 (A/T models), 3,800 (M/T models)	OFF
Below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. ● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

CONSULT-II Reference Value in Data Monitor Mode

EBS00O4L

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	● Engine speed is Below 3,600 rpm (A/T models) 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed at between 3,500 to 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON
	● Engine speed: Above 3,600 rpm (A/T models), 3,800 rpm (M/T models)	OFF

On Board Diagnosis Logic

EBS00O4M

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	● Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) ● Heater oxygen sensor 2 heater
P0038 0038	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	● Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) ● Heater oxygen sensor 2 heater

DTC Confirmation Procedure

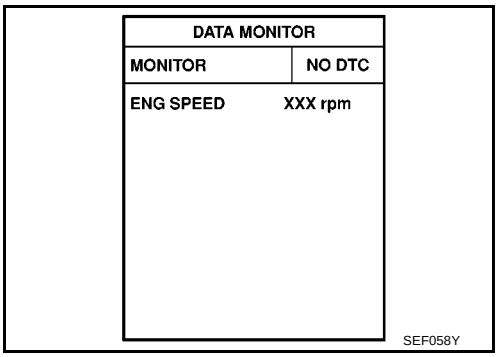
EBS00O4N

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. If 1st trip DTC is detected, go to EC-145, "Diagnostic Procedure" .



WITH GST

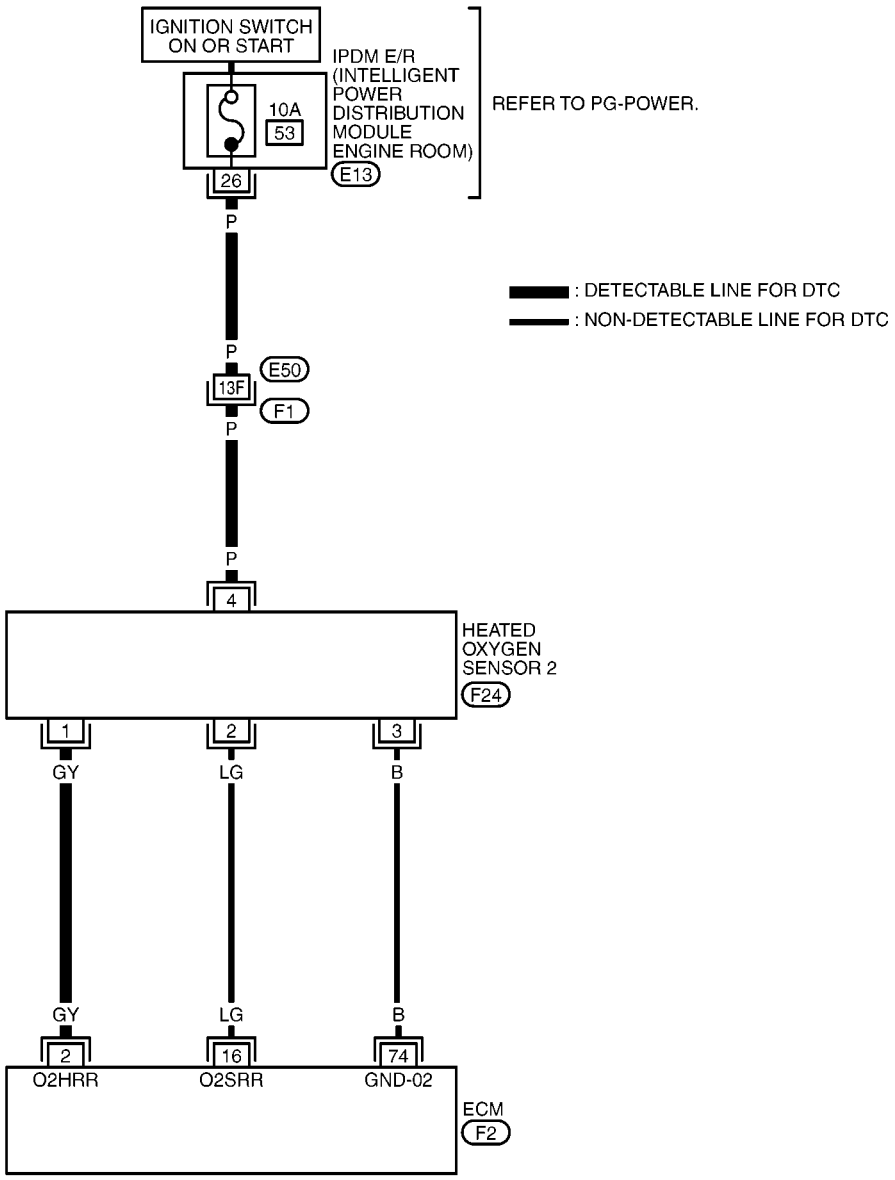
1. Start engine and warm it up the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 1 minute.
8. Select “MODE 3” with GST.
9. If DTC is detected, go to EC-145, "Diagnostic Procedure" .

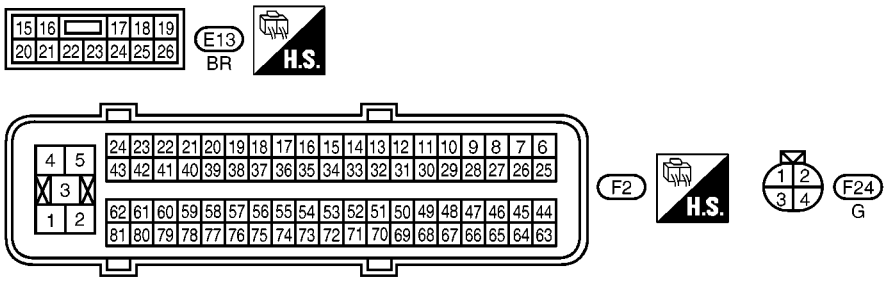
- **When using GST, DTC Confirmation Procedure should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EBS00O4O

EC-HO2S2H-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0270E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

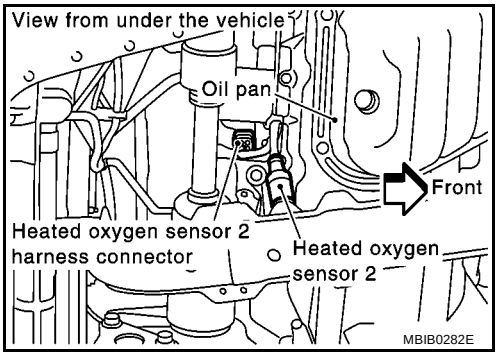
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	GY	Heated oxygen sensor 2 heater	**[Engine is running]** ● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - 1.0V
			[Ignition switch "ON"] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm (A/T models), 3,800 rpm (M/T models).	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

EBS00O4P

1. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch ON.

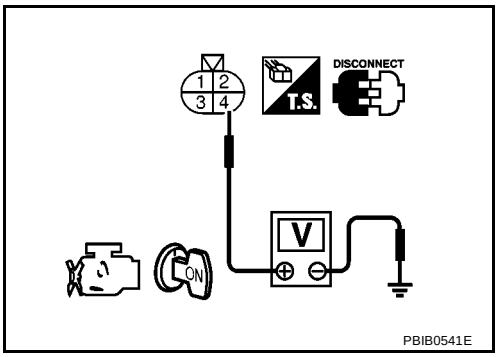


4. Check voltage between HO2S2 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair harness or connectors.

3. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 and HO2S2 terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-147, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace malfunctioning heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

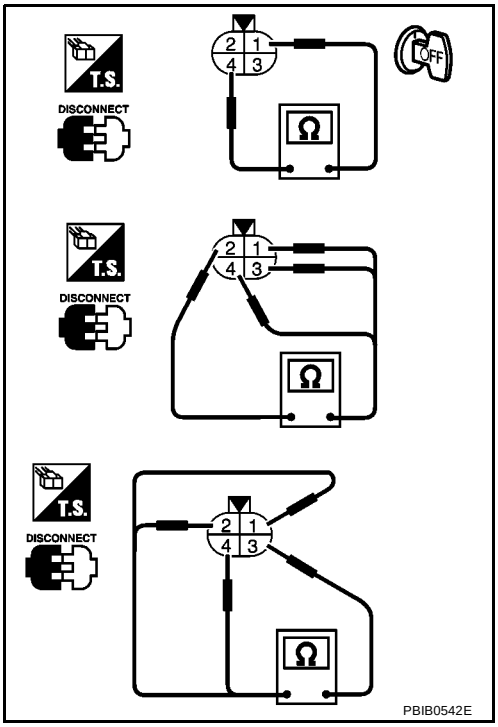
EBS00O4Q

HEATED OXYGEN SENSOR 2 HEATER

1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
1 and 4	3.3 - 4.0 Ω at 25°C (77°F)
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O4R

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

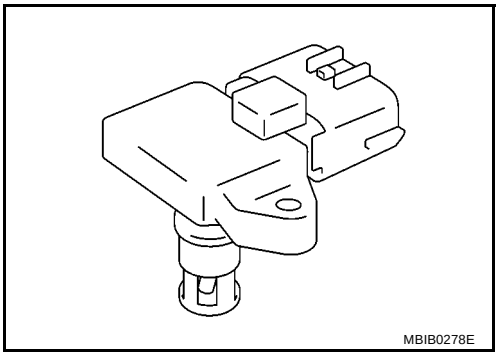
DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR

PFP:22365

Component Description

EBS00OE1

The manifold absolute pressure (MAP) sensor is placed intake manifold corrector. It detects intake manifold pressure and sends the voltage signal to the ECM, ECM uses the signal to compute intake air volume value.
The sensor uses a silicon diaphragm which is sensitive to the change in pressure. As the pressure increase, the voltage rises.


MBIB0278E

On Board Diagnosis Logic

EBS00OE2

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0107 0107	Manifold absolute pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Manifold absolute pressure sensor
P0108 0108	Manifold absolute pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted) ● Manifold absolute pressure sensor ● Intake air leaks

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and MI lights up.

Detected items	Engine operating condition in fail-safe mode
Manifold absolute pressure sensor circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.

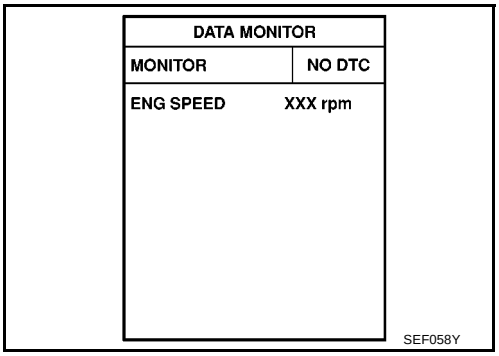
DTC Confirmation Procedure

EBS00OE3

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If the 1st trip DTC is detected, go to EC-150, "Diagnostic Procedure" .



SEF058Y

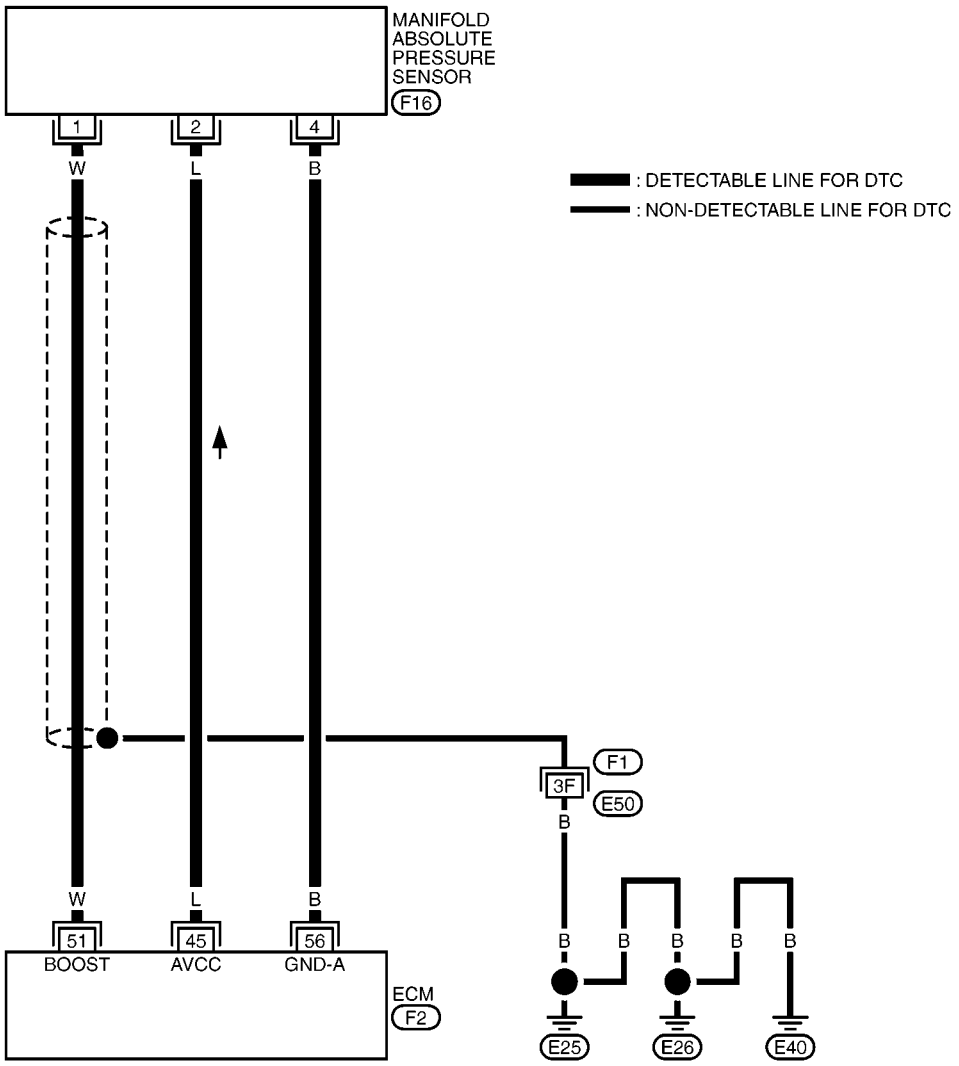
WITH GST

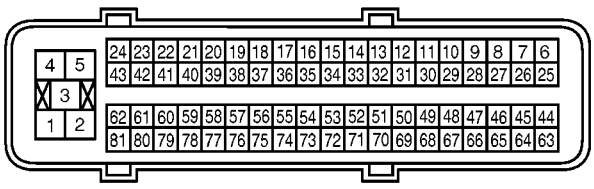
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00OE4

EC-AP/SEN-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0304E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

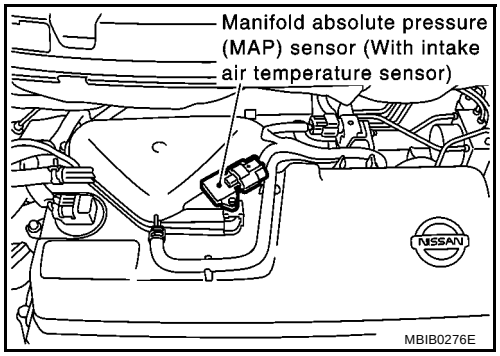
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V

Diagnostic Procedure

EBS00OE5

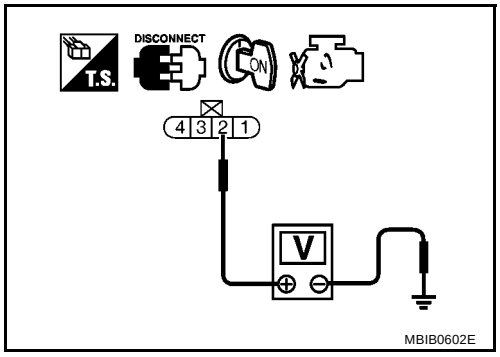
1. CHECK MAP SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor harness connector.
3. Turn ignition switch ON.



4. Check voltage between MAP sensor terminal 2 and ground.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 2.
NG >> Repair harness or connectors.

2. CHECK MAP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAP sensor terminal 4 and ECM terminal 56
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK MAP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAP sensor terminal 1 and ECM terminal 51.
   Refer to Wiring Diagram

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK MAP SENSOR

Refer to EC-151, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace manifold absolute pressure sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

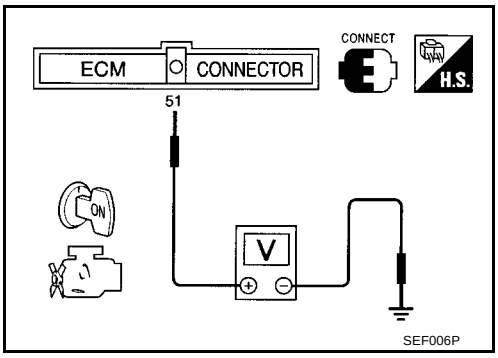
Component Inspection

EBS00OE6

MANIFOLD ABSOLUTE PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
4. Check voltage between ECM terminal 51 (manifold absolute pressure sensor signal) and ground.

   NOTE:
   - To avoid the affection of intake manifold vacuum, check the voltage 1 or more minutes past after engine is stopped.
   - Because the sensor is absolute pressure sensor, output value may differ depends on atmospheric pressure and altitude.



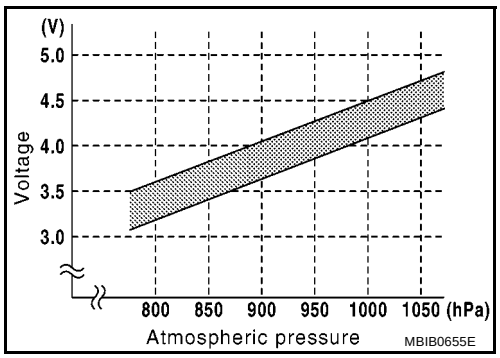
5. Measure the atmospheric pressure.

   NOTE:
   As atmospheric pressure describe on synoptic chart is value at sea level, please compensate the actual pressure with the following chart.

Altitude	Compensated pressure
0m	0hPa
200m	-24hPa
400m	-47hPa
600m	-70hPa
800m	-92hPa
1,000m	-114hPa
1,500m	-168hPa
2,000m	-218hPa

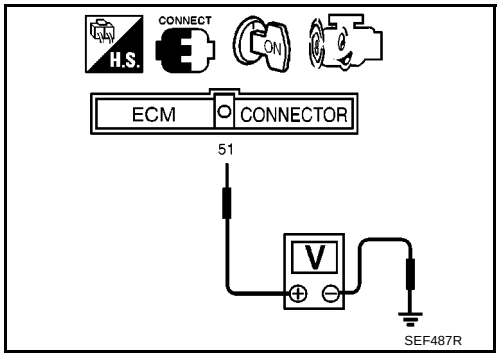
6. Check the manifold absolute pressure sensor value corresponds to the atmospheric pressure.

Atmospheric pressure	Voltage
800hPa	3.2 - 3.6v
850hPa	3.4 - 3.8v
900hPa	3.7 - 4.1v
960hPa	3.9 - 4.3v
1,000hPa	4.1 - 4.5v
1,050hPa	4.3 - 4.7v



7. Start engine and let it idle.
8. Check the voltage between ECM terminal 51 and ground at idling and confirm the voltage difference between engine is stopped and at idling is within following chart.

Intake manifold vacuum	Voltage difference
-40kPa (-300mmHg)	1.6 - 2.0v
-53.3kPa (-400mmHg)	2.2 - 2.6v
-66.7kPa (-500mm)	2.8 - 3.2v
-80kPa (-600mmHg)	3.4 - 3.8v



EBS00OE7

Removal and Installation

MANIFOLD ABSOLUTE PRESSURE SENSOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

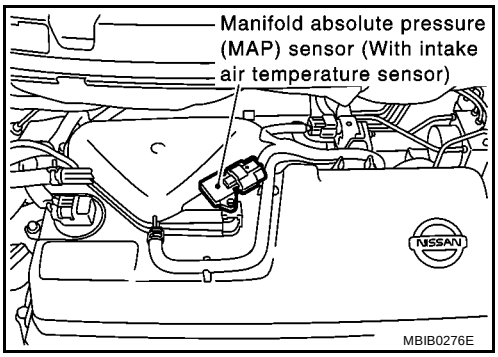
DTC P0112, P0113 IAT SENSOR

PFP:22630

Component Description

EBS00O50

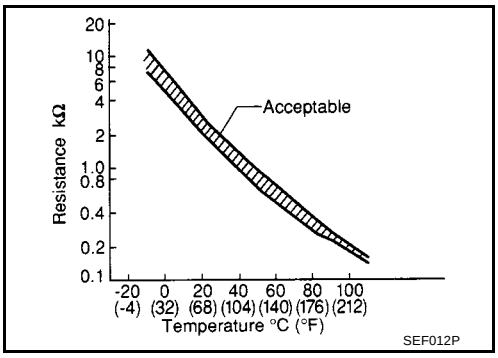
The intake air temperature sensor is built into manifold absolute pressure sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.



CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

EBS00O51

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and MI lights up.

Detected items	Engine operating condition in fail-safe mode
Intake air temperature sensor circuit	Intake air temperature is determined as 30°C (86°F).

DTC Confirmation Procedure

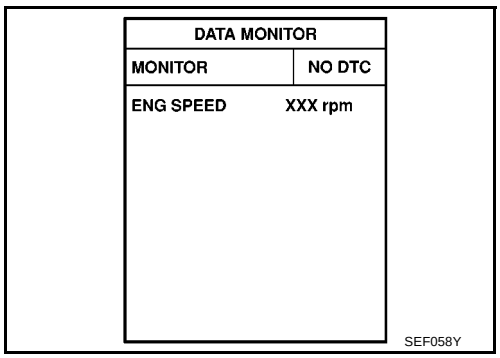
EBS00O52

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.

2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-156, "Diagnostic Procedure"
.



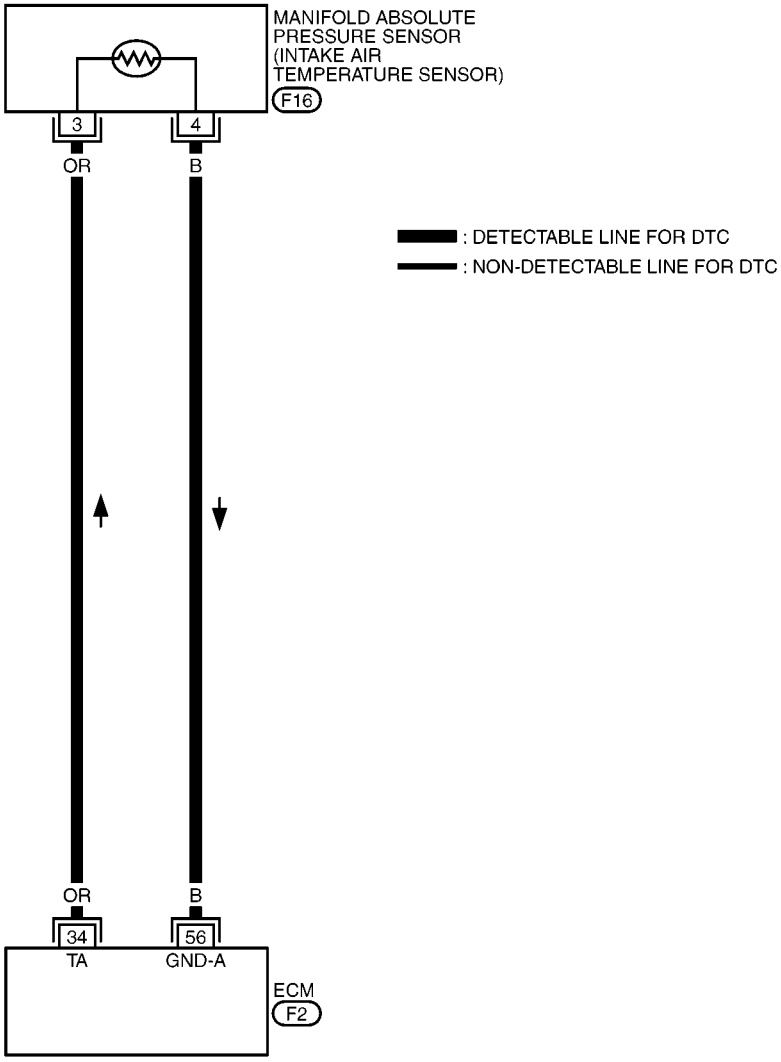
WITH GST

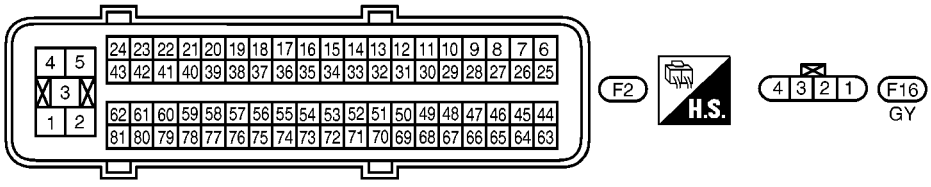
Follow the procedure “With CONSULT-II” above.

Wiring Diagram

EBS00O53

EC-IATS-01





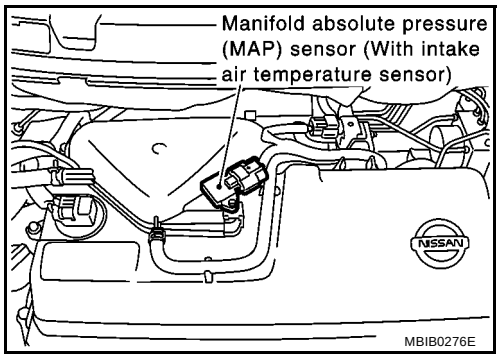
MBWA0462E

Diagnostic Procedure

EBS00O54

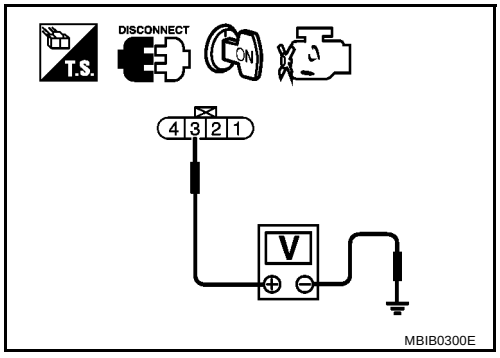
1. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch ON.



4. Check voltage between MAP sensor terminal 3 and ground.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 2.
NG >> Repair harness or connectors.

2. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAP sensor terminal 4 and ECM terminal 56.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-157, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace manifold absolute pressure sensor (with intake air temperature sensor).

4. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

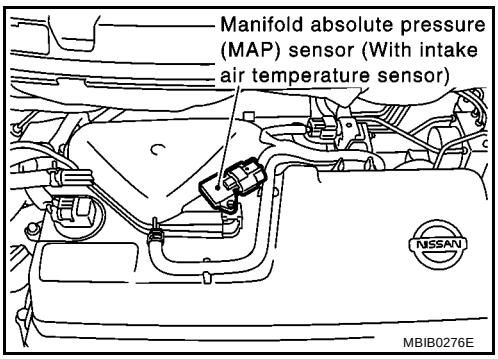
EBS00O55

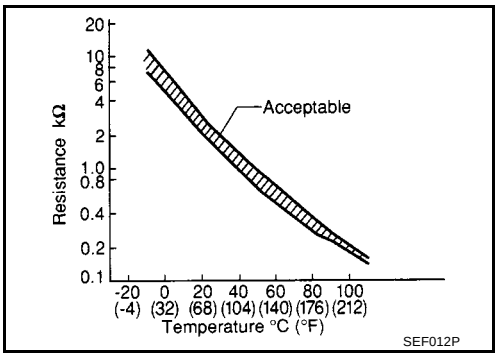
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between manifold absolute pressure sensor terminals 3 and 4 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace manifold absolute pressure sensor (with intake air temperature sensor).





Removal and Installation

EBS00O56

MANIFOLD ABSOLUTE PRESSURE SENSOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

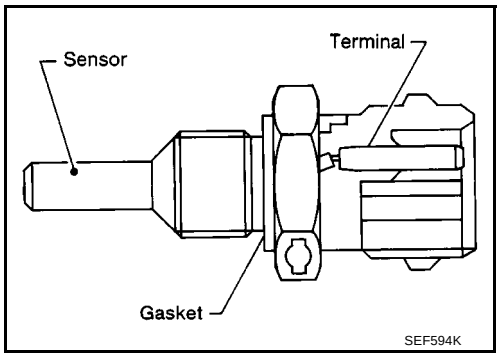
DTC P0117, P0118 ECT SENSOR

PFP:22630

Component Description

EBS00O57

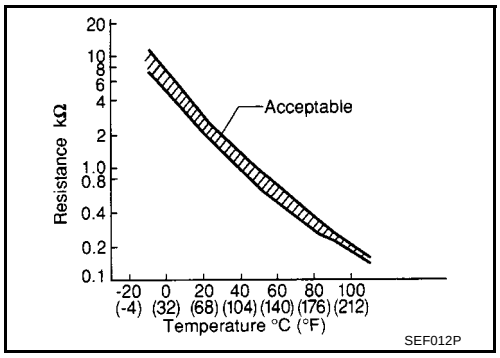
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 72 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

EBS00O58

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When this malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
	When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	

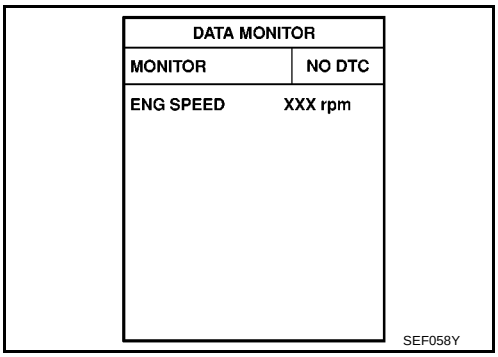
DTC Confirmation Procedure

EBS00O59

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-161, "Diagnostic Procedure" .



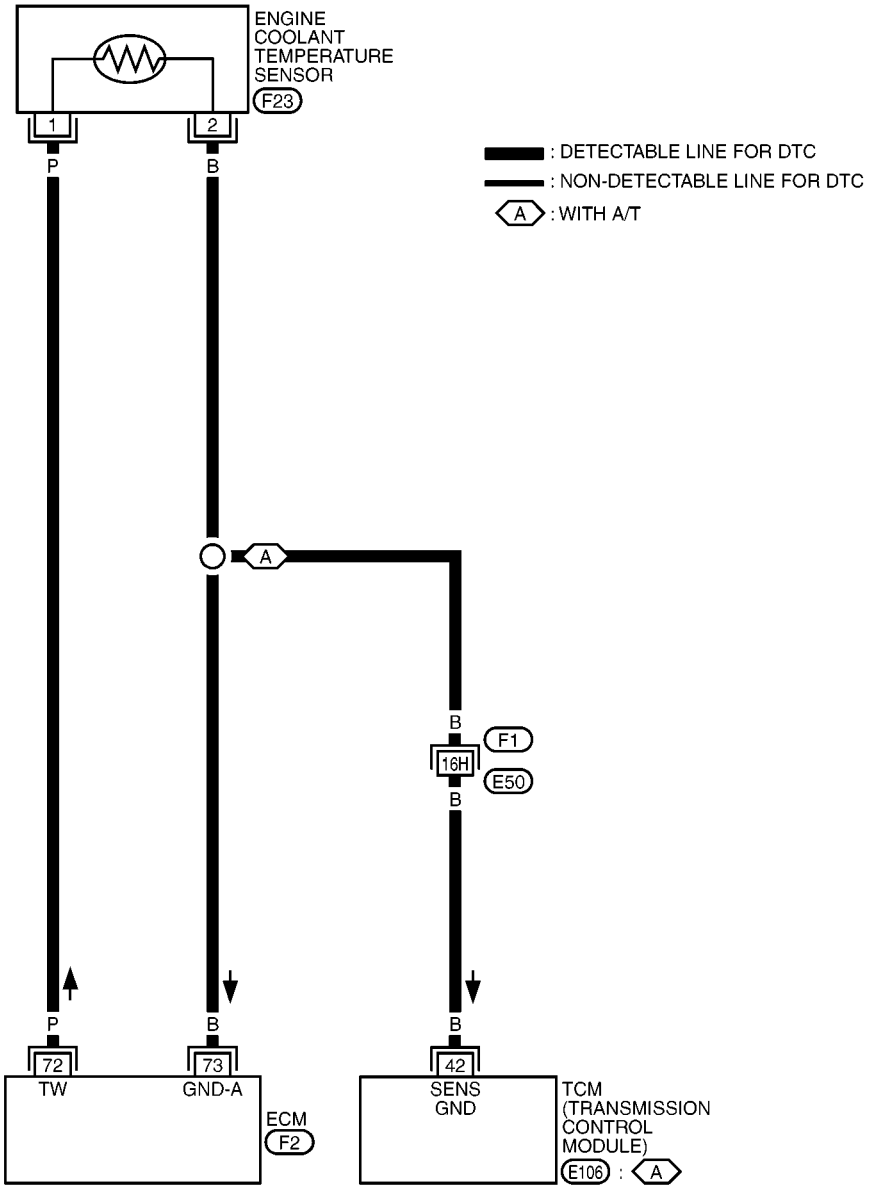
WITH GST

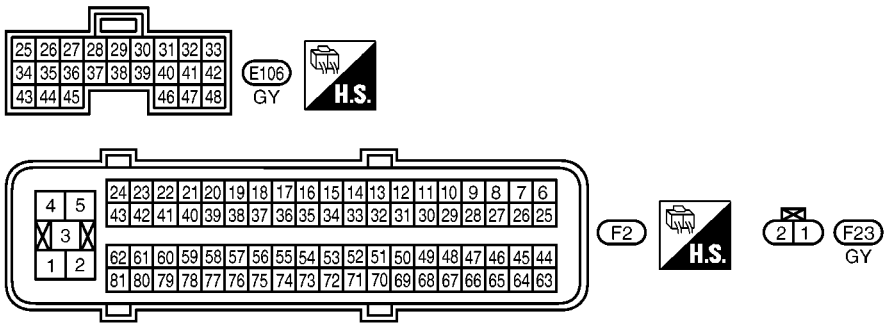
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O5A

EC-ECTS-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

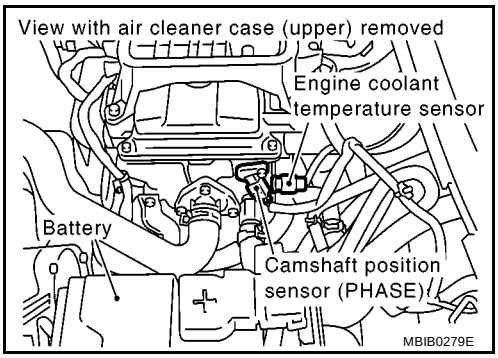
MBWA0271E

Diagnostic Procedure

EBS00O5B

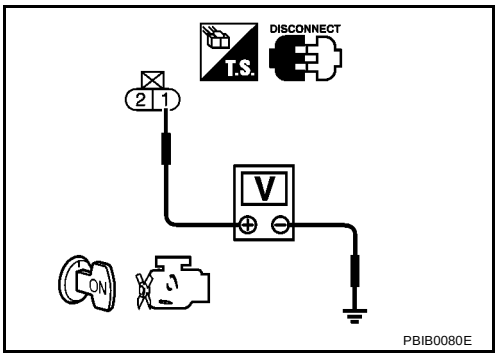
1. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch ON.



4. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect TCM harness connector.
4. Check harness continuity between ECT sensor terminal 2 and ECM terminal 73, TCM terminal 42. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between engine coolant temperature sensor and ECM
- Harness for open or short between engine coolant temperature sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-162, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

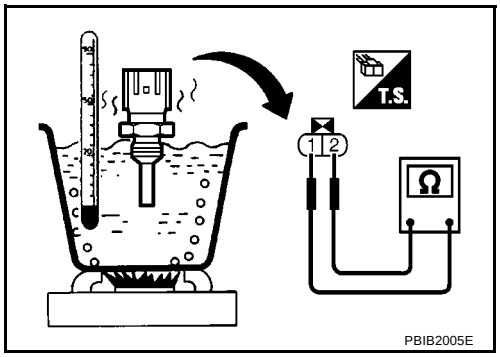
>> **INSPECTION END**

Component Inspection

EBS00O5C

ENGINE COOLANT TEMPERATURE SENSOR

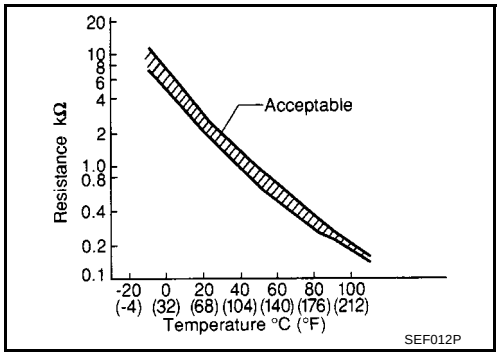
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 72 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

Removal and Installation

EBS00O5D

ENGINE COOLANT TEMPERATURE SENSOR

Refer to CO-23, "THERMOSTAT" .

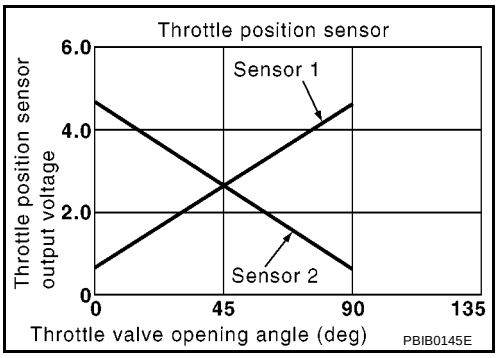
DTC P0122, P0123 TP SENSOR

PFP:16119

Component Description

EBS010BT

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS010BU

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010BV

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (The TP sensor 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

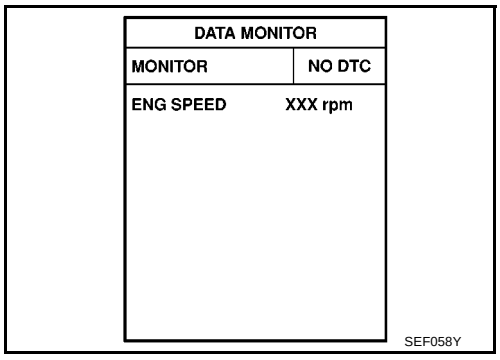
DTC Confirmation Procedure

EBS010BW

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-166, "Diagnostic Procedure" .



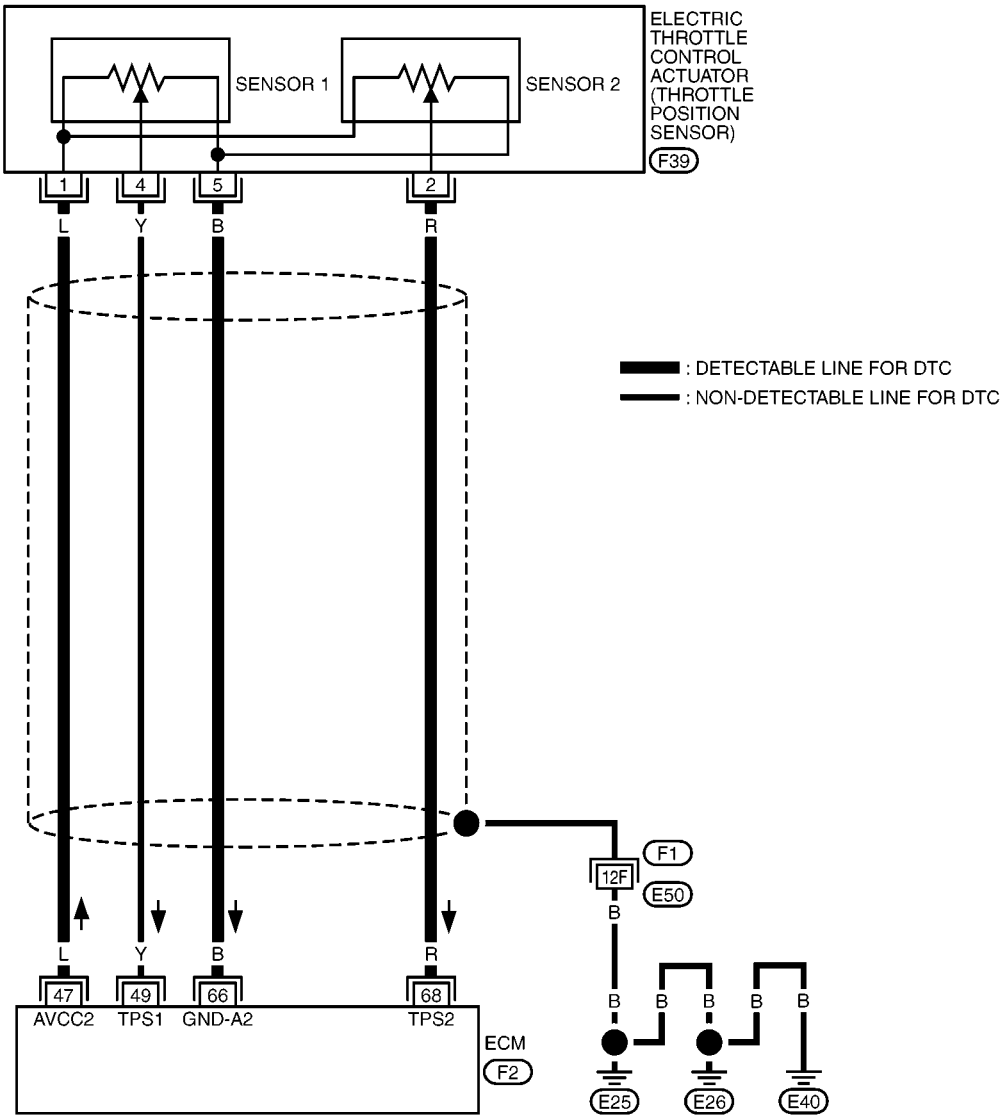
WITH GST

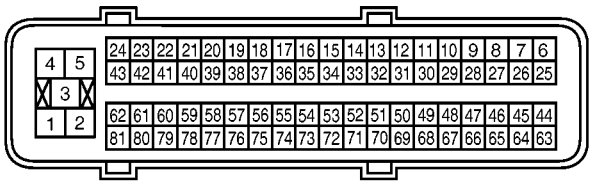
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS010BX

EC-TPS2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0291E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

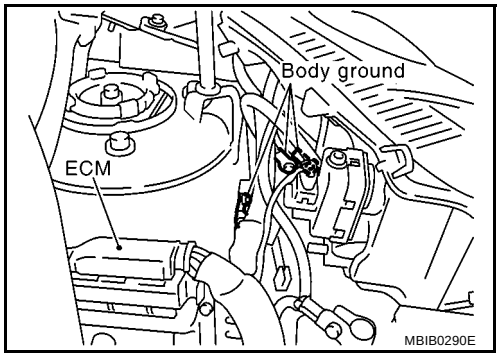
Diagnostic Procedure

EBS010BY

1. RETIGHTEN GROUND SCREWS

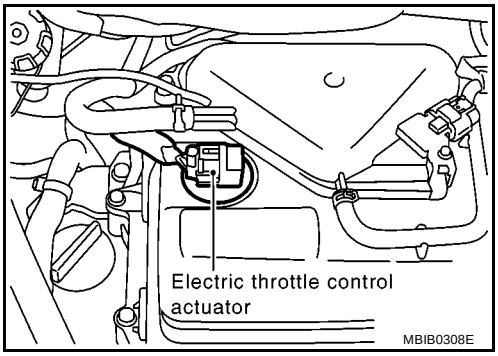
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



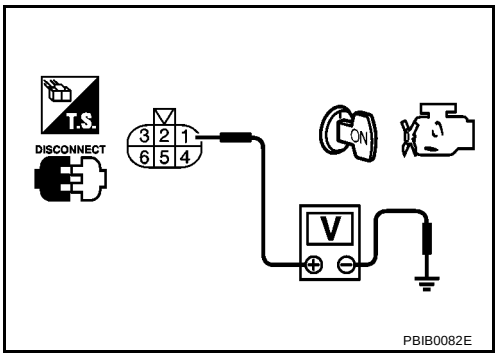
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-168, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

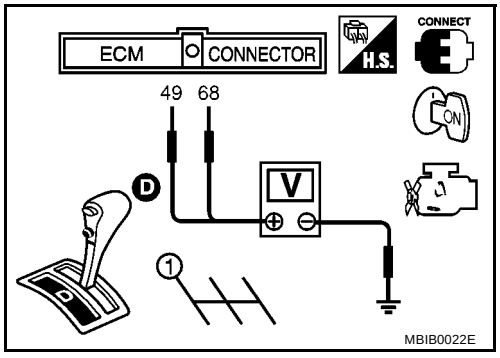
Component Inspection

EBS010BZ

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-42, "Throttle Valve Closed Position Learning" .
8. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS010C0

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

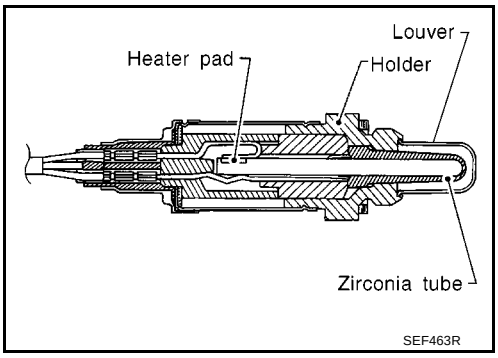
DTC P0132 HO2S1

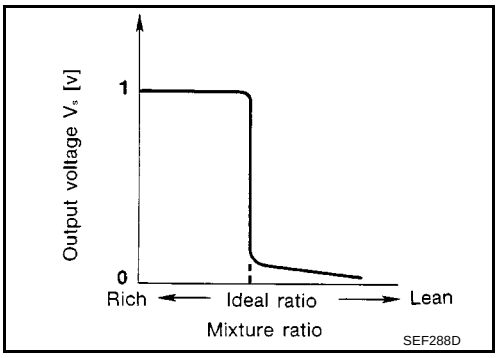
PFP:22690

Component Description

EBS00O5E

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00O5F

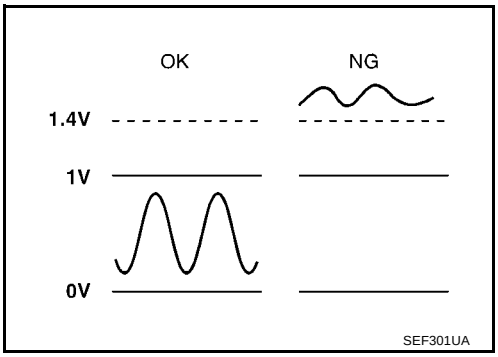
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00O5G

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 1

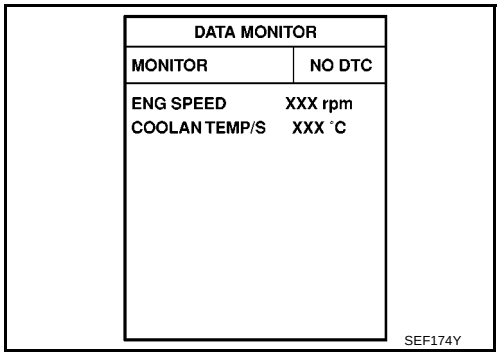
DTC Confirmation Procedure

EBS00O5H

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-172, "Diagnostic Procedure" .



WITH GST

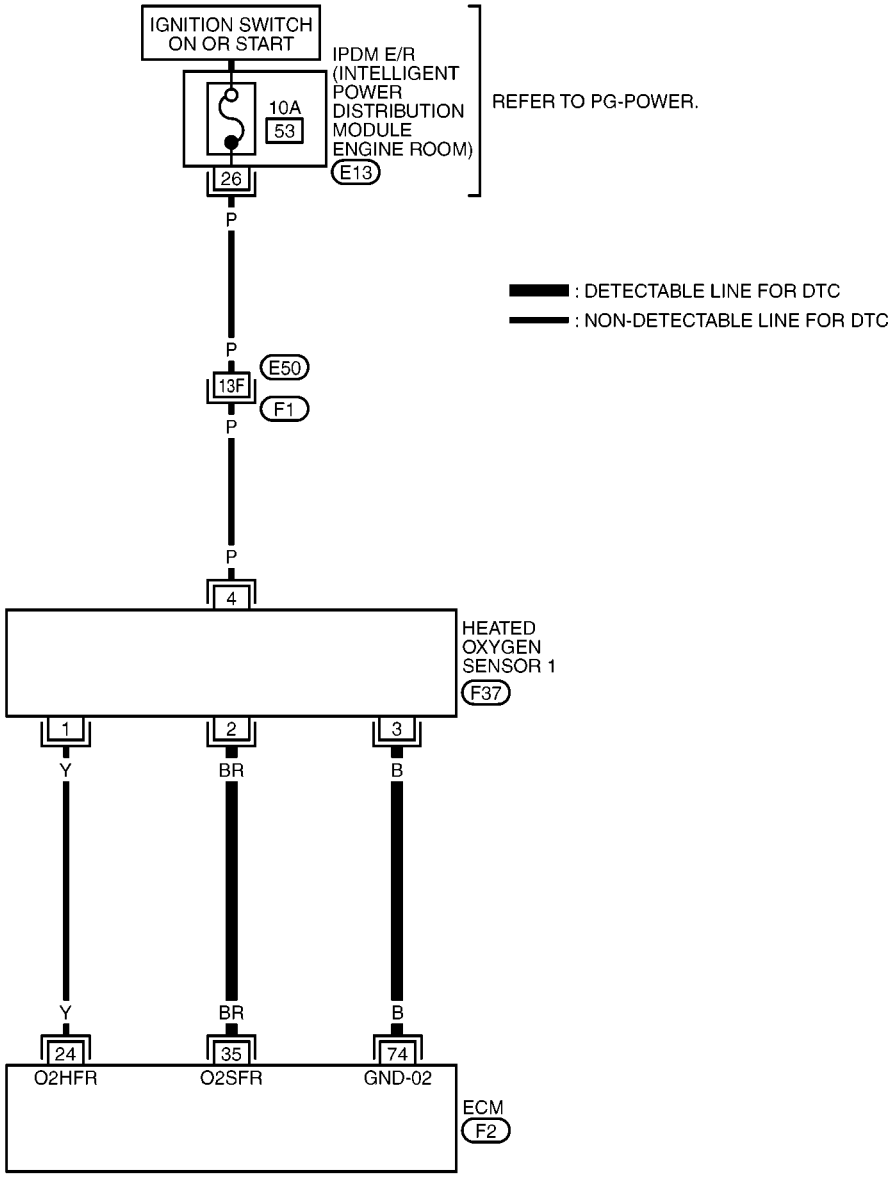
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Restart engine and let it idle for 2 minutes.
6. Select “MODE 3” with GST.
7. If DTC is detected, go to EC-172, "Diagnostic Procedure" .

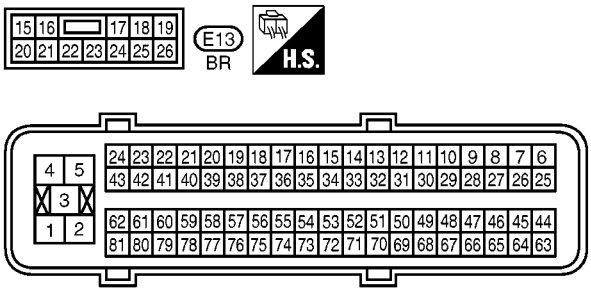
- **When using GST, DTC Confirmation Procedure should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EBS00O5I

EC-HO2S1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0272E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

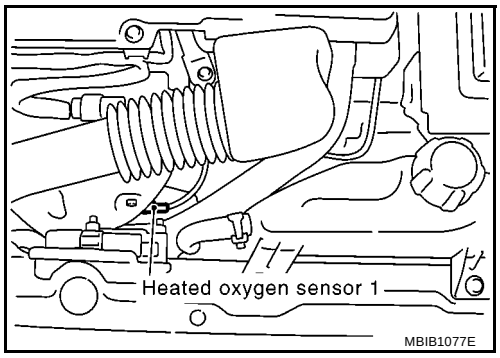
EBS00O5J

1. RETIGHTEN HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg-m, 30 - 44 ft-lb)

>> GO TO 2.



2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

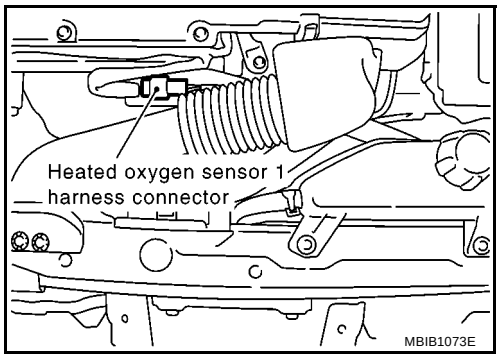
1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector
3. Check connectors for water

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-173, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace malfunctioning heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

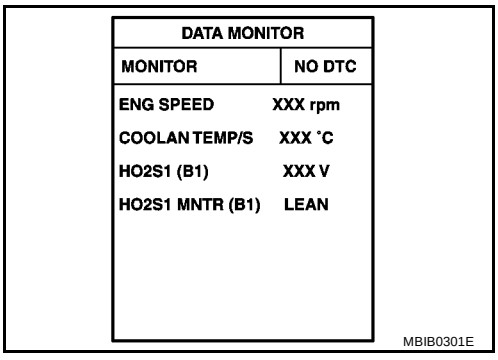
Component Inspection

EBS00O5K

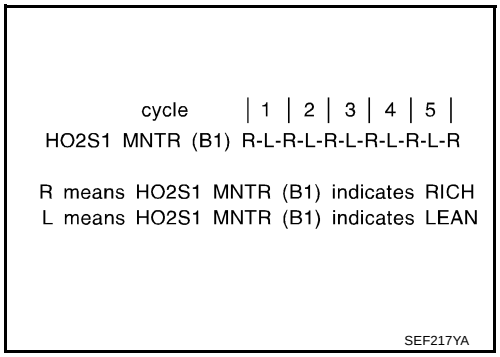
HEATED OXYGEN SENSOR 1

With CONSULT-II

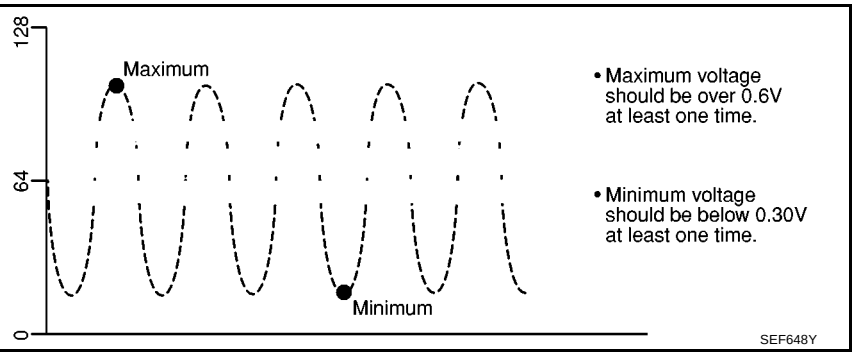
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX

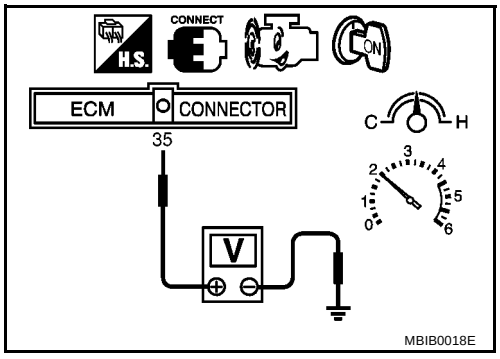


CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O5L

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

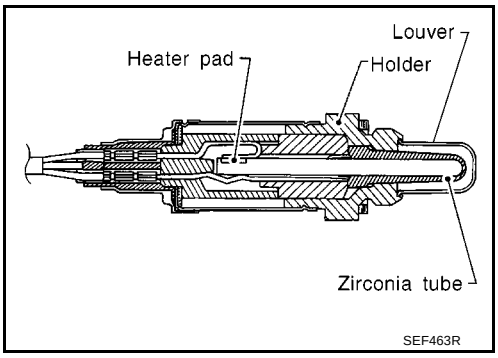
DTC P0133 HO2S1

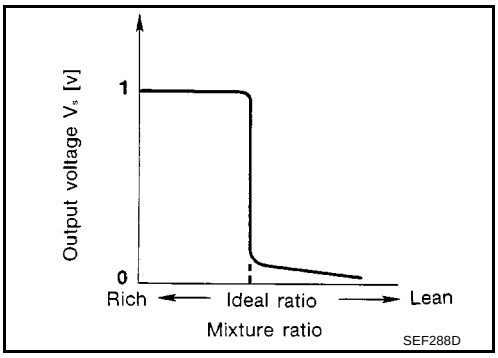
PFP:22690

Component Description

EBS00O5M

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00O5N

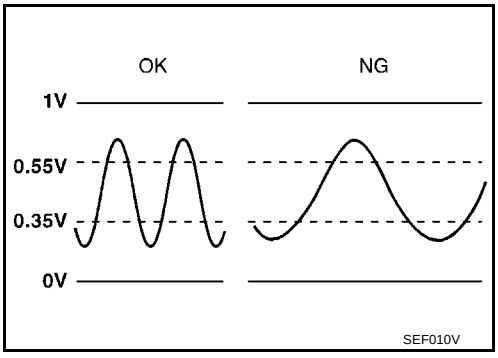
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00O5O

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks ● Exhaust gas leaks ● Manifold absolute pressure sensor

DTC Confirmation Procedure

EBS00O5P

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

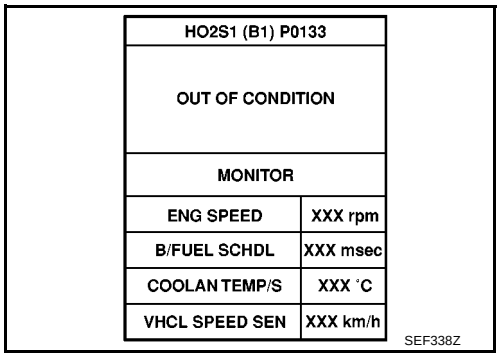
TESTING CONDITION:

- **Always perform at a temperature above −10°C (14°F).**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

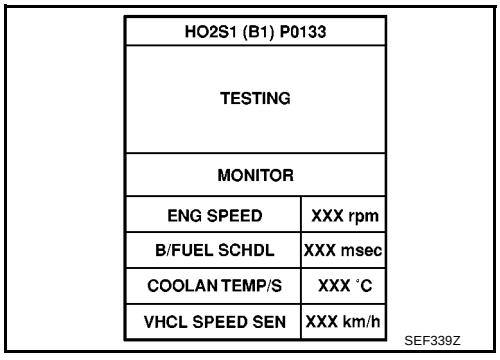
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



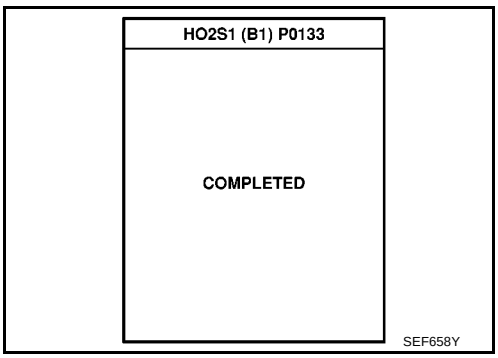
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 60 seconds.)



ENG SPEED	2,750 - 4,350 rpm (M/T models with CR 10 engine) 2,450 - 3,950 rpm (M/T models with CR 12 engine) 2,550 - 4,100 rpm (M/T models with CR 14 engine) 2,100 - 3,300 rpm (A/T models with CR 12 engine) 2,100 - 3,400 rpm (A/T models with CR 14 engine)
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	3.3 - 6.5 msec
Selector lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-179, "Diagnostic Procedure" .



Overall Function Check

EBS00O5Q

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

WITH GST

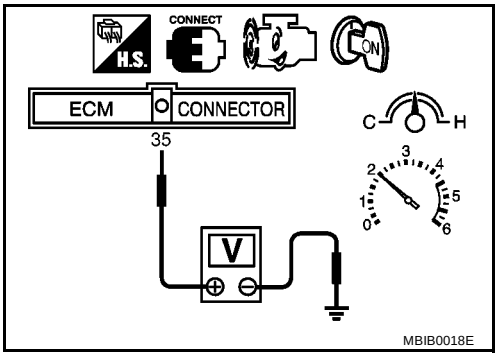
1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

1 time: **0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

2 times: **0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

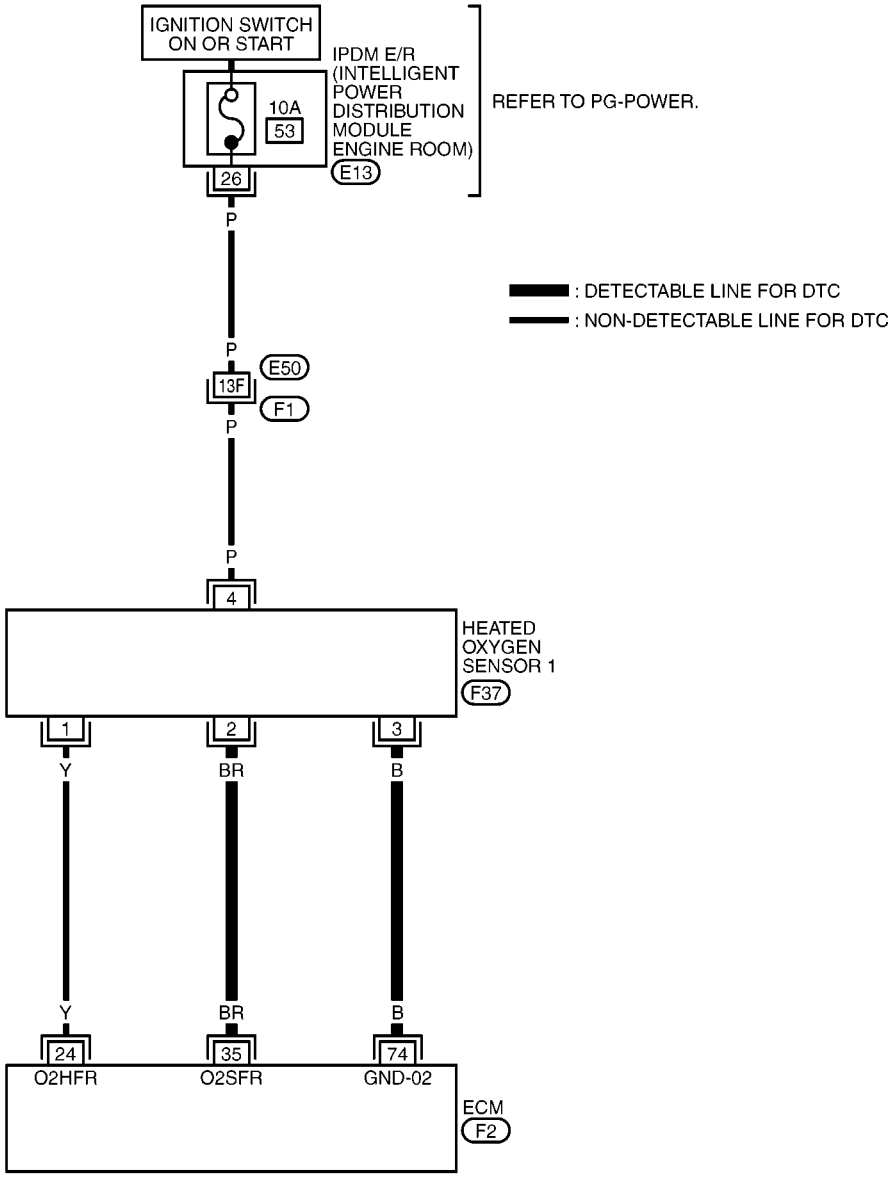
4. If NG, go to EC-179, "Diagnostic Procedure" .

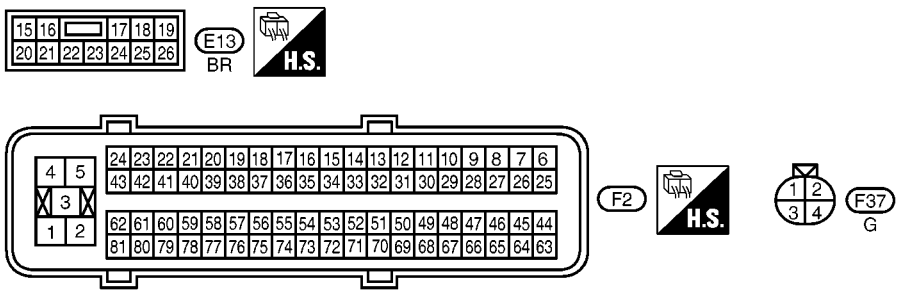


Wiring Diagram

EBS00O5R

EC-HO2S1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0272E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

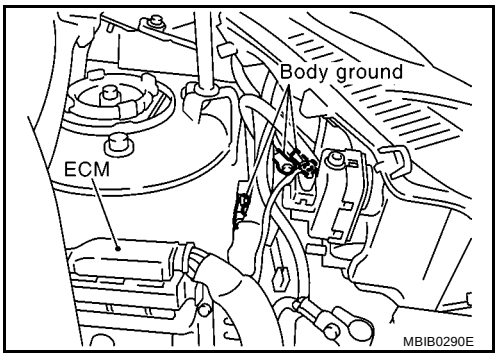
Diagnostic Procedure

EBS00O5S

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.

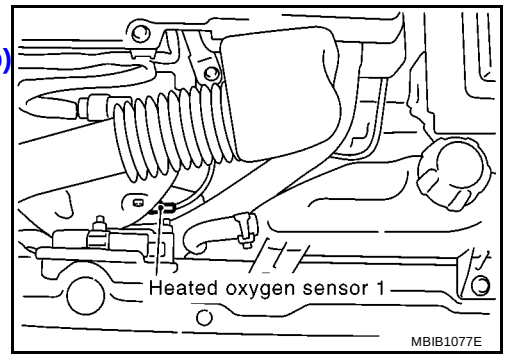


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

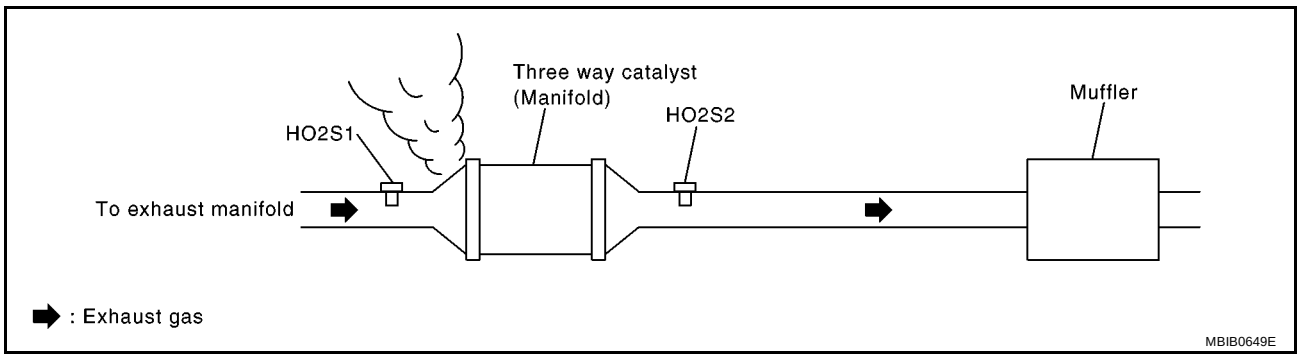
Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg-m, 30 - 44 ft-lb)

>> GO TO 3.



3. CHECK FOR EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (Manifold).



OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the manifold absolute pressure sensor.

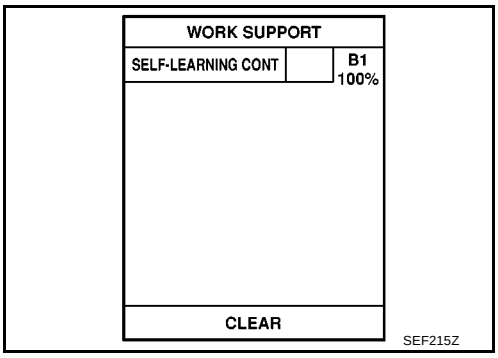
OK or NG

OK >> GO TO 5.
NG >> Repair or replace.

5. CLEAR THE SELF-LEARNING DATA

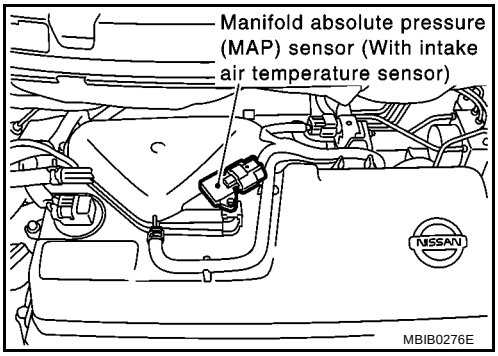
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171 or DTC P0172 (Refer to EC-208 or EC-215).
No >> GO TO 6.

6. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

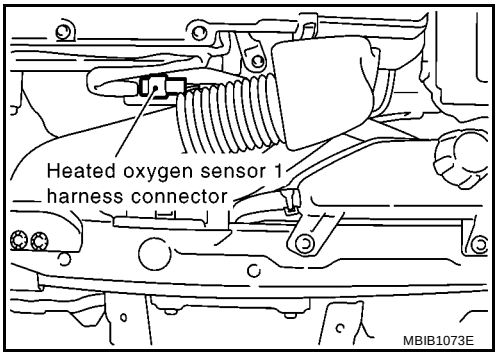
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3. Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



7. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-141, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace malfunctioning heated oxygen sensor 1.

9. CHECK MANIFOLD ABSOLUTE PRESSURE SENSOR

Refer to EC-151, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace manifold absolute pressure sensor.

10. CHECK PCV VALVE

Refer to EC-468, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace PCV valve.

11. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-182, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace heated oxygen sensor 1.

12. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS00O5T

HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.

3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

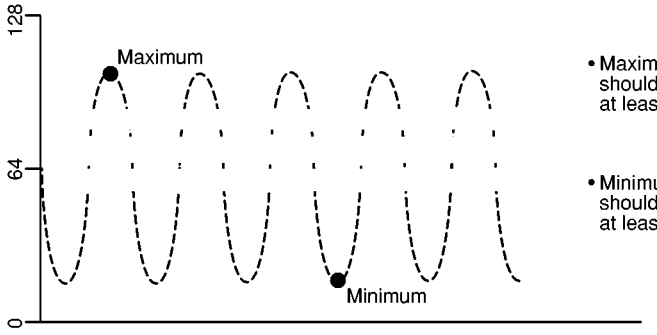
6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



SEF648Y

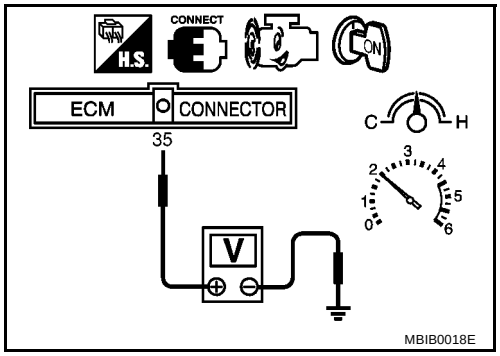
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O5U

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

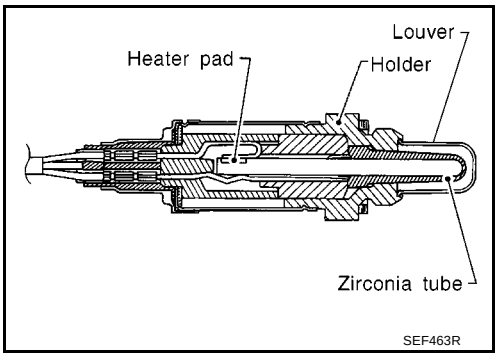
DTC P0134 HO2S1

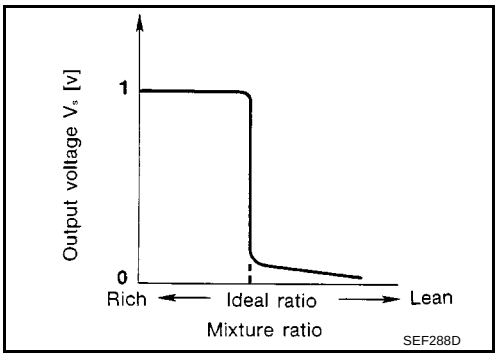
PFP:22690

Component Description

EBS00O5V

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00O5W

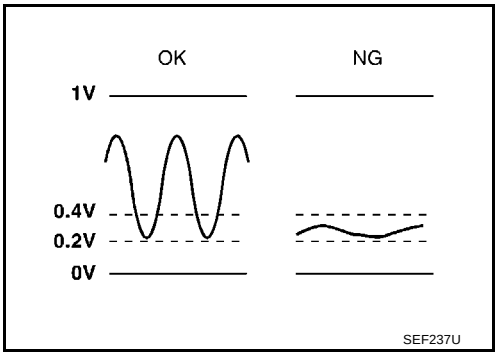
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00O5X

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 1

DTC Confirmation Procedure

EBS00O5Y

CAUTION:
Always drive vehicle at a safe speed.

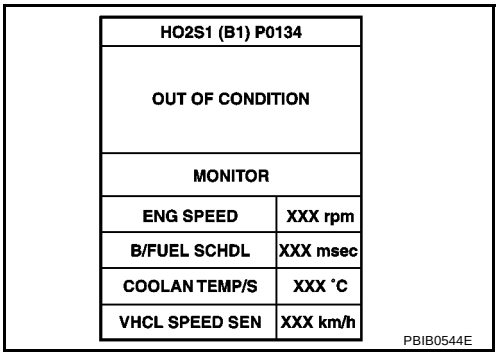
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

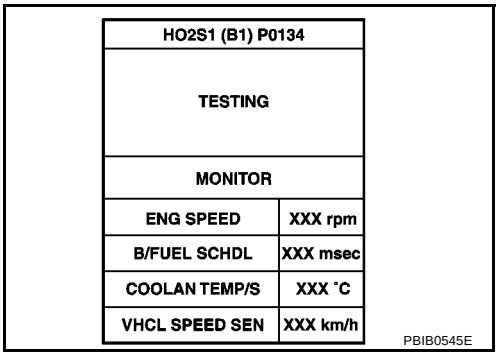
1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.



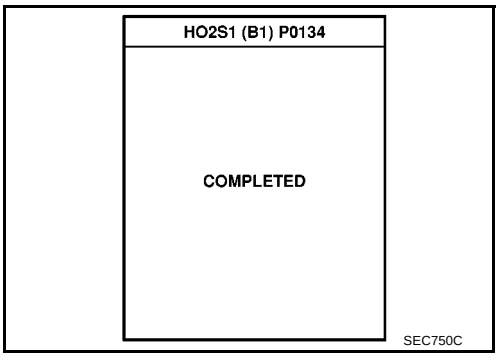
5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

ENG SPEED	2,400 - 4,700 rpm (M/T models with CR10 engine) 2,150 - 4,250 rpm (M/T models with CR12 engine) 2,200 - 4,400 rpm (M/T models with CR14 engine) 1,650 - 3,650 rpm (A/T models)
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.9 - 7.2 msec
Selector lever	Suitable position



If “TESTING” is not displayed after 5 minutes, retry from step 2.

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-189, "Diagnostic Procedure" .



Overall Function Check

EBS00O5Z

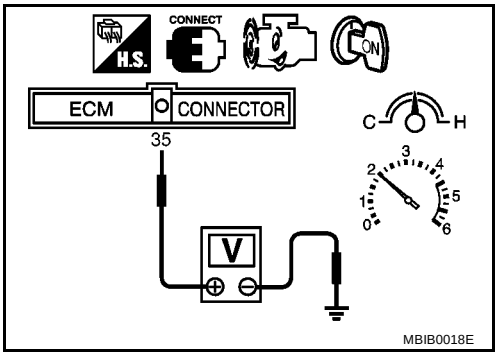
Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage does not remain in the range of 0.2 to 0.4V.

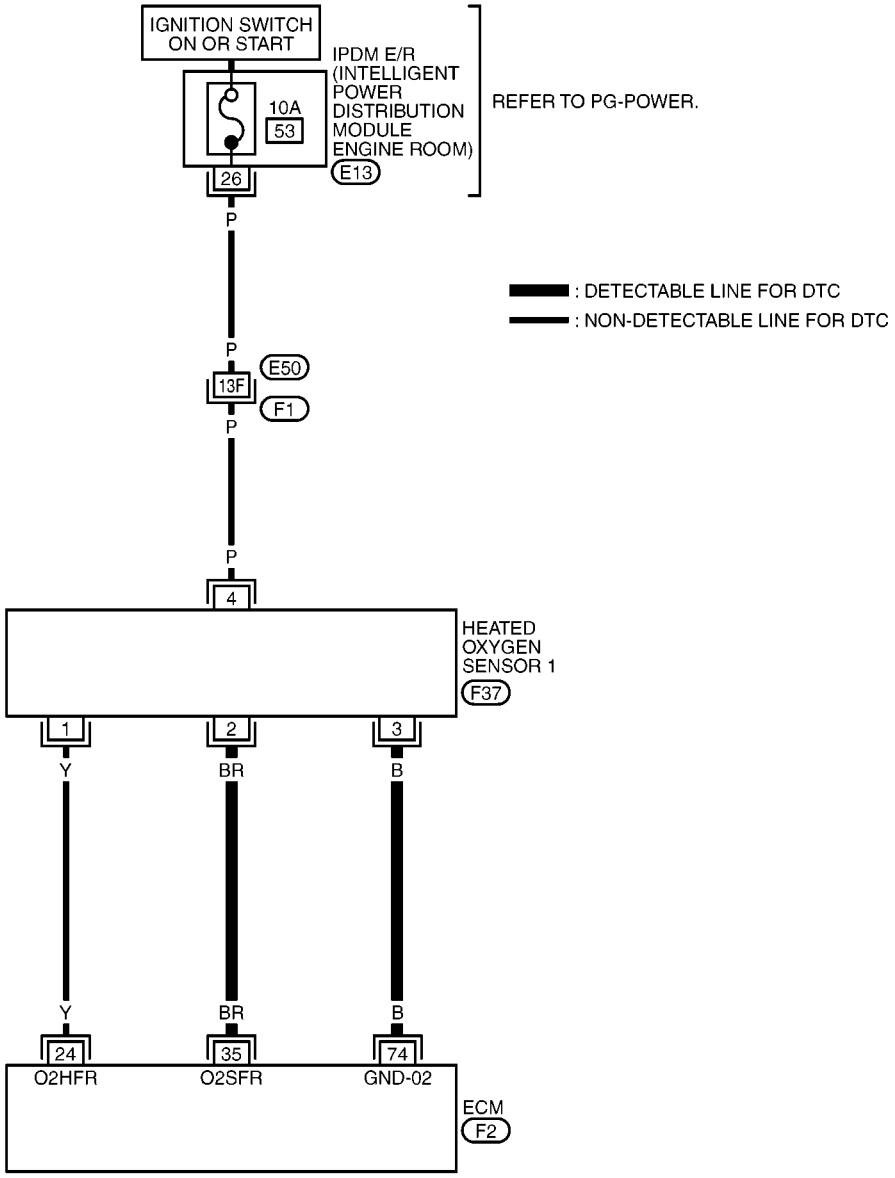
4. If NG, go to EC-189, "Diagnostic Procedure" .

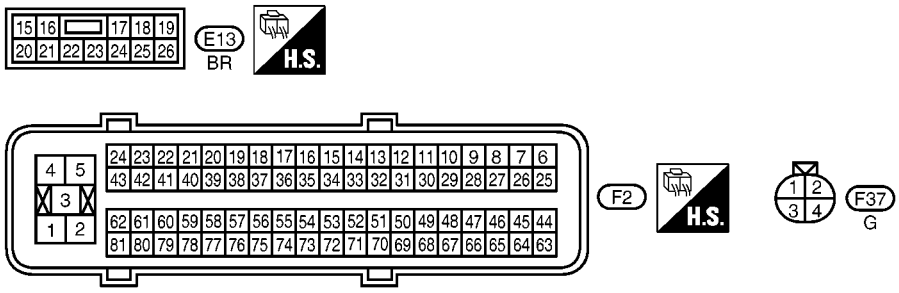


Wiring Diagram

EBS00O60

EC-HO2S1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0272E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

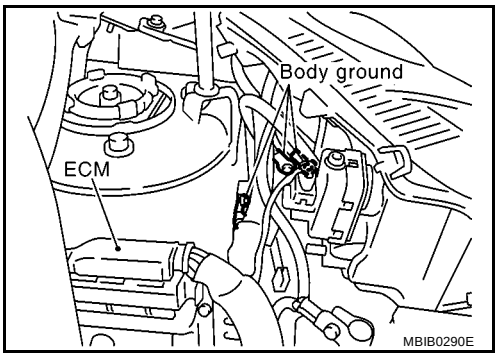
Diagnostic Procedure

EBS00O61

1. INSPECTION START

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

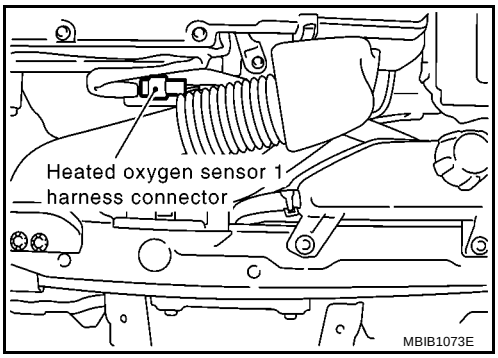
1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-190, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

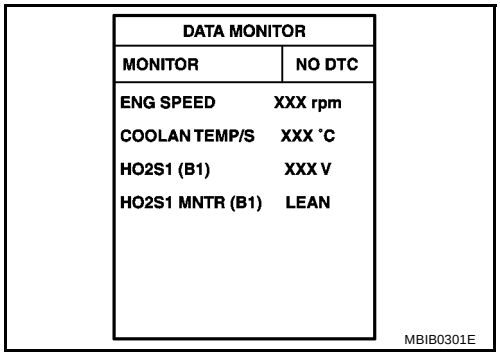
Component Inspection

EBS00O62

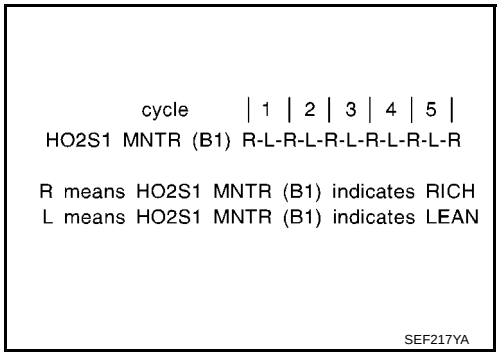
HEATED OXYGEN SENSOR 1

With CONSULT-II

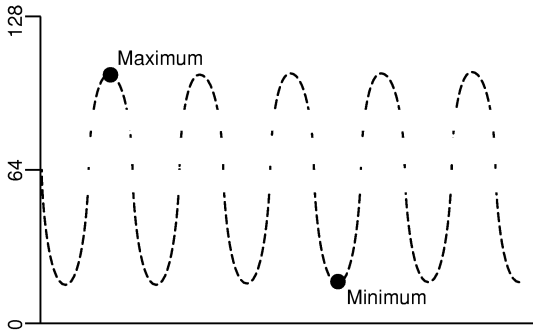
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



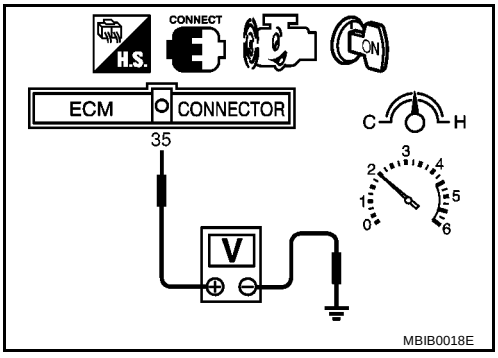
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O63

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

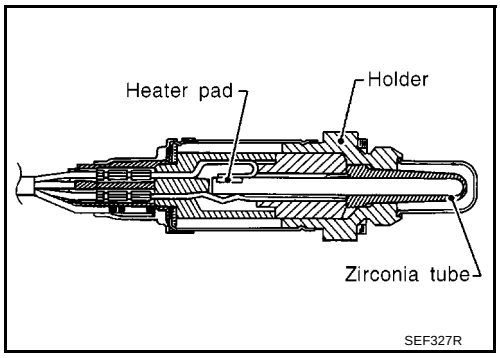
DTC P0138 HO2S2

PFP:226A0

Component Description

EBS00O64

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O65

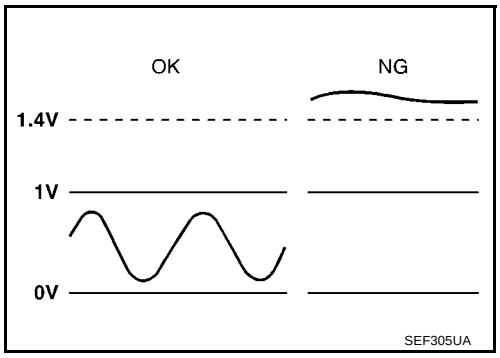
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

EBS00O66

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2

DTC Confirmation Procedure

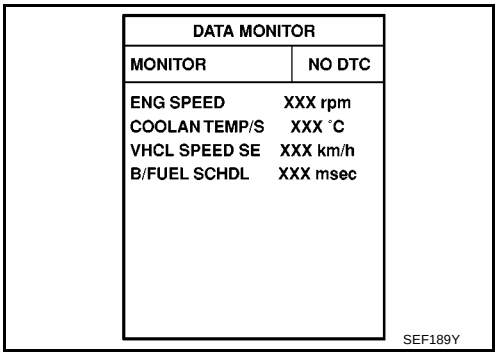
EBS00O67

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-195, "Diagnostic Procedure" .



WITH GST

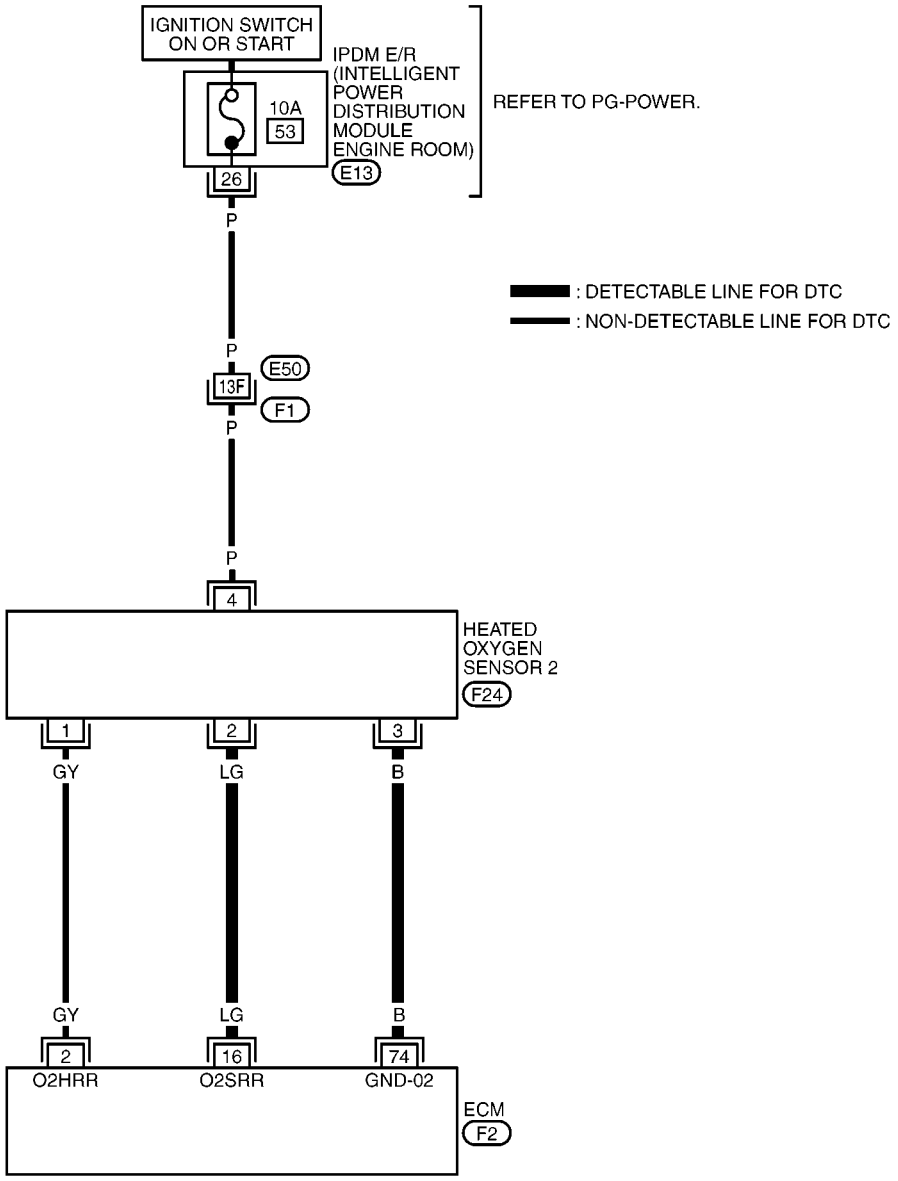
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 2 minutes.
8. Select “MODE 3” with GST.
9. If NG, go to EC-195, "Diagnostic Procedure" .

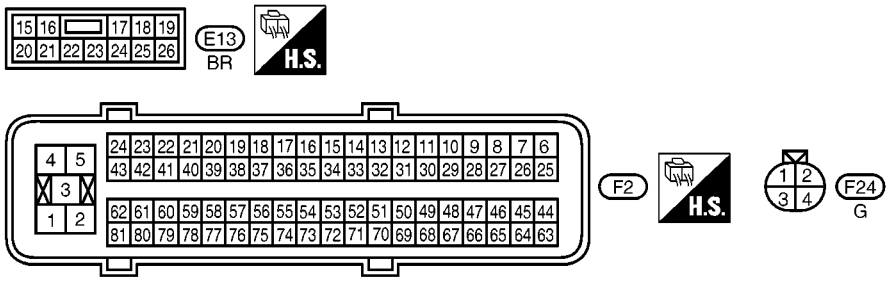
- **When using GST, DTC Confirmation Procedure should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

Wiring Diagram

EBS00O69

EC-HO2S2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0273E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

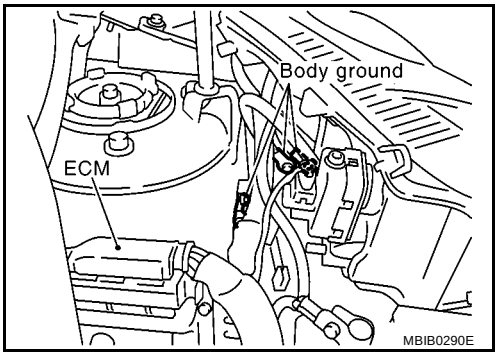
Diagnostic Procedure

EBS00O6A

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

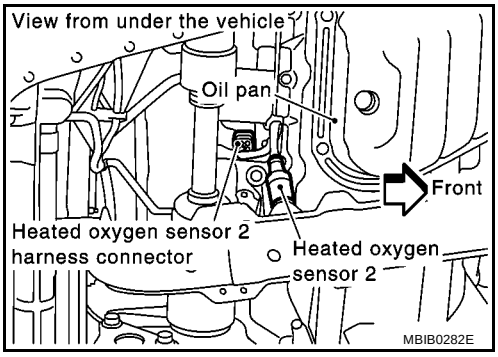
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-196, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

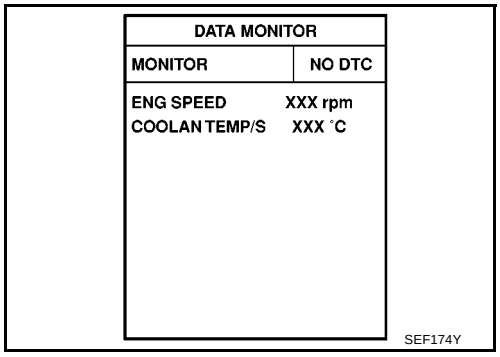
Component Inspection

EBS00O6B

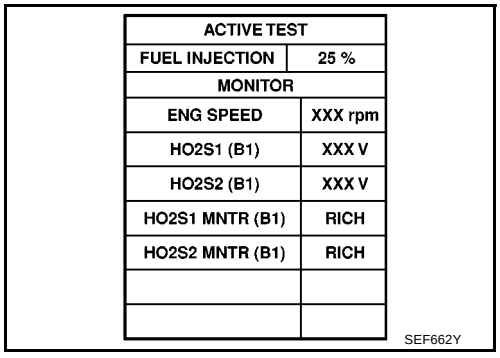
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select ″DATA MONITOR″ mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

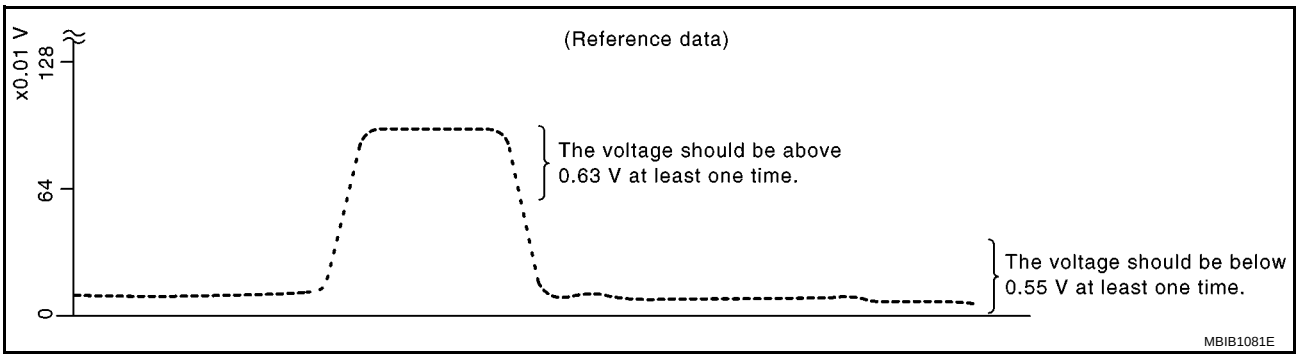


6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2(B1)” as the monitor item with CONSULT-II.



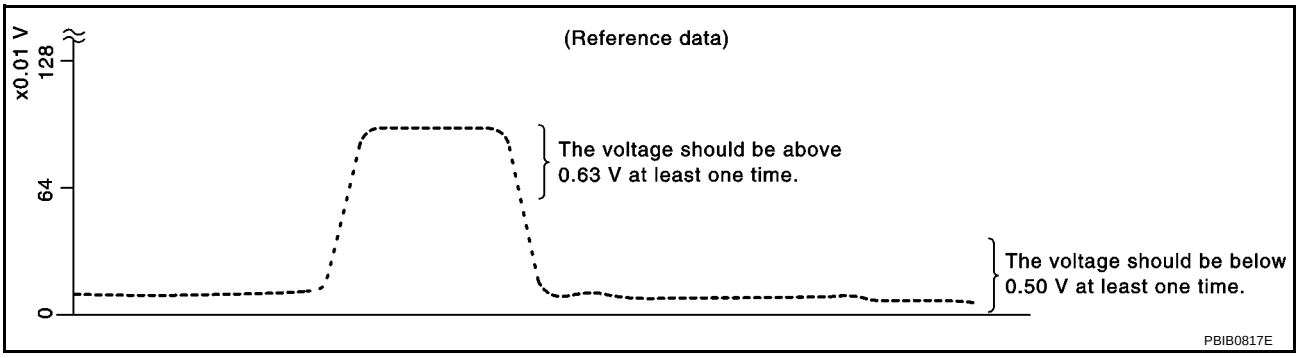
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.

[CR10 engine models]



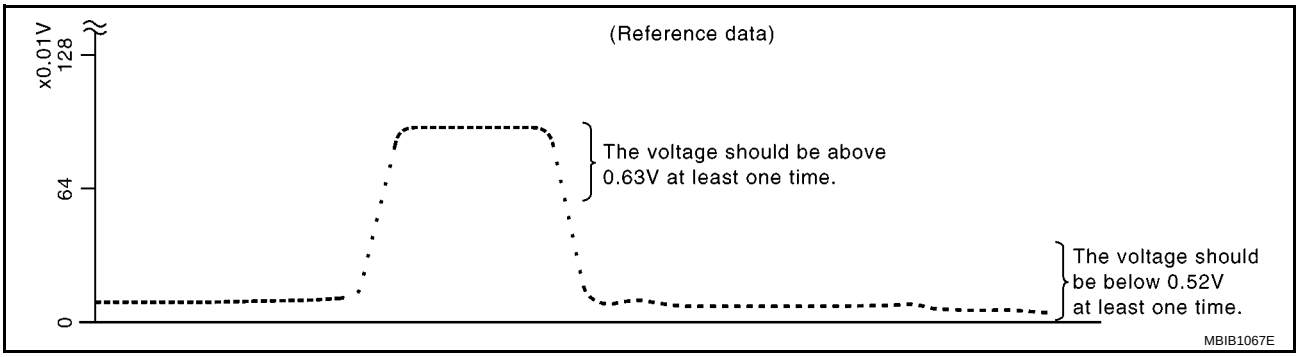
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.55V at least once when the "FUEL INJECTION" is −25%.

[A/T models with CR14 engine without ESP]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is −25%.

[Except above models]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is −25%.

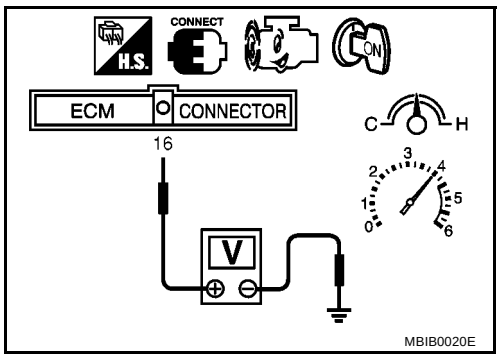
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
The voltage should be below 0.55V (CR10 engine models), 0.50V (A/T models with CR14 engine without ESP), 0.52V (Other models) at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O6C

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

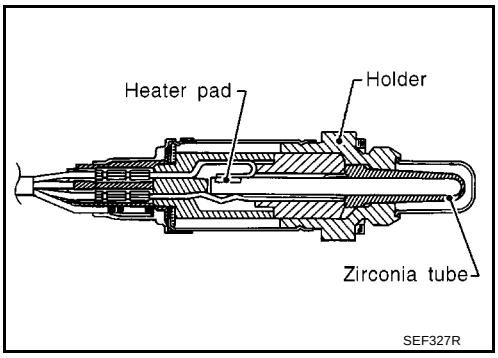
DTC P0139 HO2S2

PFP:226A0

Component Description

EBS00O6D

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O6E

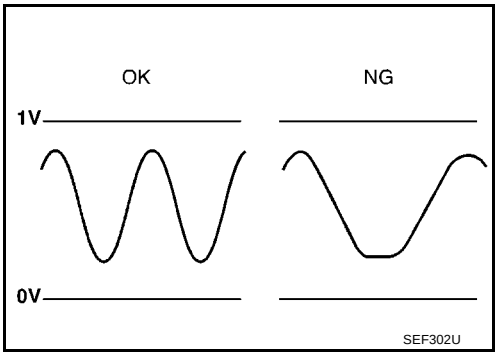
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

EBS00O6F

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

EBS00O6G

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
- **"COMPLETED" will appear on CONSULT-II screen when all tests "COND1", "COND2" and "COND3" are completed.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Never stop engine during this procedure. If the engine is stopped, retry this procedure from step 2 in Procedure for COND1.

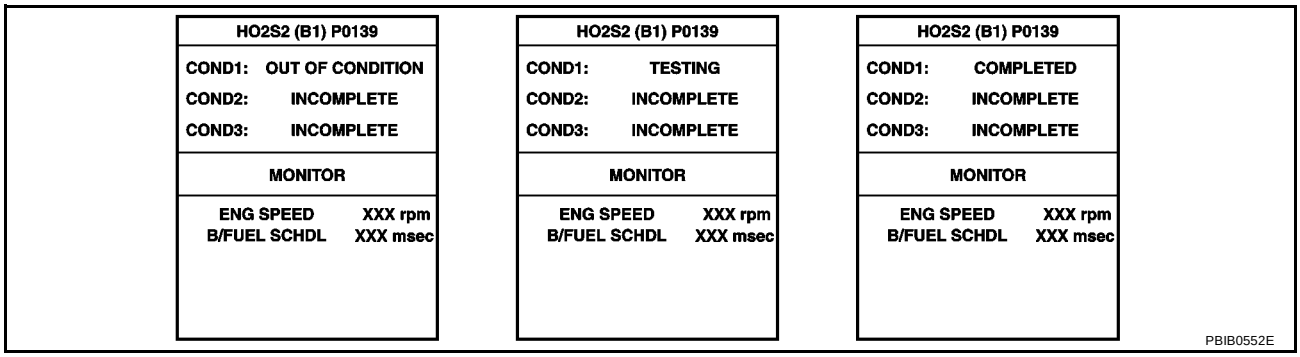
WITH CONSULT-II

Procedure for COND1

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°(32 to 86°F).

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
7. Start engine and let it idle for at least 30 seconds.
8. Rev engine up to 2,000 rpm 2 or 3 times quickly under no load.
   If "COMPLETED" appears on CONSULT-II screen, go to step 2 in "Procedure for COND3".
   If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.
9. When the following conditions are met, "TESTING" will be displayed at "COND1" on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 60 seconds.)

ENG SPEED	More than 1,000 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLANT TEMP/S	70 - 105 °C (158 - 221°F)
Selector level	Suitable position

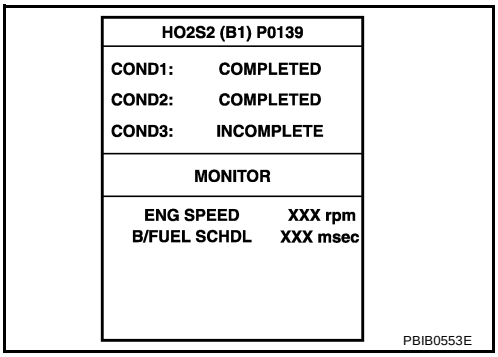


NOTE:
- **If "TESTING" is not displayed after 5 minutes, retry from step 2 in Procedure for COND1.**
- **If "COMPLETED" already appears at "COND2" on CONSULT-II screen before Procedure for COND2 is conducted, it is unnecessary to conduct step 1 in Procedure for COND2.**

Procedure for COND2

1. While driving, release accelerator pedal completely from the above condition [step 9] until “INCOMPLETE” at “COND2” on CONSULT-II screen has turned to “COMPLETED”. (It will take approximately 4 seconds.)

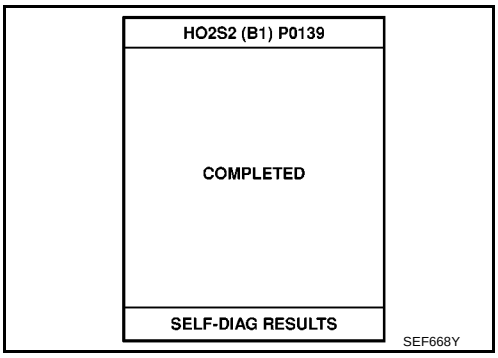
NOTE:
If “COMPLETED” already appears at “COND3” on CONSULT-II screen before Procedure for COND3 is conducted, it is unnecessary to conduct step 1 in Procedure for COND3.



Procedure for COND3

1. Stop vehicle and let it idle until “INCOMPLETE” of “COND3” on CONSULT-II screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)
2. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
   If “NG” is displayed, refer to EC-203, "Diagnostic Procedure" .
   If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Turn ignition switch ON and select “COOLANTEMP/S” in “DATA MONITOR” mode with CONSULT-II.
c. Start engine and warm it up while monitoring “COOLANTEMP/S” indication on CONSULT-II.
d. When “COOLANTEMP/S” indication reaches to 70°(158°F), go to procedure for COND1 step 3.



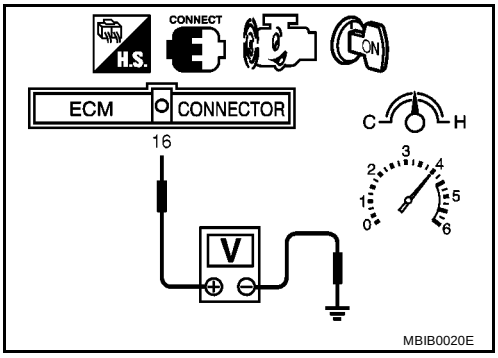
Overall Function Check

EBS00O6H

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

WITH GST

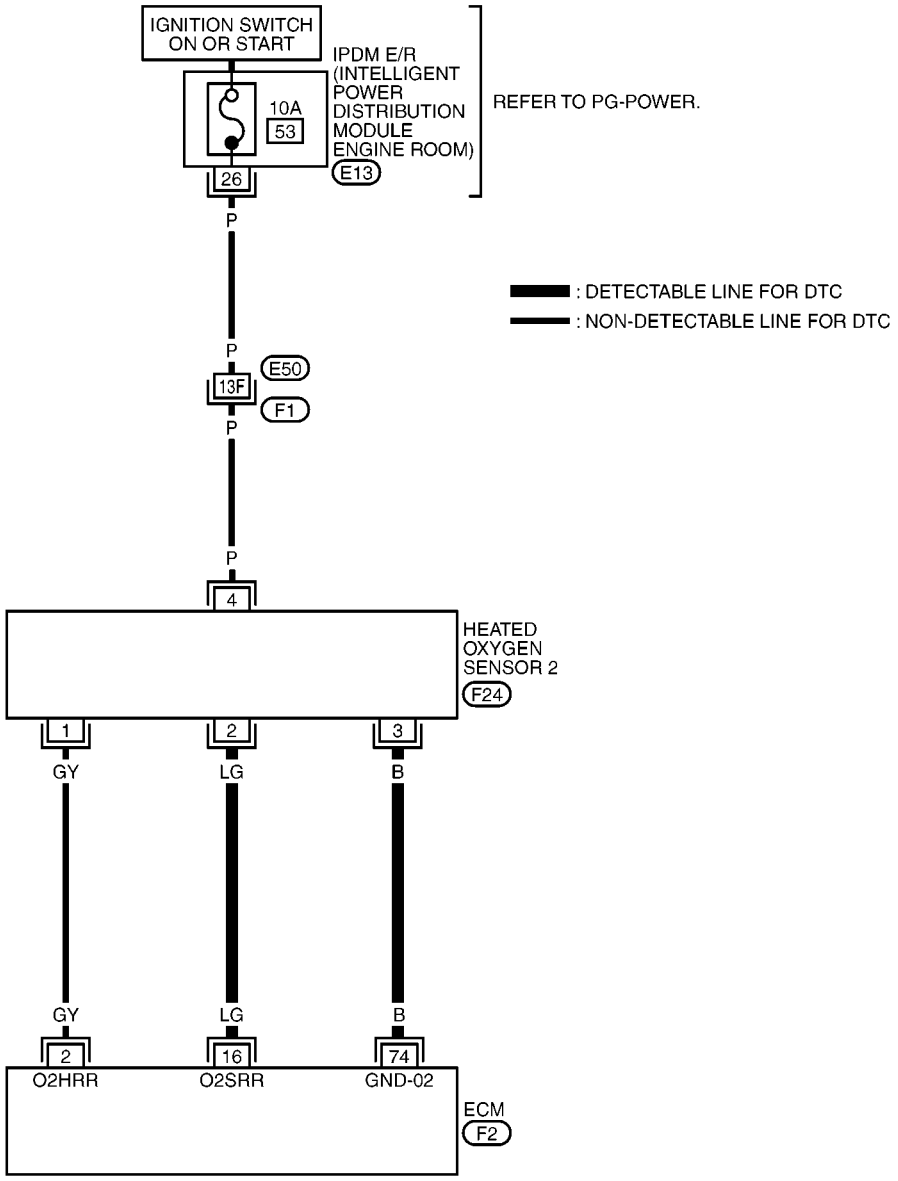
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   A change of voltage should be more than 0.06V for 1 second during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
   A change of voltage should be more than 0.06V for 1 second during this procedure.
8. If NG, go to EC-203, "Diagnostic Procedure" .

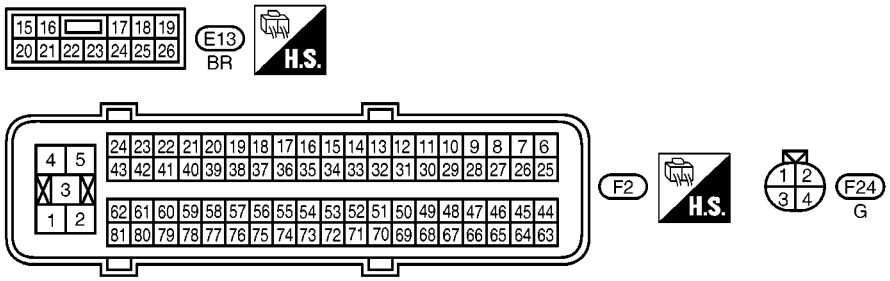


Wiring Diagram

EBS00O6I

EC-HO2S2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0273E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed at between 3,500 to 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

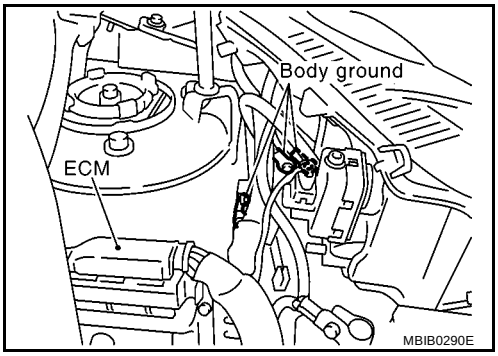
Diagnostic Procedure

EBS00O6J

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

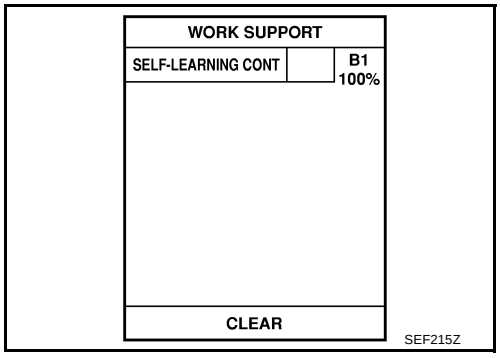
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

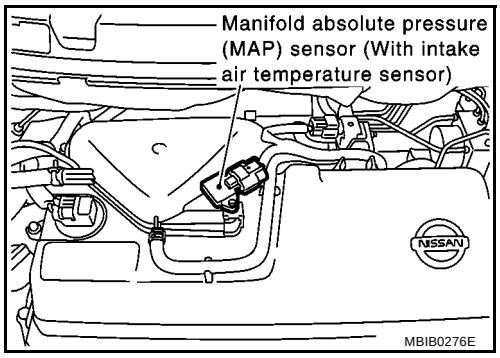
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-208 or EC-215 .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

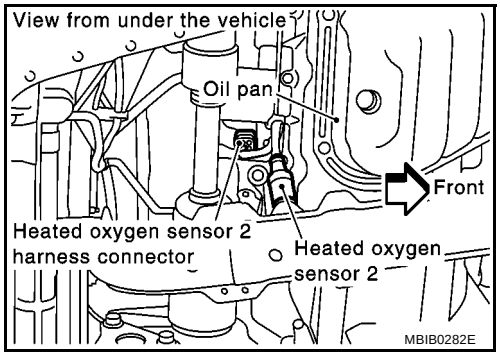
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2. Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground. Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-205, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

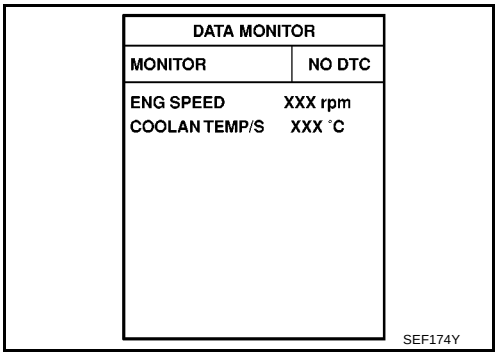
Component Inspection

EBS00O6K

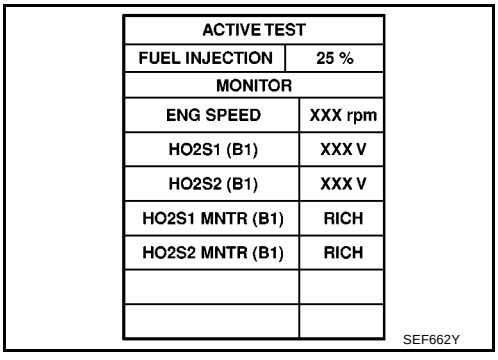
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

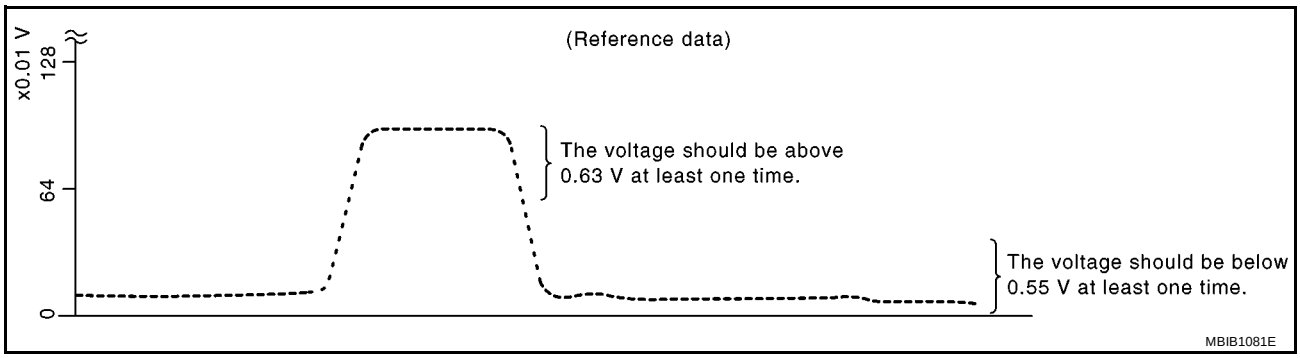


6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



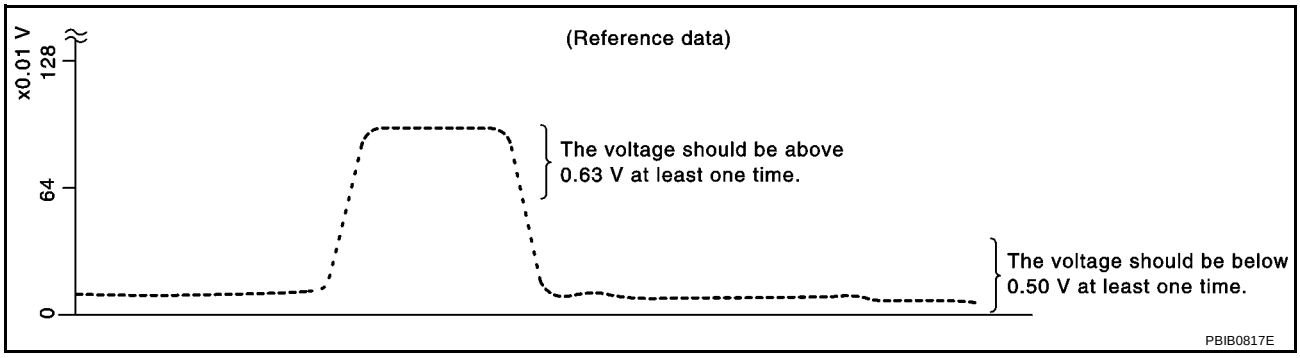
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.

[CR10 engine models]



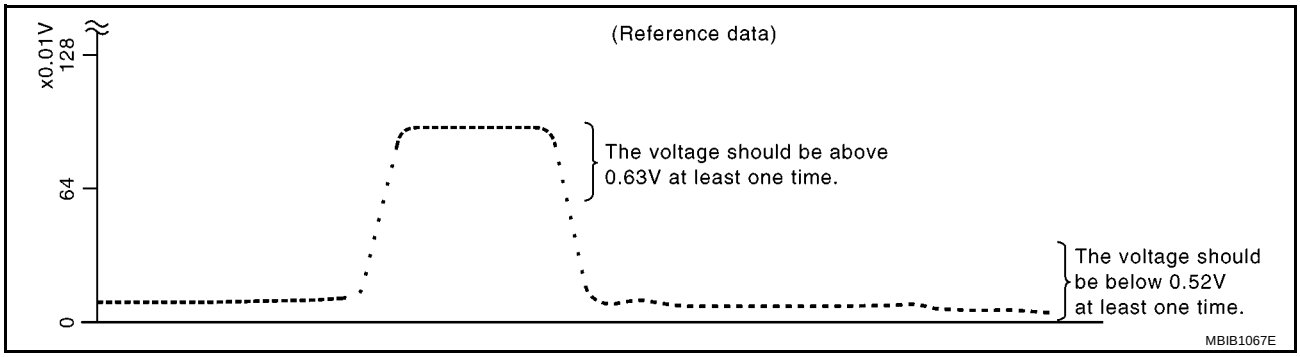
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.55V at least once when the "FUEL INJECTION" is −25%.

[A/T models with CR14 engine without ESP]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is −25%.

[Except above models]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is −25%.

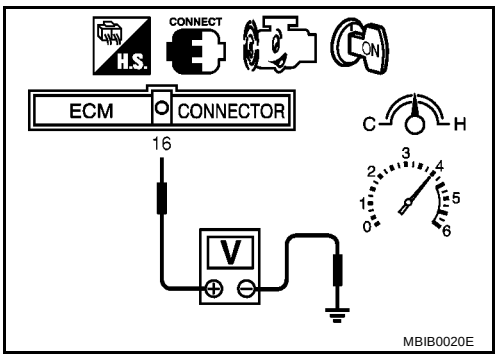
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
The voltage should be below 0.55V (CR10 engine models), 0.50V (A/T models with CR14 engine without ESP), 0.52V (Other models) at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00O6L

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

EBS00O6M

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0171 0171	Fuel injection system too lean	● Fuel injection system does not operate properly. ● The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	● Intake air leaks ● Heated oxygen sensor 1 ● Injectors ● Exhaust gas leaks ● Incorrect fuel pressure ● Lack of fuel ● Manifold absolute pressure sensor ● Incorrect PCV hose connection

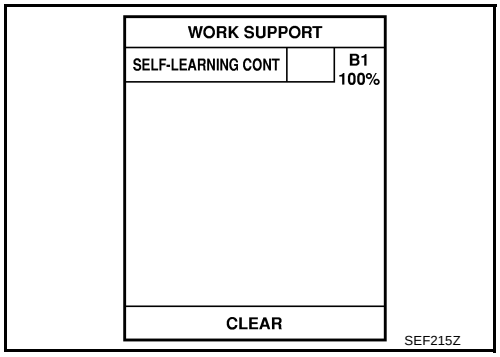
DTC Confirmation Procedure

EBS00O6N

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

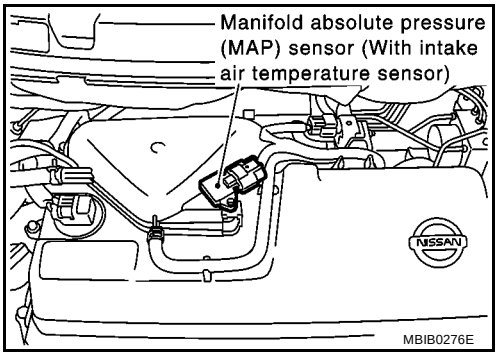
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes.
   The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-211, "Diagnostic Procedure" .
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal. If engine starts, go to EC-211, "Diagnostic Procedure" . If engine does not start, check exhaust and intake air leak visually.



WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect manifold absolute pressure sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Select “MODE 3” with GST. Make sure DTC P0107 is detected.
6. Select “MODE 4” with GST and erase the DTC P0107.
7. Start engine again and let it idle for at least 10 minutes.
8. Select “MODE 7” with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-211, "Diagnostic Procedure" .

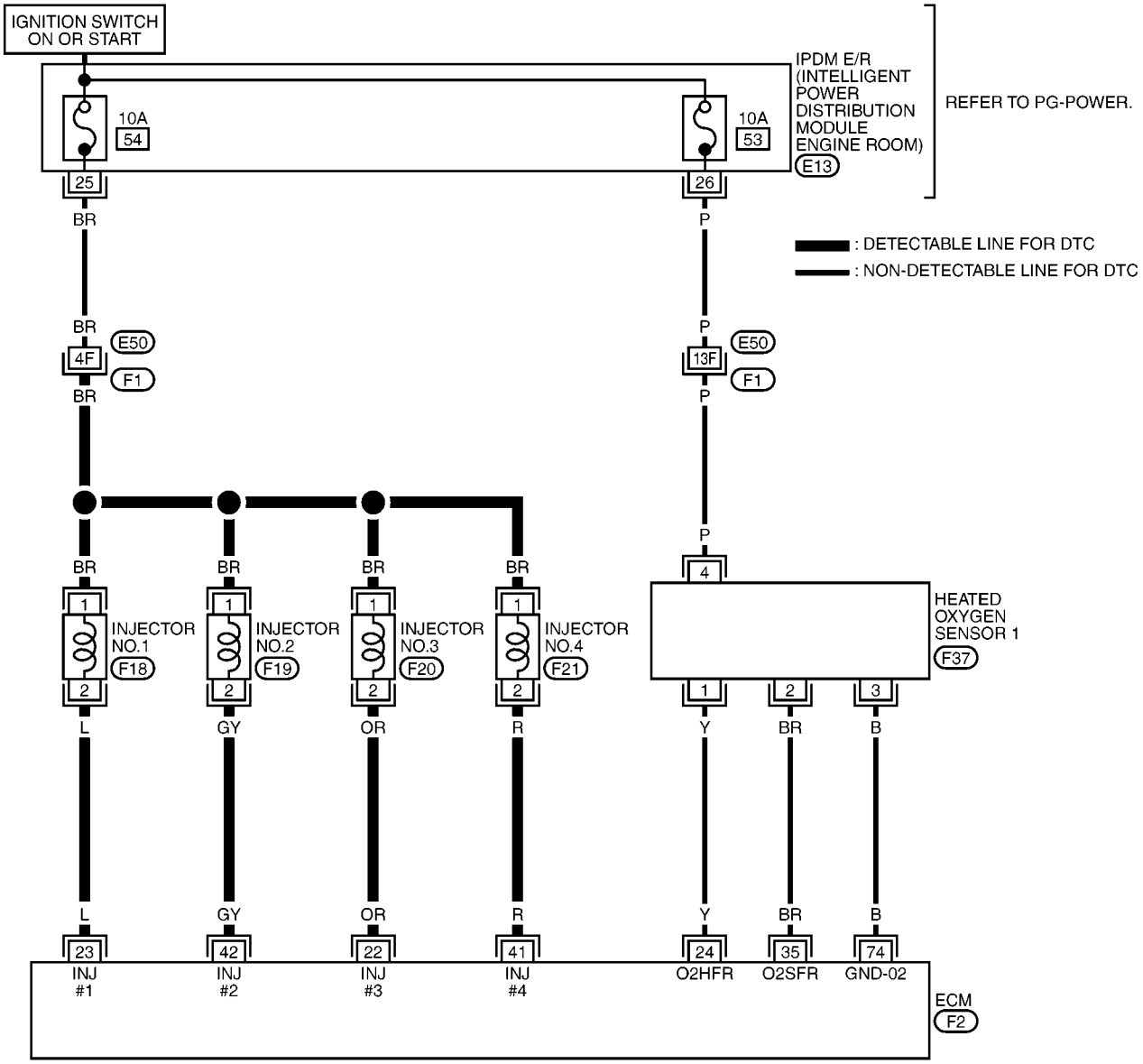


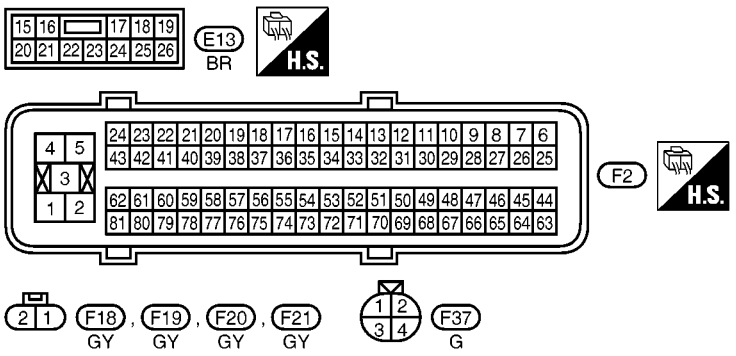
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal. If engine starts, go to EC-211, "Diagnostic Procedure" . If engine does not start, check exhaust and intake air leak visually.

Wiring Diagram

EBS00O6O

EC-FUEL-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

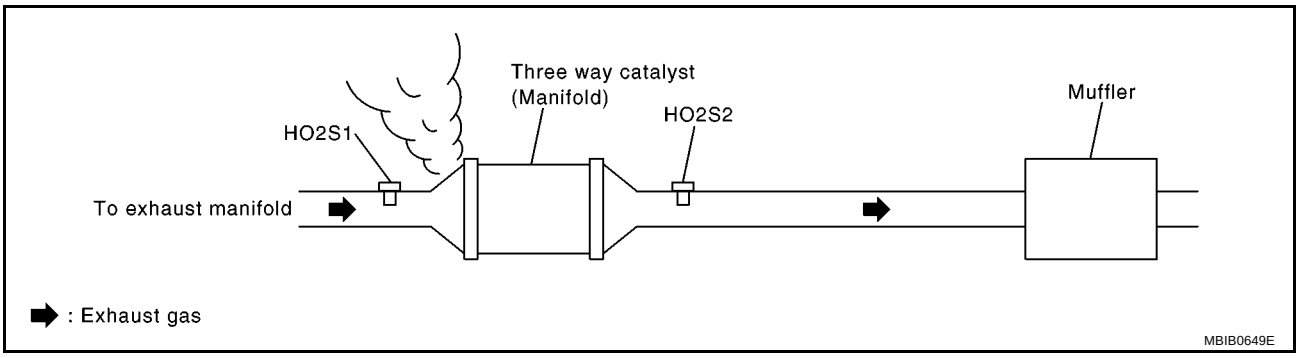
MBWA0274E

Diagnostic Procedure

EBS00O6P

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the manifold absolute pressure sensor.
2. Check PCV hose connection.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

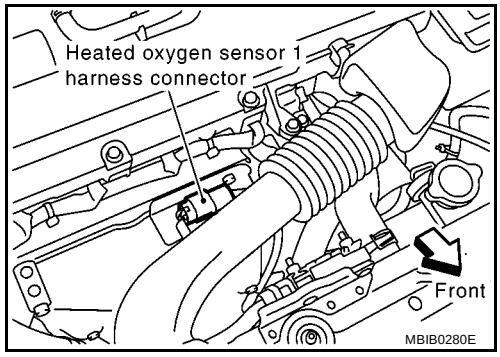
3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.



6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-44, "FUEL PRESSURE RELEASE" .
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-45, "FUEL PRESSURE CHECK" .

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2 , 51 psi)

OK or NG

OK >> GO TO 5.
NG >> Follow the construction of “FUEL PRESSURE CHECK” (EC-44).

5. CHECK MANIFOLD ABSOLUTE PRESSUR SENSOR

With CONSULT-II

1. Install all removed parts.
2. Check manifold absolute pressure sensor signal with CONSULT-II.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check manifold absolute pressure sensor signal in MODE 1 with GST.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

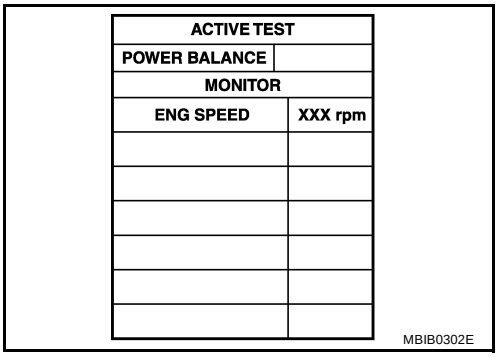
OK or NG

OK >> GO TO 6.
NG >> Check connectors for rusted terminals or loose connections in the manifold absolute pressure sensor circuit or engine grounds. Refer to EC-148, "DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR" .

6. CHECK FUNCTION OF INJECTORS

With CONSULT-II

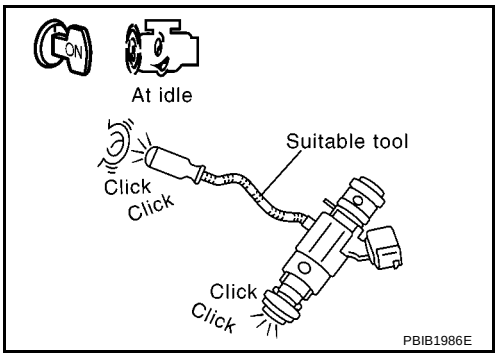
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



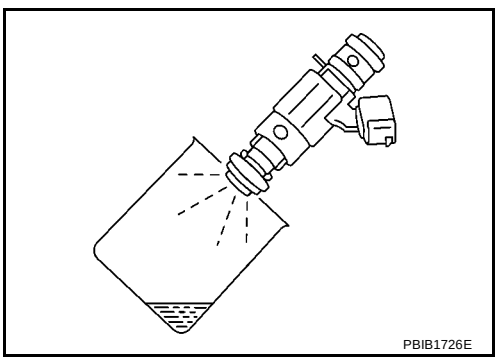
OK or NG

OK >> GO TO 7.
NG >> Perform trouble diagnosis for “INJECTORS”, EC-444, "INJECTOR CIRCUIT" .

7. CHECK INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Remove injector gallery assembly. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all injectors connected to injector gallery.
   The injector harness connectors should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injector.
6. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

Fuel should be sprayed evenly for each injector.



OK or NG

OK >> GO TO 8.
NG >> Replace injectors from which fuel does not spray out. Always replace O-ring with new ones.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

EBS00O6Q

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensors 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MI (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injectors

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0172 0172	Fuel injection system too rich	● Fuel injection system does not operate properly. ● The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	● Heated oxygen sensor 1 ● Injectors ● Exhaust gas leaks ● Incorrect fuel pressure ● Manifold absolute pressure sensor

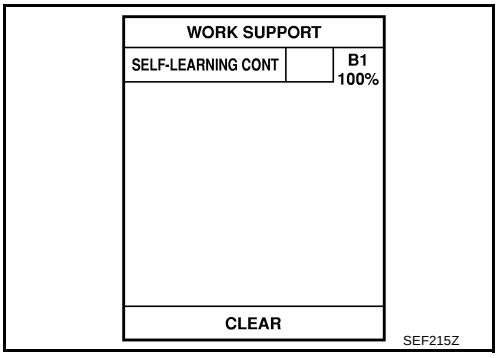
DTC Confirmation Procedure

EBS00O6R

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

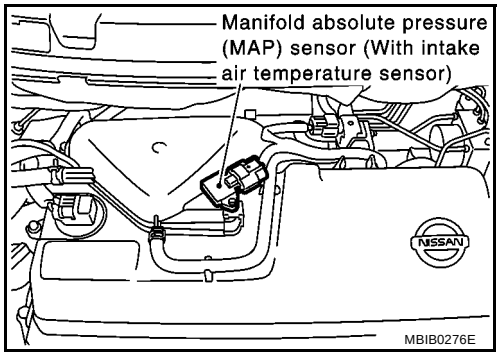
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes.
   The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-218, "Diagnostic Procedure" .
7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal.
   If engine starts, go to EC-218, "Diagnostic Procedure" . If engine does not start, remove ignition plugs and check for fouling, etc.



WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect manifold absolute pressure sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Select “MODE 3” with GST. Make sure DTC P0107 is detected.
6. Select “MODE 4” with GST and erase the DTC P0107.
7. Start engine again and let it idle for at least 10 minutes.
8. Select “MODE 7” with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-218, "Diagnostic Procedure" .

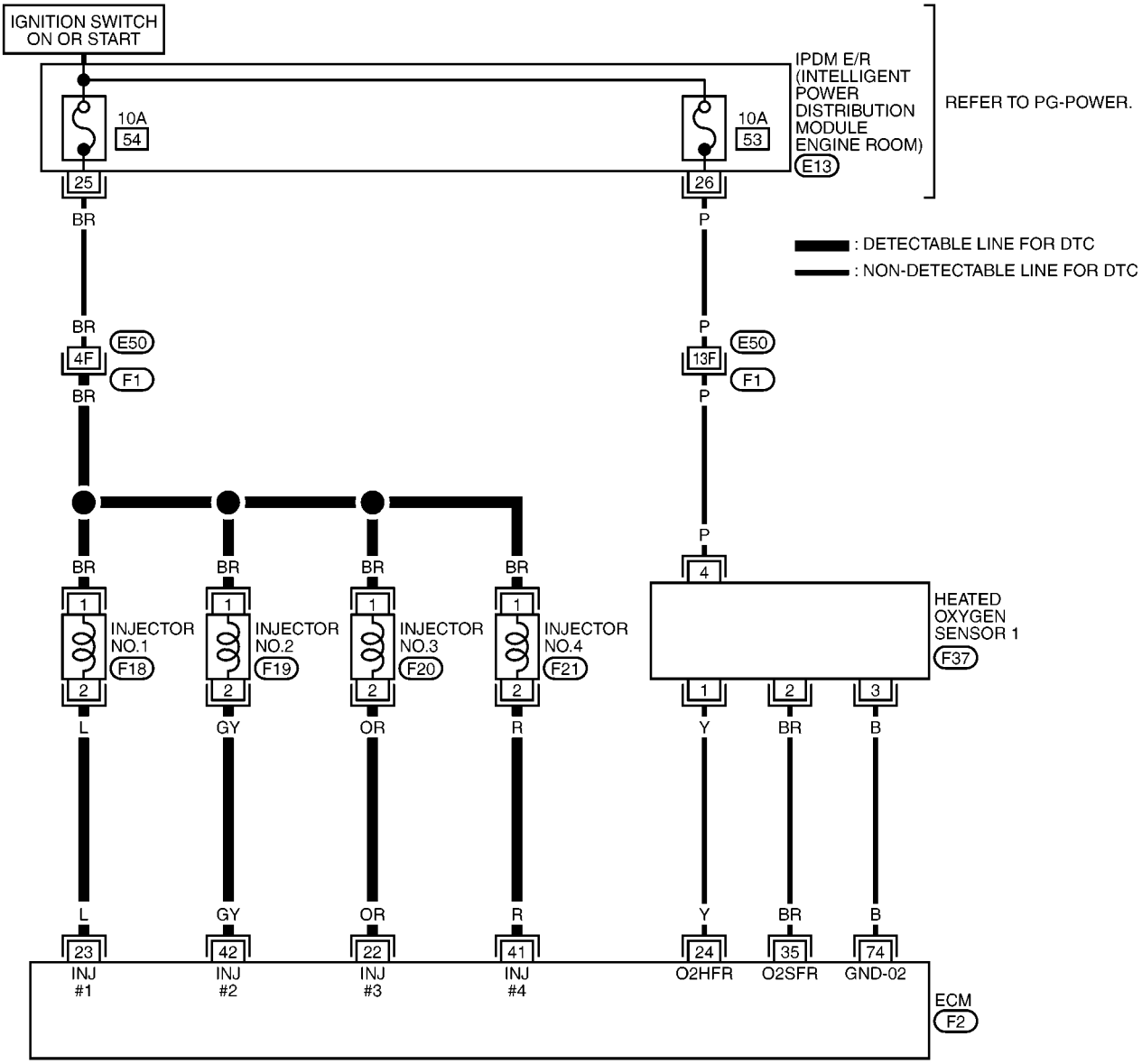


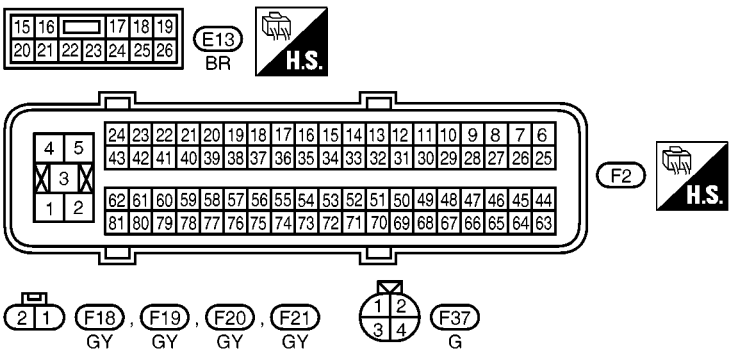
9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.
    If engine starts, go to EC-218, "Diagnostic Procedure" . If engine does not start, remove ignition plugs and check for fouling, etc.

Wiring Diagram

EBS00O6S

EC-FUEL-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

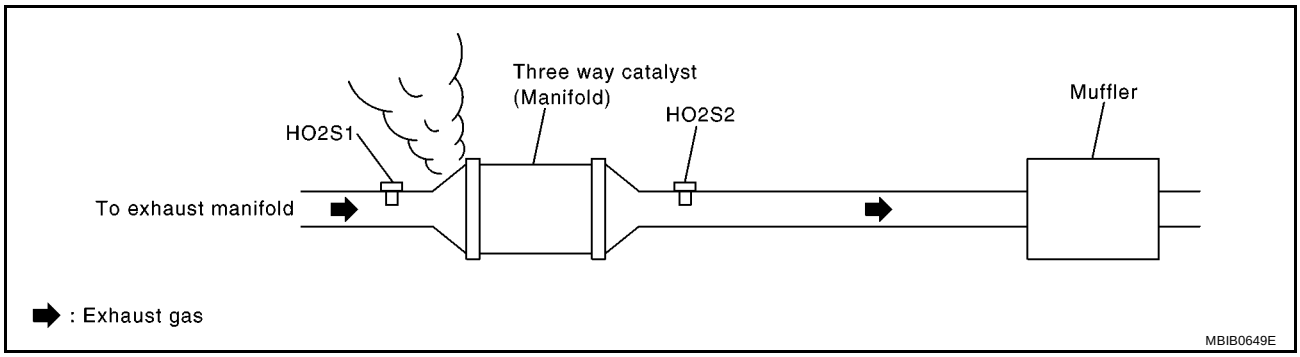
MBWA0274E

Diagnostic Procedure

EBS00O6T

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the manifold absolute pressure sensor.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

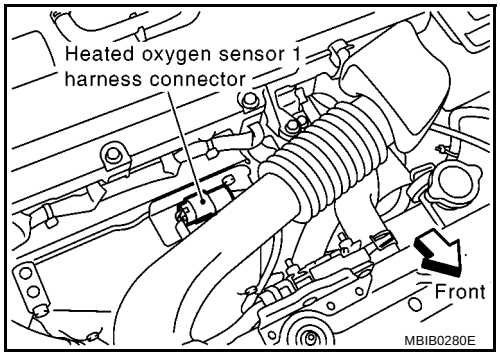
3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.



6. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-44, "FUEL PRESSURE RELEASE" .
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-45, "FUEL PRESSURE CHECK" .

   At idling: 350 kPa (3.5 bar, 3.57 kg/cm2, 51 psi)

OK or NG

OK >> GO TO 5.
NG >> Follow the construction of “FUEL PRESSURE CHECK”.

5. CHECK MANIFOLD ABSOLUTE PRESSUR SENSOR

With CONSULT-II

1. Install all removed parts.
2. Check manifold absolute pressure sensor signal with CONSULT-II.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check manifold absolute pressure sensor signal in MODE 1 with GST.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

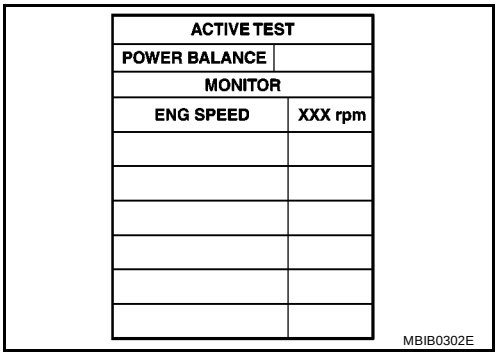
OK or NG

OK >> GO TO 6.
NG >> Check connectors for rusted terminals or loose connections in the manifold absolute pressure sensor circuit or engine grounds. Refer to EC-148, "DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR" .

6. CHECK FUNCTION OF INJECTORS

With CONSULT-II

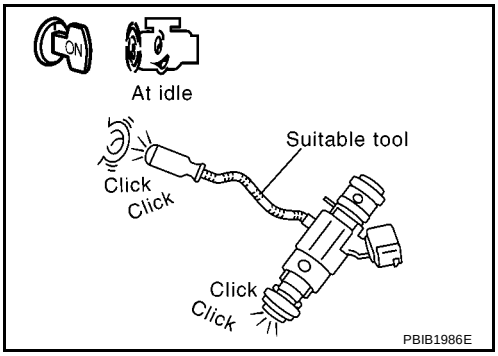
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> GO TO 7.
NG >> Perform trouble diagnosis for INJECTORS, refer to EC-444, "INJECTOR CIRCUIT" .

7. CHECK INJECTOR

1. Remove injector assembly. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all injectors connected to injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each injectors.
6. Crank engine for about 3 seconds.
   Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip.)>>GO TO 8.
NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

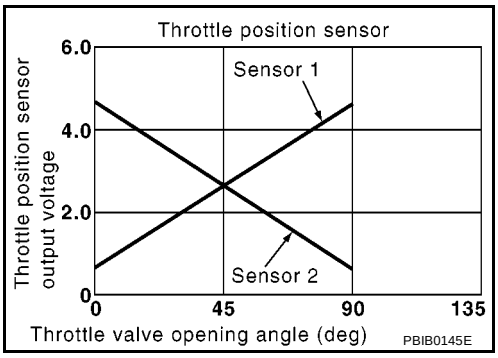
DTC P0221 TP SENSOR

PFP:16119

Component Description

EBS00O6U

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O6V

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00O6W

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0221 0221	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

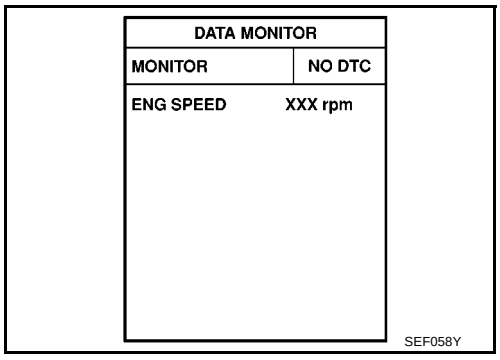
DTC Confirmation Procedure

EBS00O6X

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-224, "Diagnostic Procedure" .



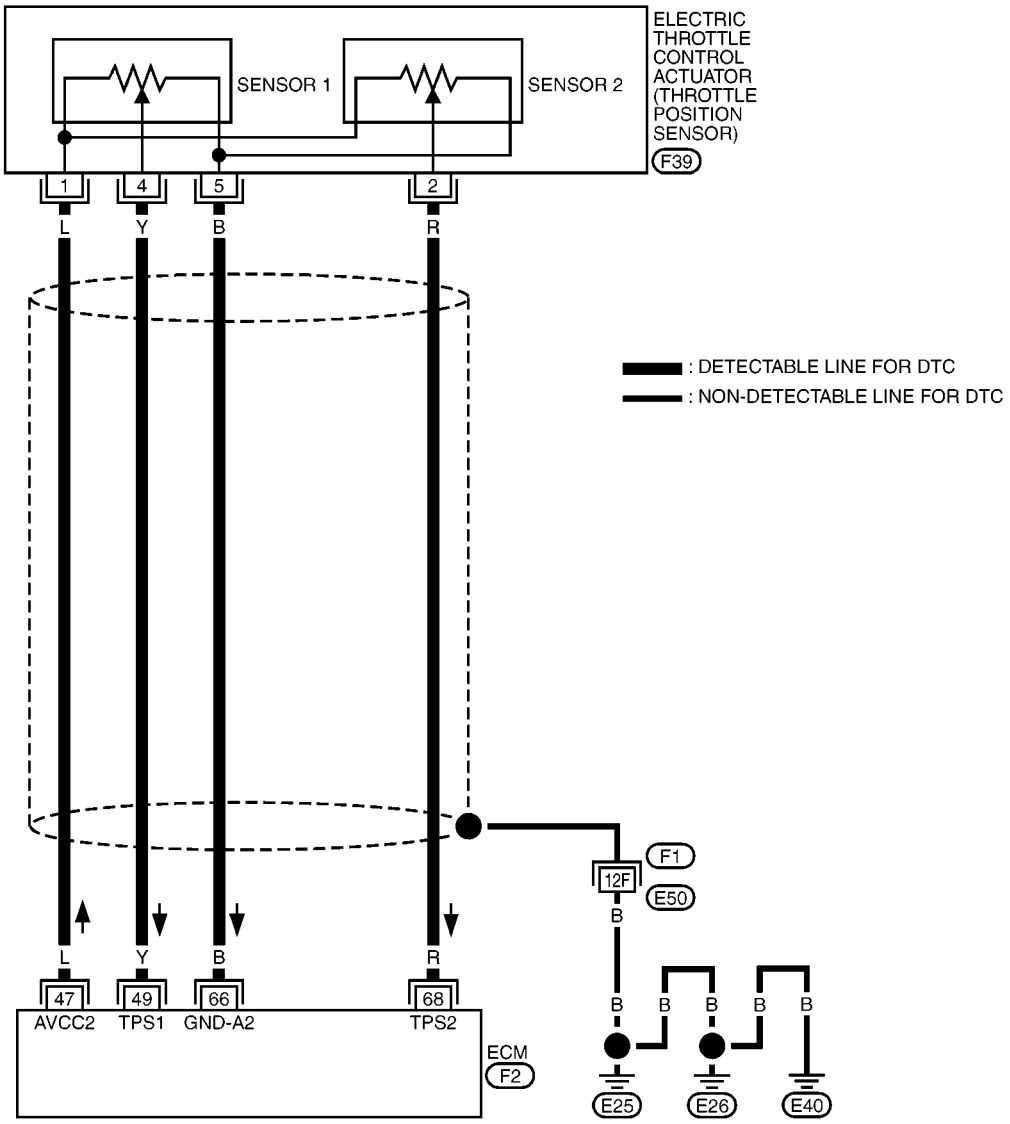
WITH GST

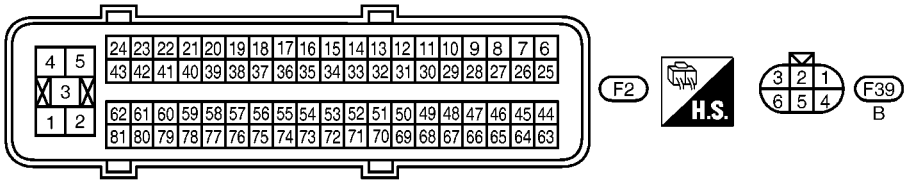
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O6Y

EC-TPS3-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0275E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

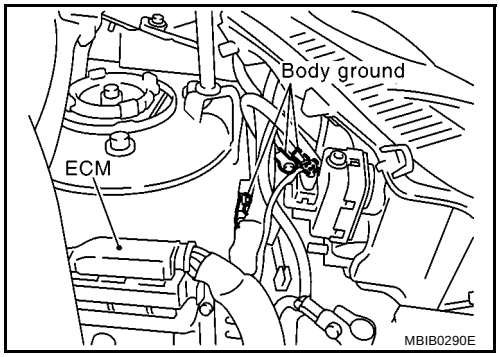
Diagnostic Procedure

EBS00O6Z

1. RETIGHTEN GROUND SCREWS

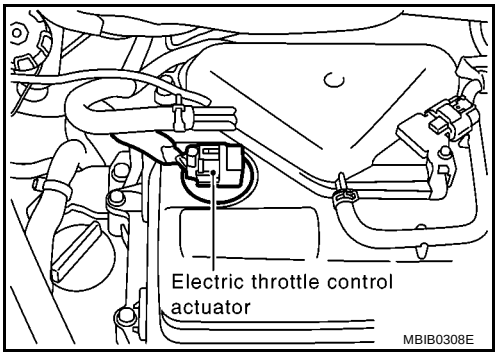
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



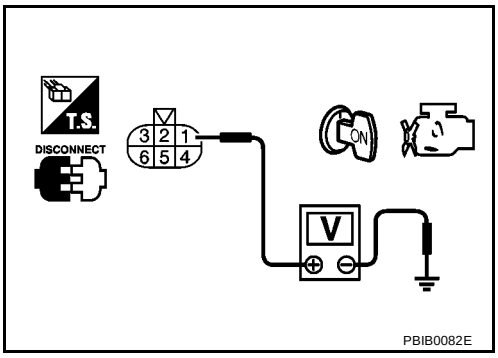
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4, ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-226, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

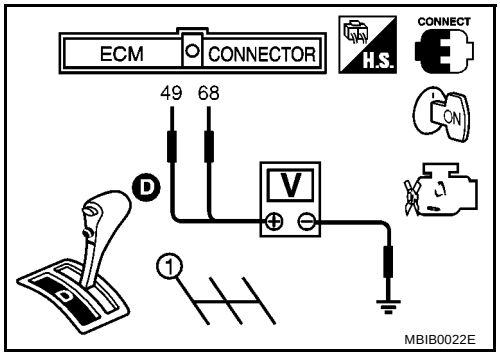
Component Inspection

EBS00O70

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-42, "Throttle Valve Closed Position Learning" .
8. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00O71

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

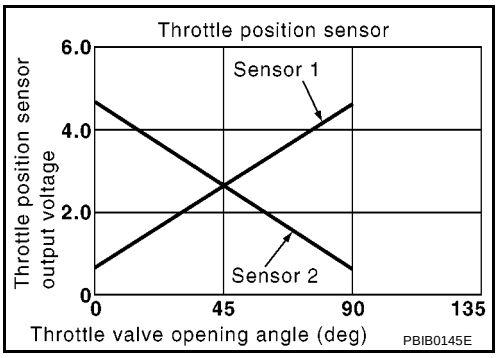
DTC P0222, P0223 TP SENSOR

PFP:16119

Component Description

EBS00O72

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O73

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00O74

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	● Harness or connectors (The TP sensor 1 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

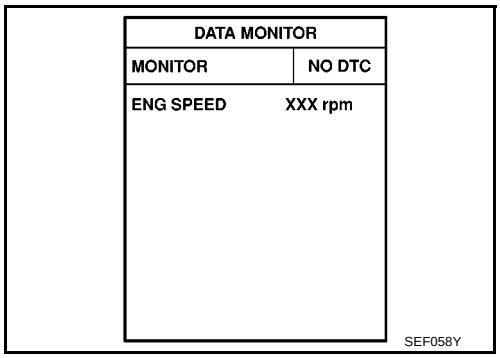
DTC Confirmation Procedure

EBS00O75

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-230, "Diagnostic Procedure" .



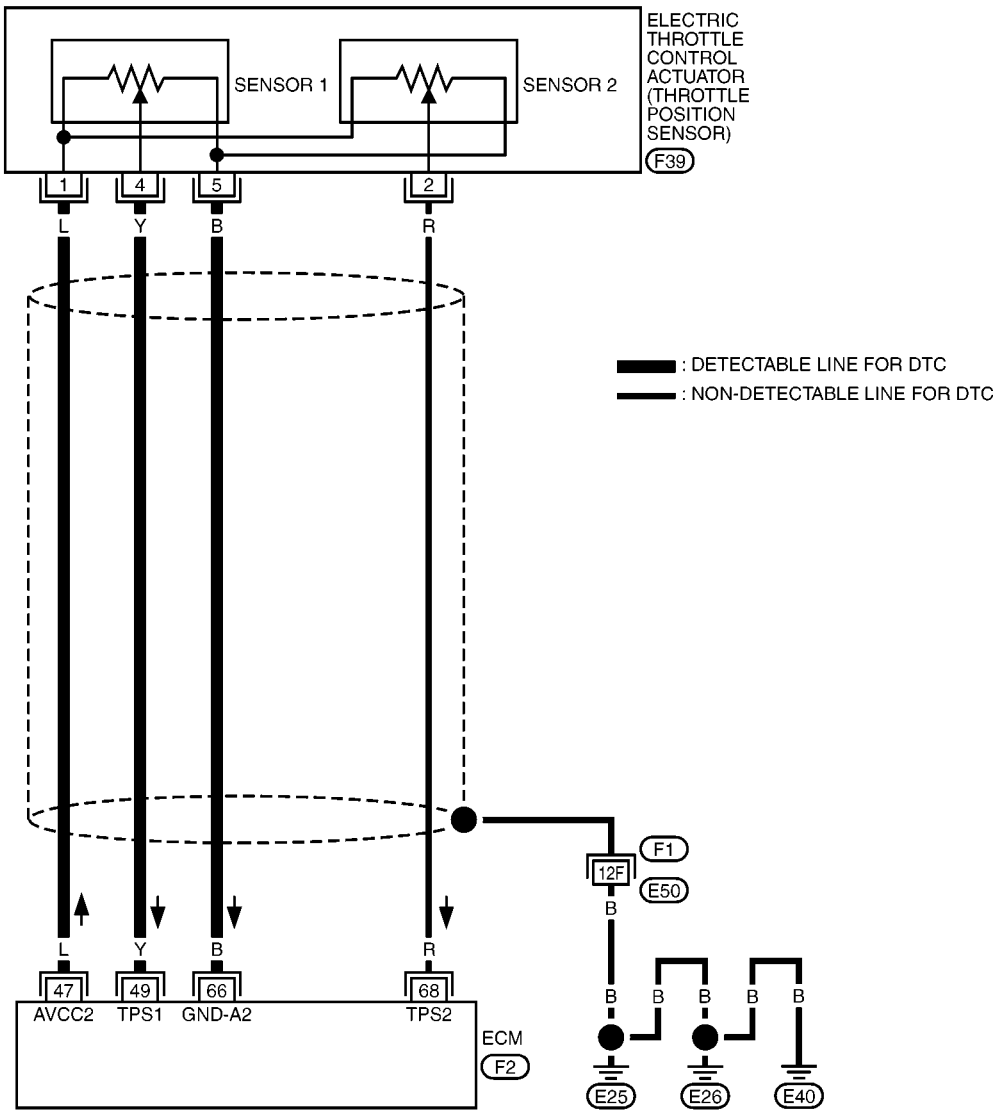
WITH GST

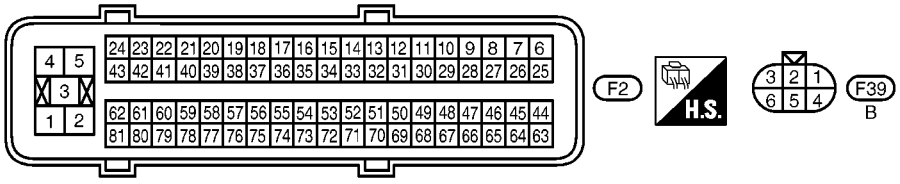
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O76

EC-TPS1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0276E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

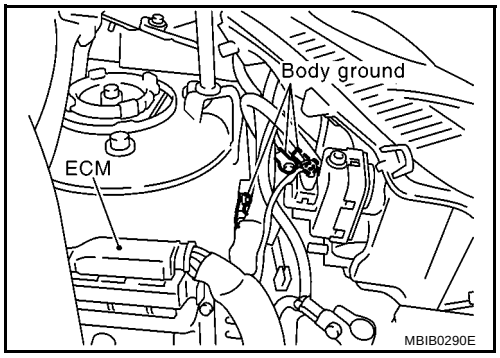
Diagnostic Procedure

EBS00O77

1. RETIGHTEN GROUND SCREWS

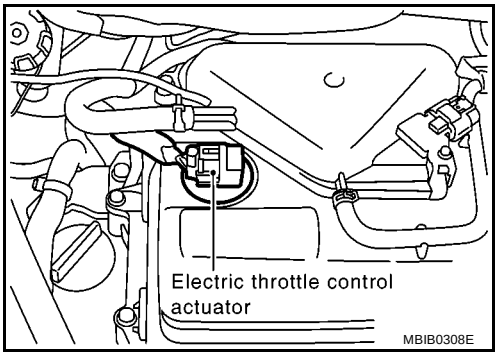
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



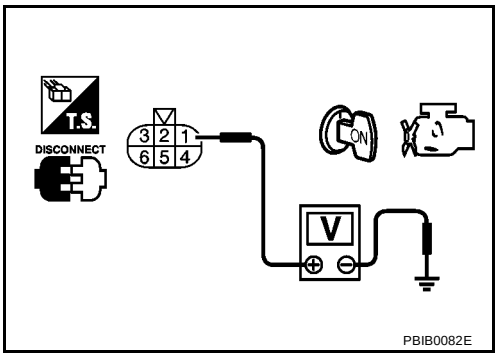
2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-232, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

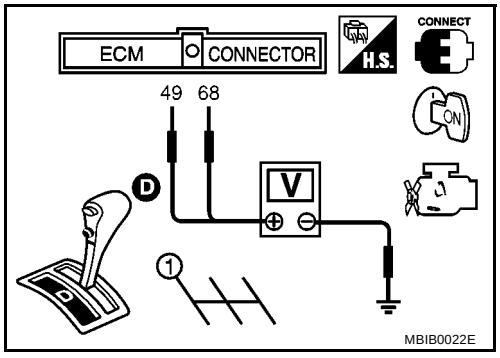
Component Inspection

EBS00O78

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-42, "Throttle Valve Closed Position Learning" .
8. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00O79

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

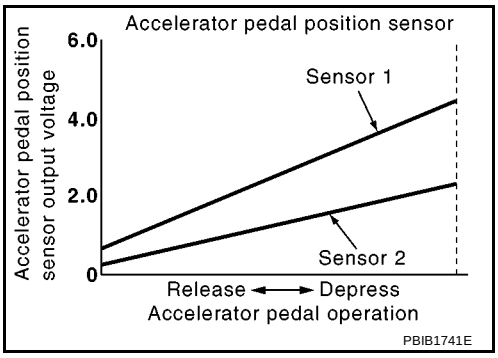
DTC P0226 APP SENSOR

PFP:18002

Component Description

EBS00O7A

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O7B

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS00O7C

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0226 0226	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

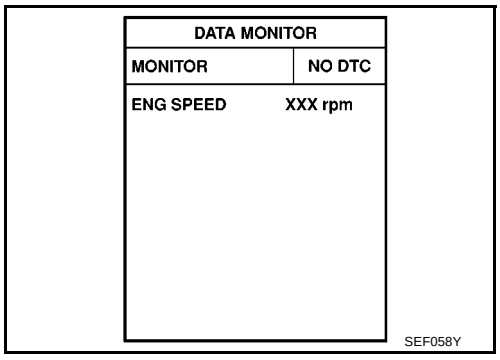
DTC Confirmation Procedure

EBS00O7D

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-238, "Diagnostic Procedure" .

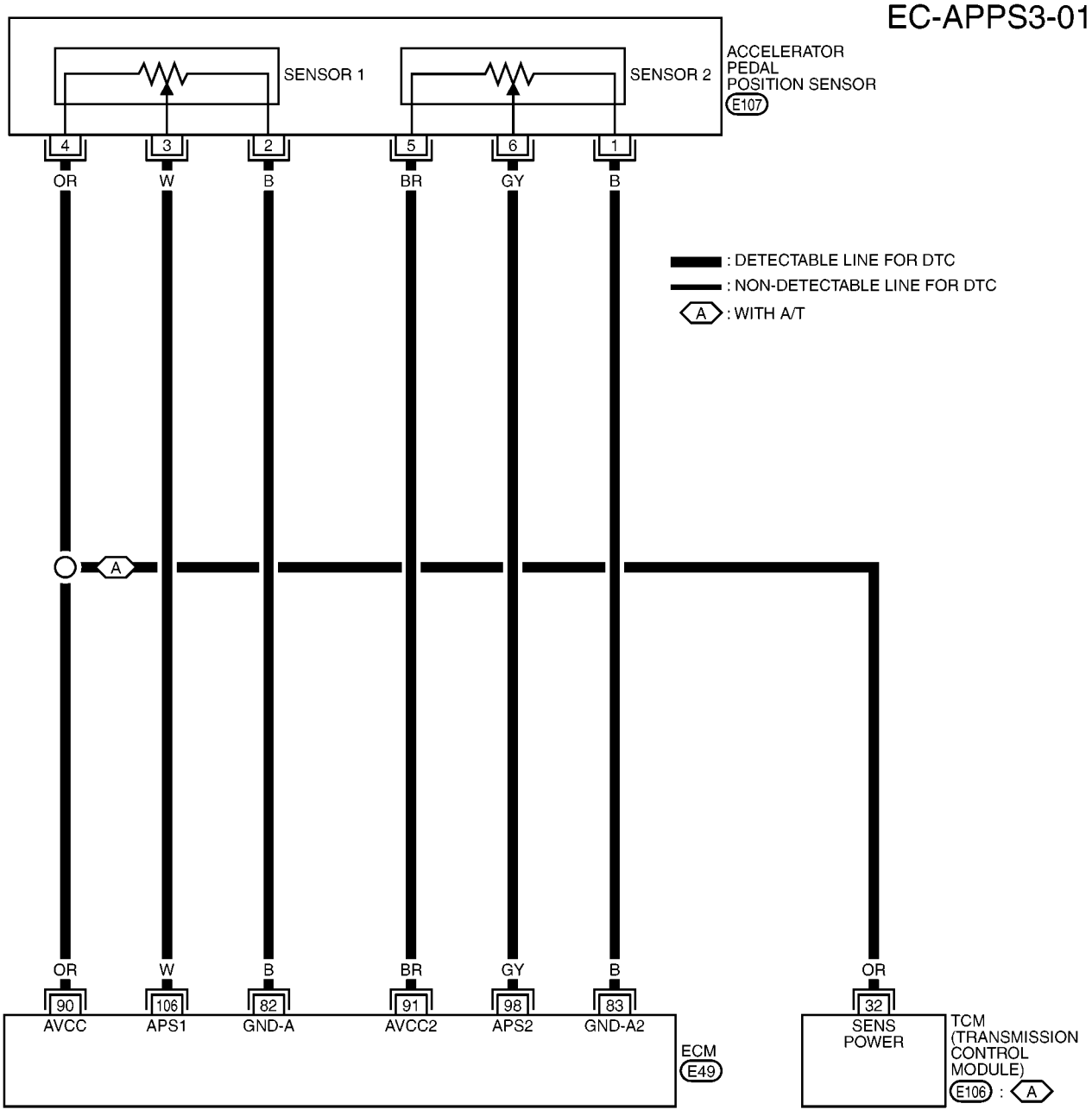


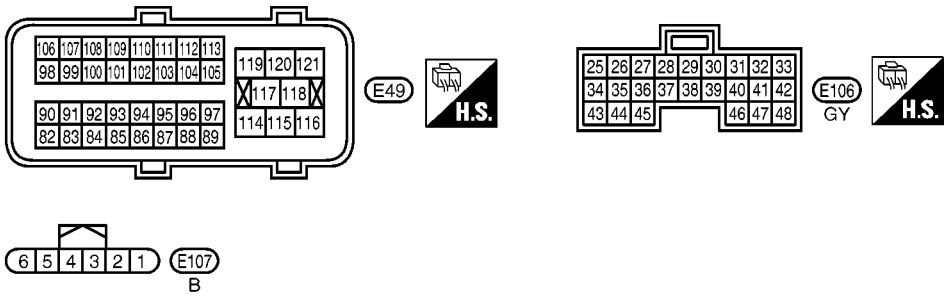
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS00O7E





MBWA0277E

Specification data are reference values and are measured between each terminal and ground.

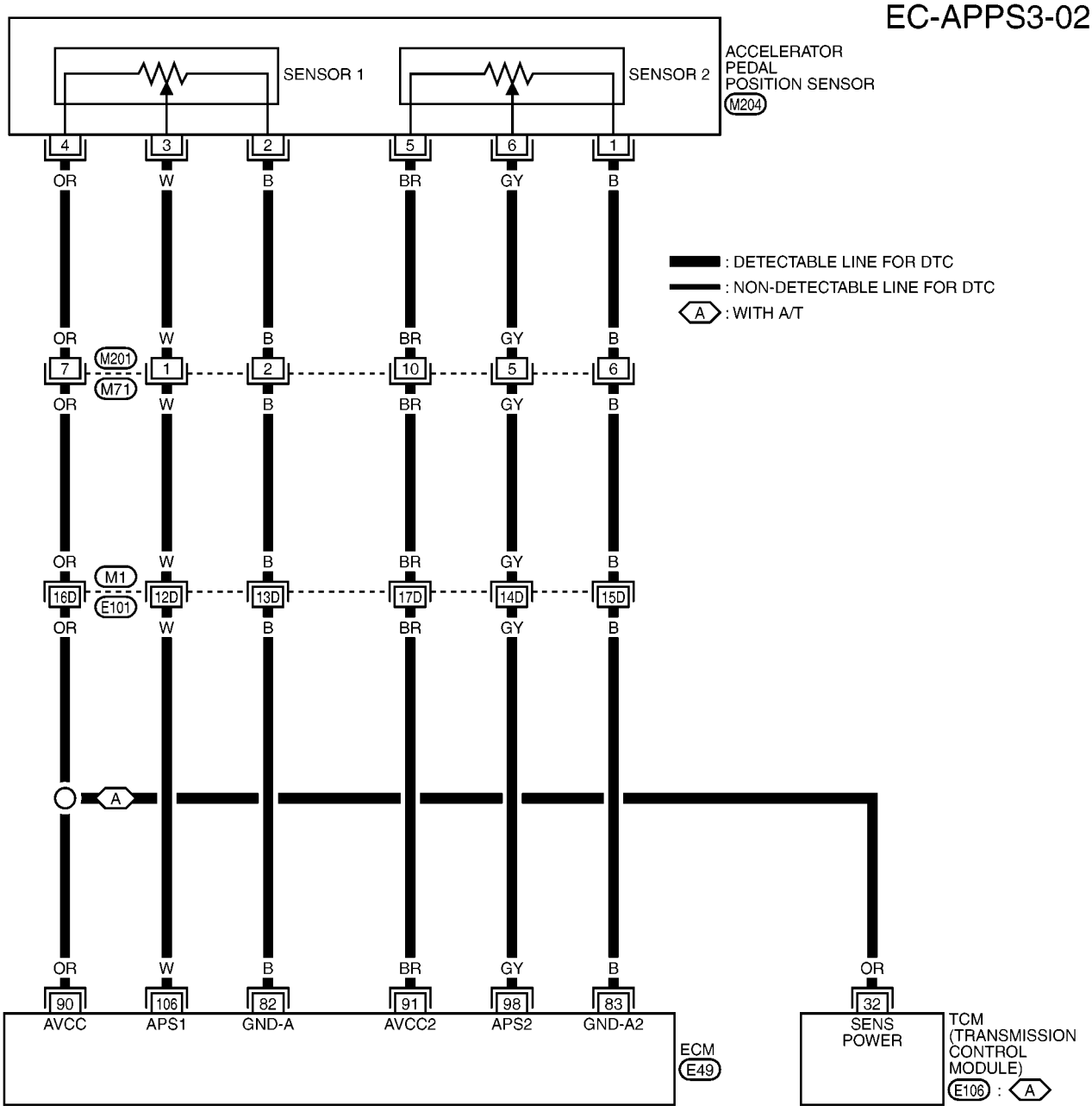
CAUTION:

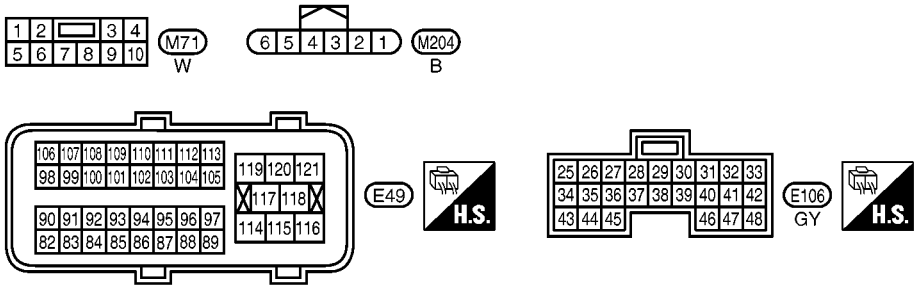
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS3-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0278E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

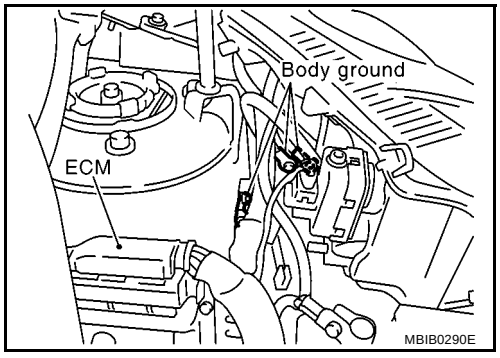
Diagnostic Procedure

EBS00O7F

1. RETIGHTEN GROUND SCREWS

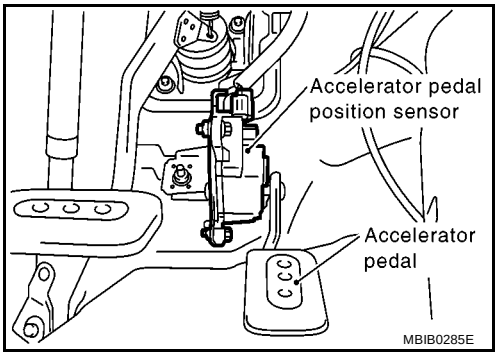
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



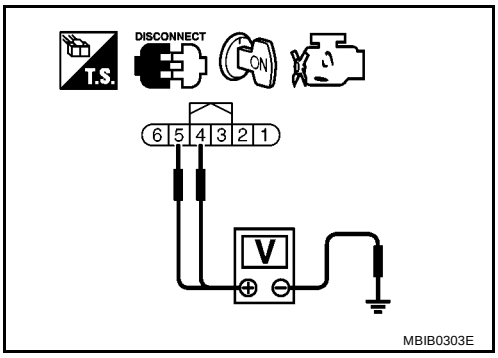
2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminals 4, 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2, ECM terminal 83 and APP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-241, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

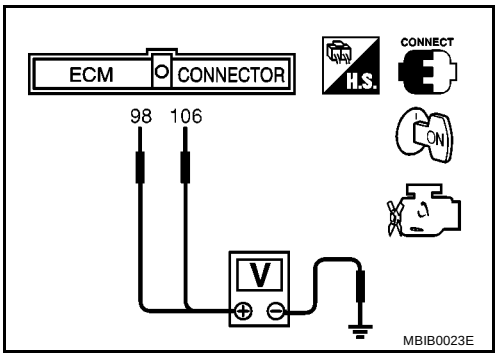
Component Inspection

EBS00O7G

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00O7H

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

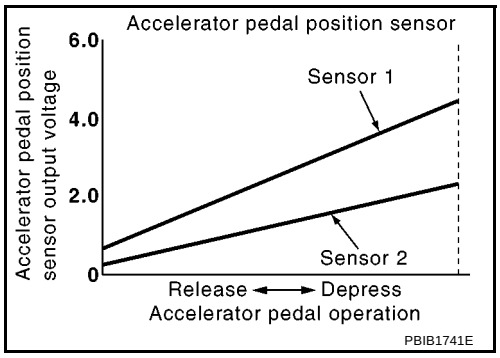
DTC P0227, P0228 APP SENSOR

PFP:18002

Component Description

EBS00O7I

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O7J

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS00O7K

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0227 0227	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0228 0228	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

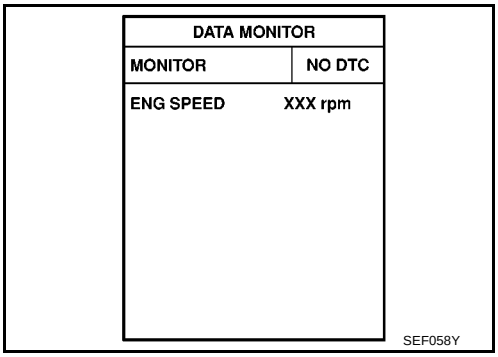
DTC Confirmation Procedure

EBS00O7L

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-247, "Diagnostic Procedure" .

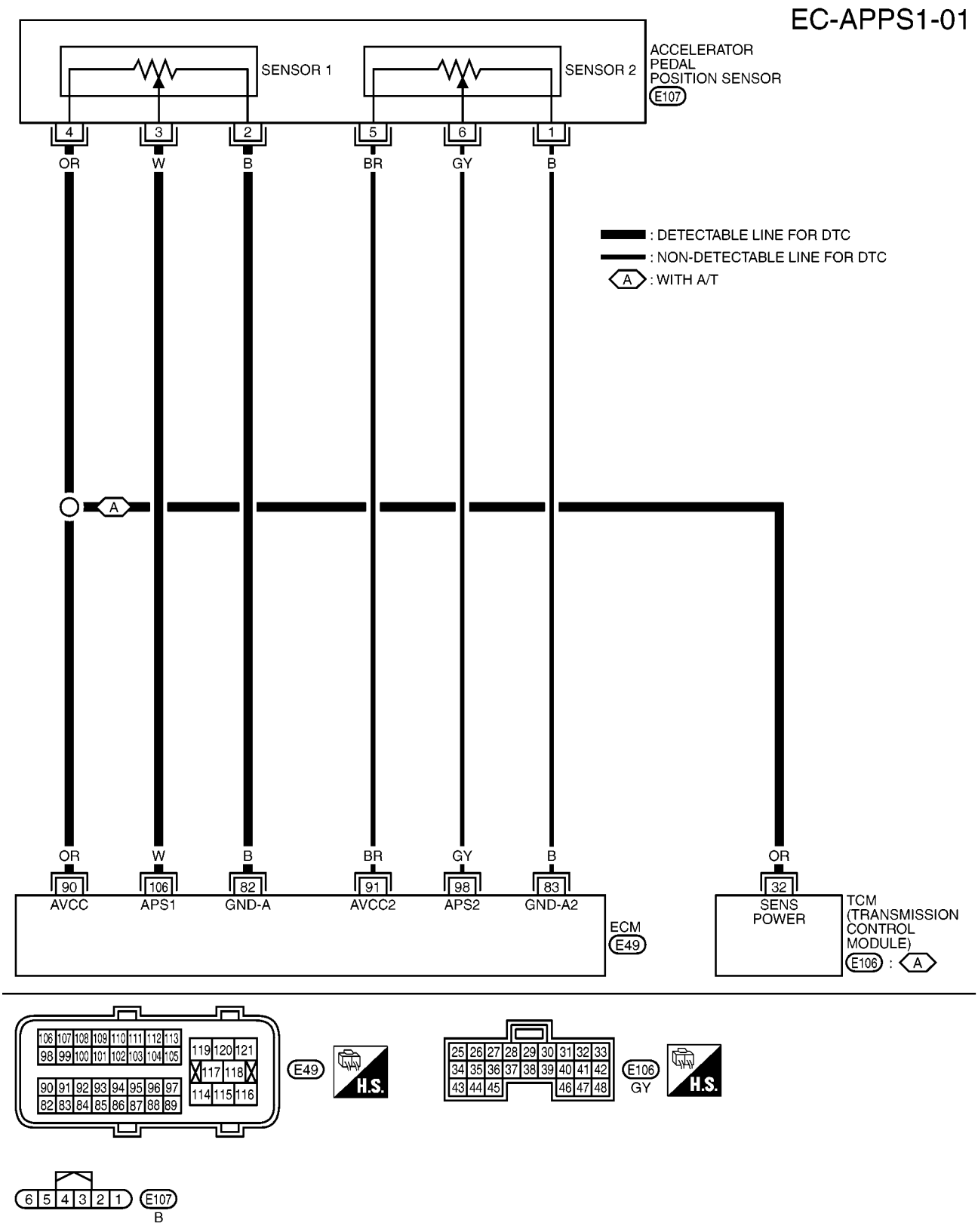


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS00O7M



MBWA0279E

Specification data are reference values and are measured between each terminal and ground.

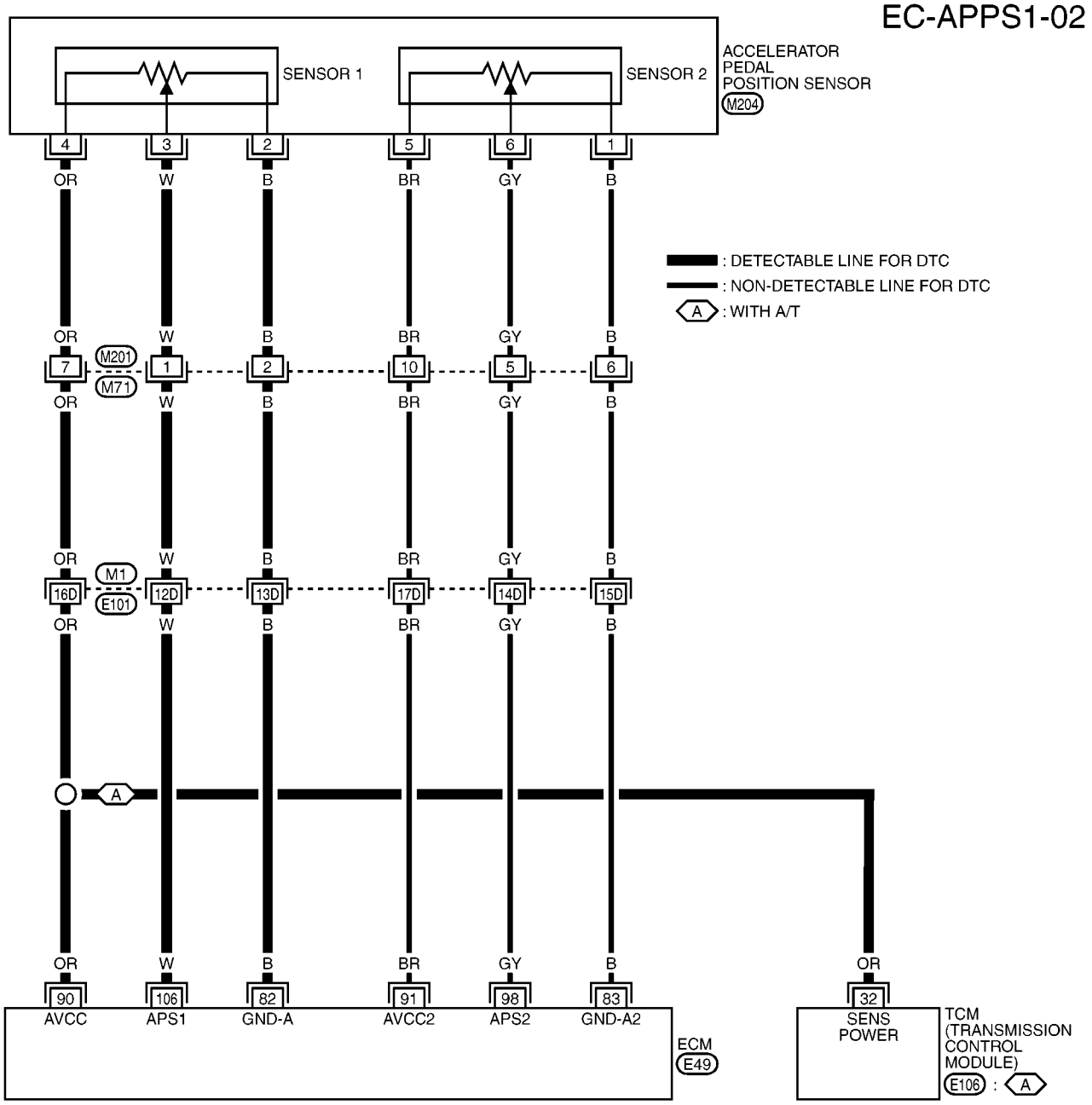
CAUTION:

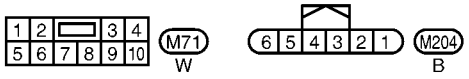
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

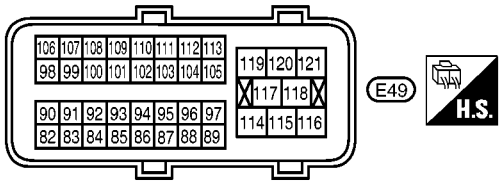
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

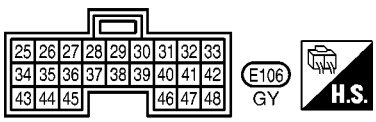
RHD MODELS

EC-APPS1-02









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0280E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

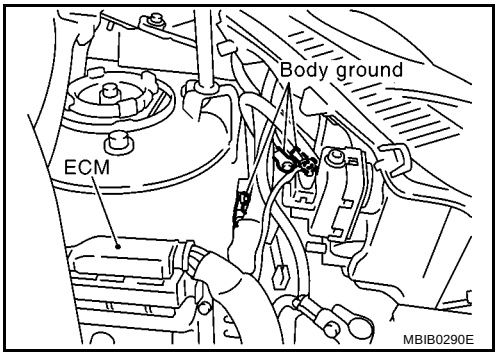
Diagnostic Procedure

EBS00O7N

1. RETIGHTEN GROUND SCREWS

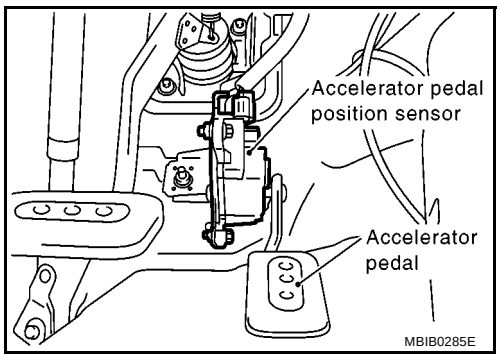
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



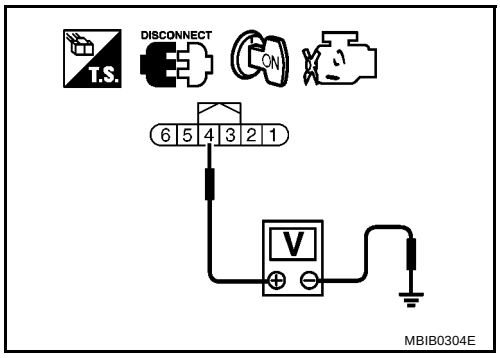
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-249, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

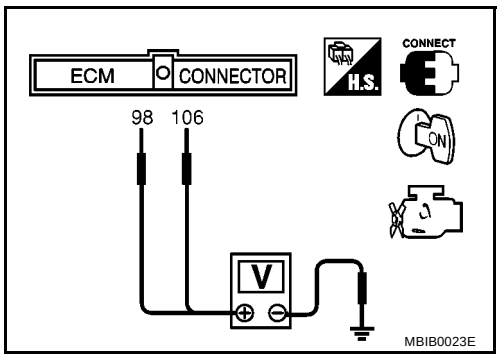
EBS00O7O

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00O7P

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

PFP:00000

On Board Diagnosis Logic

EBS00O7Q

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM Function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)
   On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MI will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor (POS) signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MI will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MI will remain on.
   If another misfire condition occurs that can damage the TWC, the MI will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MI will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	● Improper spark plug ● Insufficient compression ● Incorrect fuel pressure ● The injector circuit is open or shorted ● Fuel injectors ● Intake air leak ● The ignition signal circuit is open or shorted ● Lack of fuel ● Drive plate or flywheel ● Heated oxygen sensor 1 ● Incorrect PCV hose connection
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

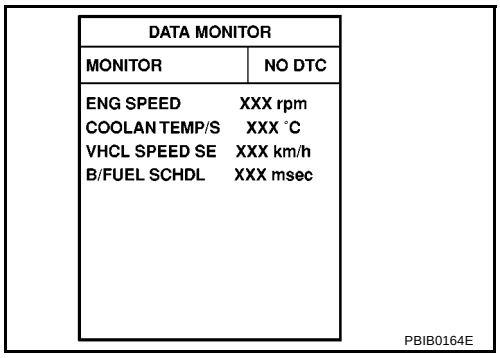
EBS00O7R

CAUTION:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON, and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Restart engine and let it idle for about 15 minutes.
5. If 1st trip DTC is detected, go to EC-252, "Diagnostic Procedure" .



NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to table below.
   Hold the accelerator pedal as steady as possible.

   Similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time:

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (5 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70°C (158°F), T should be lower than 70°C (158°F).
	When the freeze frame data shows higher than or equal to 70°C (158°F), T should be higher than or equal to 70°C (158°F).

   The time to drive varies according to the engine speed in the freeze frame data.
   Refer to the following table.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS00O7S

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

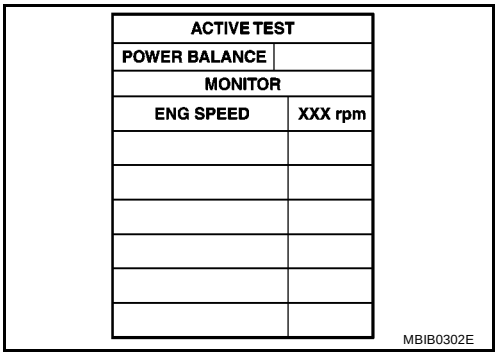
OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. PERFORM POWER BALANCE TEST

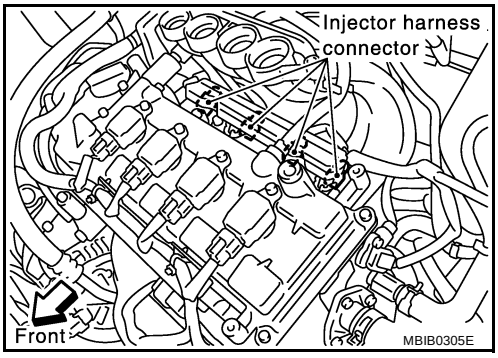
With CONSULT-II

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?



Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



Yes or No

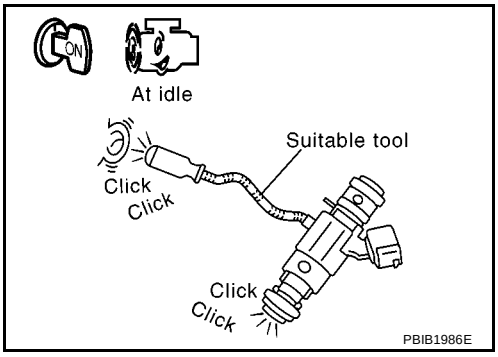
Yes >> GO TO 4.
No >> GO TO 7.

4. CHECK INJECTOR

Does each injector make an operating sound at idle?

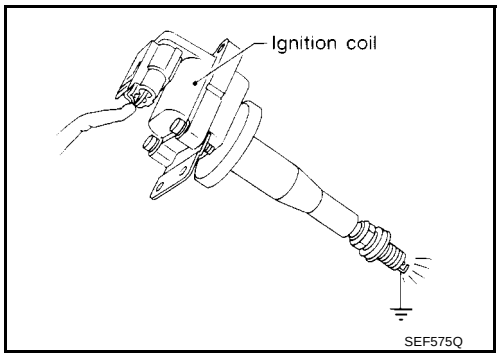
Yes or No

Yes >> GO TO 5.
No >> Check injector(s) and circuit(s). Refer to EC-444, "INJECTOR CIRCUIT" .



5. CHECK IGNITION SPARK

1. Disconnect ignition coil assembly from rocker cover.
2. Connect a known-good spark plug to the ignition coil assembly.
3. Disconnect all injector harness connectors.
4. Place end of spark plug against a suitable ground and crank engine.
5. Check for spark.

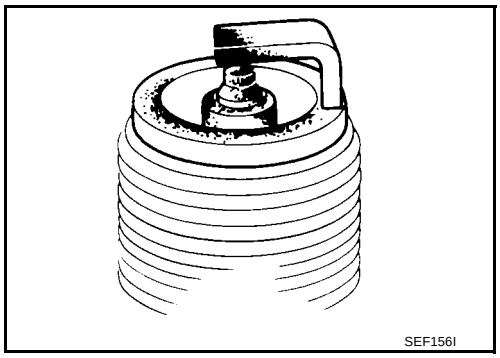


OK or NG

OK >> GO TO 6.
NG >> Check ignition coil, power transistor and their circuits. Refer to EC-435, "IGNITION SIGNAL" .

6. CHECK SPARK PLUGS

Remove the spark plugs and check for fouling, etc.



OK or NG

OK >> GO TO 7.
NG >> Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-28, "Changing Spark Plugs" .

7. CHECK COMPRESSION PRESSURE

Check compression pressure. Refer to EM-59, "COMPRESSION PRESSURE INSPECTION" .

[kPa (bar, kg/cm^2 , psi)/350rpm]

Engine type	CR10DE	CR12DE, CR14DE
Standard	1,432 (14.32, 14.6, 208)	1,383 (13.83, 14.1, 201)
minimum	1,236 (12.36, 12.6, 179)	1,187 (11.87, 12.1, 172)
Difference limit among cylinders	98 (0.98, 1.0, 14)	98 (0.98, 1.0, 14)

OK or NG

OK >> GO TO 8.
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

8. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to EC-44, "FUEL PRESSURE RELEASE" .
3. Install fuel pressure gauge and check fuel pressure. Refer to EC-45, "FUEL PRESSURE CHECK" .

At idle: Approx. 350 kPa (3.5 bar, 3.57 kg/cm^2 , 51 psi)

OK or NG

OK >> GO TO 9.
NG >> Follow the construction of FUEL PRESSURE CHECK.

9. CHECK IGNITION TIMING

Check the following items. Refer to EC-77, "Basic Inspection" .

Items		Specifications
Target idle speed	A/T	700 ± 50 rpm (in P or N position)
	M/T	650 ± 50 rpm
Ignition timing	A/T	5 ± 2° BTDC (in P or N position)
	M/T	5 ± 2° BTDC

OK or NG

OK >> GO TO 10.
NG >> Follow the Basic Inspection.

10. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-173, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace heated oxygen sensor 1.

11. CHECK MANIFOLD ABSOLUTE PRESSUR SENSOR

With CONSULT-II
Check manifold absolute pressure sensor signal in “DATA MONITOR” mode with CONSULT-II.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

With GST
Check manifold absolute pressure sensor signal in MODE 1 with GST.

Approximately 1.5V: at idling
Approximately 1.2V: at 2,500 rpm

OK or NG

OK >> GO TO 12.
NG >> Check connectors for rusted terminals or loose connections in the manifold absolute pressure sensor circuit or engine grounds. Refer to EC-148, "DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR" .

12. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in EC-82, "Symptom Matrix Chart" .

OK or NG

OK >> GO TO 13.
NG >> Repair or replace.

13. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.
Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 14.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

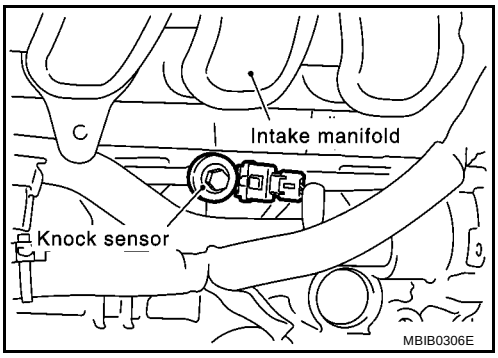
DTC P0327, P0328 KS

PFP:22060

Component Description

EBS00O7T

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



On Board Diagnosis Logic

EBS00O7U

The MI will not light up for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

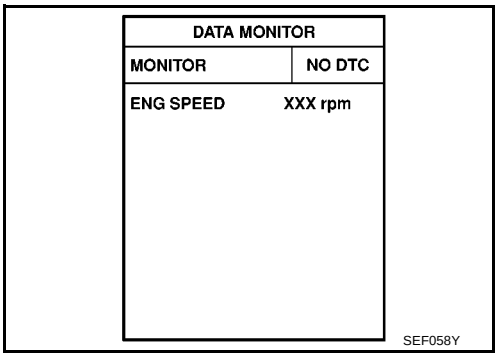
EBS00O7V

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-259, "Diagnostic Procedure"
.



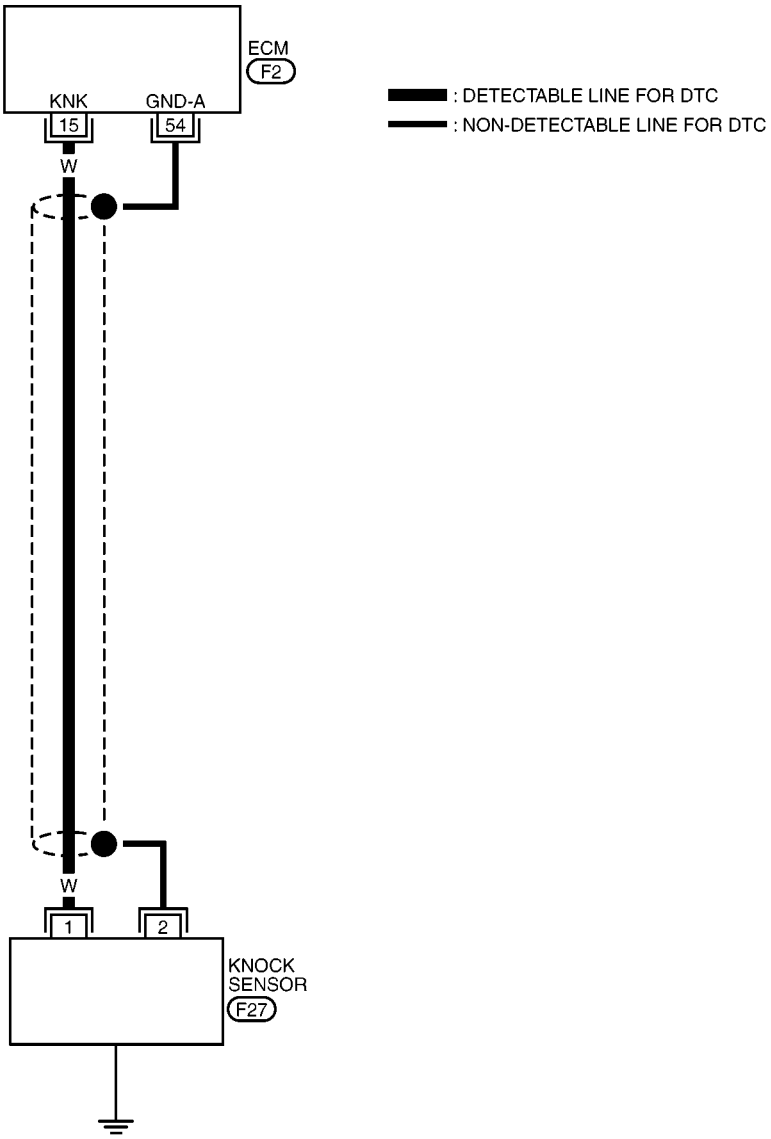
WITH GST

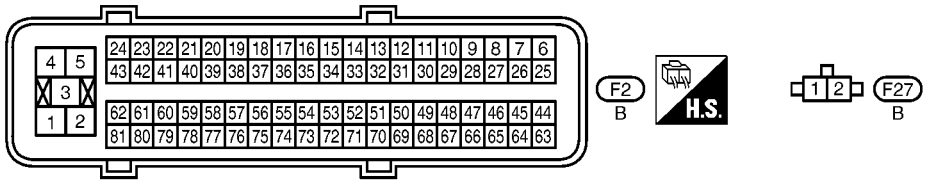
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O7W

EC-KS-01





MBWA1173E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
54	—	Sensor ground (Knock sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

EBS00O7X

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 15 and engine ground. Refer to Wiring Diagram.

   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

   Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

4. Also check harness for short to ground and short to power.

OK or NG

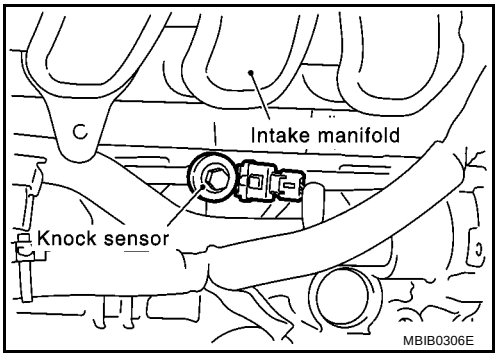
OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 15 and knock sensor terminal 1.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK KNOCK SENSOR

Refer to EC-260, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace knock sensor.

4. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 54 and engine ground.

Continuity should exist

2. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS00O7Y

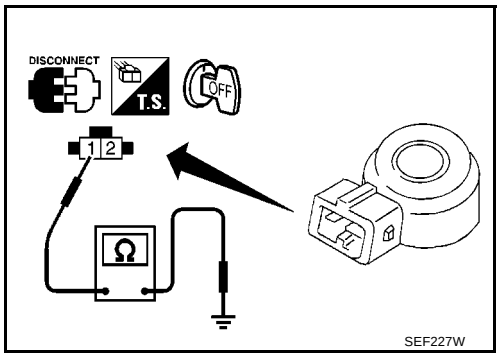
KNOCK SENSOR

Check resistance between knock sensor terminal 1 and ground.

NOTE:
It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



Removal and Installation

EBS00O7Z

KNOCK SENSOR

Refer to EM-73, "CYLINDER BLOCK" .

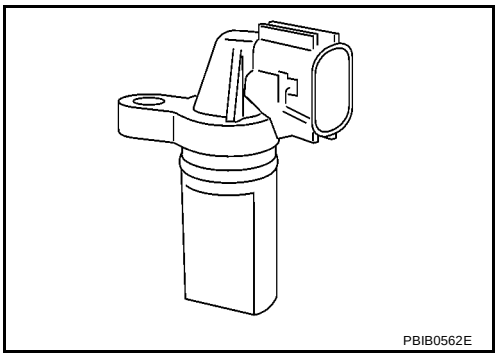
DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

EBS00O80

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.


PBIB0562E

CONSULT-II Reference Value in Data Monitor Mode

EBS00O81

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

EBS00O82

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	● The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. ● The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. ● The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor (POS) ● Signal plate

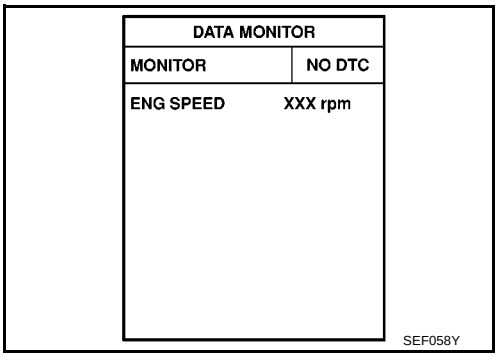
DTC Confirmation Procedure

EBS00O83

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-263, "Diagnostic Procedure" .



SEF058Y

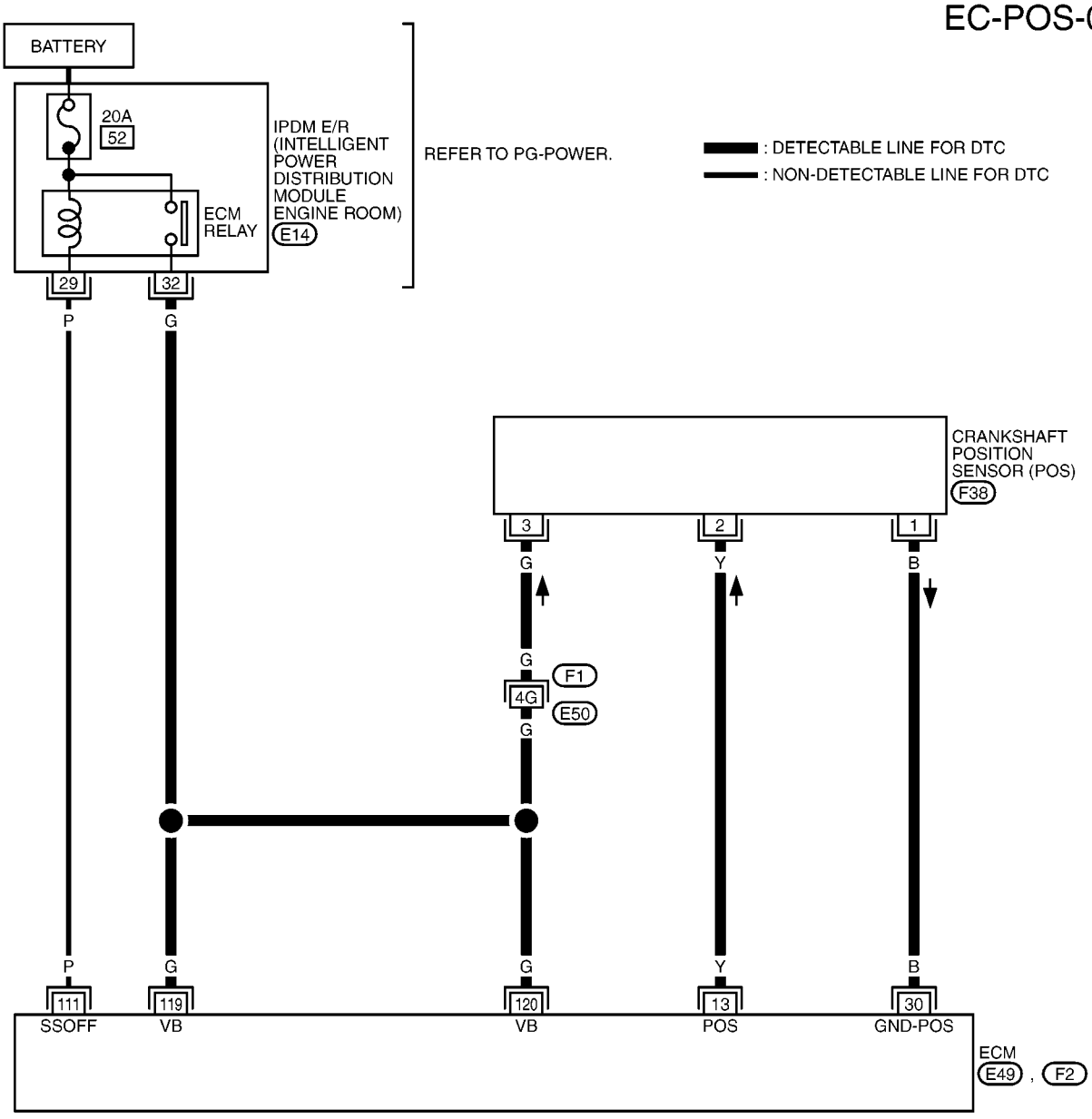
WITH GST

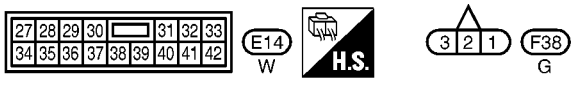
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

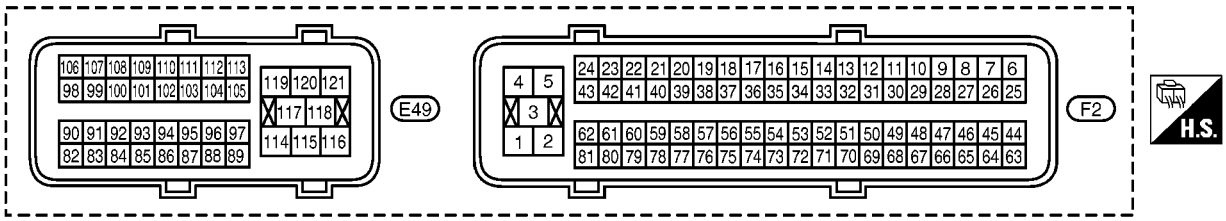
EBS00O84

EC-POS-01





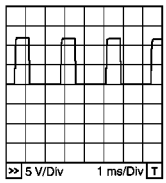
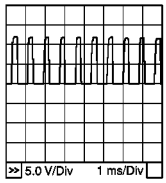
REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)



MBWA0282E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	Y	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 3.0V★  PBIB0528E
30	B	Sensor ground (Crankshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

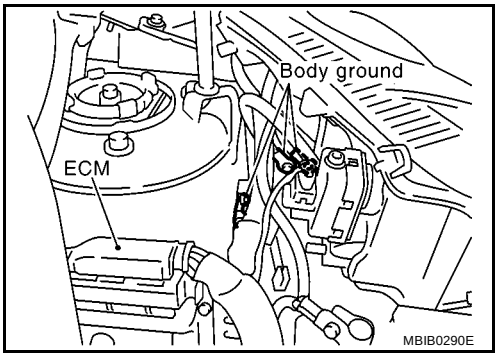
Diagnostic Procedure

EBS00O85

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

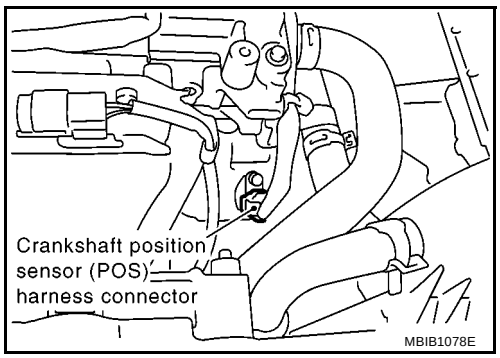
>> GO TO 2.



MBIB0290E

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.



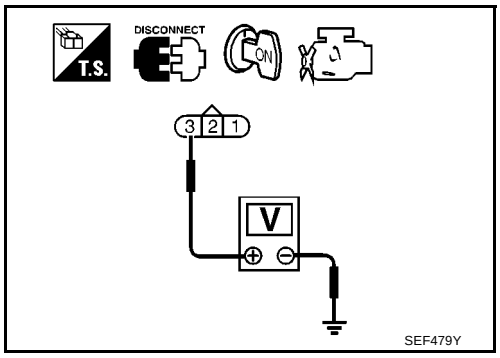
3. Check voltage between CKP sensor (POS) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 30 and CKP sensor (POS) terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 13 and CKP sensor (POS) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-265, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace crankshaft position sensor (POS).

7. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 8.
NG >> Replace the signal plate.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

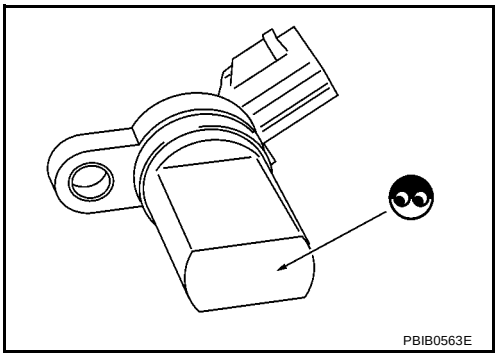
>> **INSPECTION END**

Component Inspection

EBS00O86

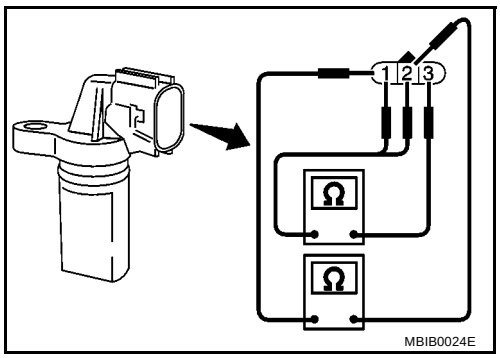
CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 2 (-)	
2 (+) - 1 (-)	



6. If NG, replace crankshaft position sensor (POS).

Removal and Installation

EBS00O87

CRANKSHAFT POSITION SENSOR (POS)

Refer to EM-73, "CYLINDER BLOCK" .

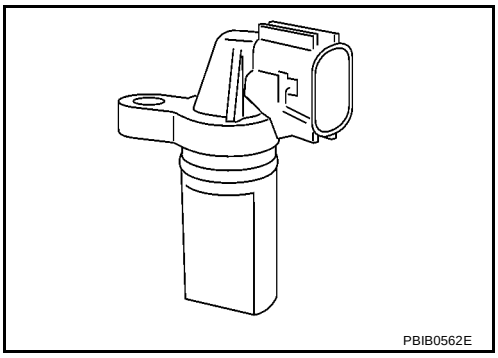
DTC P0340 CMP SENSOR (PHASE)

PFP:23731

Component Description

EBS00O88

The camshaft position sensor (PHASE) senses the retraction of intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.


PBIB0562E

On Board Diagnosis Logic

EBS00O89

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	● The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. ● The cylinder No. signal is not set to ECM during engine running. ● The cylinder No. signal is not in the normal pattern during engine running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Camshaft position sensor (PHASE) ● Camshaft (Intake) ● Starter motor (Refer to SC-39 .) ● Starting system circuit (Refer to SC-39 .) ● Dead (Weak) battery

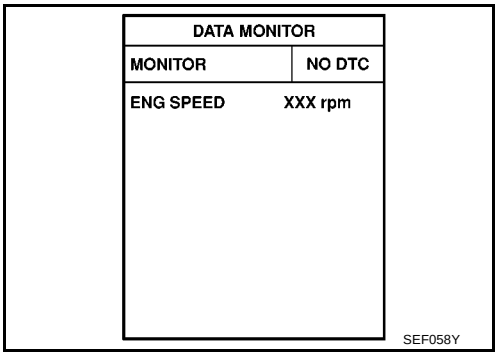
DTC Confirmation Procedure

EBS00O8A

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to EC-269, "Diagnostic Procedure" .
   If 1st trip DTC is not detected, go to next step.
5. Maintain engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to EC-269, "Diagnostic Procedure" .



SEF058Y

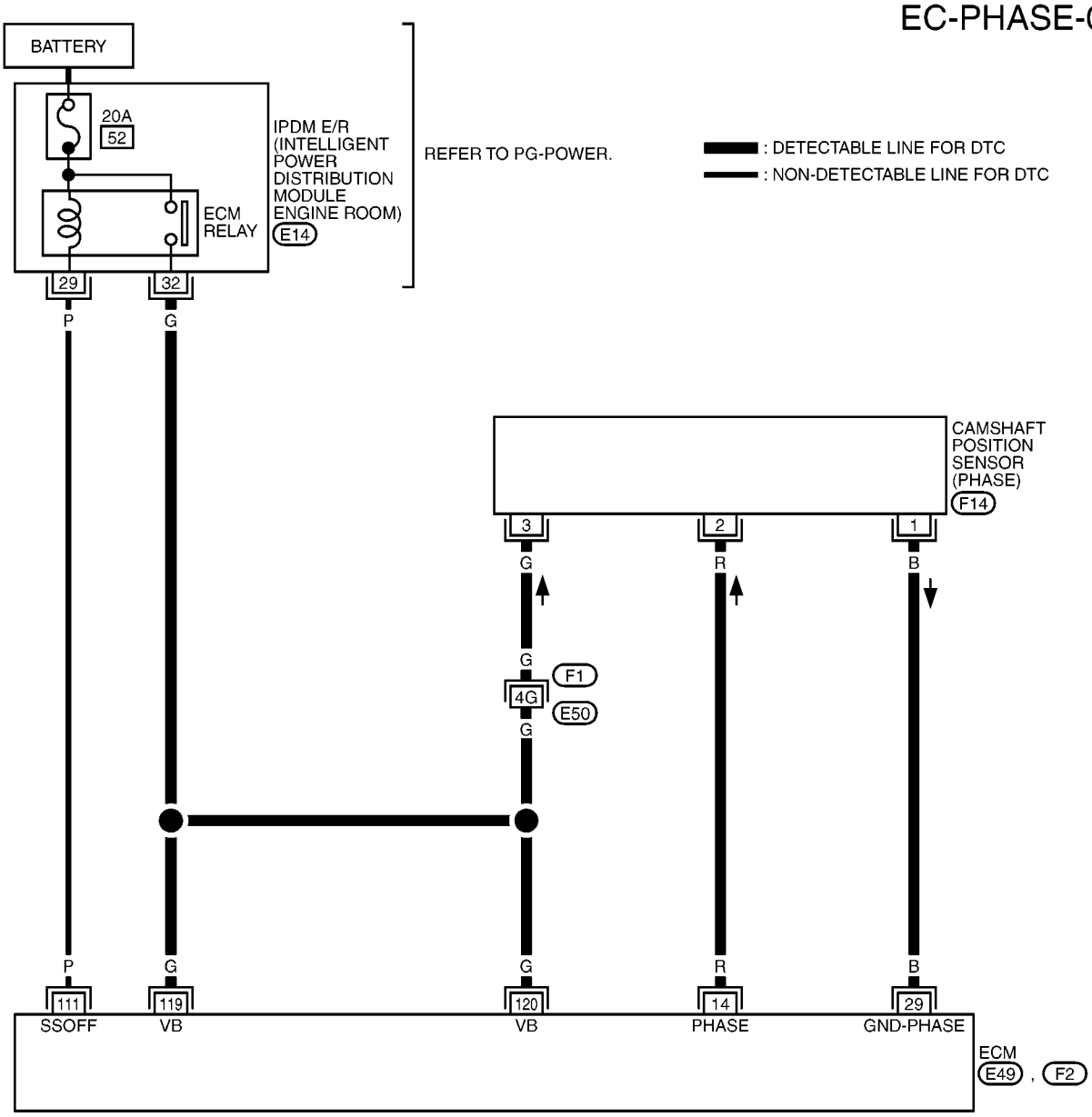
WITH GST

Follow the procedure “WITH CONSULT-II” above.

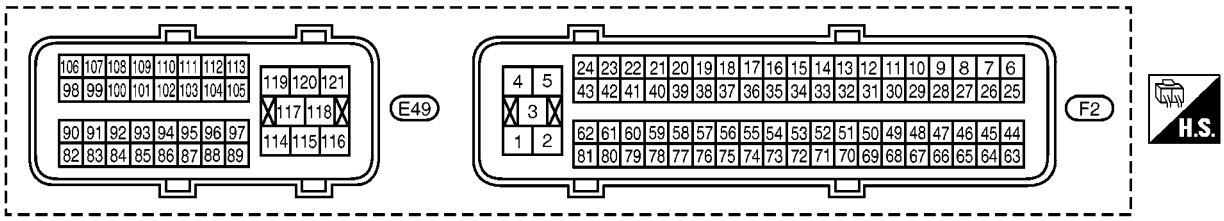
Wiring Diagram

EBS00O8B

EC-PHASE-01



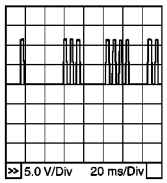
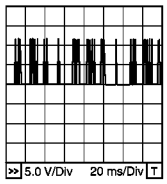
REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)



MBWA0283E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	R	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  PBIB0526E
29	B	Sensor ground (Camshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00O8C

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

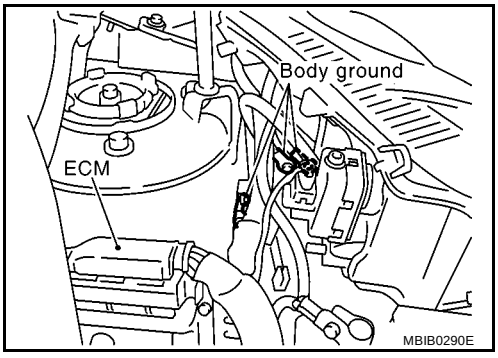
Yes or No

Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-39, "STARTING SYSTEM" .)

2. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

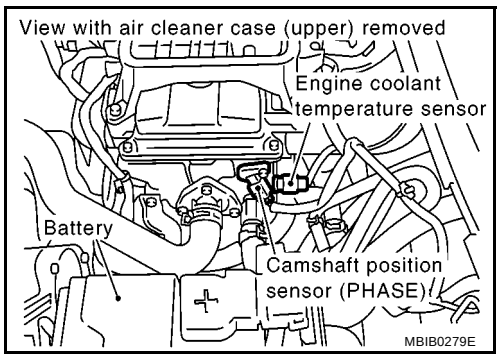
>> GO TO 3.



MBIB0290E

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

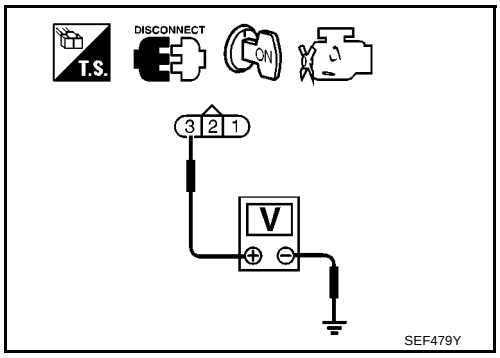
1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.



3. Check voltage between CMP sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 29 and CMP sensor (PHASE) terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 14 and CMP sensor (PHASE) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-271, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace camshaft position sensor (PHASE).

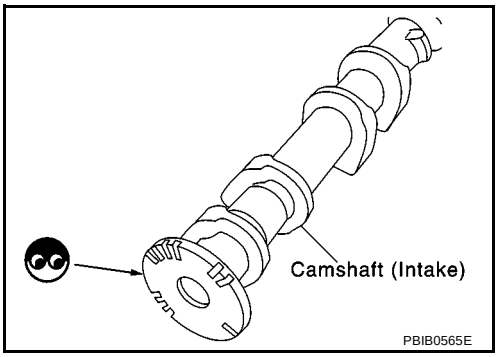
8. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



9. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

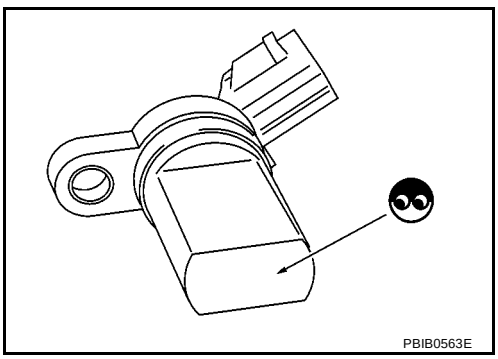
>> **INSPECTION END**

Component Inspection

EBS00O8D

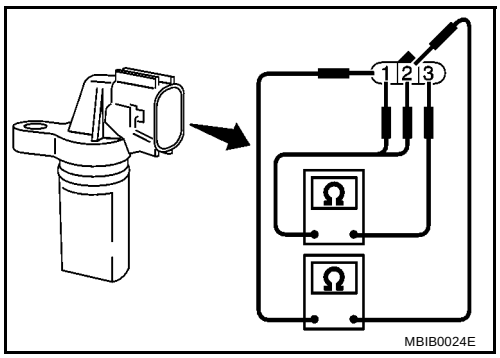
CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 2 (-)	
2 (+) - 1 (-)	



Removal and Installation

EBS00O8E

CAMSHAFT POSITION SENSOR (PHASE)

Refer to EM-36, "CAMSHAFT" .

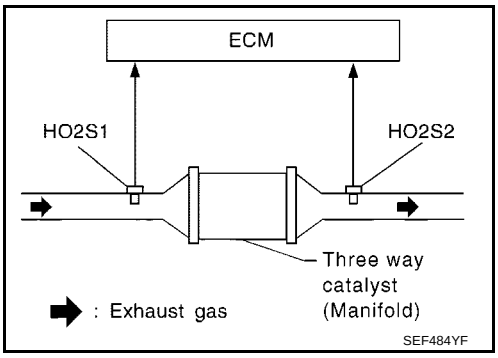
DTC P0420 THREE WAY CATALYST FUNCTION

PFP:20905

On Board Diagnosis Logic

EBS00O8F

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 2.
A three way catalyst (Manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.
When the frequency ratio of heated oxygen sensors 1 and 2 approaches a specified limit value, the three way catalyst (Manifold) malfunction is diagnosed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	● Three way catalyst (Manifold) does not operate properly. ● Three way catalyst (Manifold) does not have enough oxygen storage capacity.	● Three way catalyst (Manifold) ● Exhaust tube ● Intake air leaks ● Fuel injectors ● Fuel injector leaks ● Spark plug ● Improper ignition timing

DTC Confirmation Procedure

EBS00O8G

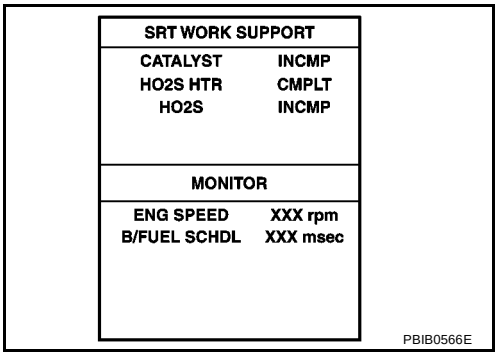
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

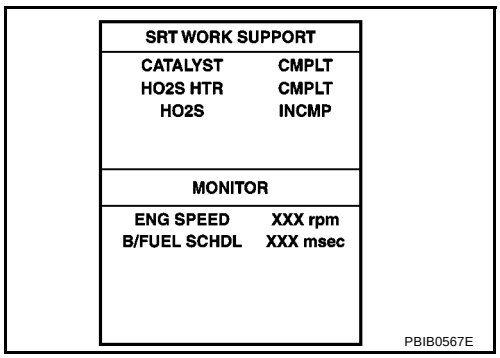
TESTING CONDITION:

- **Open engine hood before conducting the following procedure.**
- **Do not hold engine speed for more than the specified minutes below.**

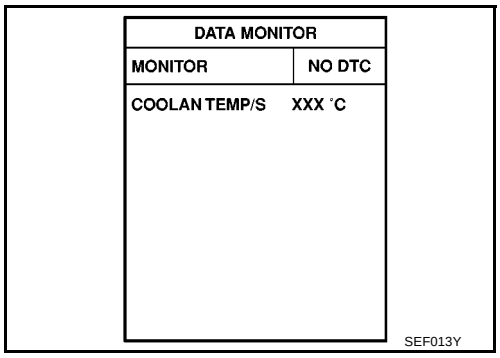
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “DTC & SRT CONFIRMATION” then “SRT WORK SUPPORT” mode with CONSULT-II.
6. Rev engine up to 2,000 to 3,000 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
   If “INCMP” of “CATALYST” changed to “COMPLT”, go to step 10
7. Wait 5 seconds at idle.



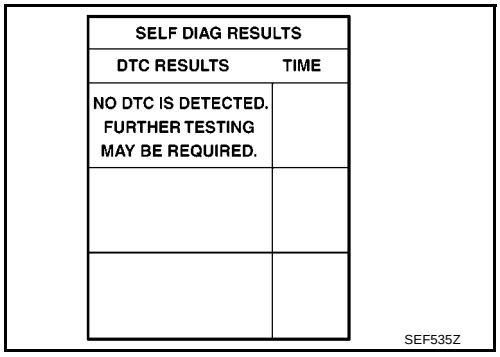
8. Rev engine up to 2,000 to 3,000 rpm and maintain it until “INCMP” of “CATALYST” changes to “CMPLT” (It will take approximately 5 minutes).
   If not “CMPLT”, stop engine and cool it down to less than 70°C (158 °F) and then retest from step 1.



a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle)
b. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
c. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-II.
d. When “COOLANTEMP/S” indication reaches to 70°(158°F), go to step 3.



9. Select “SELF-DIAG RESULTS” mode with CONSULT-II.
10. Confirm that the 1st trip DTC is not detected.
    If the 1st trip DTC is detected, go to EC-275, "Diagnostic Procedure" .



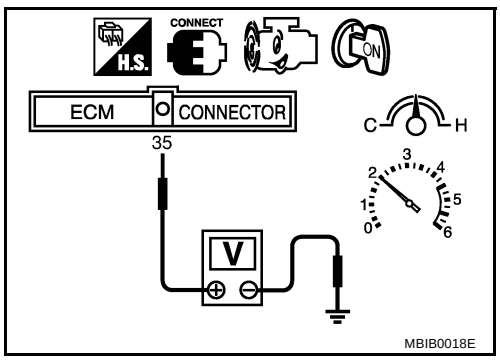
Overall Function Check

EBS00O8H

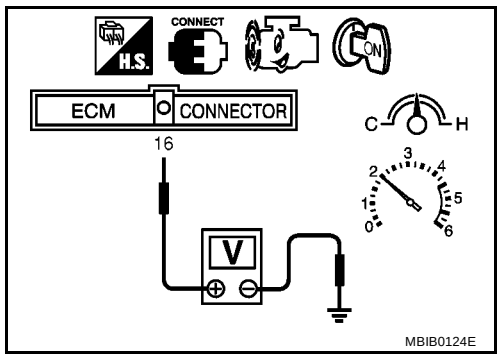
Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,00 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Open engine hood.
6. Set voltmeters probes between ECM terminal 35 (HO2S1 signal) and engine ground, and ECM terminal 16 (HO2S2 signal) and engine ground.
7. Keep engine speed at 2,000 rpm constant under no load.



8. Make sure that the voltage switching frequency (high & low) between ECM terminal 16 and engine ground is very less than that of ECM terminal 35 and engine ground.
Switching frequency ratio = A/B
A: Heated oxygen sensor 2 voltage switching frequency
B: Heated oxygen sensor 1 voltage switching frequency
This ratio should be less than 0.75.
If the ratio is greater than above, it means three way catalyst (manifold) does not operate properly. Go to EC-275, "Diagnostic Procedure" .



NOTE:
If the voltage at terminal 35 does not switch periodically more than 5 times within 10 seconds at step 8, perform trouble diagnosis for DTC P0133 first. (See EC-179 .)

Diagnostic Procedure

EBS00O8I

1. CHECK EXHAUST SYSTEM

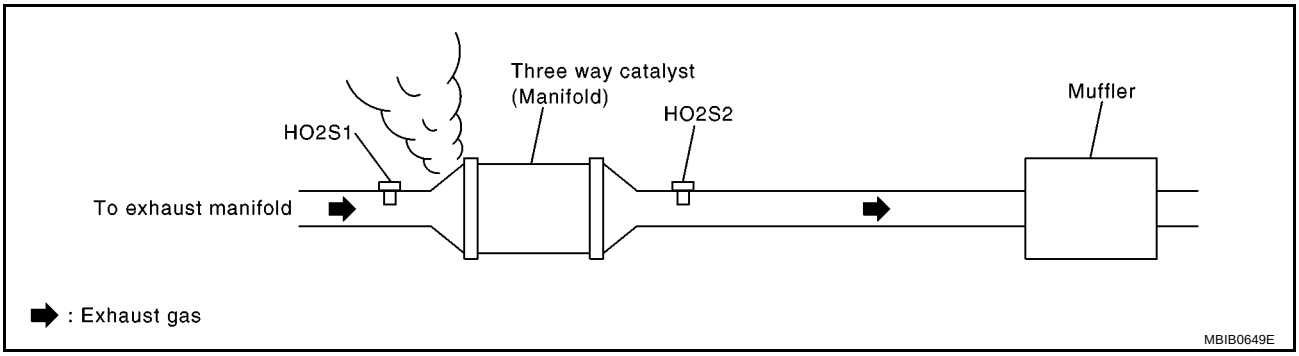
Visually check exhaust tubes and muffler for dent.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (Manifold).



OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the manifold absolute pressure sensor.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK IGNITION TIMING

Check the following items. Refer to EC-77, "Basic Inspection" .

Items		Specifications
Ignition timing	A/T	5° ± 2° BTDC (in P or N position)
	M/T	5° ± 2° BTDC
Target idle speed	A/T	700 ± 50 rpm (in P or N position)
	M/T	650 ± 50 rpm

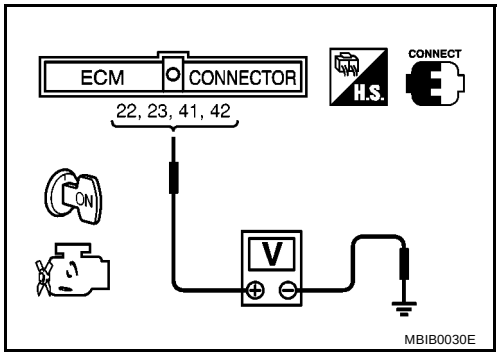
OK or NG

OK >> GO TO 5.
NG >> Follow the EC-77, "Basic Inspection" .

5. CHECK INJECTORS

1. Stop engine and then turn ignition switch ON.
2. Refer to Wiring Diagram for Injectors, EC-445 .
3. Check voltage between ECM terminals 22, 23, 41, 42 and ground with CONSULT-II or tester.

Battery voltage should exist.

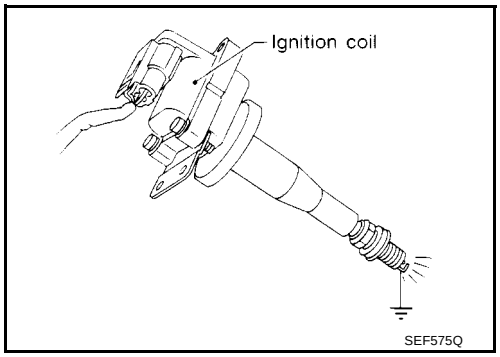


OK or NG

OK >> GO TO 6.
NG >> Perform EC-446, "Diagnostic Procedure" .

6. CHECK IGNITION SPARK

1. Turn ignition switch OFF.
2. Disconnect ignition coil assembly from rocker cover.
3. Connect a known-good spark plug to the ignition coil assembly.
4. Disconnect all injector harness connectors.
5. Place end of spark plug against a suitable ground and crank engine.
6. Check for spark.



OK or NG

OK >> GO TO 7.
NG >> Check ignition coil with power transistor and their circuit. Refer to EC-435, "IGNITION SIGNAL" .

7. CHECK INJECTOR

1. Turn ignition switch OFF.
2. Remove injector assembly.
   Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all injectors connected to injector gallery.
3. Reconnect all injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Turn ignition switch ON.
   Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip.)>>GO TO 8.
NG (Drips.)>>Replace the injector(s) from which fuel is dripping.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

Trouble is fixed.>>**INSPECTION END**
Trouble is not fixed.>>Replace three way catalyst (Manifold).

DTC P0444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description

EBS00O8J

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed signal*2	Vehicle speed		

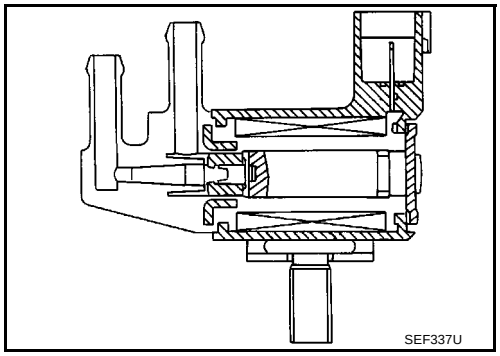
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O8K

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%

On Board Diagnosis Logic

EBS00O8L

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	● Harness or connectors (The solenoid valve circuit is open or shorted.) ● EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

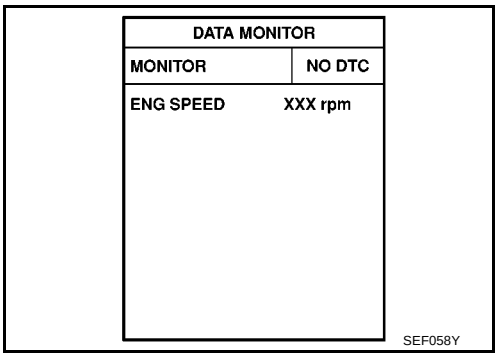
EBS00O8M

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to EC-281, "Diagnostic Procedure"
.

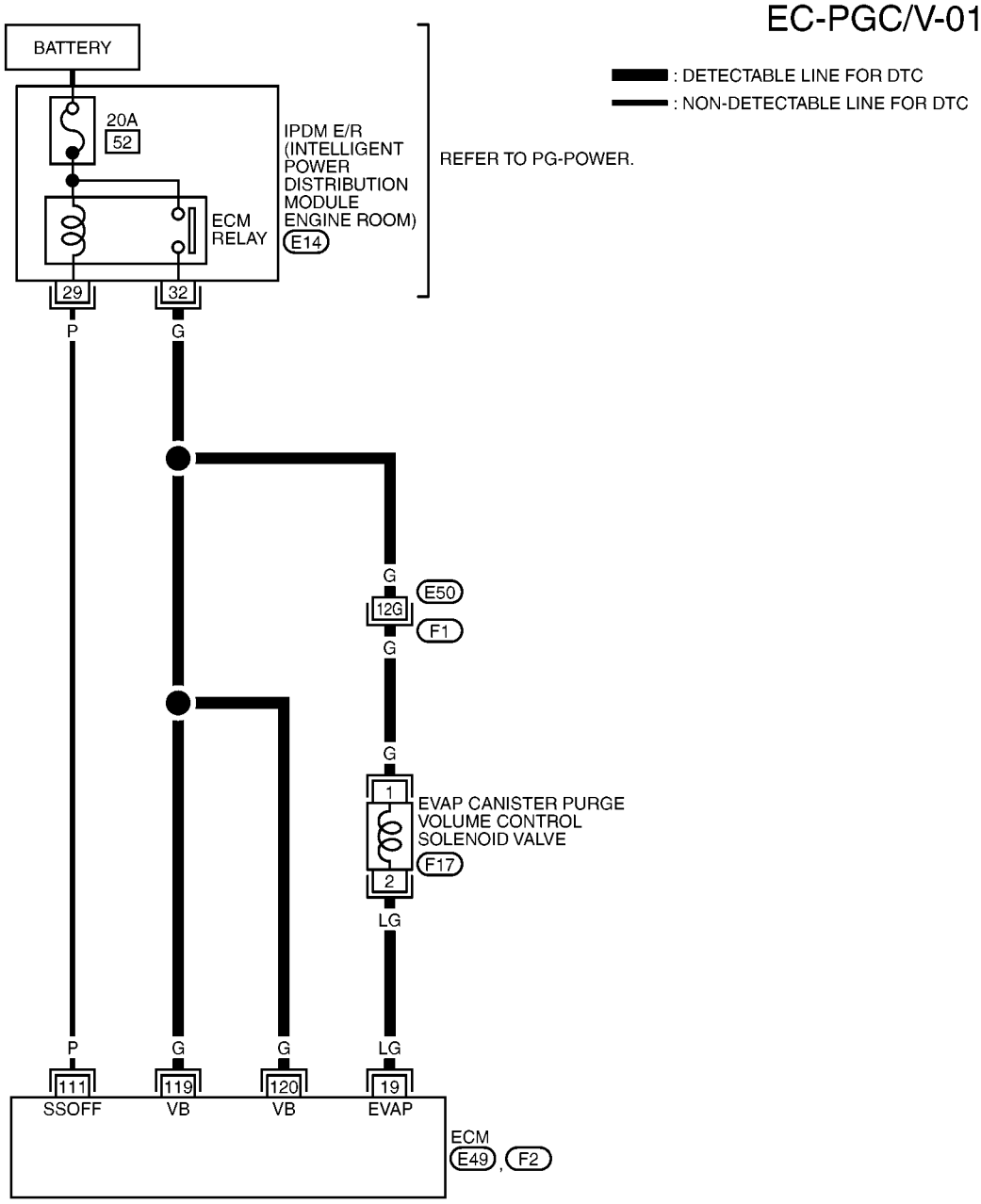


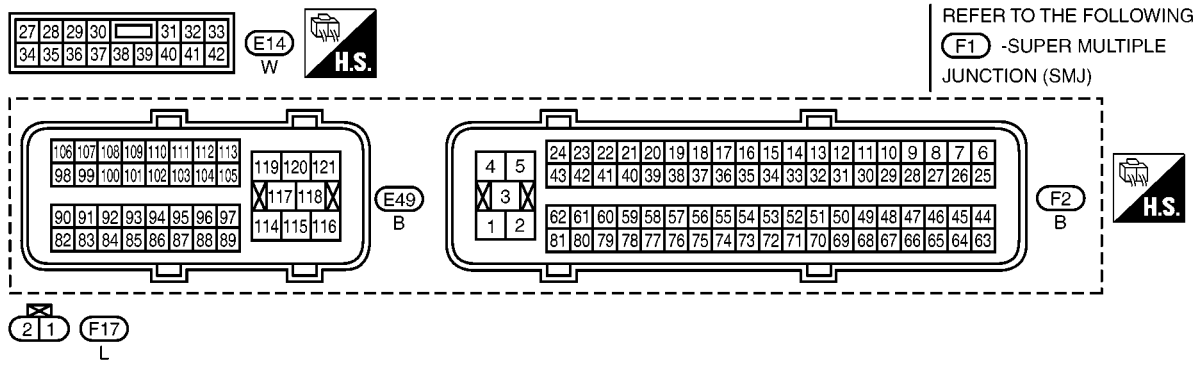
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O8N

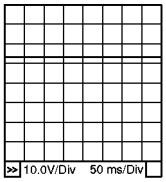
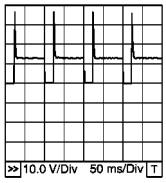




MBWA0572E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
19	LG	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E

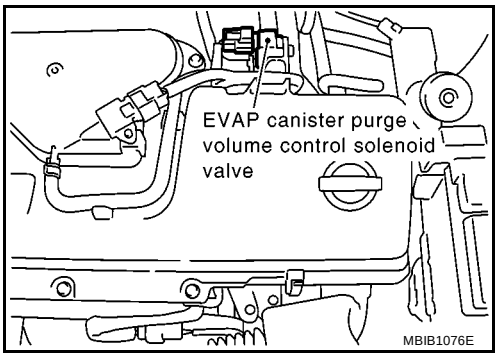
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00O8O

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.



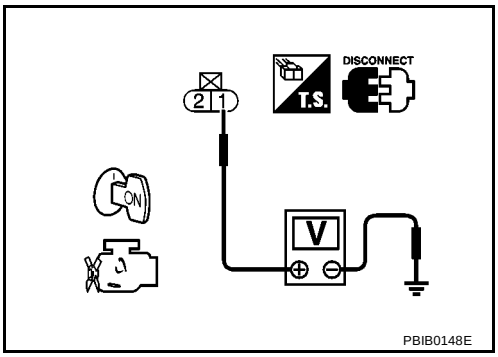
MBIB1076E

4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



PBIB0148E

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between EVAP canister purge volume control solenoid valve and E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 19 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 4.
OK (Without CONSULT-II)>>GO TO 5.
NG >> Repair open circuit or short to ground and short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0569E

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-283, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

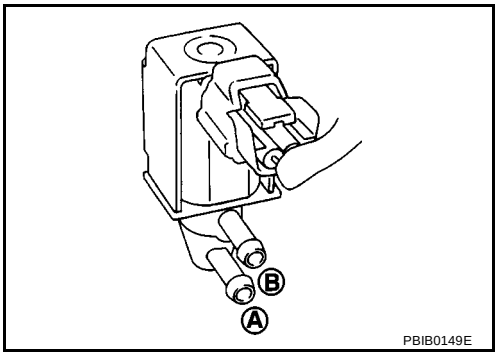
EBS00O8P

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No

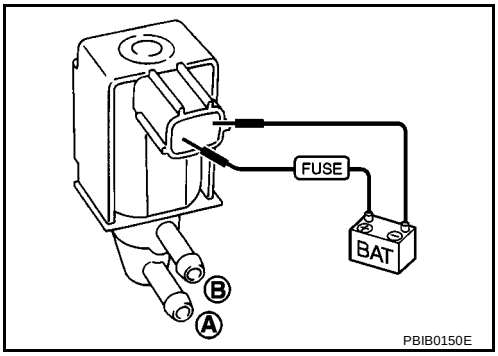


PBIB0149E

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation

EBS00O8Q

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

DTC P0500 VSS

PFP:32702

Description

EBS00O8R

NOTE:
If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .
The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” through CAN communication line. The combination meter then sends a signal to the ECM through CAN communication line.

On Board Diagnosis Logic

EBS00O8S

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	● Harness or connectors (The CAN communication line is open or shorted.) ● ABS control unit ● ABS actuator and electric unit (control unit) ● Wheel sensor ● Combination meter

DTC Confirmation Procedure

EBS00O8T

CAUTION:
Always drive vehicle at a safe speed.

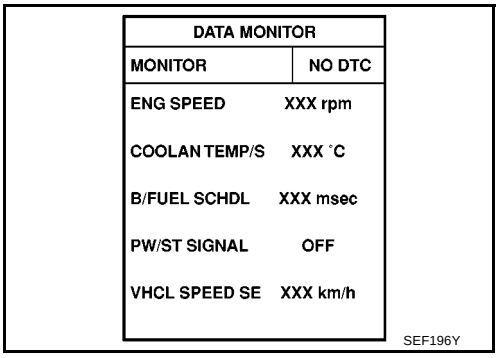
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
   If NG, go to EC-285, "Diagnostic Procedure" .
   If OK, go to following step.
3. Select “DATA MONITOR” mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	More than 1,900 rpm (A/T models) More than 2,300 rpm (M/T models)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.5 - 31.8 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF



6. If 1st trip DTC is detected, go to EC-285, "Diagnostic Procedure" .

Overall Function Check

EBS00O8U

Use this procedure to check the overall function of the vehicle speed signal circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed signal in “MODE 1” with GST.
   The vehicle speed signal on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
4. If NG, go to EC-285, "Diagnostic Procedure" .

Diagnostic Procedure

EBS00O8V

1. CHECK DTC

Refer to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK COMBINATION METER

Check combination meter function.
Refer to DI-5, "COMBINATION METERS" .

>> **INSPECTION END**

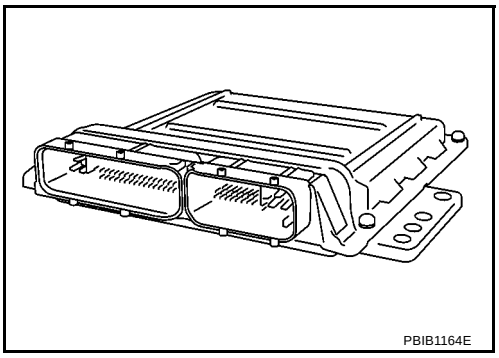
DTC P0605 ECM

PFP:23710

Component Description

EBS00O8W

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.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On Board Diagnosis Logic

EBS00O8X

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

EBS00O8Y

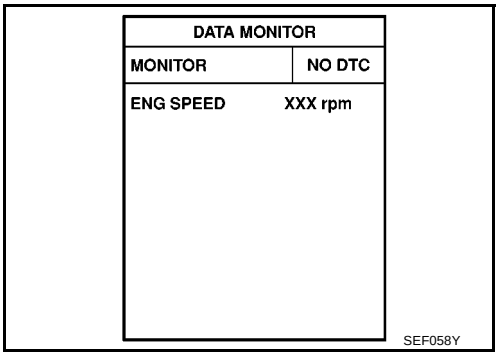
Perform PROCEDURE FOR MALFUNCTION A first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B. If there is no malfunction on PROCEDURE FOR MALFUNCTION B, perform PROCEDURE FOR MALFUNCTION C.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-287, "Diagnostic Procedure" .



SEF058Y

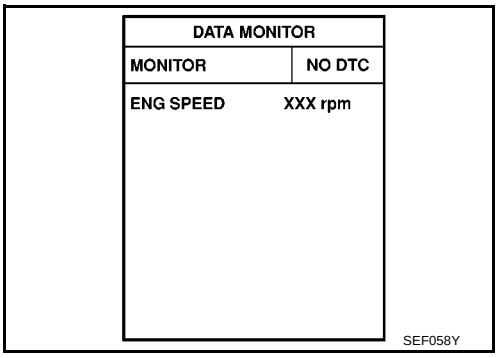
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. If 1st trip DTC is detected, go to EC-287, "Diagnostic Procedure" .



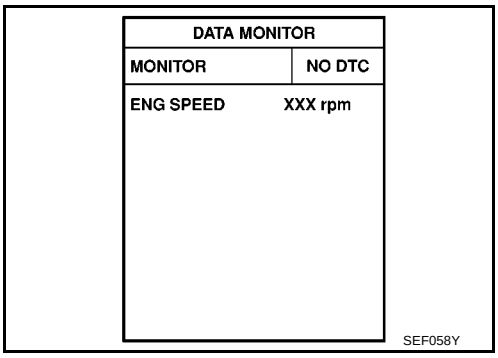
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. Repeat step 3 for 32 times.
5. If 1st trip DTC is detected, go to EC-287, "Diagnostic Procedure" .



With GST

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

EBS00O8Z

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-286 .
5. Is the 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE 4 with GST.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-286 .
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-60, "NATS (Nissan Anti-theft System)" .
3. Perform EC-42, "Accelerator Pedal Released Position Learning" .
4. Perform EC-42, "Throttle Valve Closed Position Learning" .
5. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

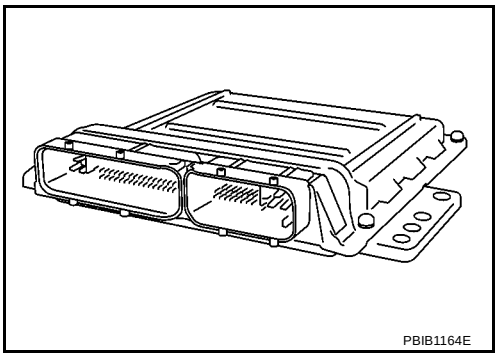
DTC P1065 ECM POWER SUPPLY

PFP:23710

Component Description

EBS00O90

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.


PBIB1164E

On Board Diagnosis Logic

EBS00O91

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ● ECM

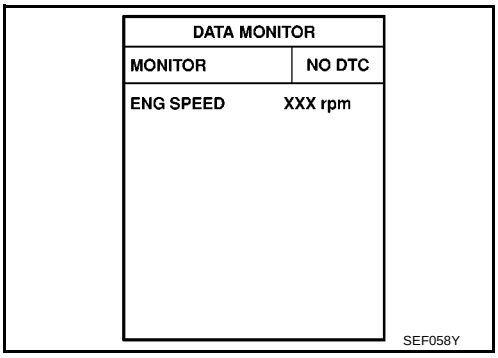
DTC Confirmation Procedure

EBS00O92

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
5. Repeat steps 3 and 4 for 4 times.
6. If 1st trip DTC is detected, go to EC-291, "Diagnostic Procedure".



SEF058Y

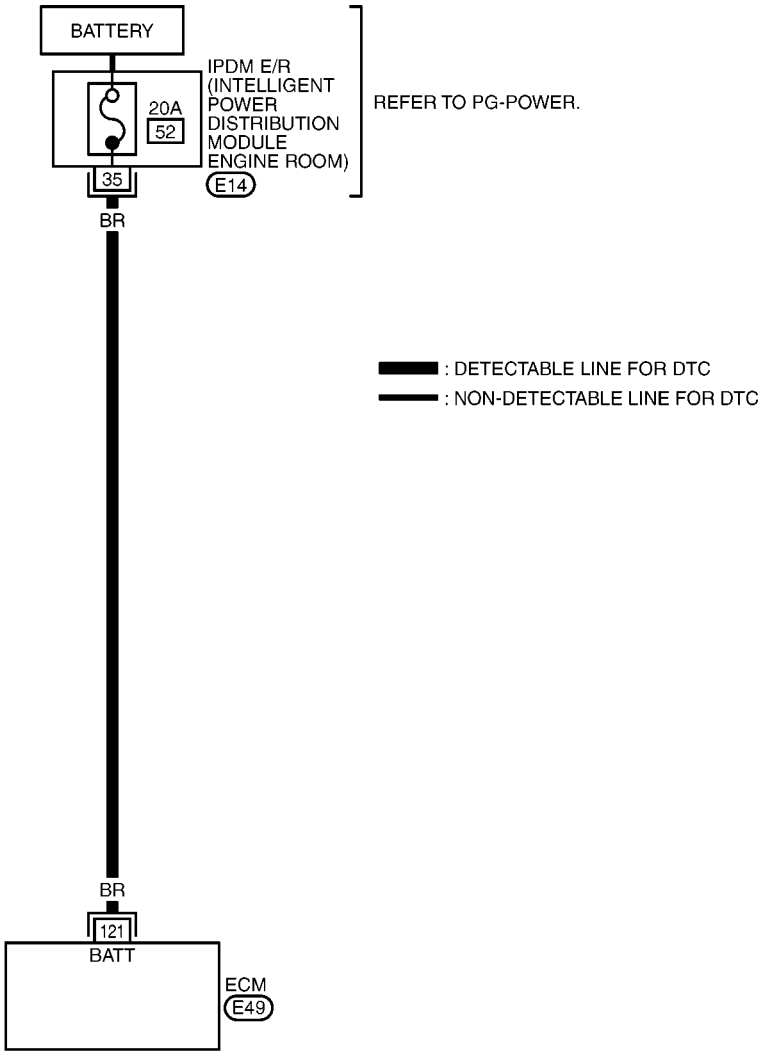
WITH GST

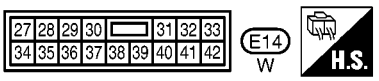
Follow the procedure “WITH CONSULT-II” above.

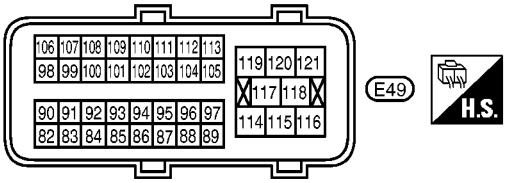
Wiring Diagram

EBS00O93

EC-ECM/PW-01







MBWA0285E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	BR	Power supply for ECM (Buck-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

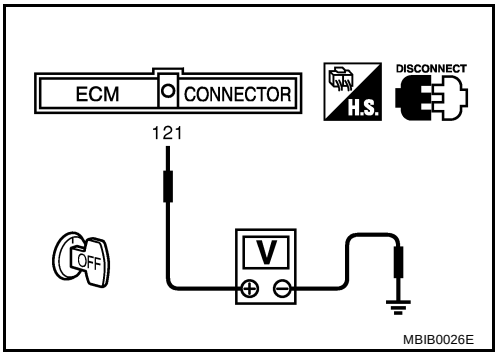
Diagnostic Procedure

EBS00O94

1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- 20A fuse
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-289 .
5. Is the 1st trip DTC P1065 displayed again?

With GST

1. Turn ignition switch ON.
2. Select MODE 4 with GST.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-289 .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes >> GO TO 5.
No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-60, "NATS (Nissan Anti-theft System)" .
3. Perform EC-42, "Accelerator Pedal Released Position Learning" .
4. Perform EC-42, "Throttle Valve Closed Position Learning" .
5. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

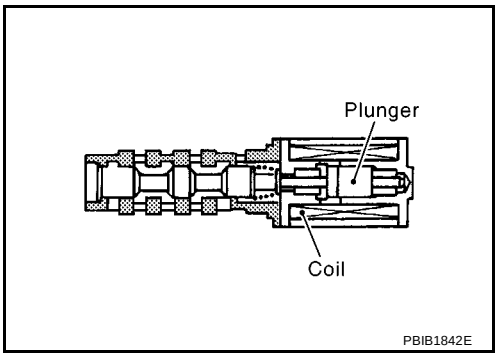
DTC P1111 IVT CONTROL SOLENOID VALVE

PFP:23796

Component Description

EBS00O95

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



CONSULT-II Reference Value in Data Monitor Mode

EBS00O96

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly	Approx. 0% - 50%

On Board Diagnosis Logic

EBS00O97

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	● Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) ● Intake valve timing control solenoid valve

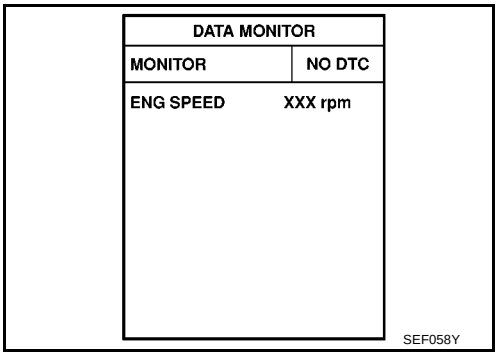
DTC Confirmation Procedure

EBS00O98

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to EC-295, "Diagnostic Procedure" .

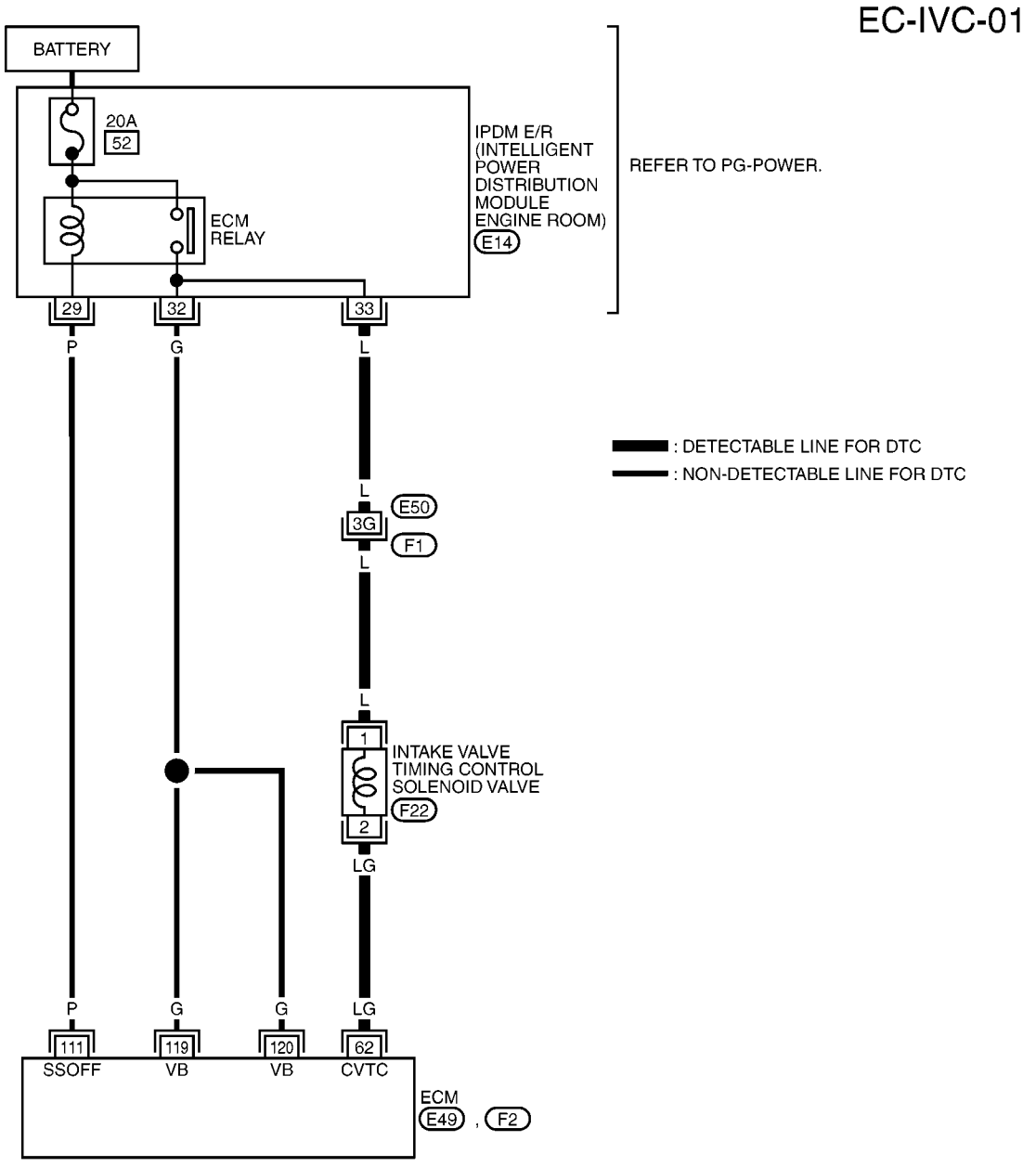


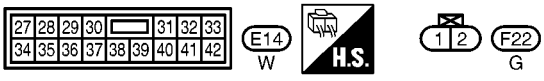
WITH GST

Following the procedure “WITH CONSULT-II” above.

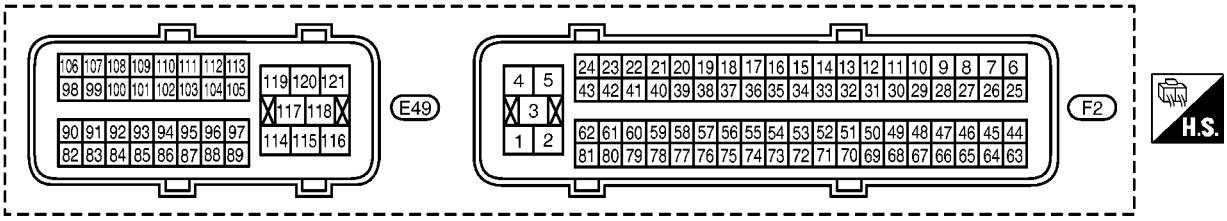
Wiring Diagram

EBS00O99





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

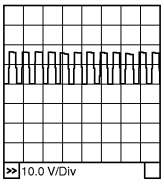


MBWA0303E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	LG	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● **Warm-up condition** ● When revving engine up to 2,000 rpm quickly	Approximately 4V - BATTERY VOLTAGE (11 - 14V)★  PBIB1790E

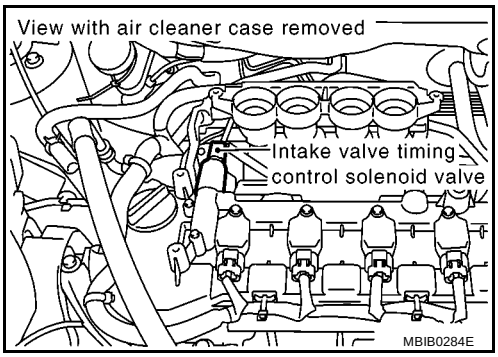
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00O9A

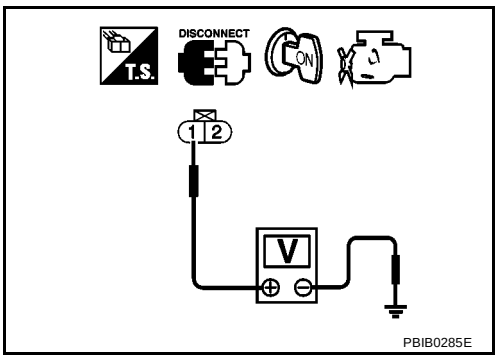
1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTION PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 62 and intake valve timing control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-296, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace intake valve timing control solenoid valve.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

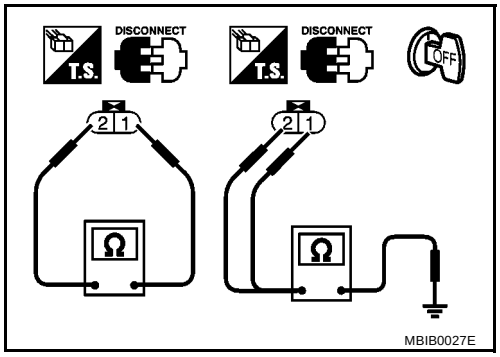
Component Inspection

EBS00O9B

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2 under the following conditions.

Terminals	Resistance
1 and 2	Approximately 7.2Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



Removal and Installation

EBS00O9C

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EM-33, "ROCKER COVER" .

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

EBS00O9D

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00O9E

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

EBS00O9F

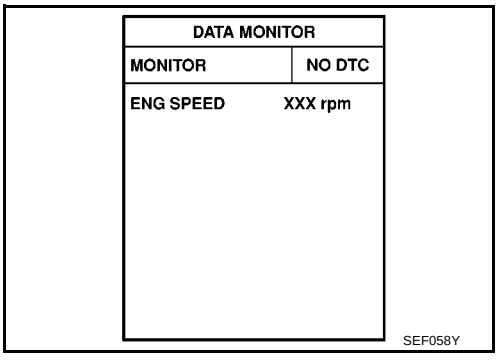
NOTE:

- **Perform PROCEDURE FOR MALFUNCTION A AND B first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION C.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

With CONSULT-II

1. Turn ignition witch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Shift selector lever to D position (A/T), 1st position (M/T) and wait at least 2 seconds.
4. Shift selector lever to P position (A/T), Neutral position (M/T).
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Turn ignition switch ON and wait at least 1 second.
7. Shift selector lever to D position (A/T), 1st position (M/T) and wait at least 2 seconds.
8. Shift selector lever to P position (A/T), Neutral position (M/T).
9. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
10. If 1st trip DTC is detected, go to EC-298, "Diagnostic Procedure" .



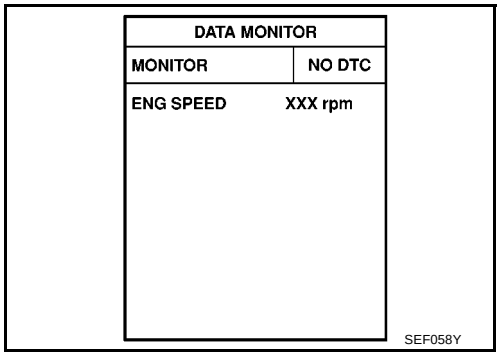
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Shift selector lever to D position (A/T), 1st position (M/T) and wait at least 2 seconds.
4. Shift selector lever to N or P position (A/T) or Neutral position (M/T).
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to EC-298, "Diagnostic Procedure" .



With GST

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

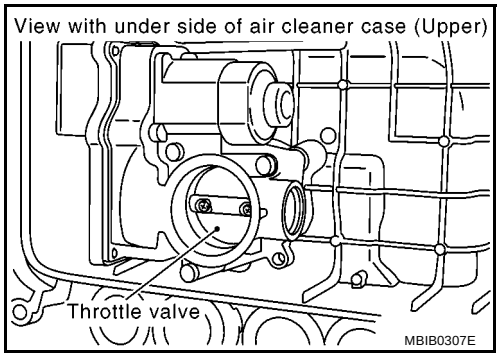
EBS00O9G

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

EBS00O9I

NOTE:
If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-297 or EC-305 .
Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00O9J

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	● Harness or connectors (Throttle control motor circuit is open or shorted.) ● Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

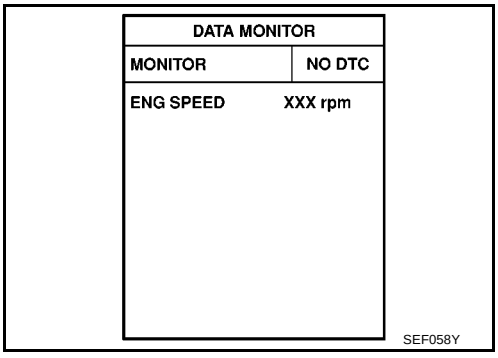
DTC Confirmation Procedure

EBS00O9K

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-301, "Diagnostic Procedure" .



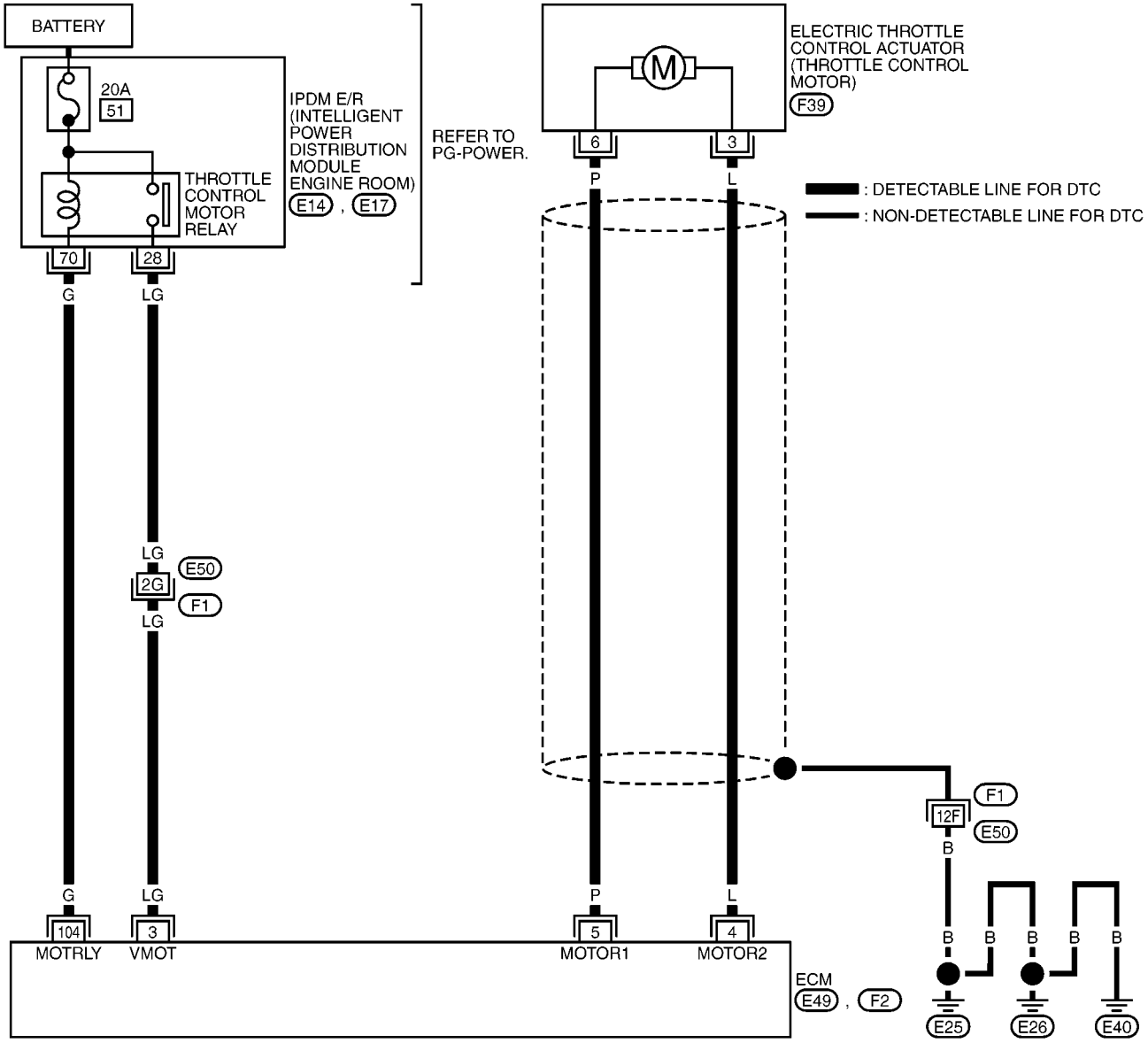
WITH GST

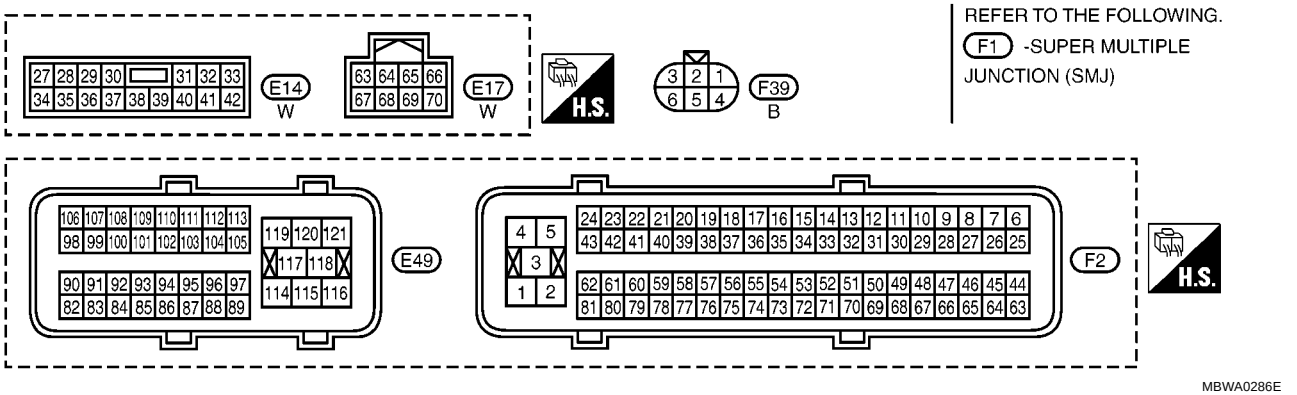
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O9L

EC-ETC1-01

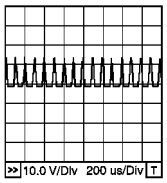
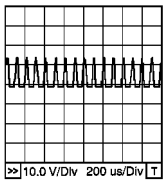




MBWA0286E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

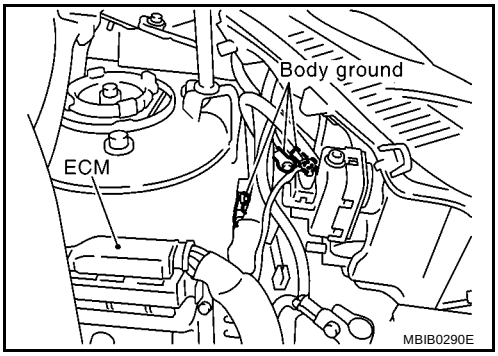
Diagnostic Procedure

EBS00O9M

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.

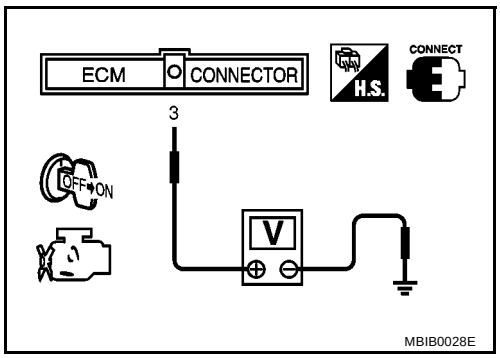


MBIB0290E

2. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT-I

Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)



OK or NG

OK >> GO TO 10.
NG >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E14.
4. Check harness continuity between ECM terminal 3 and IPDM E/R terminal 28. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

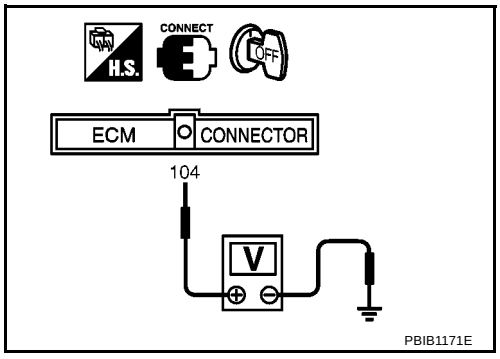
- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch OFF.
3. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E17.
3. Check continuity between ECM terminal 104 and IPDM E/R terminal 70. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector E17
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

OK or NG

OK >> GO TO 9.
NG >> Replace 20A fuse.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

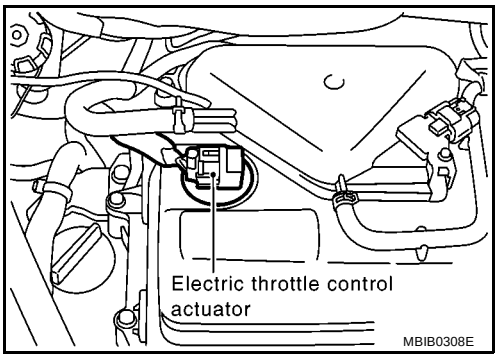
OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	5	Should not exist
	4	Should exist
6	5	Should exist
	4	Should not exist



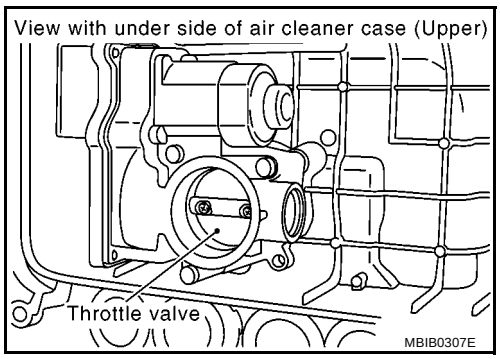
5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 12.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-304, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 14.
NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

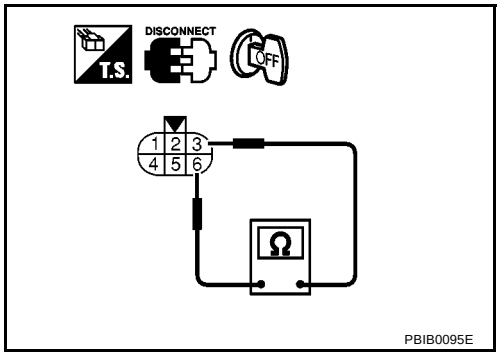
Component Inspection

EBS00O9N

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]



3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-42, "Throttle Valve Closed Position Learning" .
5. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00O9O

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PFP:16119

Component Description

EBS00O9P

Power supply for the Throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

EBS00O9Q

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

EBS00O9R

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	● Harness or connectors (Throttle control motor relay circuit is shorted.) ● Throttle control motor relay
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	● Harness or connectors (Throttle control motor relay circuit is open.) ● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

EBS00O9S

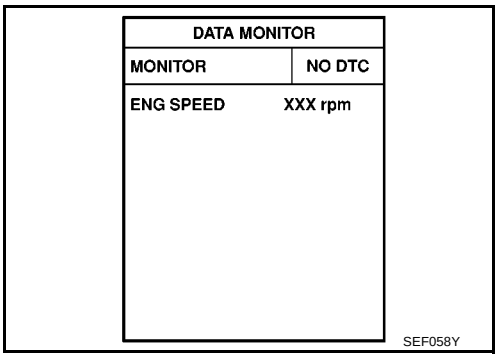
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P1124

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V.

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-308, "Diagnostic Procedure" .



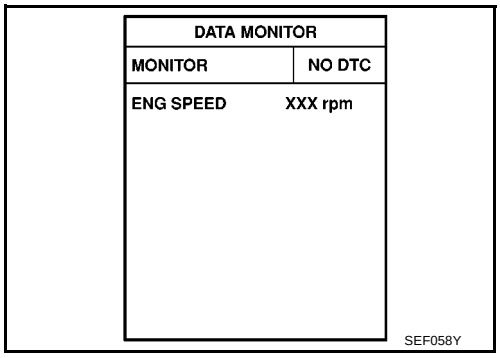
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-308, "Diagnostic Procedure" .



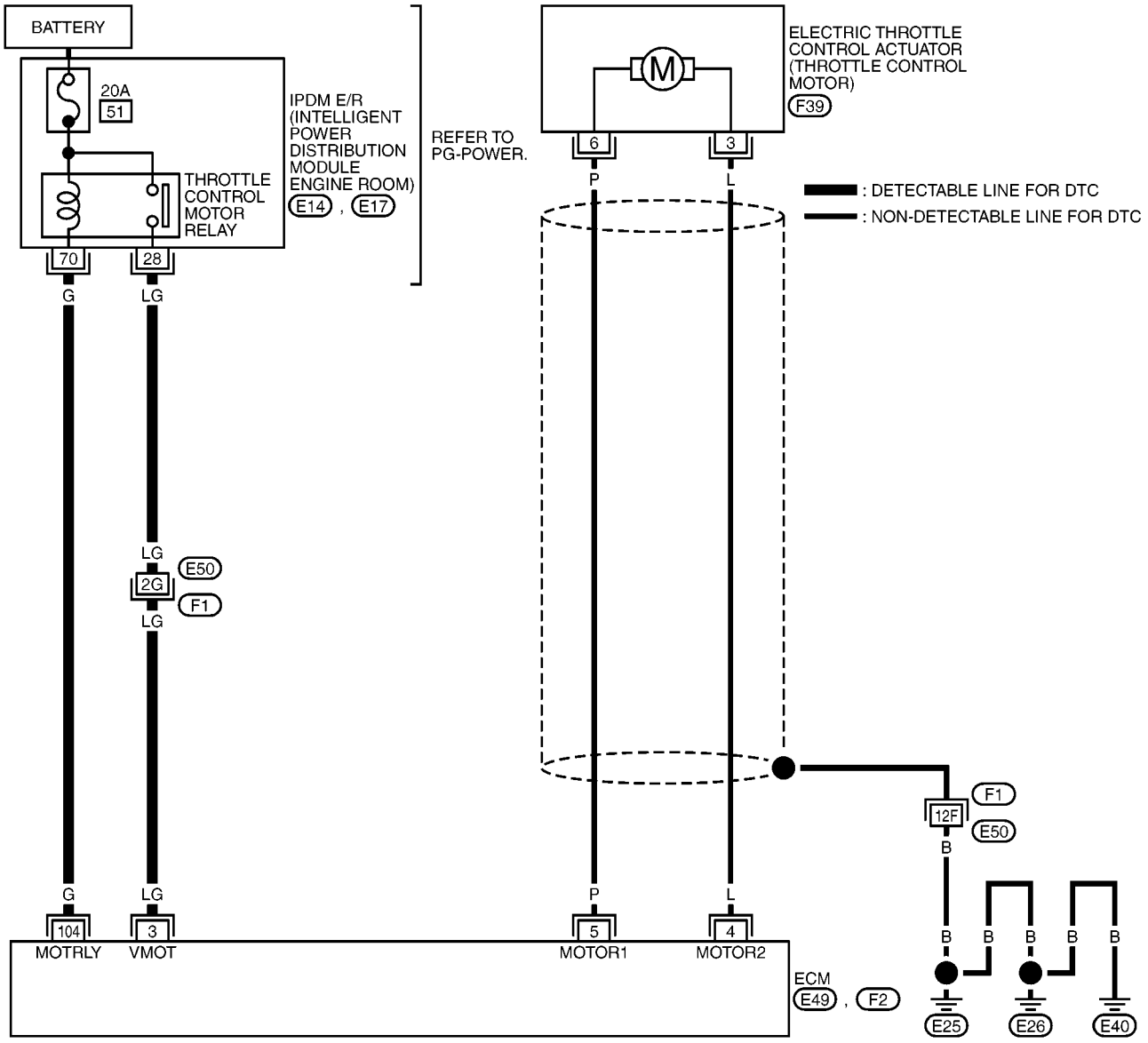
With GST

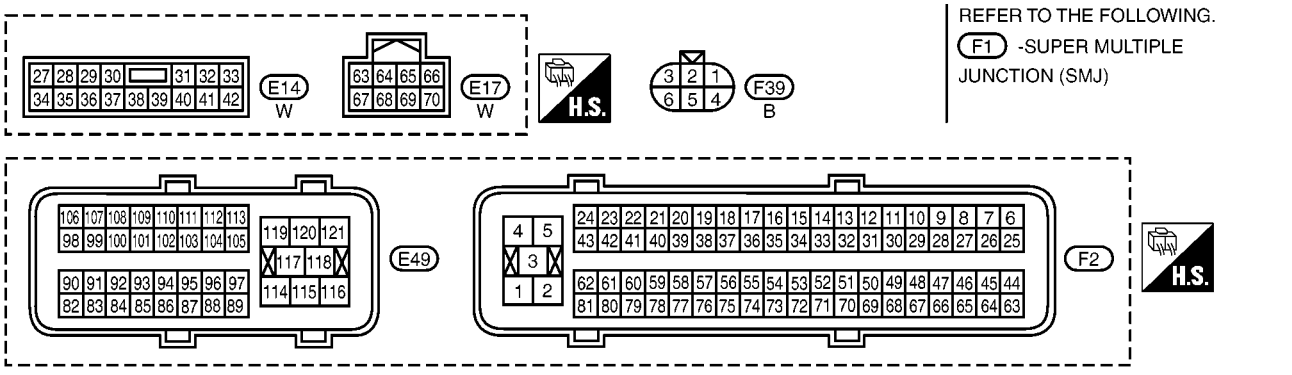
Follow the procedure “With CONSULT-II” above.

Wiring Diagram

EBS00O9T

EC-ETC2-01





MBWA0287E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

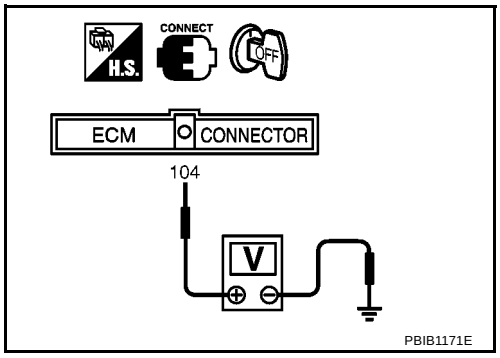
Diagnostic Procedure

EBS00O9U

1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage.



OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E17.
3. Check continuity between ECM terminal 104 and IPDM E/R terminal 70.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector E17
- Harness for open or shot between ECM and IPDM E/R

>> Repair open circuit of short to ground or short to power in harness or connectors.

4. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

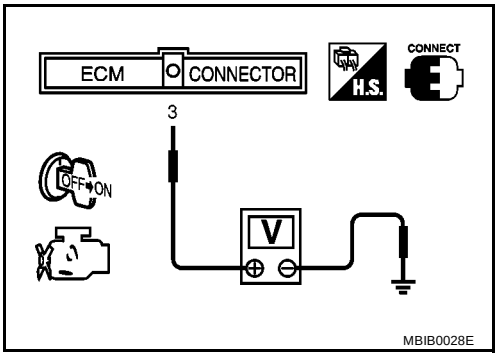
OK or NG

OK >> GO TO 8.
NG >> Replace 20A fuse.

5. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT-I

1. Reconnect all disconnected connectors.
2. Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)



OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E14.
4. Check continuity between ECM terminal 3 and IPDM E/R terminal 28. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connectors.

DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

Component Description

EBS00O9W

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00O9X

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	● Harness or connectors (Throttle control motor circuit is shorted.) ● Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

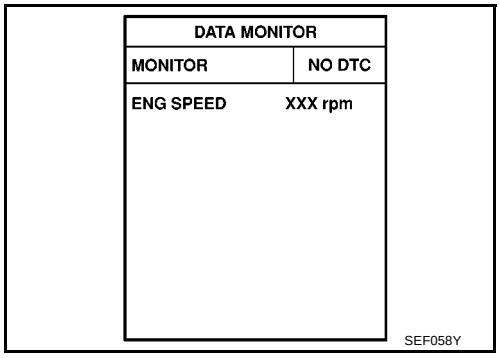
DTC Confirmation Procedure

EBS00O9Y

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-312, "Diagnostic Procedure" .



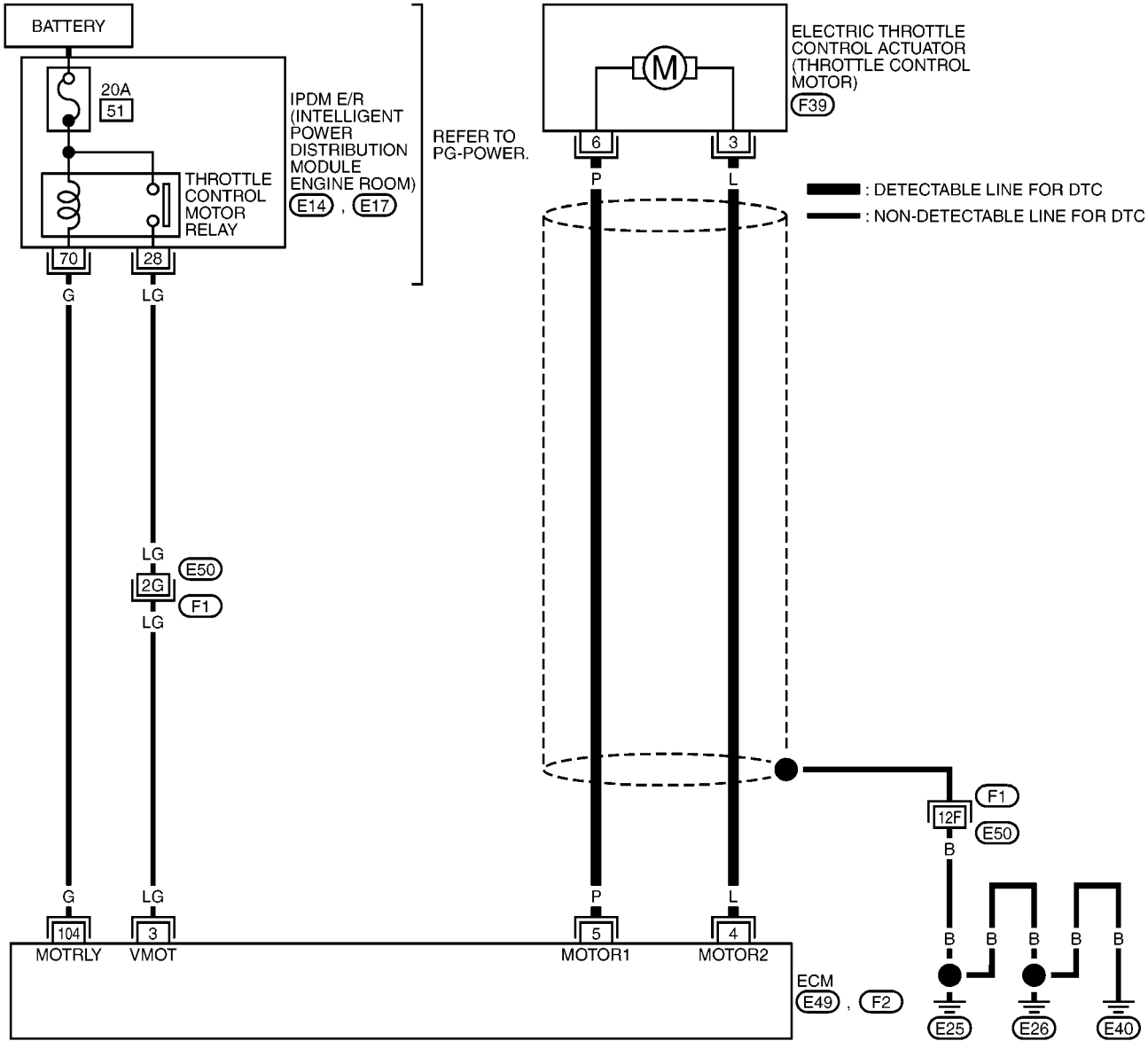
WITH GST

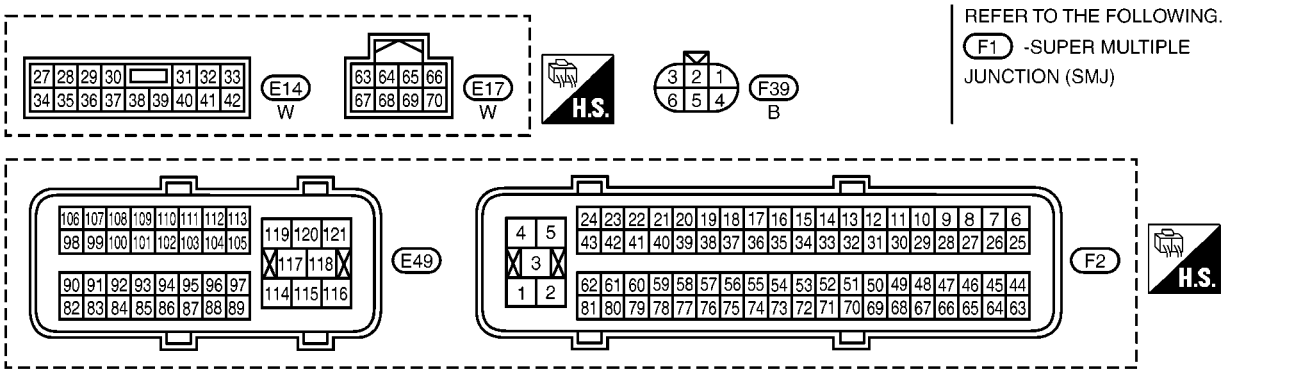
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00O9Z

EC-ETC3-01



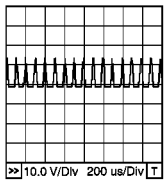
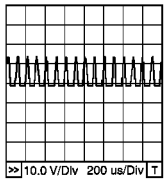


MBWA0288E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

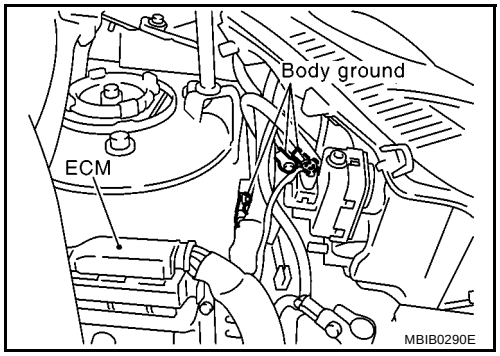
Diagnostic Procedure

EBS00OA0

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

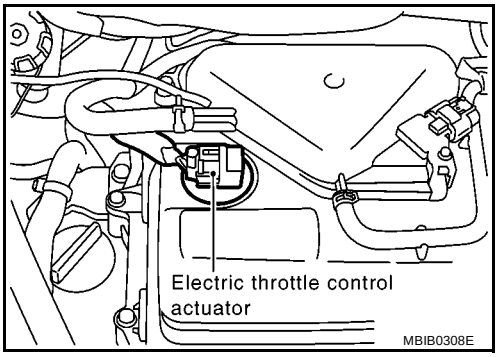
>> GO TO 2.



MBIB0290E

2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK THROTTLE CONTROL MOTOR

Refer to EC-313, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

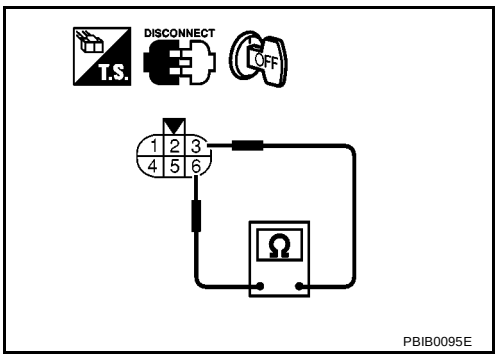
Component Inspection

EBS00OA1

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]



3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-42, "Throttle Valve Closed Position Learning" .
5. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00OA2

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

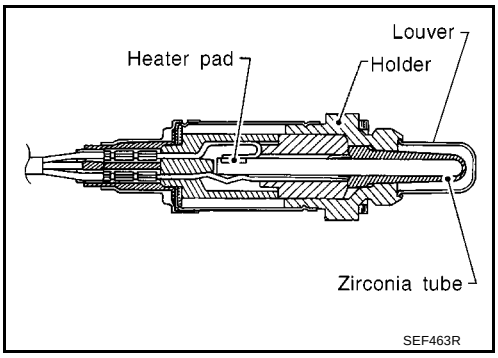
DTC P1143 HO2S1

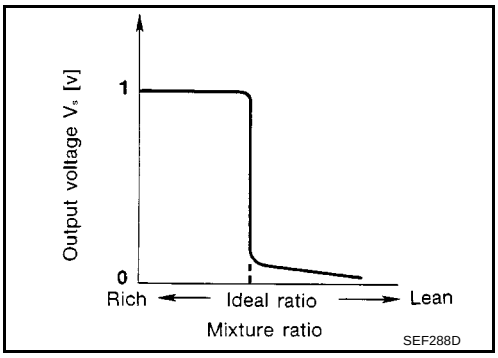
PFP:22690

Component Description

EBS00OA3

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00OA4

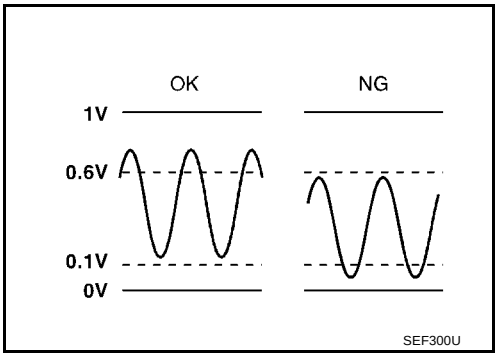
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00OA5

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

EBS00OA6

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

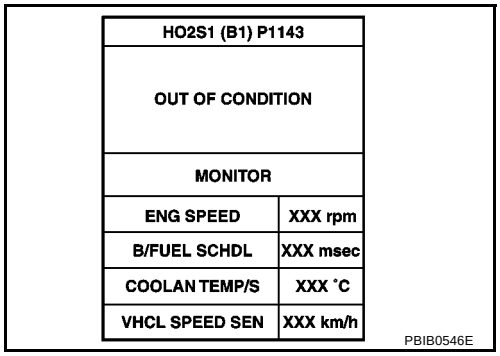
TESTING CONDITION:

- **Always perform at a temperature above −10°C (14°F).**
- **Before performing following procedure, confirm that battery voltage is more than 11V at idle.**

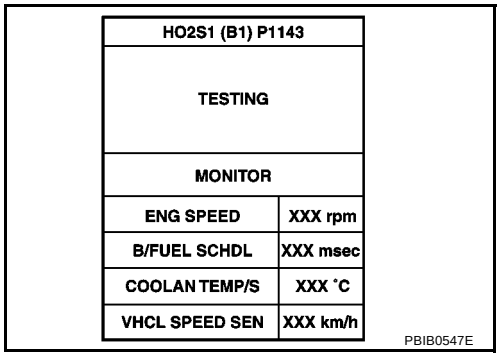
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



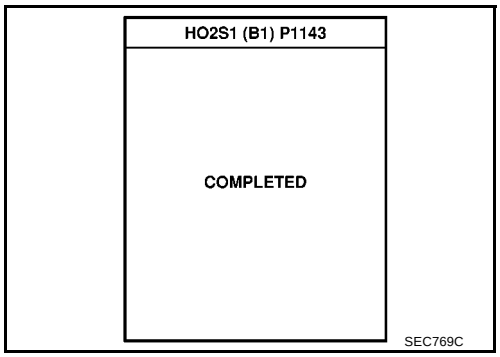
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)



ENG SPEED	1,700 - 3,700 rpm (M/T models with CR10 engine) 1,500 - 3,350 rpm (M/T models with CR12 engine) 1,600 - 3,450 rpm (M/T models with CR14 engine) 1,300 - 2,850 rpm (A/T models)
Vehicle speed	50 - 100 km/h (31 - 62 MPH)
B/FUEL SCHDL	1.8 - 5.1 msec (M/T models) 2.4 - 6.1 msec (A/T models)
Selector lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-317, "Diagnostic Procedure" .



Overall Function Check

EBS00OA7

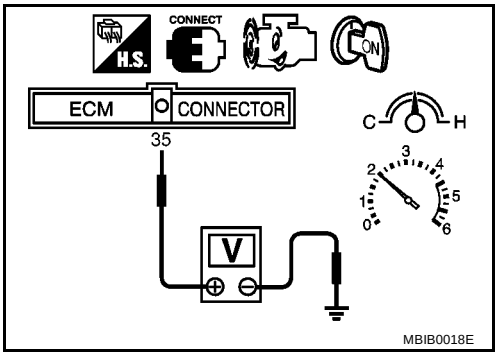
Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is over 0.1V at least one time.

4. If NG, go to EC-317, "Diagnostic Procedure" .



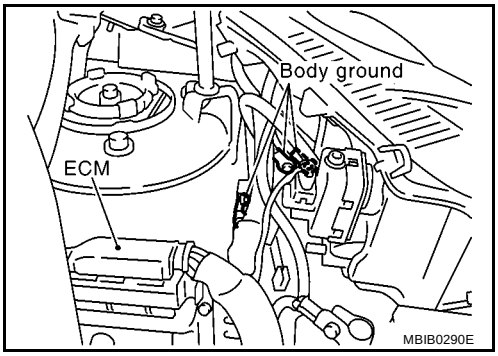
Diagnostic Procedure

EBS00OA8

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.

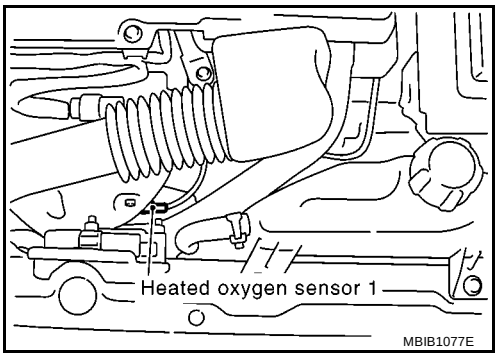


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg-m, 30 - 44 ft-lb)

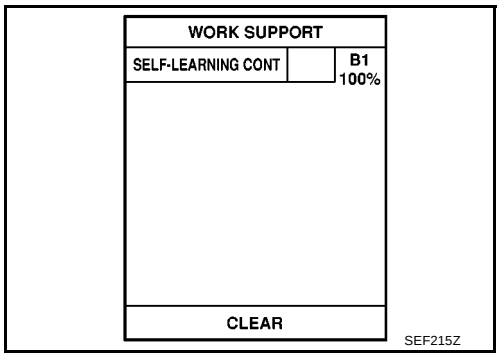
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

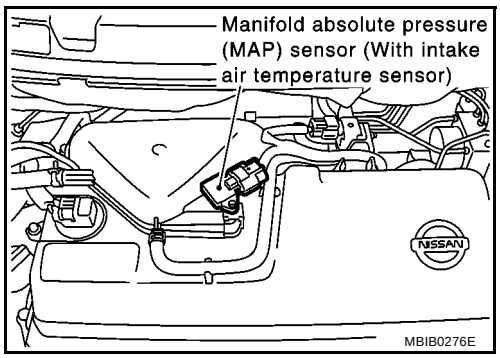
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-208 .
No >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-141, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 1.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-319, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
For circuit, refer to EC-171, "Wiring Diagram" .

>> **INSPECTION END**

Component Inspection

EBS00OA9

HEATED OXYGEN SENSOR 1

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

MBIB0301E

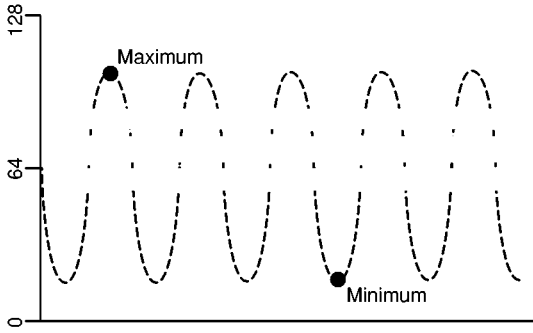
6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown in the figure.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.

cycle	1	2	3	4	5
HO2S1 MNTR (B1)	R-L	R-L	R-L	R-L	R-L

R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



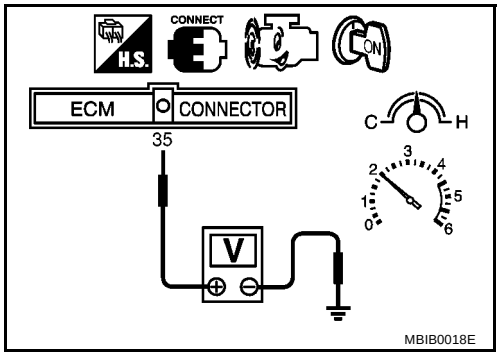
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OAA

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

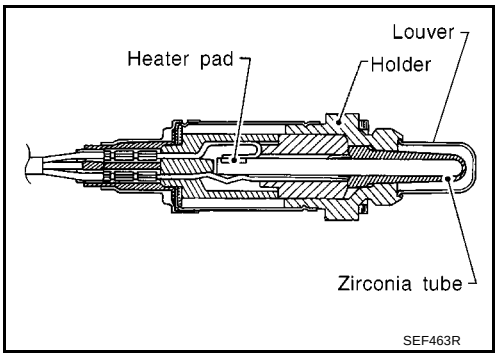
DTC P1144 HO2S1

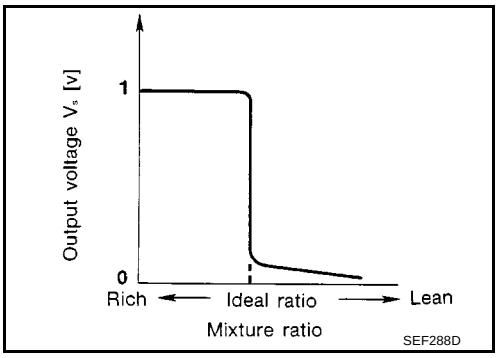
PFP:22690

Component Description

EBS00OAB

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00OAC

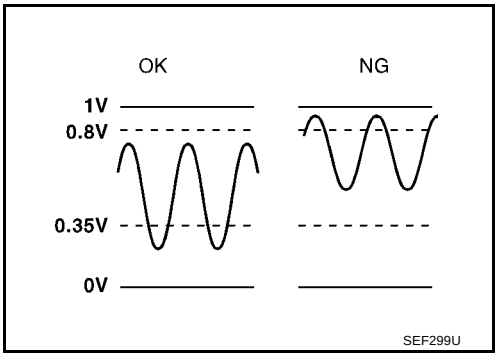
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00OAD

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the “rich” output is sufficiently high and whether the “lean” output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Injectors

DTC Confirmation Procedure

EBS00OAE

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

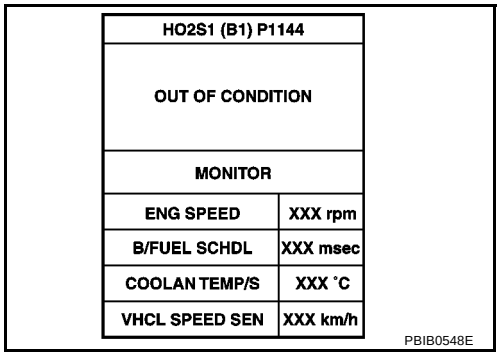
TESTING CONDITION:

- **Always perform at a temperature above −10°C (14°F).**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

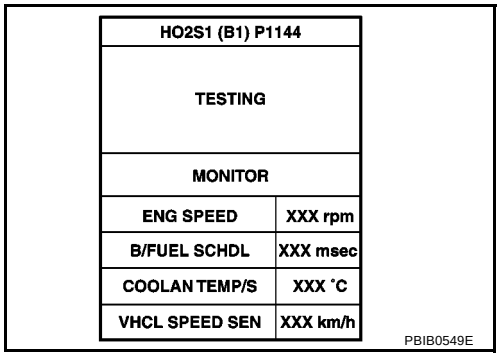
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1144” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



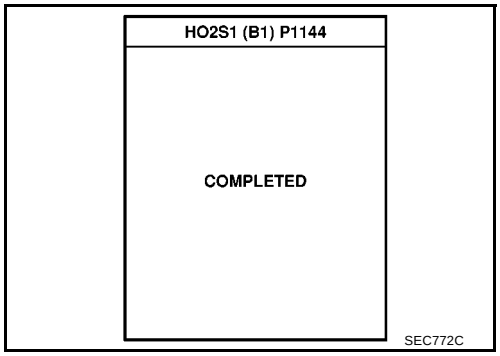
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)



ENG SPEED	1,700 - 3,700 rpm (M/T models with CR10 engine) 1,500 - 3,350 rpm (M/T models with CR12 engine) 1,600 - 3,450 rpm (M/T models with CR14 engine) 1,300 - 2,850 rpm (A/T models)
Vehicle speed	50 - 100 km/h (31 - 62 MPH)
B/FUEL SCHDL	1.8 - 5.1 msec (M/T models) 2.4 - 6.1 msec (A/T models)
Selector lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-323, "Diagnostic Procedure" .



Overall Function Check

EBS00OAF

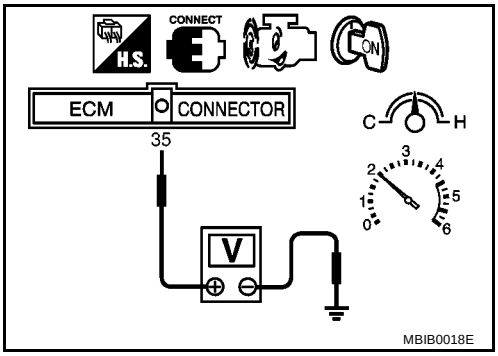
Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.

- The maximum voltage is below 0.8V at least one time.
- The minimum voltage is below 0.35V at least one time.

4. If NG, go to EC-323, "Diagnostic Procedure" .



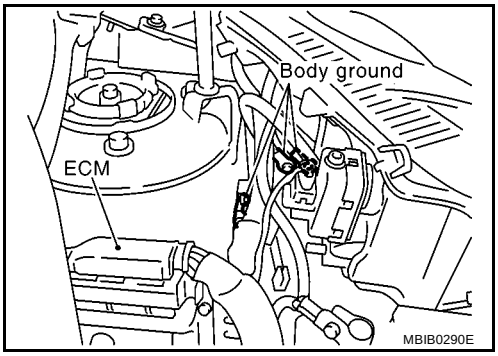
Diagnostic Procedure

EBS00OAG

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.

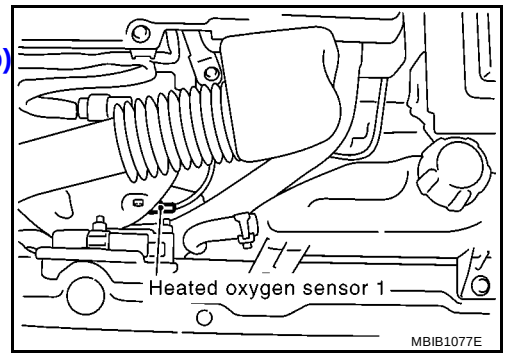


2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg-m, 30 - 44 ft-lb)

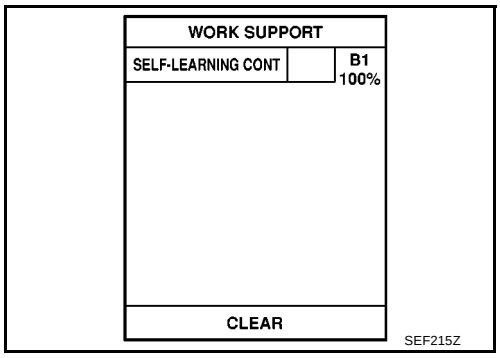
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

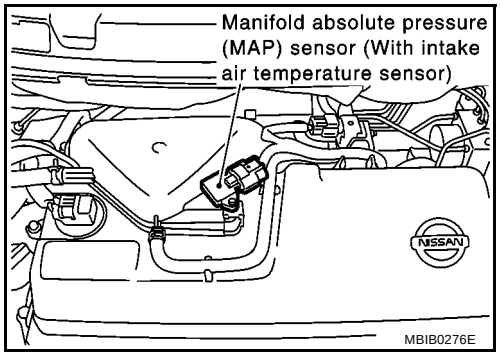
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



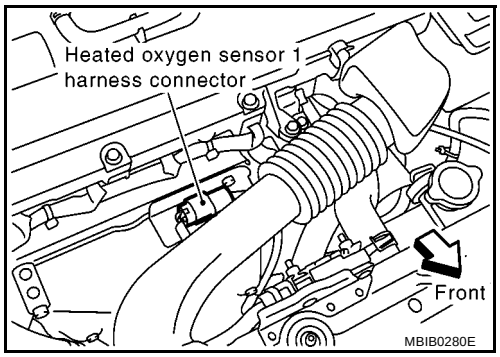
Yes or No

Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-215 .
No >> GO TO 4.

4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.



OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-141, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-325, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
For circuit, refer to EC-171, "Wiring Diagram" .

>> **INSPECTION END**

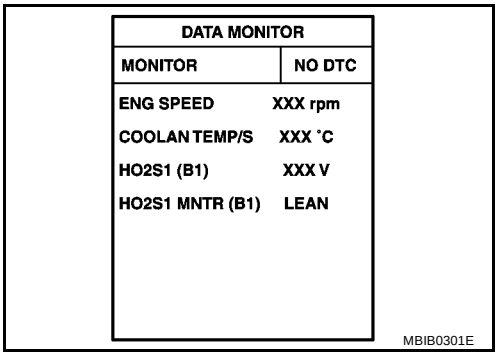
Component Inspection

EBS00OAH

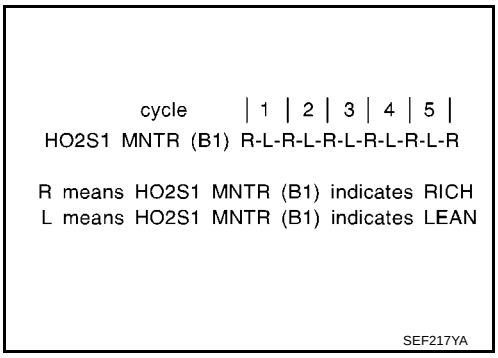
HEATED OXYGEN SENSOR 1

With CONSULT-II

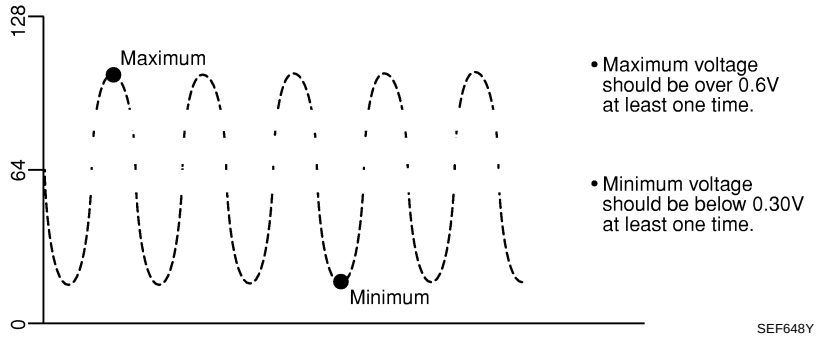
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown in the figure.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



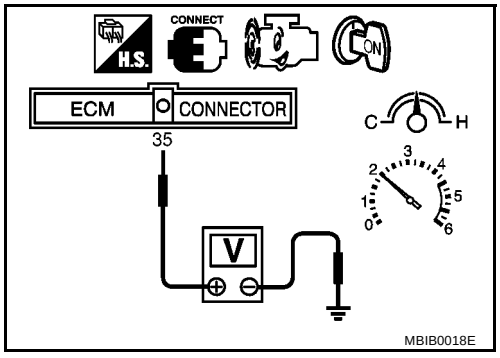
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OAI

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

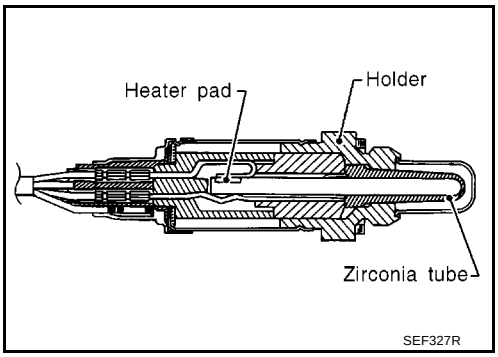
DTC P1146 HO2S2

PFP:226A0

Component Description

EBS00OAJ

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OAK

Specification data are reference values.

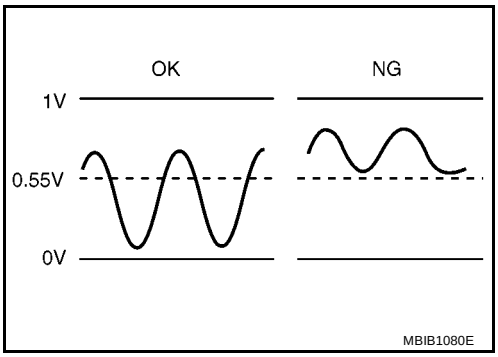
MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

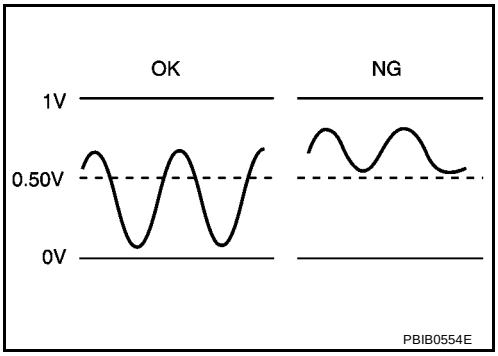
EBS00OAL

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.

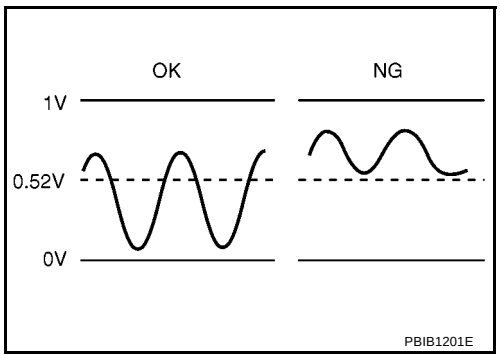
CR10 engine models



A/T models with CR14 engine without ESP



Except above models



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors

DTC Confirmation Procedure

EBS00OAM

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
- **"COMPLETED" will appear on CONSULT-II screen when all tests "COND1", "COND2" and "COND3" are completed.**
- If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Never stop engine during this procedure. If the engine is stopped, retry procedure from step 2 in Procedure for COND1.

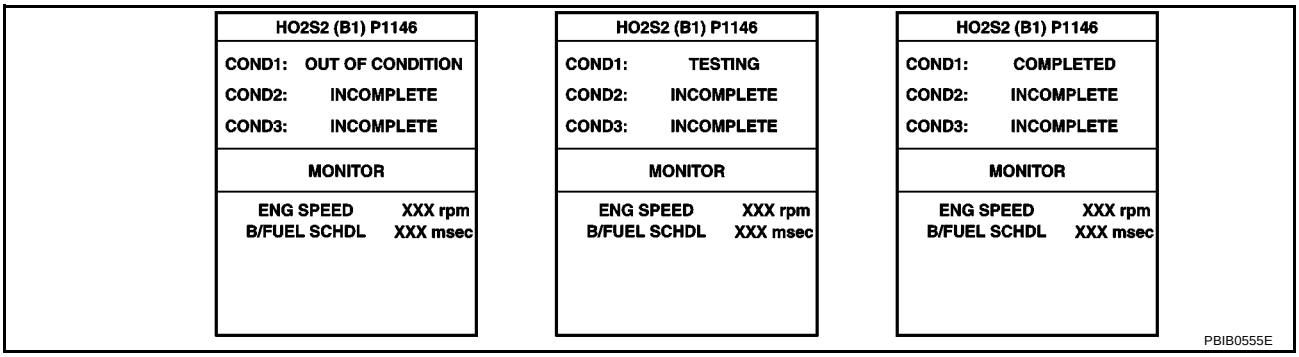
WITH CONSULT-II

Procedure for COND1

For the Best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C(32 to 86°F).

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Select "HO2S2 (B1) P1146" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
7. Start engine and let it idle for at least 30 seconds.
8. Rev engine up to 2,000 rpm 2 or 3 times quickly under no load.
   If "COMPLETED" appears on CONSULT-II screen, go to step 2 in Procedure for COND3".
   If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.
9. When the following conditions are met, "TESTING" will be displayed at "COND1" on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 60 seconds.)

ENG SPEED	More than 1,500 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLANT TEMP/S	70 - 105°C
Selector lever	Suitable position

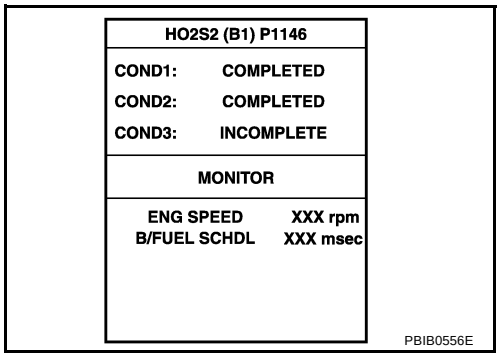


NOTE:
- **If "TESTING" is not displayed after 5 minutes, retry from step 2 in Procedure for COND1.**
- **If "COMPLETED" already appears at "COND2" on CONSULT-II screen before Procedure for COND2 is conducted, it is unnecessary to conduct step 1 in Procedure for COND2.**

Procedure for COND2

1. While driving, release accelerator pedal completed from the above condition [step 9] until “INCOMPLETE” at “COND2” on CONSULT-II screen has turned to “COMPLETED” (It will take approximately 4 seconds.)

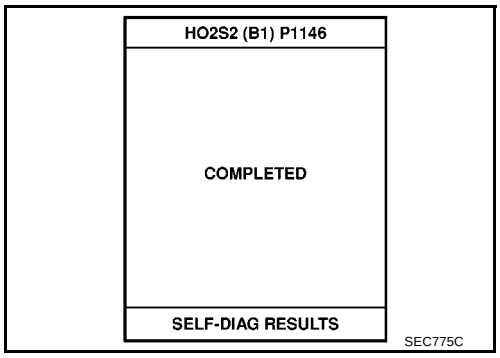
   NOTE:
   If “COMPLETE” already appears at “COND3” on CONSULT-II screen before Procedure for COND3 is conducted, it is unnecessary to conduct step 1 in Procedure for COND3.



Procedure for COND3

1. Stop vehicle and let it idle until “INCOMPLETE” of “COND3” on CONSULT-II screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)
2. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
   If “NG” is displayed, refer to EC-332, "Diagnostic Procedure" .
   If “CAN NOT BE DIAGNOSED” is displayed, performed the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Turn ignition switch ON and select “COOLANTEMP/S” in “DATA MONITOR” mode with CONSULT-II.
c. Start engine and warm it up while monitoring “COOLANTEMP/S” indication on CONSULT-II.
d. When “COOLANTEMP/S” indication reaches to 70°C(158°F), go to procedure for COND1 step 3.



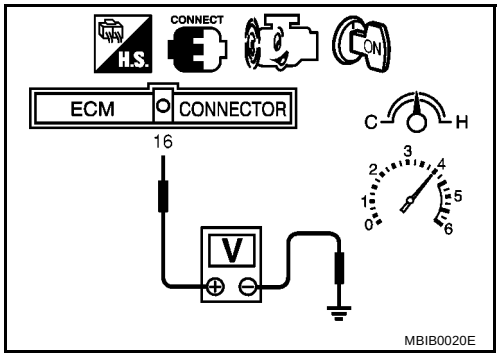
Overall Function Check

EBS00OAN

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

WITH GST

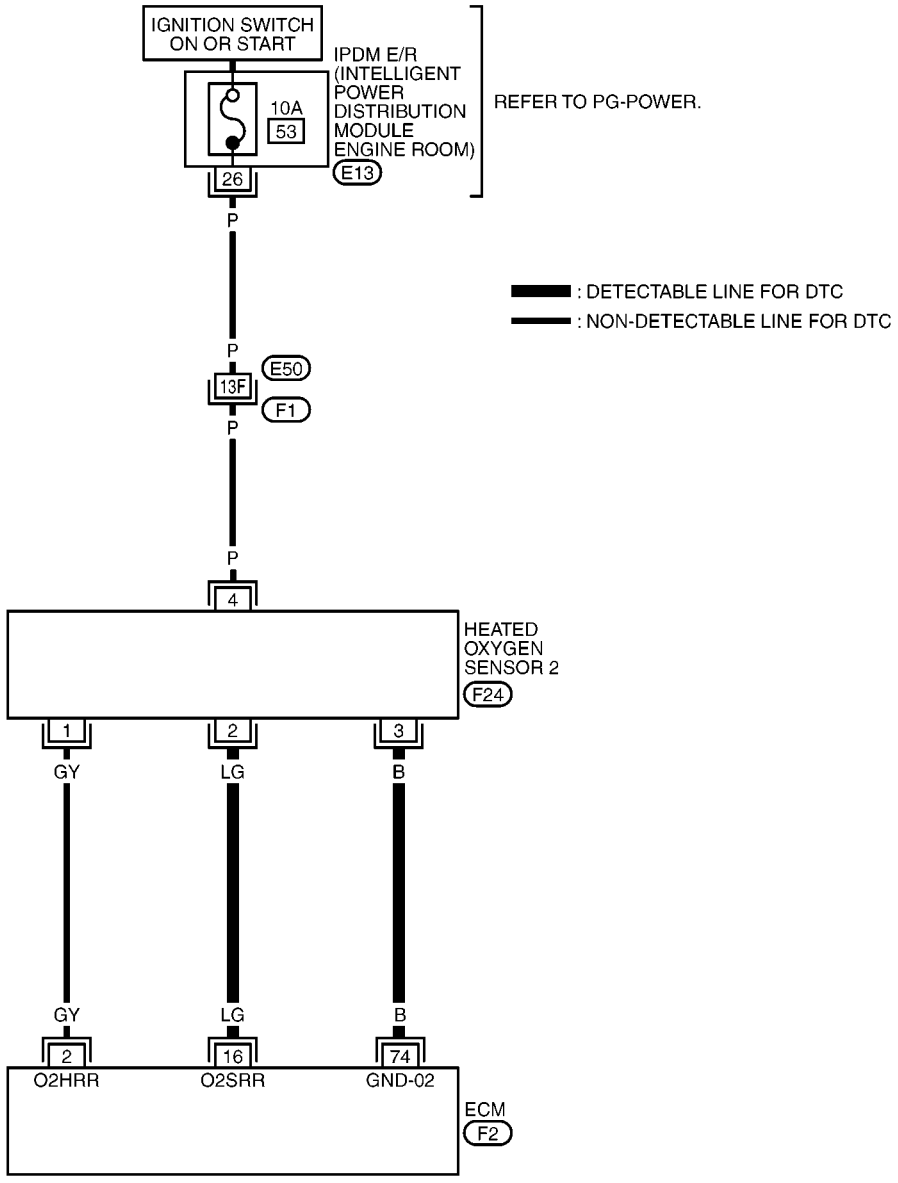
1. Start engine and warm it up to the operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be below 0.52V at least once during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
   The voltage should be below 0.52V at least once during this procedure.
8. If NG, go to EC-332, "Diagnostic Procedure" .

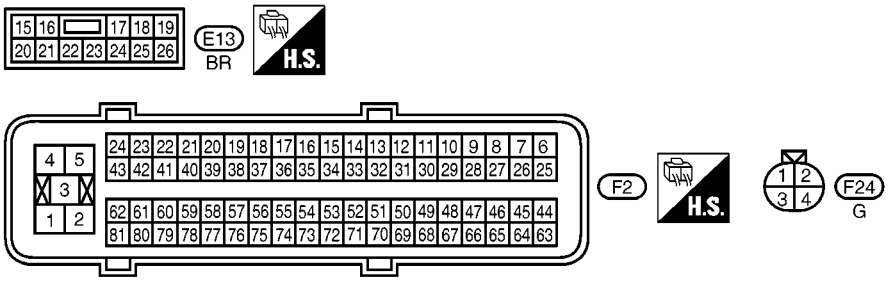


Wiring Diagram

EBS00OAO

EC-HO2S2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0273E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

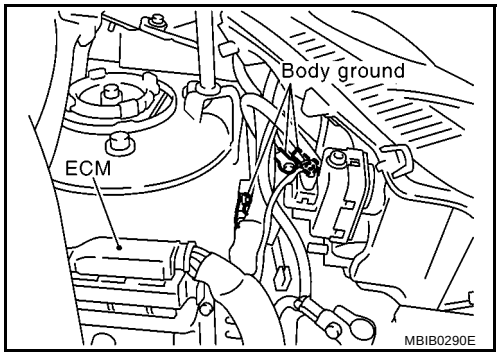
Diagnostic Procedure

EBS00OAP

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

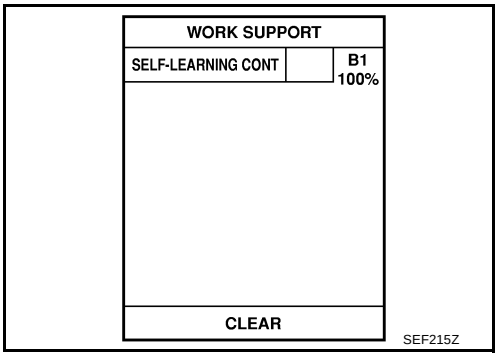
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

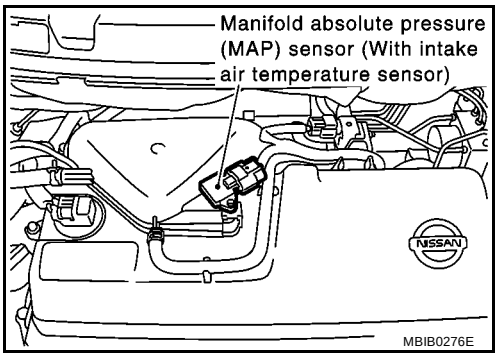
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-215 .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

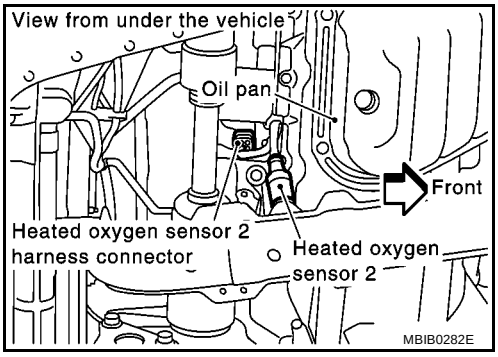
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-334, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

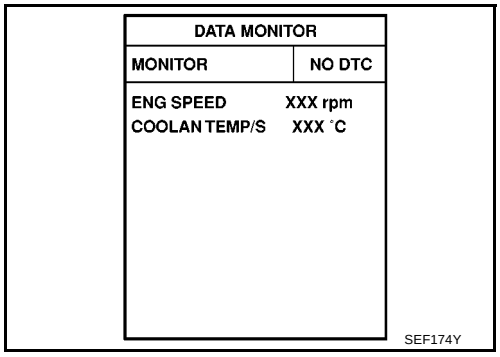
Component Inspection

EBS00OAQ

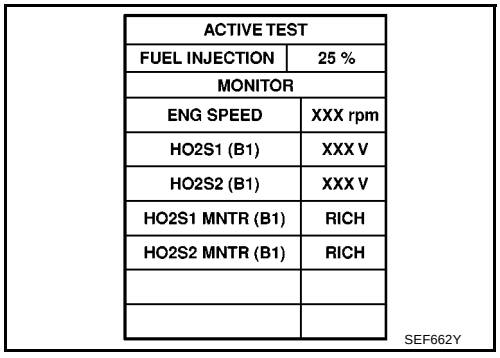
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

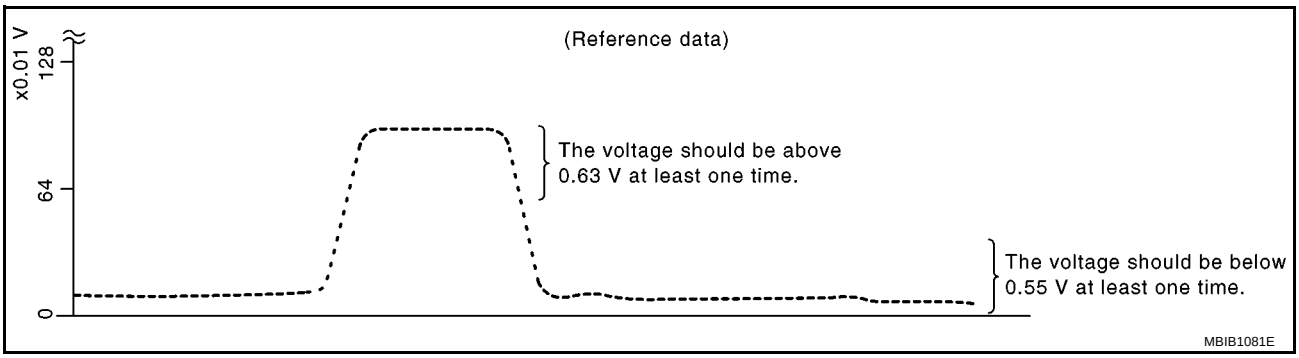


6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



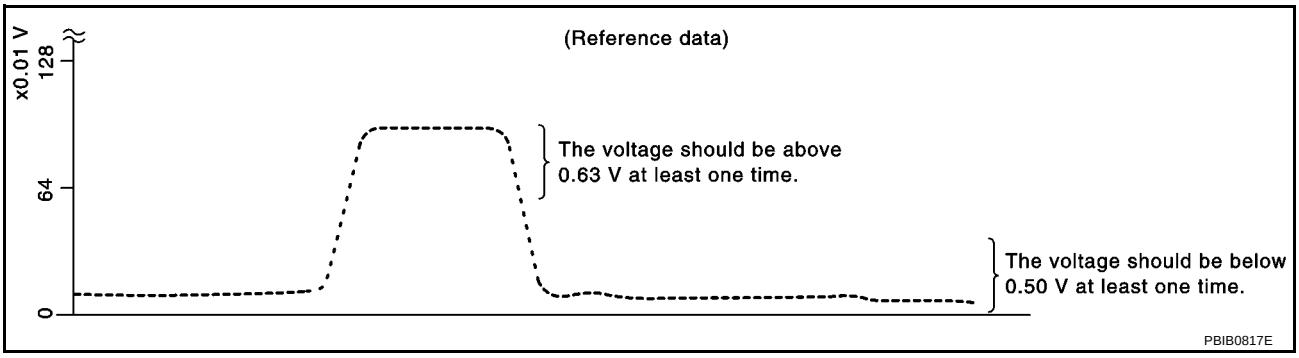
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.

[CR10 engine models]



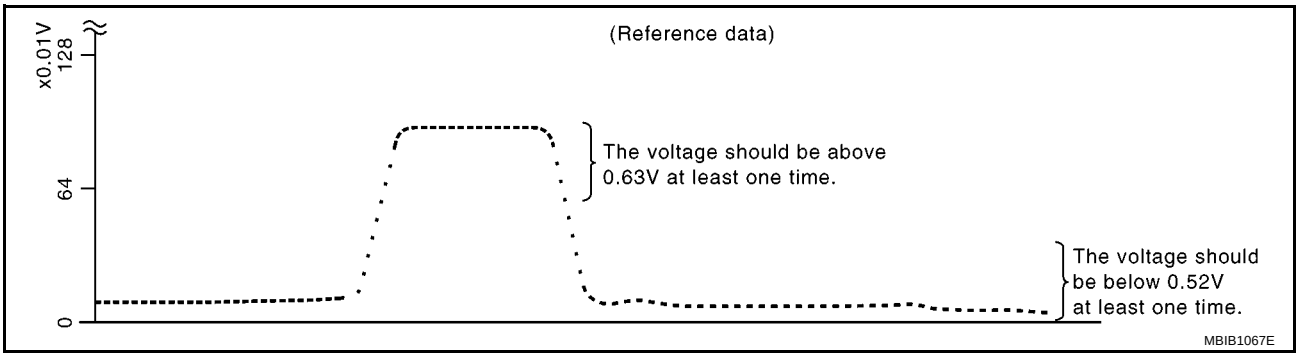
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.55V at least once when the "FUEL INJECTION" is −25%.

[A/T models with CR14 engine without ESP]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is −25%.

[Except above models]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is −25%.

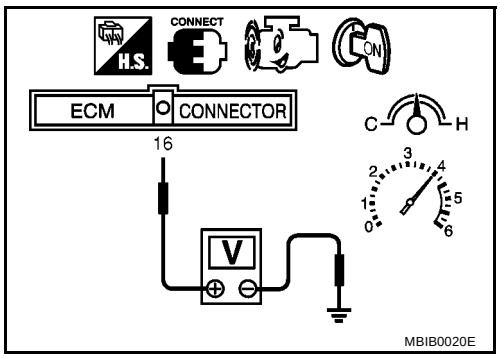
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
The voltage should be below 0.55V (CR10 engine models), 0.50V (A/T models with CR14 engine without ESP), 0.52V (Other models) at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OAR

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

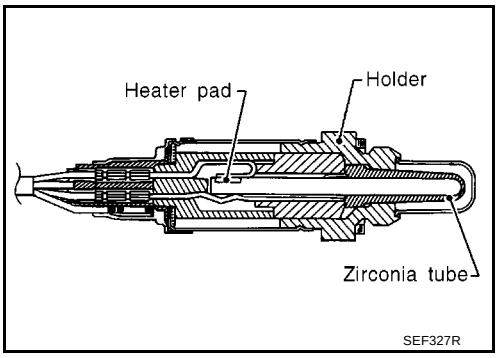
DTC P1147 HO2S2

PFP:226A0

Component Description

EBS00OAS

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OAT

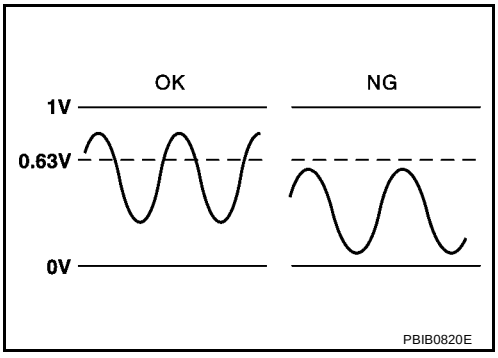
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

EBS00OAU

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	● Harness or connectors (The sensor circuit open or shorted.) ● Heated oxygen sensor 2 ● Fuel pressure ● Injectors ● Intake air leaks

DTC Confirmation Procedure

EBS00OAV

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
- **"COMPLETED" will appear on CONSULT-II screen when all tests "COND1", "COND2" and "COND3" are completed.**
- If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Never stop engine during this procedure. If the engine is stopped, retry procedure from step 2 in Procedure for COND1.

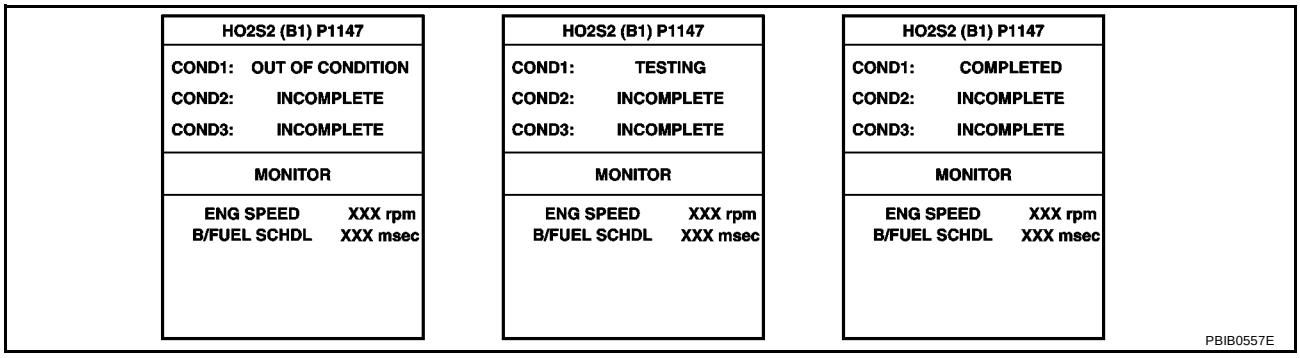
WITH CONSULT-II

Procedure for COND1

For the best results, perform "DTC WORK SUPPORT" at a temperature of 0 to 30°C(32 to 86°F).

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Select "HO2S2 (B1) P1147" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
6. Touch "START".
7. Start engine and let it idle for at least 30 seconds.
8. Rev engine up to 2,000 rpm 2 or 3 times quickly under no load.
   If "COMPLETED" appears on CONSULT-II screen, go to step 2 in Procedure for COND3.
   If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.
9. When the following conditions are met, "TESTING" will be displayed at "COND1" on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 60 seconds.)

ENG SPEED	More than 1,500 rpm
B/FUEL SCHDL	More than 1.0 msec
COOLANT TEMP/S	70 - 105°C
Selector lever	Suitable position

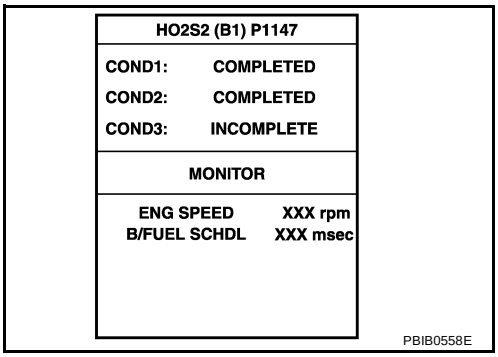


NOTE:
- **If "TESTING" is not displayed after 5 minutes, retry from step 2 in Procedure for COND1.**
- **If "COMPLETED" already appears at "COND2" on CONSULT-II screen before Procedure for COND2 is conducted, it is unnecessary to conduct step 1 in Procedure for COND2.**

Procedure for COND2

1. While driving, release accelerator pedal completed from the above condition [step 9] until “INCOMPLETE” at “COND2” on CONSULT-II screen has turned to “COMPLETED” (It will take approximately 4 seconds.)

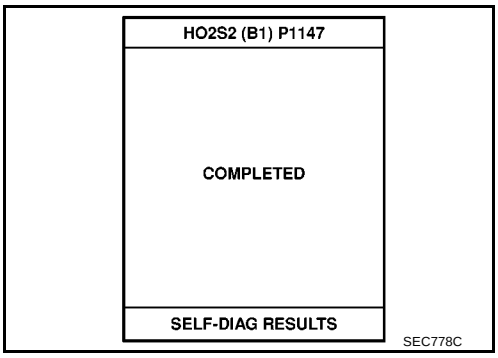
   NOTE:
   If “COMPLETE” already appears at “COND3” on CONSULT-II screen before Procedure for COND3 is conducted, it is unnecessary to conduct step 1 in Procedure for COND3.



Procedure for COND3

1. Stop vehicle and let it idle until “INCOMPLETE” of “COND3” on CONSULT-II screen has turned to “COMPLETED”. (It will take a maximum of approximately 6 minutes.)
2. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
   If “NG” is displayed, refer to EC-341, "Diagnostic Procedure" .
   If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Turn ignition switch ON and select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
c. Start engine and warm it up while monitoring “COOLAN TEMP/S” indication on CONSULT-II.
d. When “COOLANTEMP/S” indication reaches to 70°C(158°F), go to procedure for COND1 step 3.



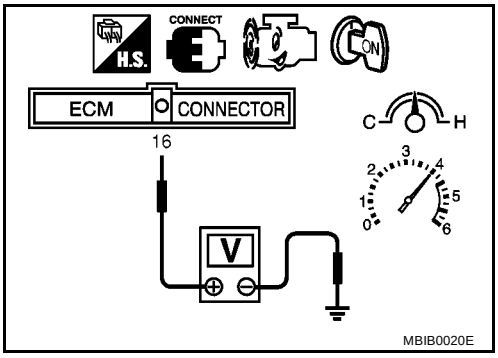
Overall Function Check

EBS00OAW

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a DTC might not be confirmed.

WITH GST

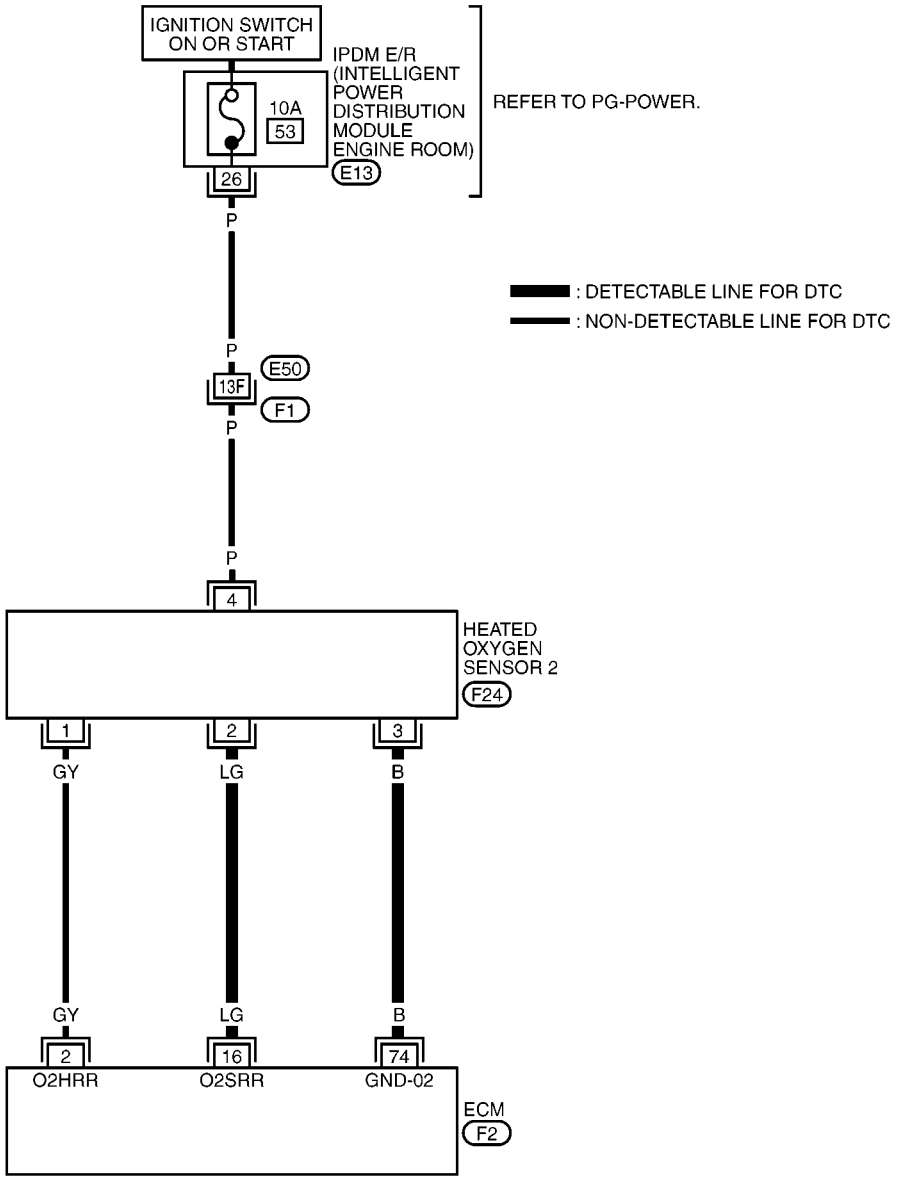
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.63V at least once during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
   The voltage should be above 0.63V at least once during this procedure.
8. If NG, go to EC-341, "Diagnostic Procedure" .

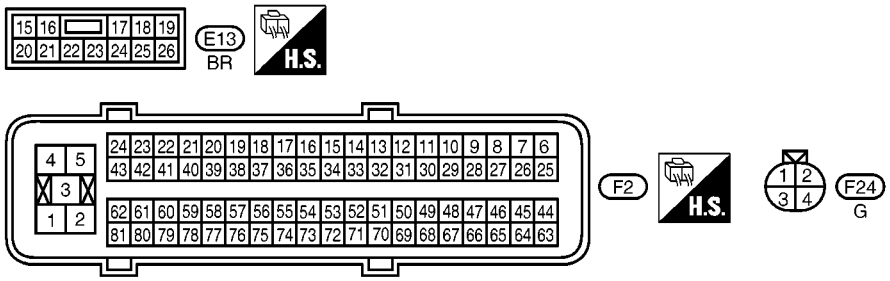


Wiring Diagram

EBS00OAX

EC-HO2S2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0273E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

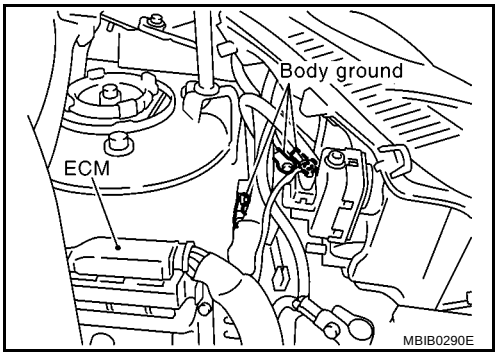
Diagnostic Procedure

EBS00OAY

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

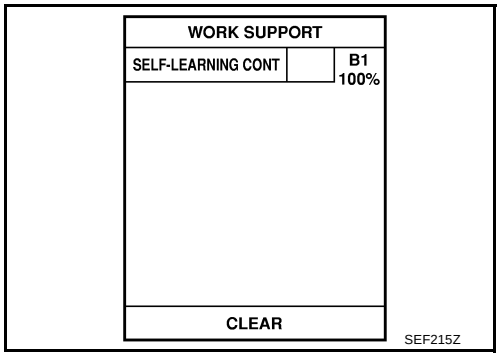
>> GO TO 2.



2. CLEAR THE SELF-LEARNING DATA

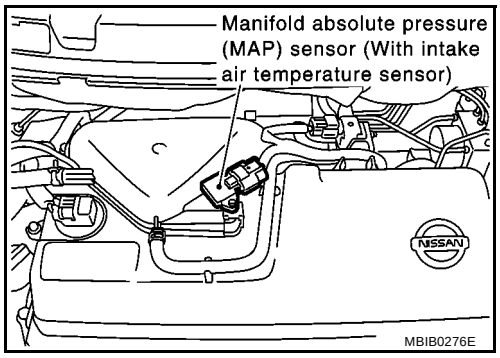
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect manifold absolute pressure sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect manifold absolute pressure sensor harness connector.
5. Make sure that DTC P0107 is displayed.
6. Erase the DTC memory. Refer to EC-59, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-208 .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

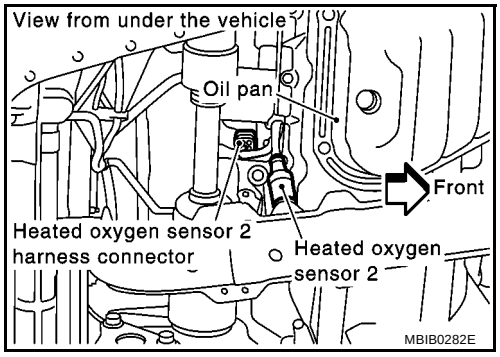
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2. Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground. Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-343, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

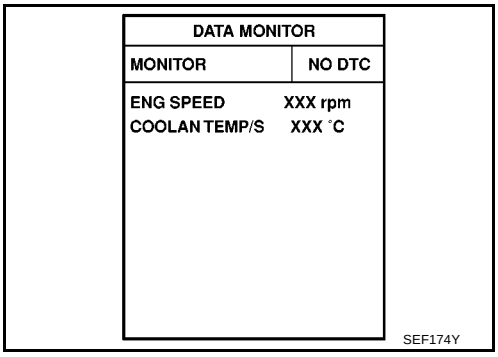
Component Inspection

EBS00OAZ

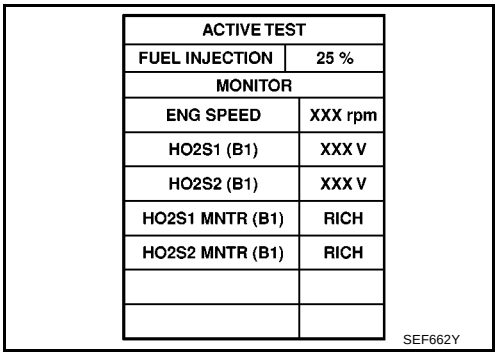
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

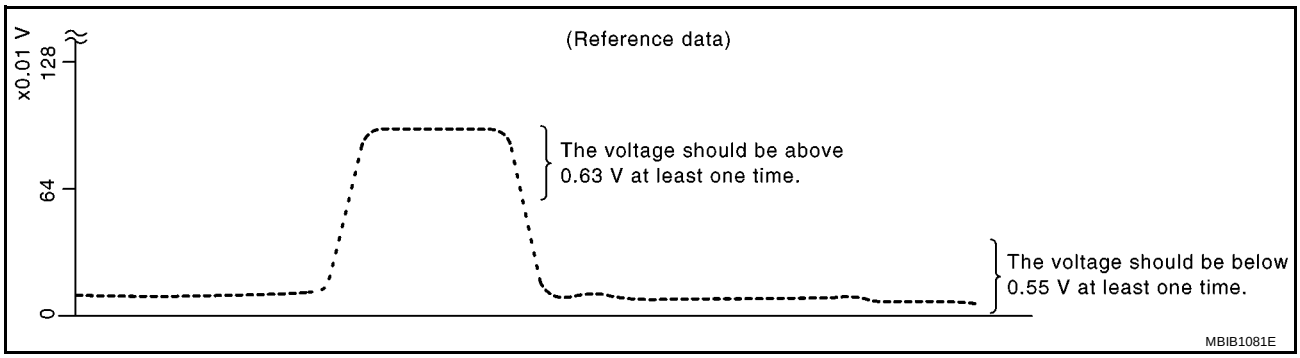


6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



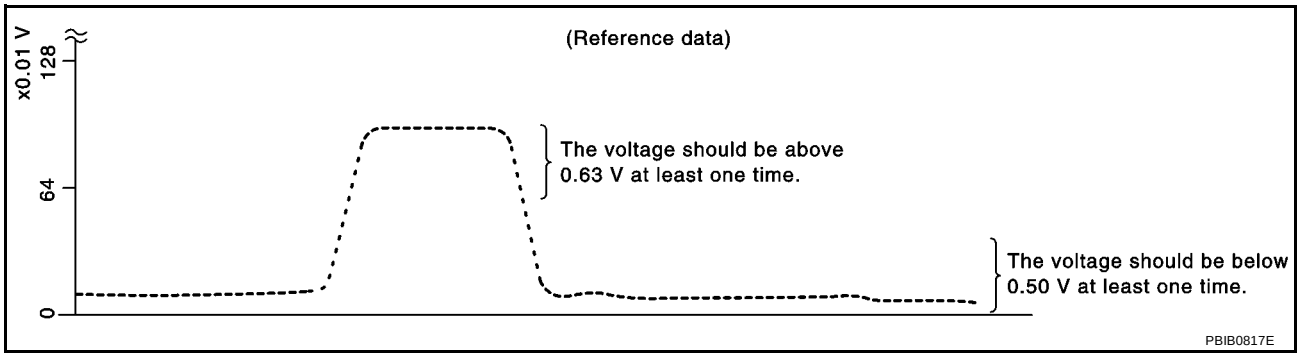
7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.

[CR10 engine models]



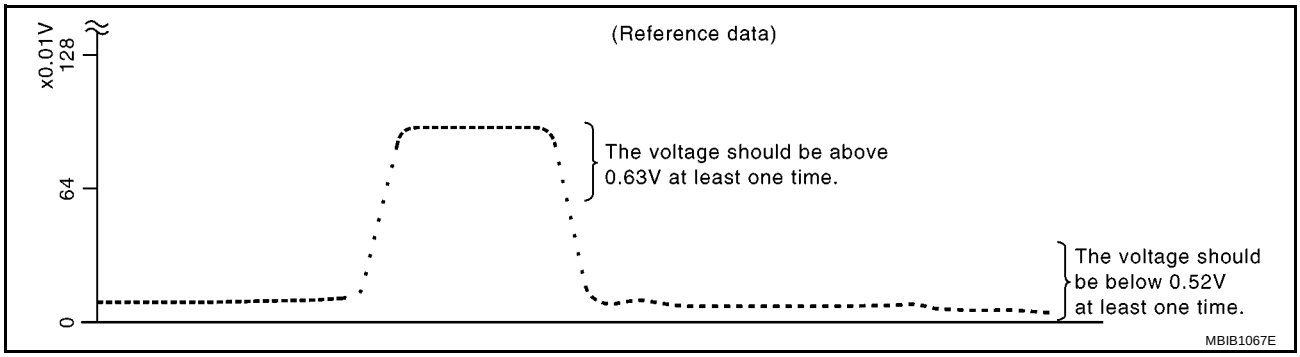
"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.55V at least once when the "FUEL INJECTION" is −25%.

[A/T models with CR14 engine without ESP]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.50V at least once when the "FUEL INJECTION" is −25%.

[Except above models]



"HO2S2 (B1)" should be above 0.63V at least once when the "FUEL INJECTION" is +25%.
"HO2S2 (B1)" should be below 0.52V at least once when the "FUEL INJECTION" is −25%.

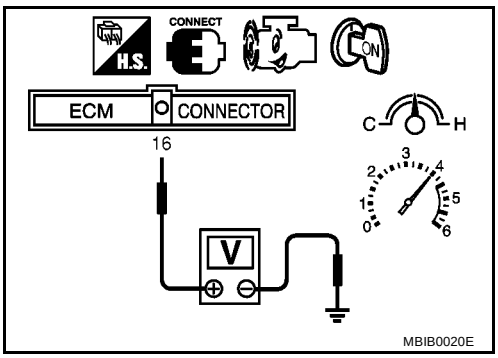
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

⊗ Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.

6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.63V at least once during this procedure.
If the voltage is above 0.63V at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
The voltage should be below 0.55V (CR10 engine models), 0.50V (A/T models with CR14 engine without ESP), 0.52V (Other models) at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OB0

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

DTC P1171 INTAKE ERROR

PFP:22365

On Board Diagnosis Logic

EBS00OSO

NOTE:
If DTC 1171 is displayed with DTC P0108, first perform the trouble diagnosis for DTC P0108.
Refer to EC-148, "DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR"
ECM computes two intake air volume values.
1: Computed from manifold absolute pressure signal and intake air temperature signal.
2: Computed from engine revolution signal and throttle position signal.

In normal condition, value 1 is used for engine control.
If intake air leak occurred between throttle valve and intake air port, manifold absolute pressure sensor signal might increase, and then ECM increases amount of fuel injected. In this case, ECM uses value 2 for engine control instead of value1.
ECM monitors the difference between value 1 and value 2. If the difference is extremely large, ECM judges intake air leak occurs and light up the MI

This diagnosis has one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1171 1171	Intake error	An excessively high voltage from manifold absolute pressure sensor is sent to ECM.	● Harness or connectors (The manifold absolute pressure sensor circuit is open or shorted.) ● Manifold absolute pressure ● Intake air leaks ● Vacuum hoses

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and MI lights up.

Detected items	Engine operating condition in fail-safe mode
Intake air system problem	When accelerator pedal is depressed, engine speed will not rise more than 2,500 rpm due to fuel cut.

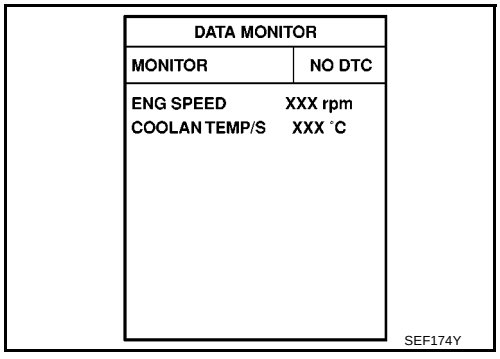
DTC Confirmation Procedure

EBS00OSP

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to EC-348, "Diagnostic Procedure" .



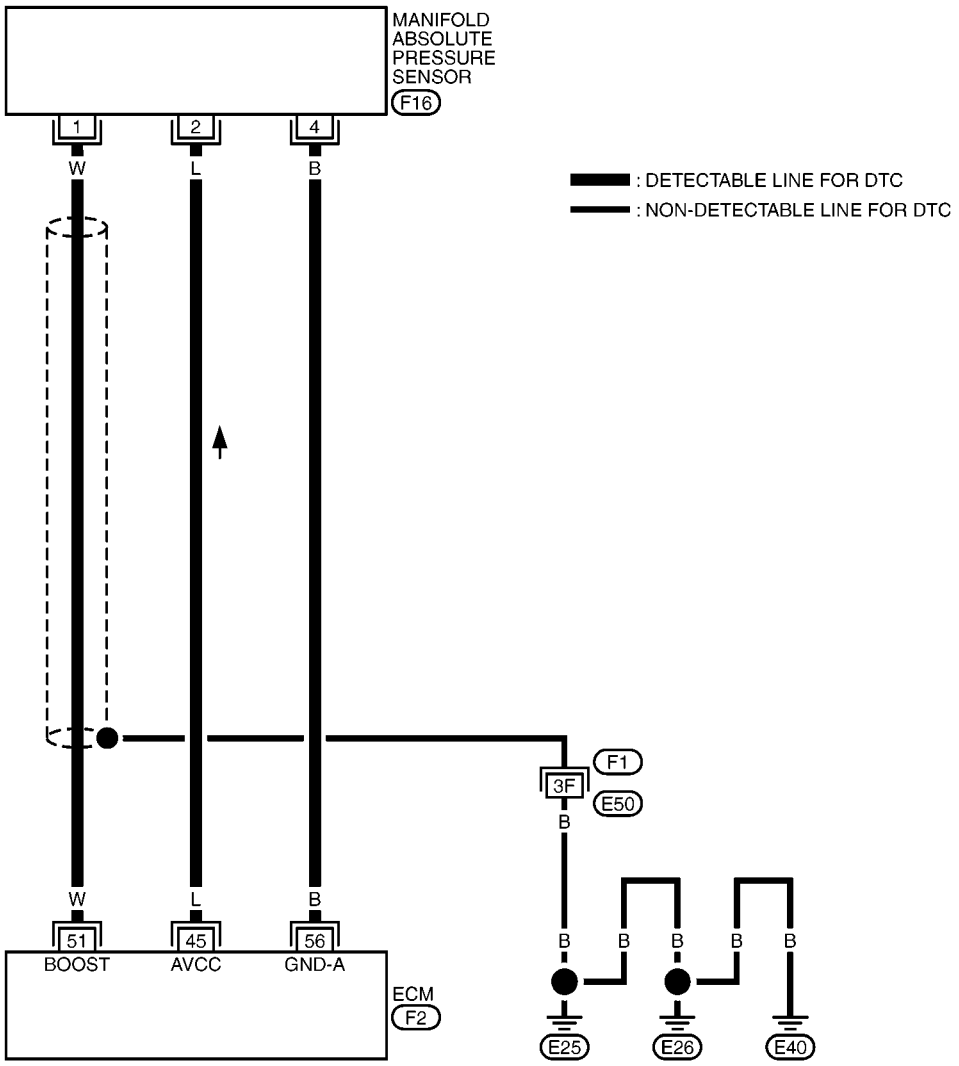
WITH GST

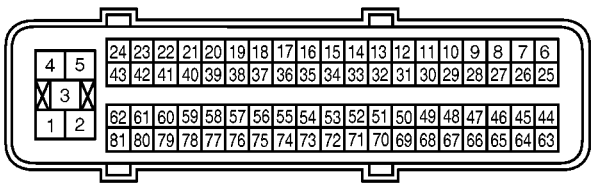
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00OSQ

EC-AP/SEN-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0304E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V

Diagnostic Procedure

EBS00OSR

1. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the air cleaner element.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK VACUUM HOSE

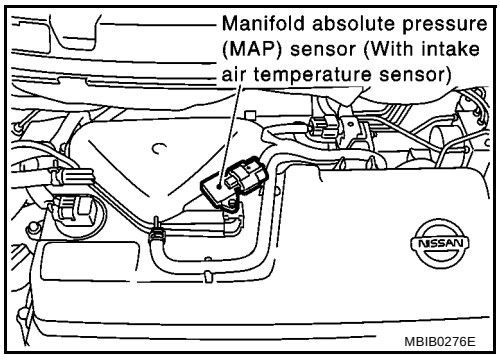
1. Check intake manifold vacuum hoses for clogging or disconnection. Refer to EC-23, "Vacuum Hose Drawing" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

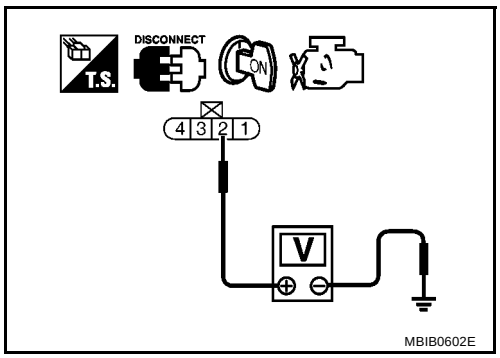
3. CHECK MAP SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor harness connector.
3. Turn ignition switch ON.



4. Check voltage between manifold absolute pressure sensor terminal 2 and ground.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair harness or connectors.

4. CHECK MAP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between manifold absolute pressure sensor terminal 4 and ECM terminal 56. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK MAP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between manifold absolute pressure sensor terminal 1 and ECM terminal 51.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAP SENSOR

Refer to EC-151, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

EBS010C1

The malfunction information related to TCS is transferred through the CAN communication line from “ABS actuator and electric unit (control unit)” to ECM.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS010C2

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	TCS control unit	ECM receives a malfunction information from “ABS actuator and electric unit (control unit)”.	● ABS actuator and electric unit (control unit) ● TCS related parts

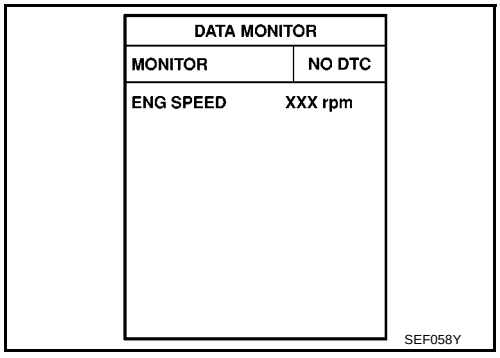
DTC Confirmation Procedure

EBS010C3

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 60 seconds.
4. If 1st trip DTC is detected, go to EC-350, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS010C4

Go to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

EBS010C5

NOTE:
If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .
This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS010C6

The MI will not light up for this self-diagnosis.
Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	● Harness or connectors (The CAN communication line is open or shorted.) ● ABS actuator and electric unit (control unit). ● Dead (Weak) battery

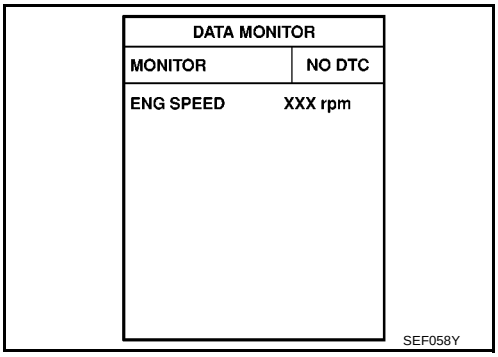
DTC Confirmation Procedure

EBS010C7

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. If a 1st trip DTC is detected, go to EC-351, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS010C8

1. CHECK “ABS ACTUATTOR AND ELECTRIC UNIT (CONTROL UNIT)” FUNCTION

Refer to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

>> **INSPECTION END**

DTC P1217 ENGINE OVER TEMPERATURE

PFP:00000

System Description

EBS00OB1

NOTE:
If DTC P1217 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-130, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

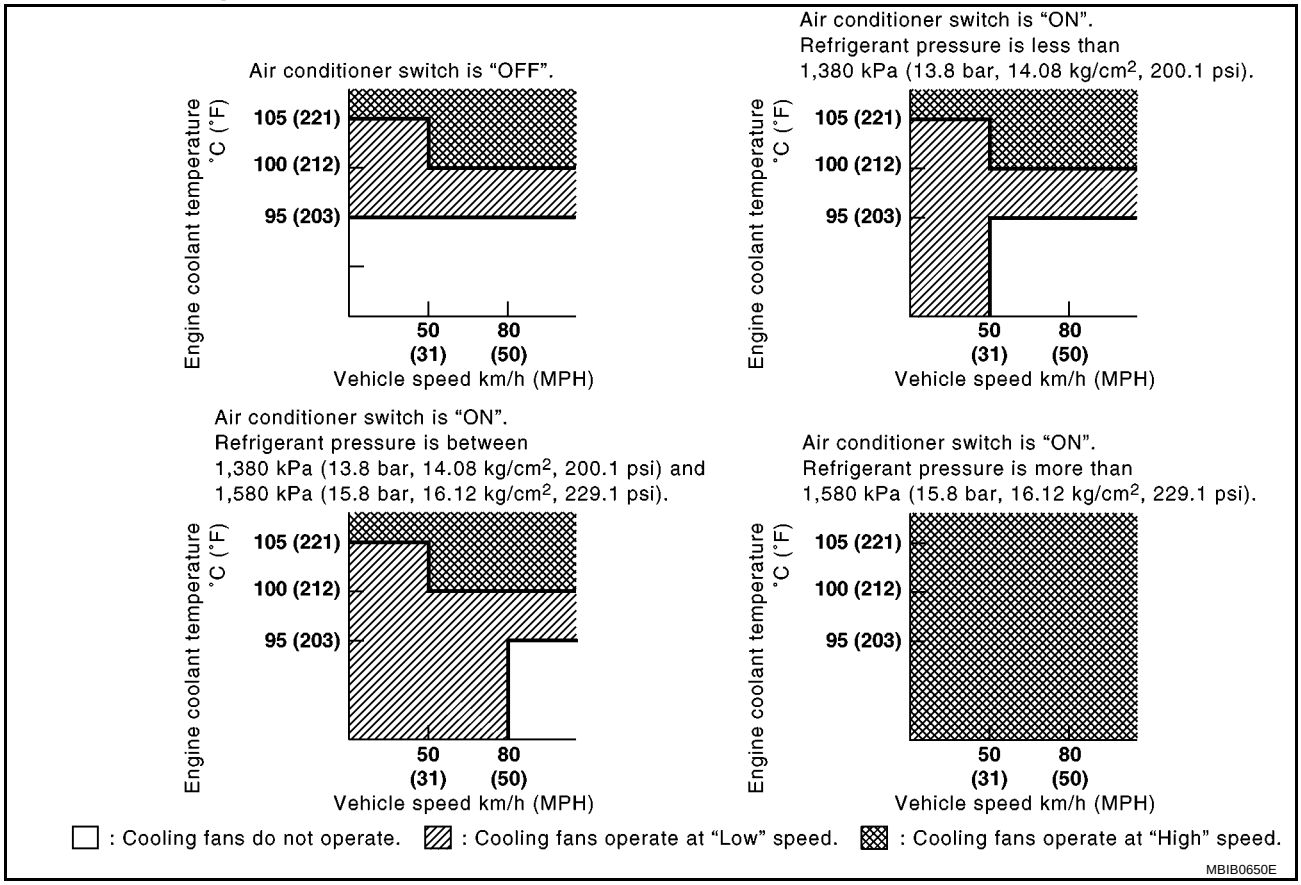
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R (Cooling fan relay)
Battery	Battery voltage*1		
Vehicle speed signal	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch*3	Air conditioner ON signal*2		
Refrigerant pressure sensor*3	Refrigerant pressure		

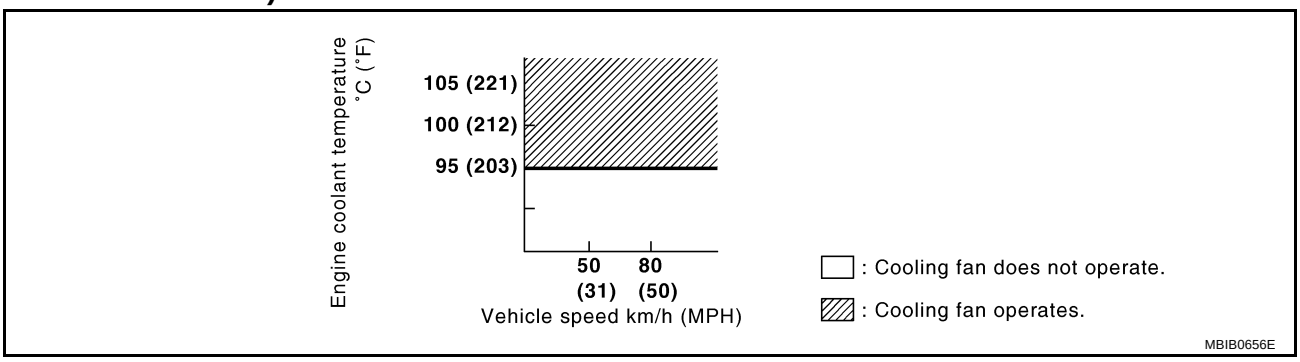
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.
*2: This signal is sent to ECM through CAN communication line.
*3: Models with air conditioner.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF] (models with A/C) or 2 step control [ON/OFF] (models without A/C).
The ECM controls cooling fan relays through CAN communication line.

OPERATION
(Models with A/C)



(Models without A/C)



CONSULT-II Reference Value in Data Monitor Mode

EBS00OB2

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	(Models with A/C) ● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (210°F)	LOW*
		Engine coolant temperature is 105°C (212°F) or more	HI*

*:Models without air conditioner, cooling fan operates only ON and OFF operation, but CONSULT-II display will change OFF, LOW and HI depends on engine coolant temperature.

On Board Diagnosis Logic

EBS00OB3

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. ● Engine coolant is not within the specified range.	● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat For more information, refer to EC-365, "Main 12 Causes of Overheating" .

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-8, "Changing Engine coolant" . Also, replace the engine oil. Refer to LU-5, "Changing Engine Oil" .

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-20, "Engine Coolant Mixture Ratio" .**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

Overall Function Check

EBS00OB4

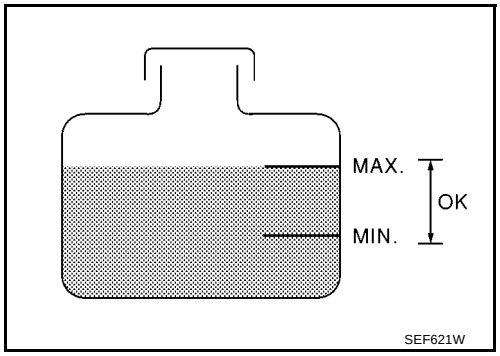
Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

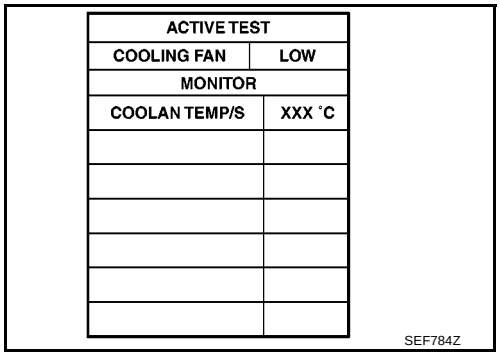
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-358, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-358, "Diagnostic Procedure" .
3. Turn ignition switch ON.



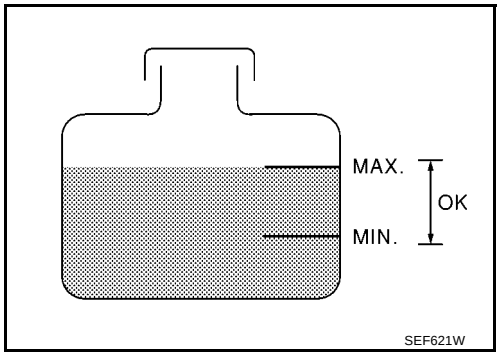
4. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.
5. If the results are NG, go to EC-358, "Diagnostic Procedure" .



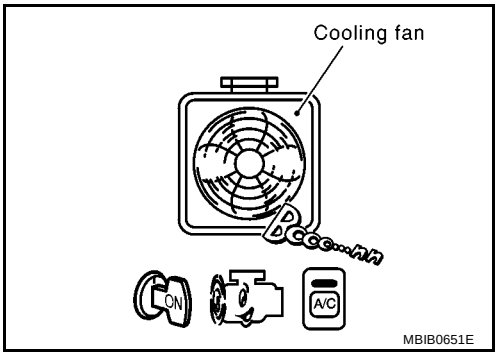
WITH GST

(Models with air conditioner)

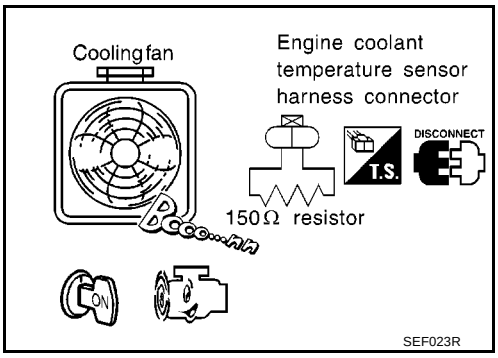
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-358, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-358, "Diagnostic Procedure" .
3. Start engine.
   Be careful not to overheat engine.
4. Set temperature control lever to full cold position.
5. Turn air conditioner switch ON.
6. Turn blower fan switch ON.
7. Run engine at idle for a few minutes with air conditioner operating.
   Be careful not to overheat engine.



8. Make sure that cooling fans operates at low speed.
   If NG, go to EC-358, "Diagnostic Procedure" .
   If OK, go to the following step.
9. Turn ignition switch OFF.
10. Turn air conditioner switch and blower fan switch OFF.
11. Disconnect engine coolant temperature sensor harness connector.
12. Connect 150Ω resistor to engine coolant temperature sensor harness connector.

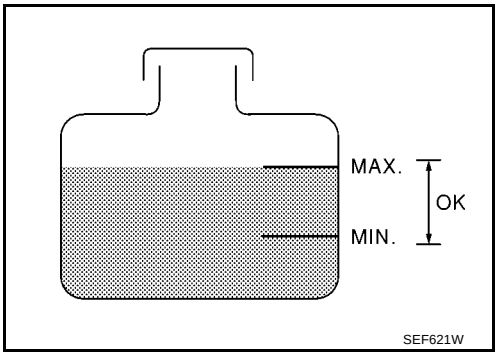


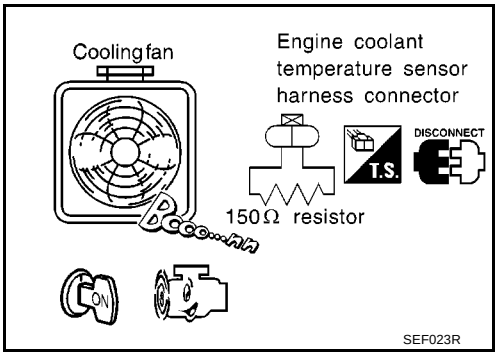
13. Restart engine and make sure that cooling fan operates at higher speed than low speed.
    Be careful not to overheat engine.
14. If NG, go to EC-358, "Diagnostic Procedure" .



(Models without air conditioner)

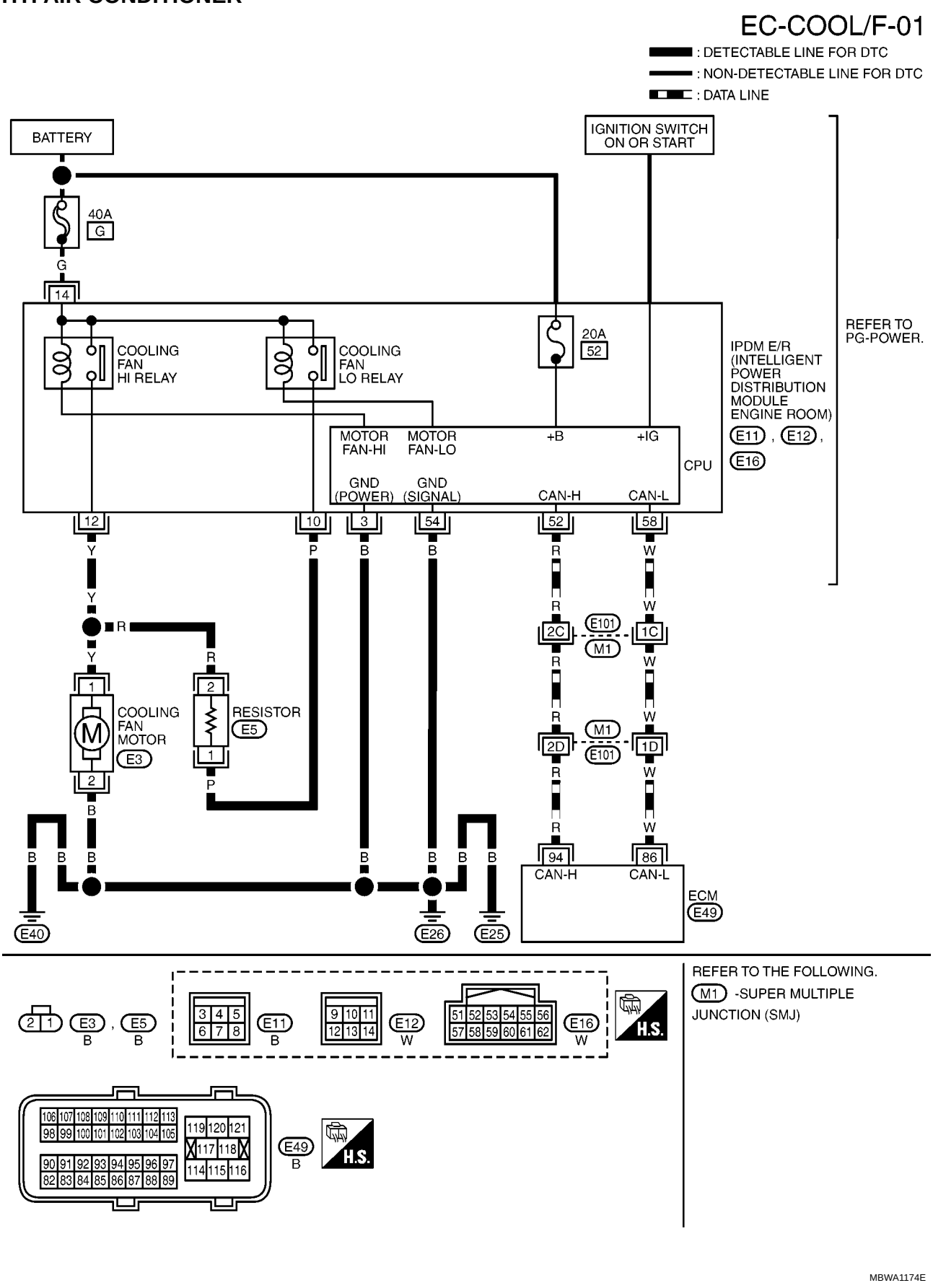
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-358, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-358, "Diagnostic Procedure" .
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Start engine and make that cooling fan operates. Be careful not to overheat engine.
6. If NG, go to EC-358, "Diagnostic Procedure" .





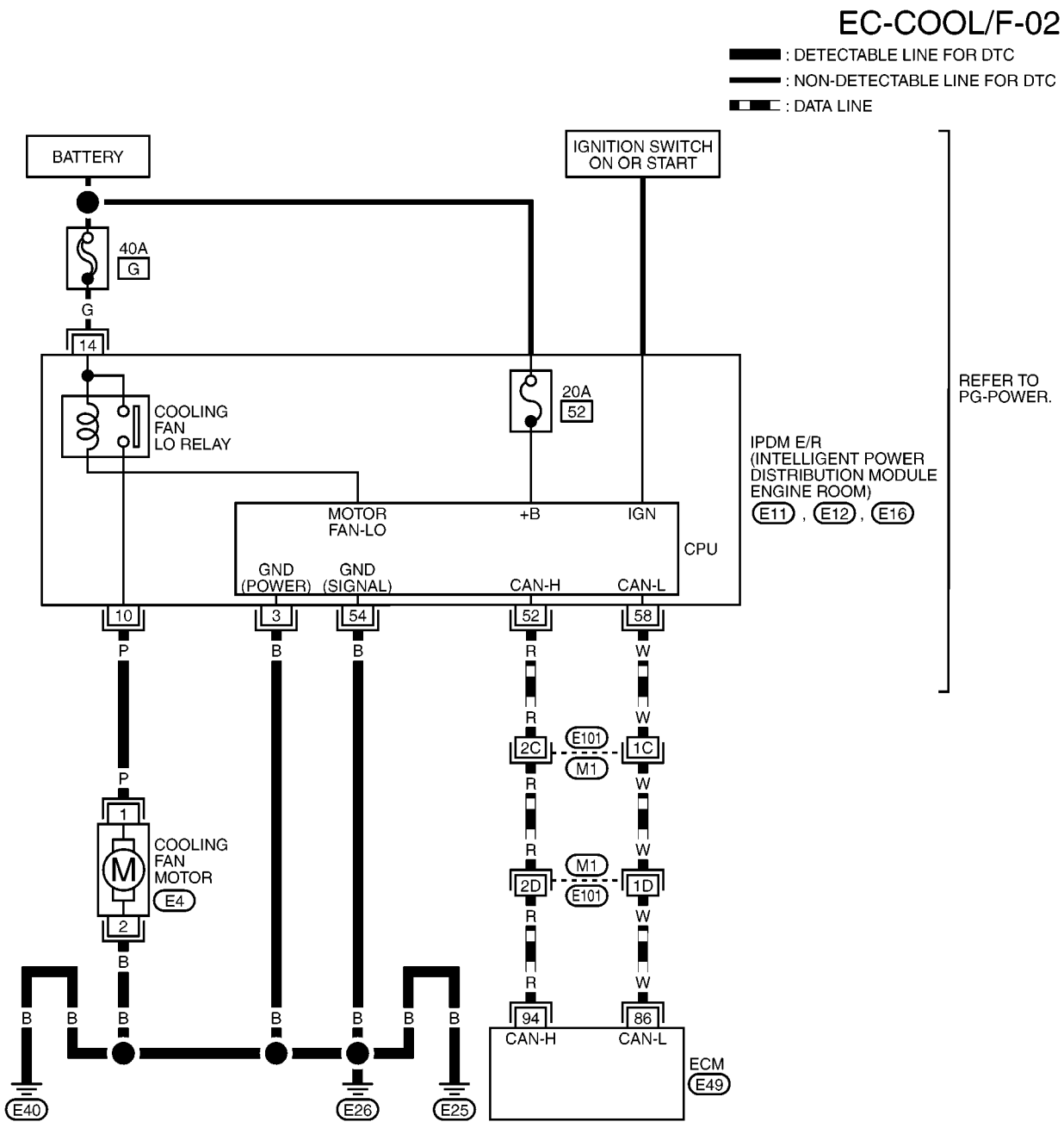
Wiring Diagram
WITH AIR CONDITIONER

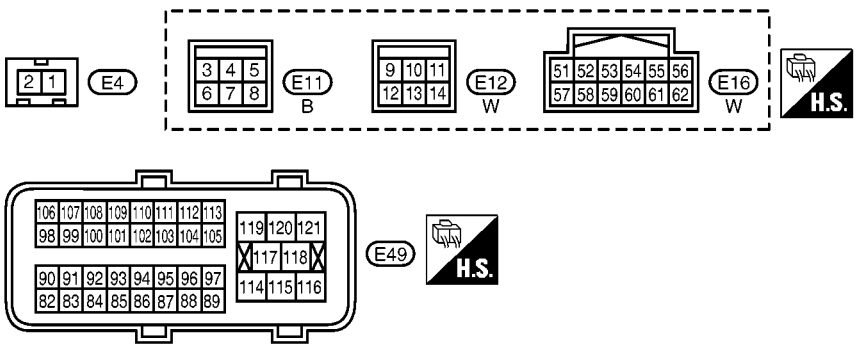
EBS00OB5



MBWA1174E

WITHOUT AIR CONDITIONER





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0290E

Diagnostic Procedure

EBS00OB6

PROCEDURE FOR MODELS WITH AIR CONDITIONER

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II and touch “LOW” on the CONSULT-II screen.
3. Make sure that cooling fan operates at low speed.

OK or NG

OK >> GO TO 3.
NG >> Check cooling fan low speed control circuit. (Go to EC-363, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-II

1. Touch “HIGH” on the CONSULT-II screen.
2. Make sure that cooling fan operates at higher speed than low speed.

OK or NG

OK >> GO TO 6.
NG >> Check cooling fan high speed control circuit. (Go to EC-363, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

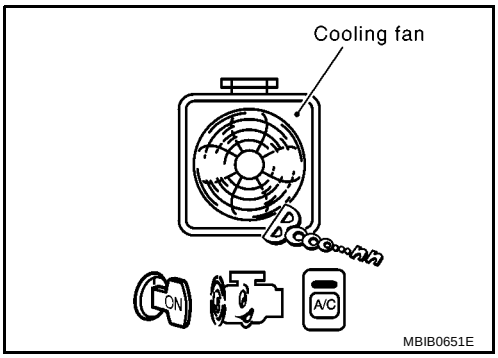
4. CHECK COOLING FAN LOW SPEED OPERATION

Without CONSULT-II

1. Start engine and let it idle.
2. Turn air conditioner switch ON.
3. Turn blower fan switch ON.
4. Make sure that cooling fan operates at low speed.

OK or NG

OK >> GO TO 5.
NG >> Check cooling fan low speed control circuit. (Go to EC-363, "PROCEDURE A" .)



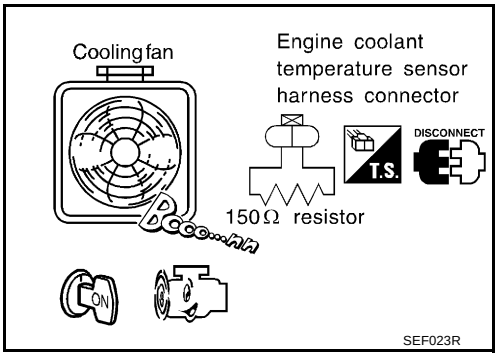
5. CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-II

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

OK or NG

OK >> GO TO 6.
NG >> Check cooling fan high speed control circuit. (Go to EC-363, "PROCEDURE A" .)



6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

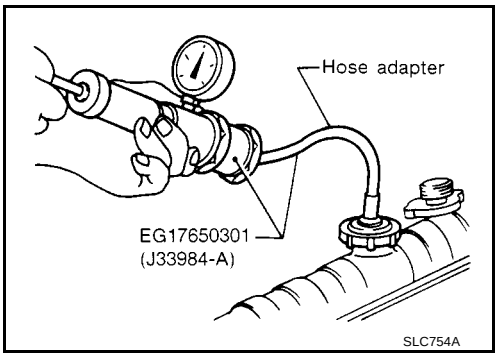
Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-21, "WATER PUMP" .)

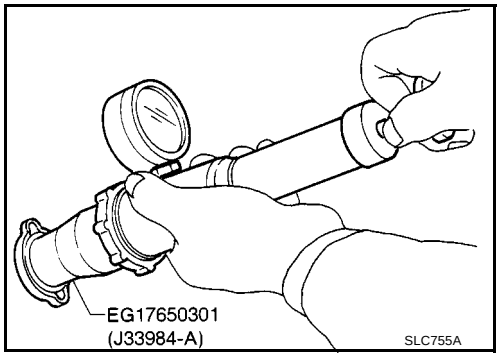
>> Repair or replace.

8. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 9.
NG >> Replace radiator cap.

9. CHECK THERMOSTAT

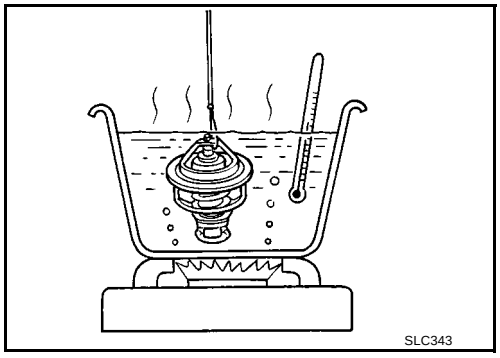
1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

Valve opening temperature:

80.5 - 83.5 °C (177 - 182 °F)

Valve lift:

More than 8 mm/95 °C (0.31 in/203 °F)



4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-23, "THERMOSTAT" .

OK or NG

OK >> GO TO 10.
NG >> Replace thermostat.

10. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-162, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace engine coolant temperature sensor.

11. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to EC-365, "Main 12 Causes of Overheating" .

>> **INSPECTION END**

PROCEDURE FOR MODELS WITHOUT AIR CONDITIONER

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

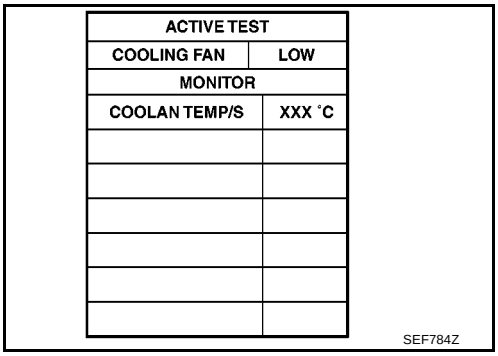
2. CHECK COOLING FAN OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II and touch “ON” on the CONSULT-II screen.
3. Make sure that cooling fan operates.

OK or NG

OK >> GO TO4.
NG >> Check cooling fan low speed control circuit. (Go to EC-363, "PROCEDURE A" .)



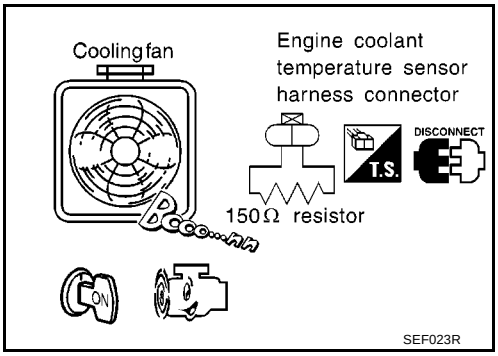
3. CHECK COOLING FAN OPERATION

Without CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
4. Restart engine and make sure that cooling fan operates.

OK or NG

OK >> GO TO 4.
NG >> Check cooling fan high speed control circuit-1. (Go to EC-363, "PROCEDURE A" .)



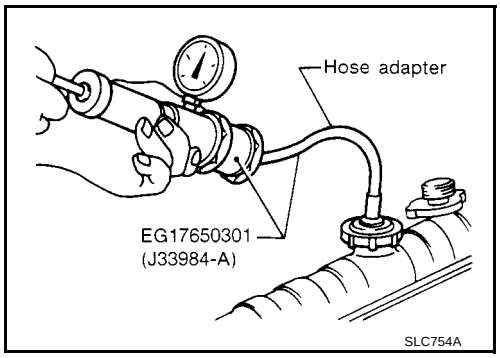
4. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-21, "WATER PUMP" .)

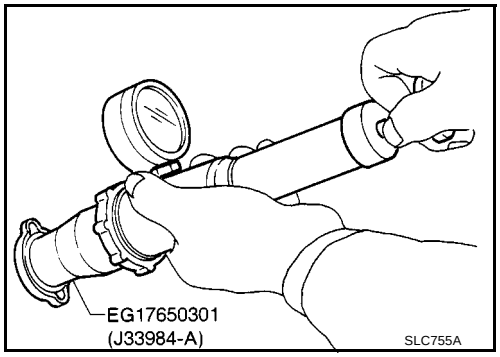
>> Repair or replace.

6. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 7.
NG >> Replace radiator cap.

7. CHECK THERMOSTAT

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

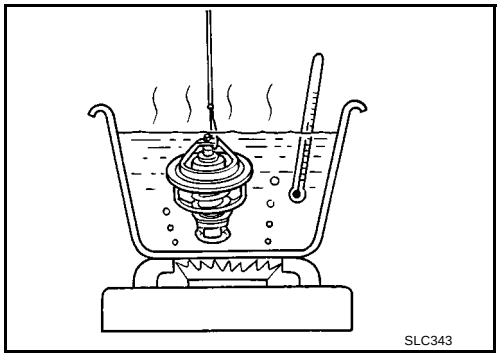
   Valve opening temperature:

   80.5 - 83.5 °C (177 - 182 °F)

   Valve lift:

   More than 8 mm/95 °C (0.31 in/203 °F)

4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-23, "THERMOSTAT" .



OK or NG

OK >> GO TO 8.
NG >> Replace thermostat.

8. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-162, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace engine coolant temperature sensor.

9. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to EC-365, "Main 12 Causes of Overheating" .

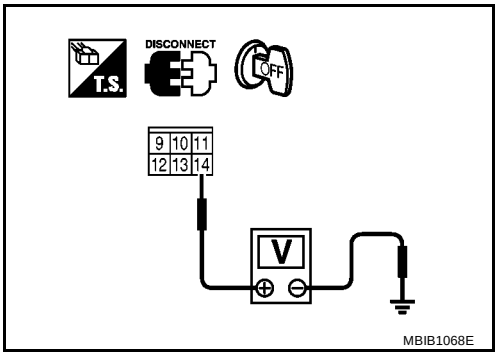
>> **INSPECTION END**

PROCEDURE A

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E12.
3. Check voltage between IPDM E/R terminal 14 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

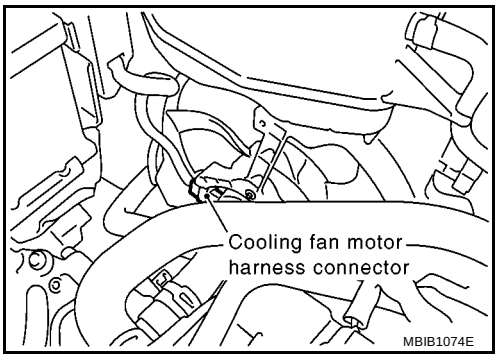
- 40A fusible links
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN MOTORS CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check harness continuity between cooling fan motor terminal 1 and IPDM E/R terminal 12 (with A/C) or 10 (without A/C), cooling fan motor terminal 2 and ground.
Refer to wiring diagram.

Continuity should exist.



3. Also check harness for short to ground and short to power.
4. For models with air conditioner, check harness continuity between IPDM E/R terminal 10 and cooling fan motor terminal 1.
Refer to wiring diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground
- Harness for open or short between resistor and IPDM E/R (models with A/C)
- Harness for open or short between resistor and cooling fan motor (models with A/C)
- Resistor E5 (models with A/C)

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK COOLING FAN MOTORS

Refer to EC-365, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace cooling fan motors.

6. CHECK INTERMITTENT INCIDENT

Perform EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connector.

Main 12 Causes of Overheating

EBS00OB7

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See MA-20, "Engine Coolant Mixture Ratio" .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-8, "LEVEL CHECK" .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi) (Limit)	See CO-15, "Checking Radiator Cap" .
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-8, "LEAK CHECK" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-23, "THERMOSTAT" , and CO-11, "RADIATOR" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-358).
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See CO-8, "Changing Engine coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-8, "LEVEL CHECK" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-59, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-73, "CYLINDER BLOCK" .

*1: Turn the ignition switch ON.
*2: Engine running at 3,000 rpm for 10 minutes.
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.
*4: After 60 minutes of cool down time.
For more information, refer to CO-5, "OVERHEATING CAUSE ANALYSIS" .

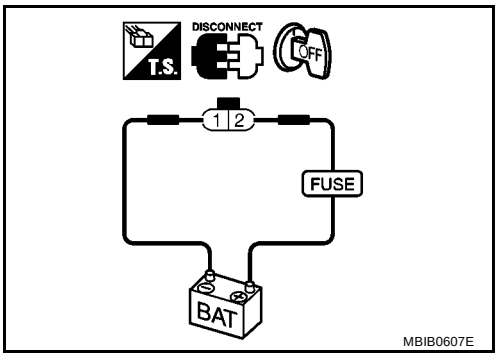
Component Inspection

EBS00OB8

COOLING FAN MOTOR

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	1	2



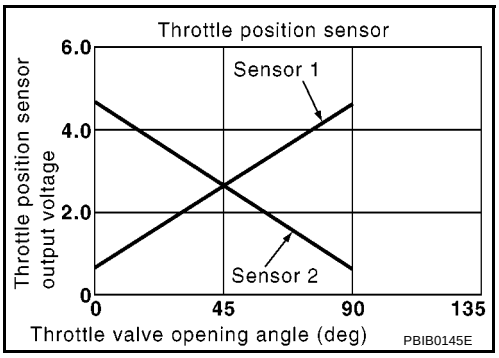
DTC P1223, P1224 TP SENSOR

PFP:16119

Component Description

EBS00OB9

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OBA

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OBB

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1223 1223	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (The TP sensor 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 2)
P1224 1224	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

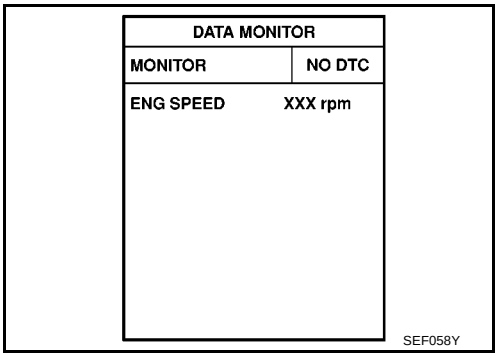
DTC Confirmation Procedure

EBS00OBC

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-369, "Diagnostic Procedure" .



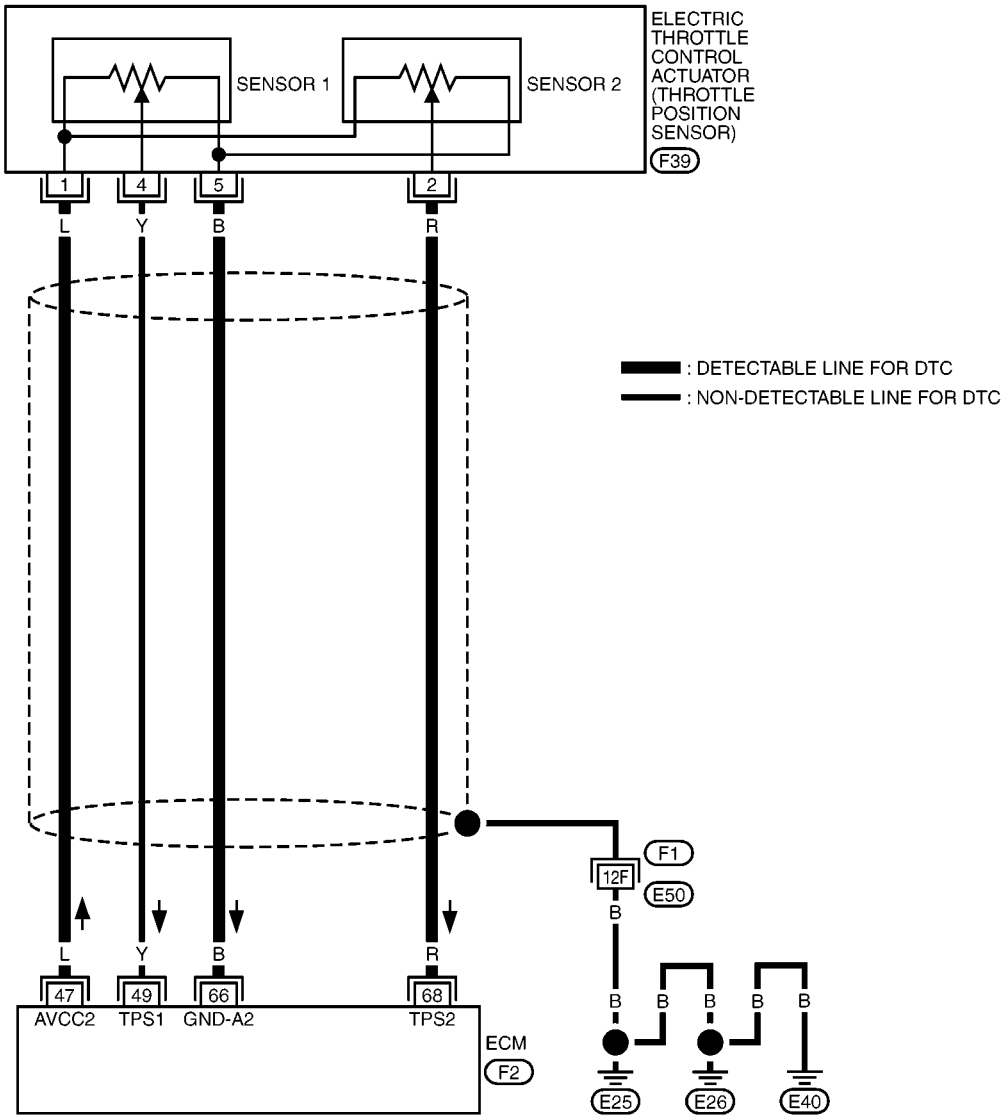
WITH GST

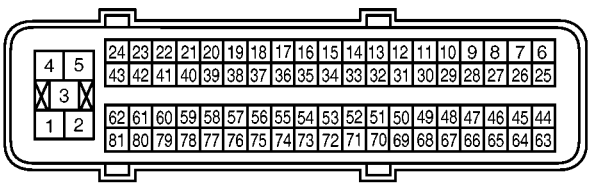
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00OBD

EC-TPS2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0291E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

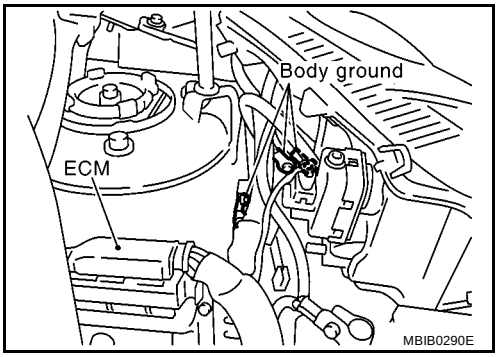
Diagnostic Procedure

EBS00OBE

1. RETIGHTEN GROUND SCREWS

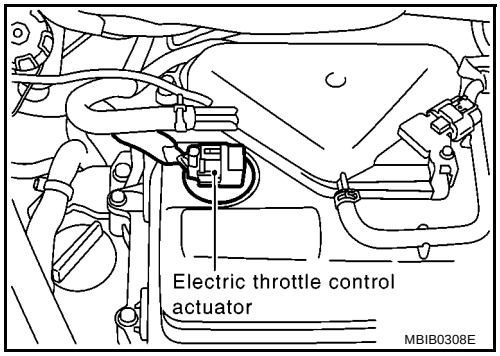
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



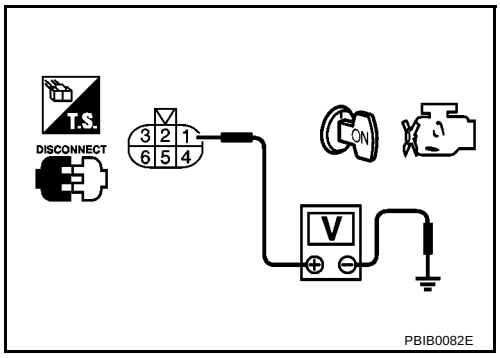
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-371, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

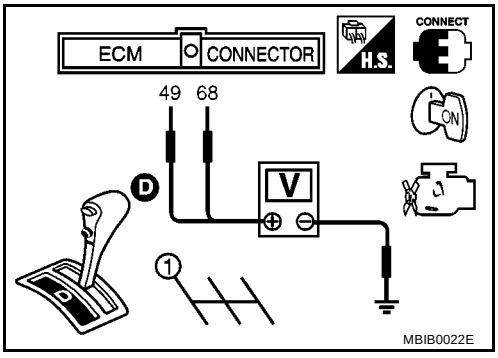
Component Inspection

EBS00OBF

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-42, "Throttle Valve Closed Position Learning" .
8. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00OBG

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

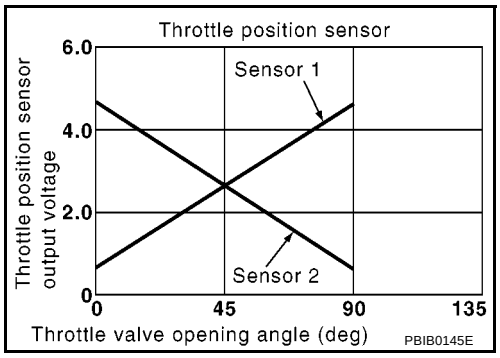
DTC P1225 TP SENSOR

PFP:16119

Component Description

EBS00OBH

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

EBS00OBI

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	● Electric throttle control actuator (TP sensor 1 and 2)

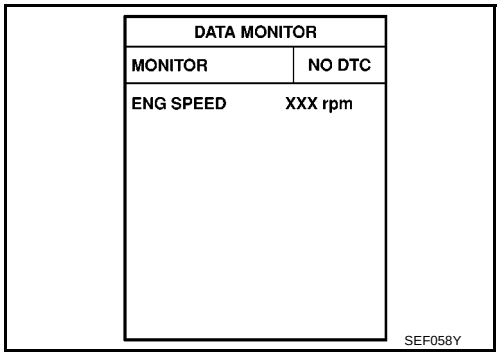
DTC Confirmation Procedure

EBS00OBJ

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. If 1st trip DTC is detected, go to EC-373, "Diagnostic Procedure"
.



WITH GST

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

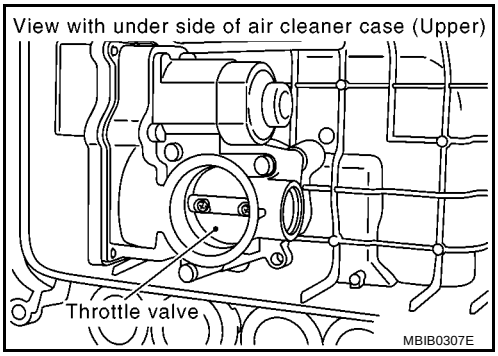
EBS00OBK

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

EBS00OBL

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

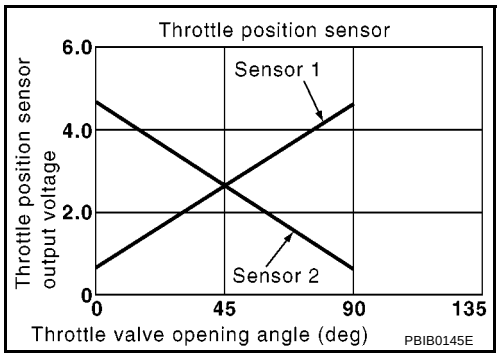
DTC P1226 TP SENSOR

PFP:16119

Component Description

EBS00OBM

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

EBS00OBN

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	● Electric throttle control actuator (TP sensor 1 and 2)

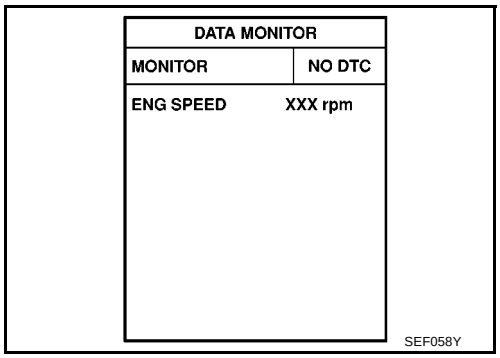
DTC Confirmation Procedure

EBS00OBO

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. Repeat steps 3 and 4 for 32 times.
6. If 1st trip DTC is detected, go to EC-375, "Diagnostic Procedure"
.



WITH GST

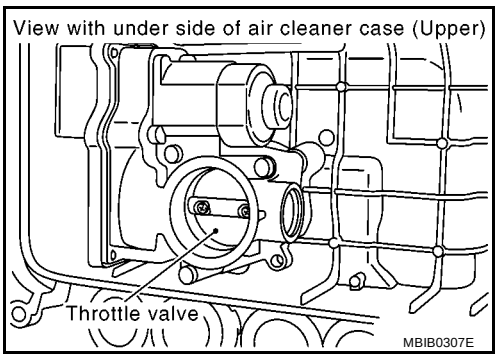
Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

EBS00OBP

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

EBS00OBQ

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

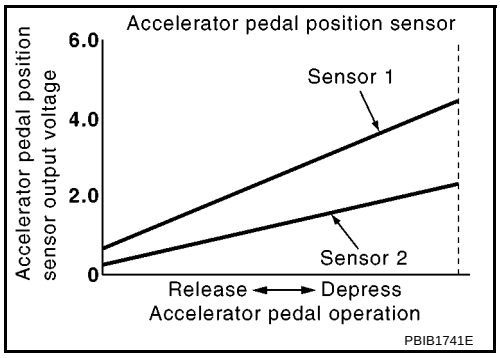
DTC P1227, P1228 APP SENSOR

PFP:18002

Component Description

EBS00OBR

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OBS

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differ from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OBT

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P1228 1228	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of throttle valve to be slower than the normal condition. So, the acceleration will be poor.

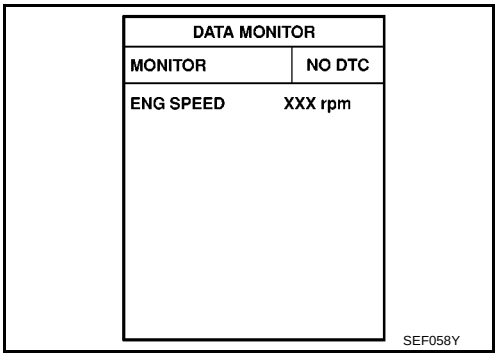
DTC Confirmation Procedure

EBS00OBU

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-381, "Diagnostic Procedure" .

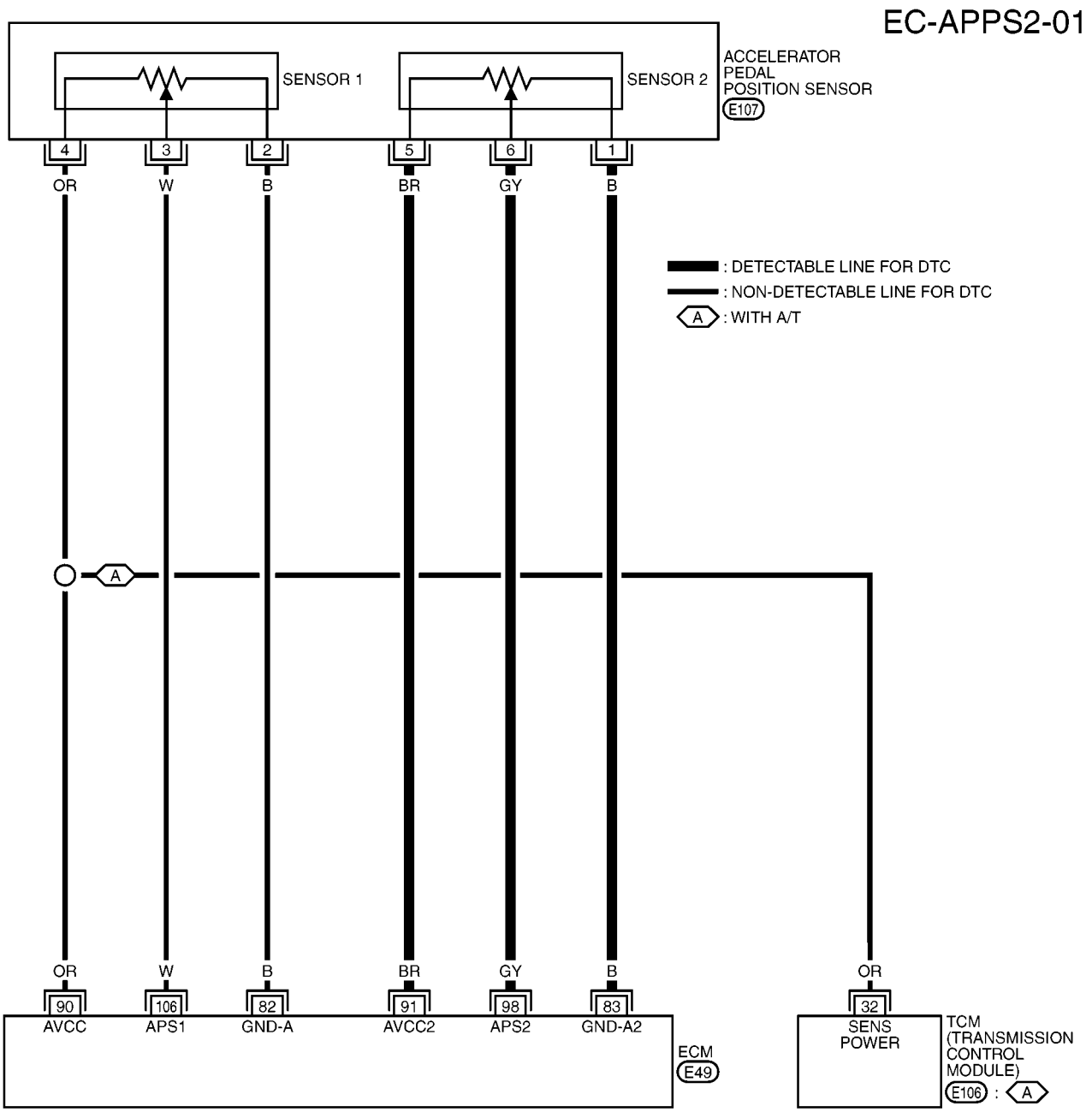


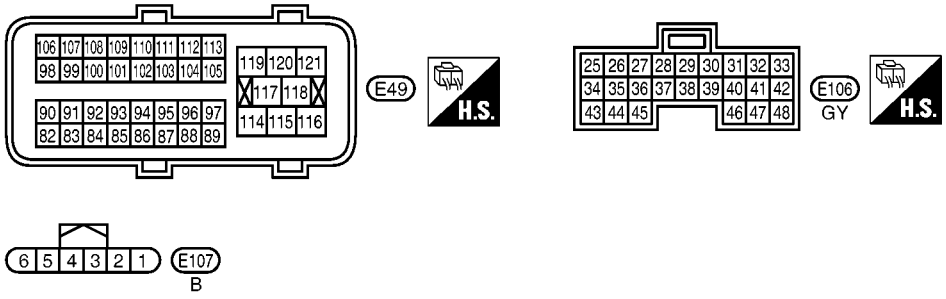
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS00OBV





MBWA0292E

Specification data are reference values and are measured between each terminal and ground.

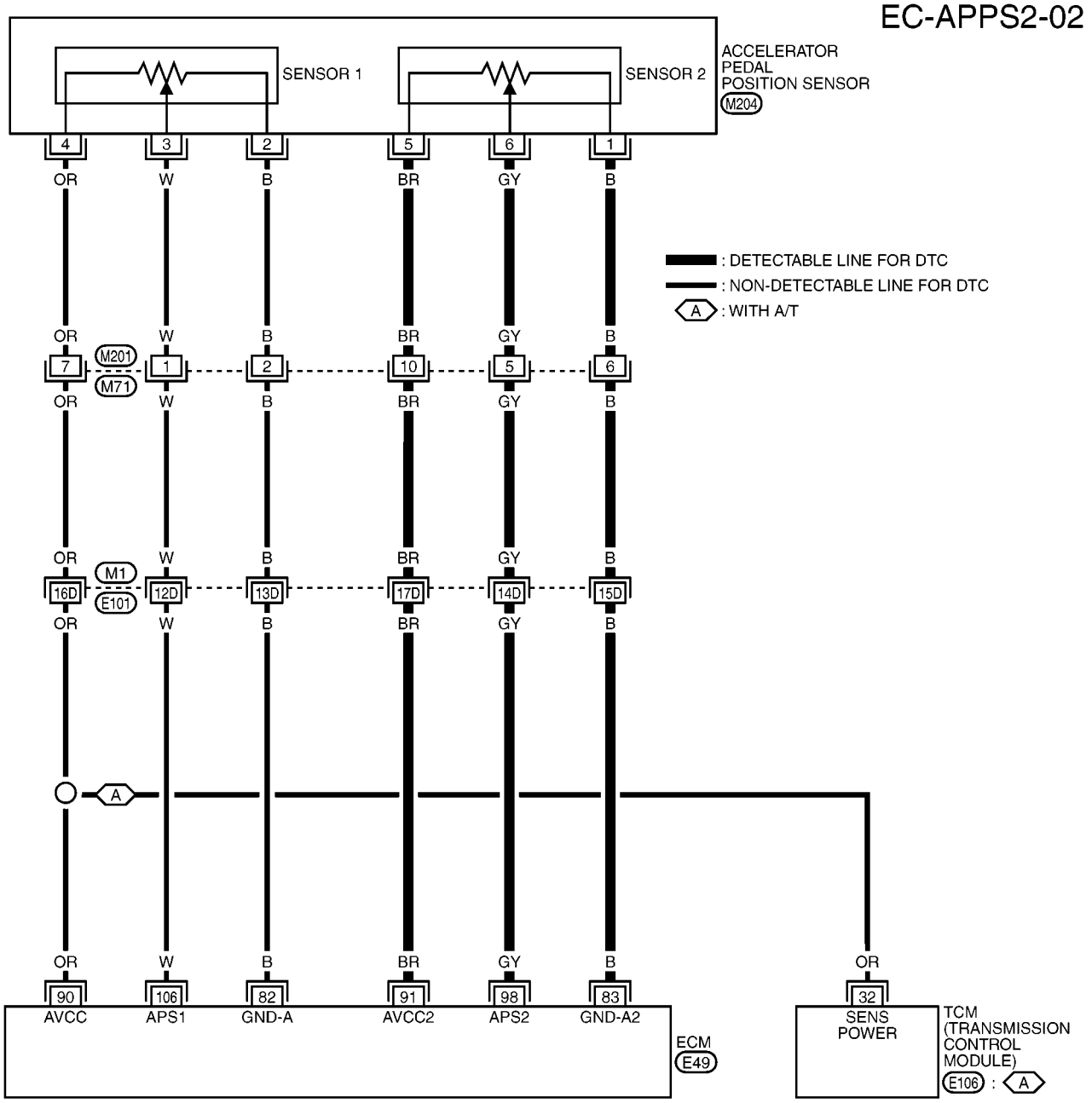
CAUTION:

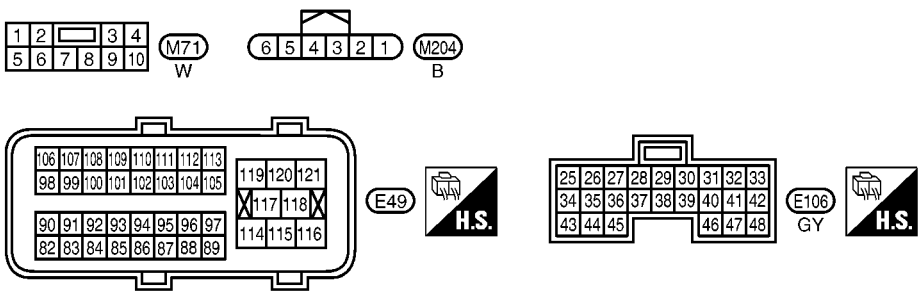
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS2-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0293E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

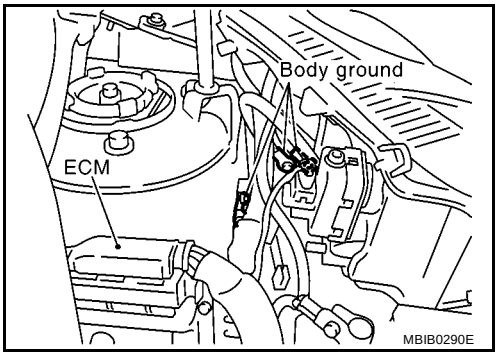
Diagnostic Procedure

EBS00OBW

1. RETIGHTEN GROUND SCREWS

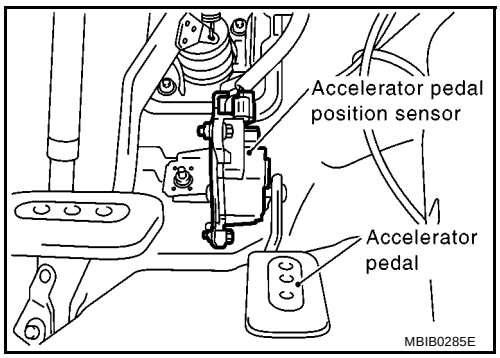
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



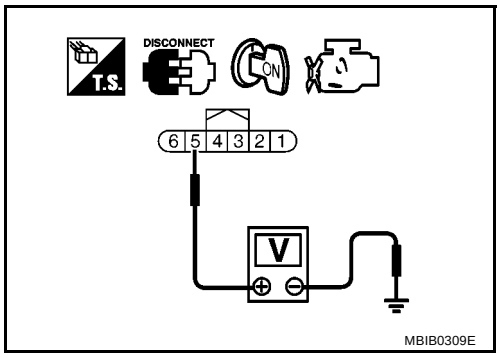
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 83 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 98 and APP sensor terminal 6. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-383, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

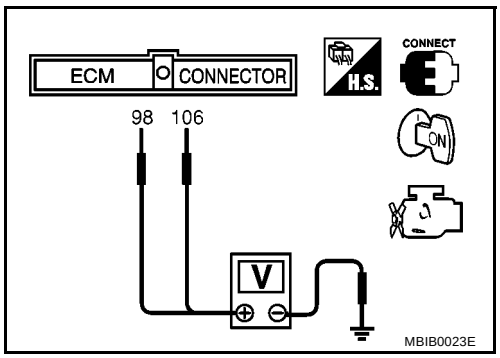
EBS00OBX

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS00OBY

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

EBS00OBZ

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	● Harness or connectors (The TP sensor 1 and 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 1 and 2) ● ECM pin terminal

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

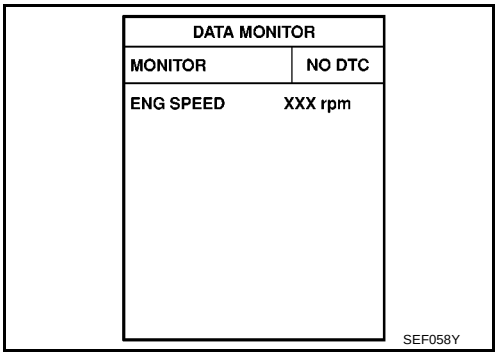
DTC Confirmation Procedure

EBS00OC0

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-387, "Diagnostic Procedure" .



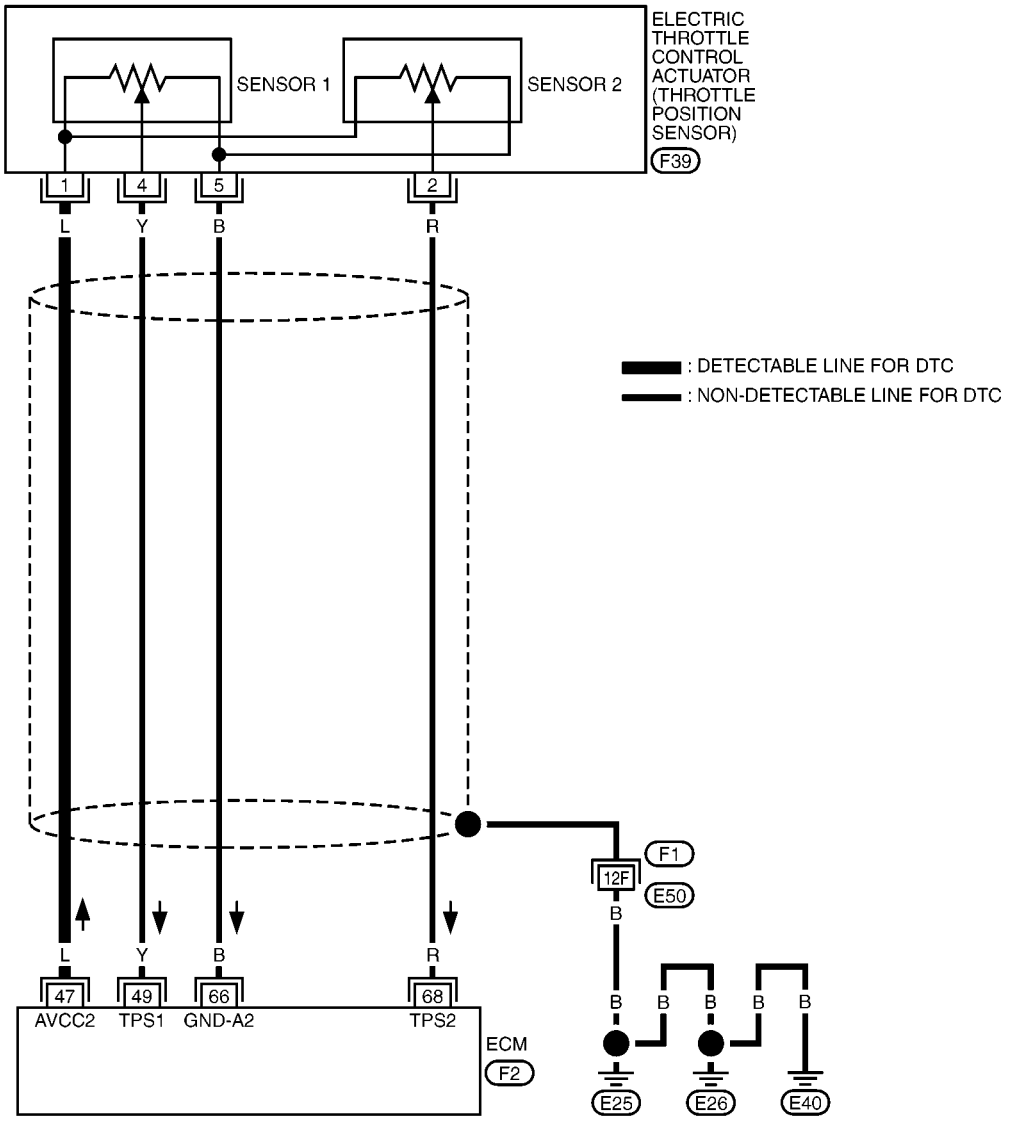
WITH GST

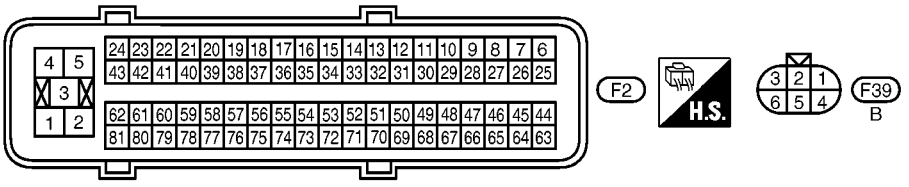
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS00OC1

EC-SEN/PW-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0463E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V

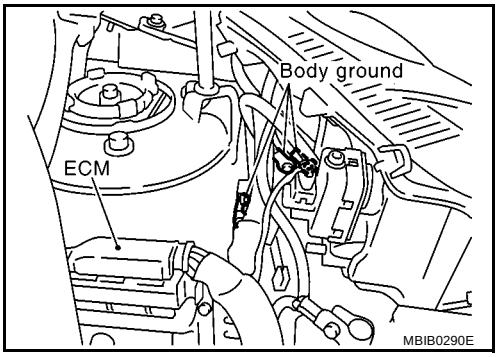
Diagnostic Procedure

EBS00OC2

1. RETIGHTEN GROUND SCREWS

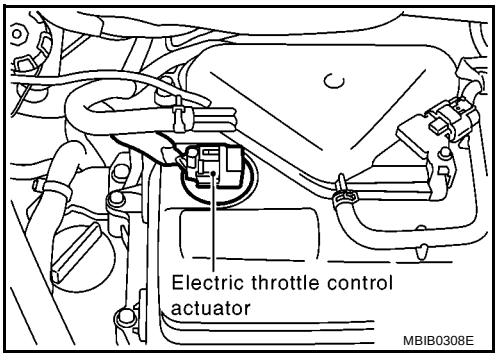
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

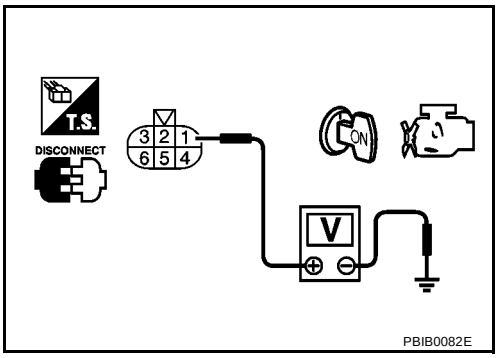


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS FOR SHORT

Check the following.

- Harness for short to power and short to ground between ECM terminal 47 and electric throttle control actuator terminal 1.
- ECM pin terminal.

OK or NG

OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR

Refer to EC-232, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P1706 PNP SWITCH

PFP:32006

Component Description

EBS00OC3

When the shift lever position is P or N (A/T models), Neutral (M/T models), park/neutral position (PNP) switch is ON.
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

EBS00OC4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T models), Neutral (M/T models)	ON
		Shift lever: Except above	OFF

On Board Diagnosis Logic

EBS00OC5

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] ● Park/neutral position (PNP) switch

DTC Confirmation Procedure

EBS00OC6

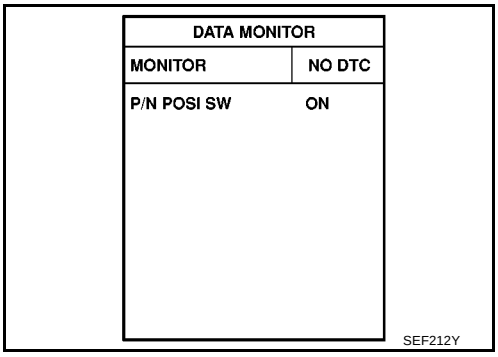
CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

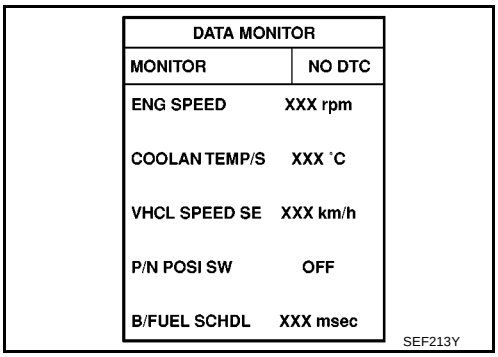
Position (Selector lever)	Known-good signal
N and P position (A/T) Neutral position (M/T)	ON
Except the above position	OFF



If NG, go to EC-392, "Diagnostic Procedure" .
If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,700 - 4,700 rpm (M/T models with CR10 engine) 1,500 - 4,200 rpm (M/T models with CR12 engine) 1,600 - 4,400 rpm (M/T models with CR14 engine) 1,250 - 3,600 rpm (A/T models)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	1.8 - 6.2 msec (M/T models) 2.3 - 7.5 msec (A/T models)
VHCL SPEED SE	More than 46 km/h (29 MPH)
Selector lever	Suitable position



6. If 1st trip DTC is detected, go to EC-392, "Diagnostic Procedure" .

Overall Function Check

EBS00OC7

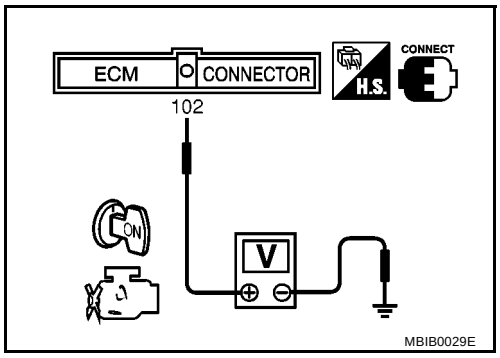
Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 (PNP switch signal) and body ground under the following conditions.

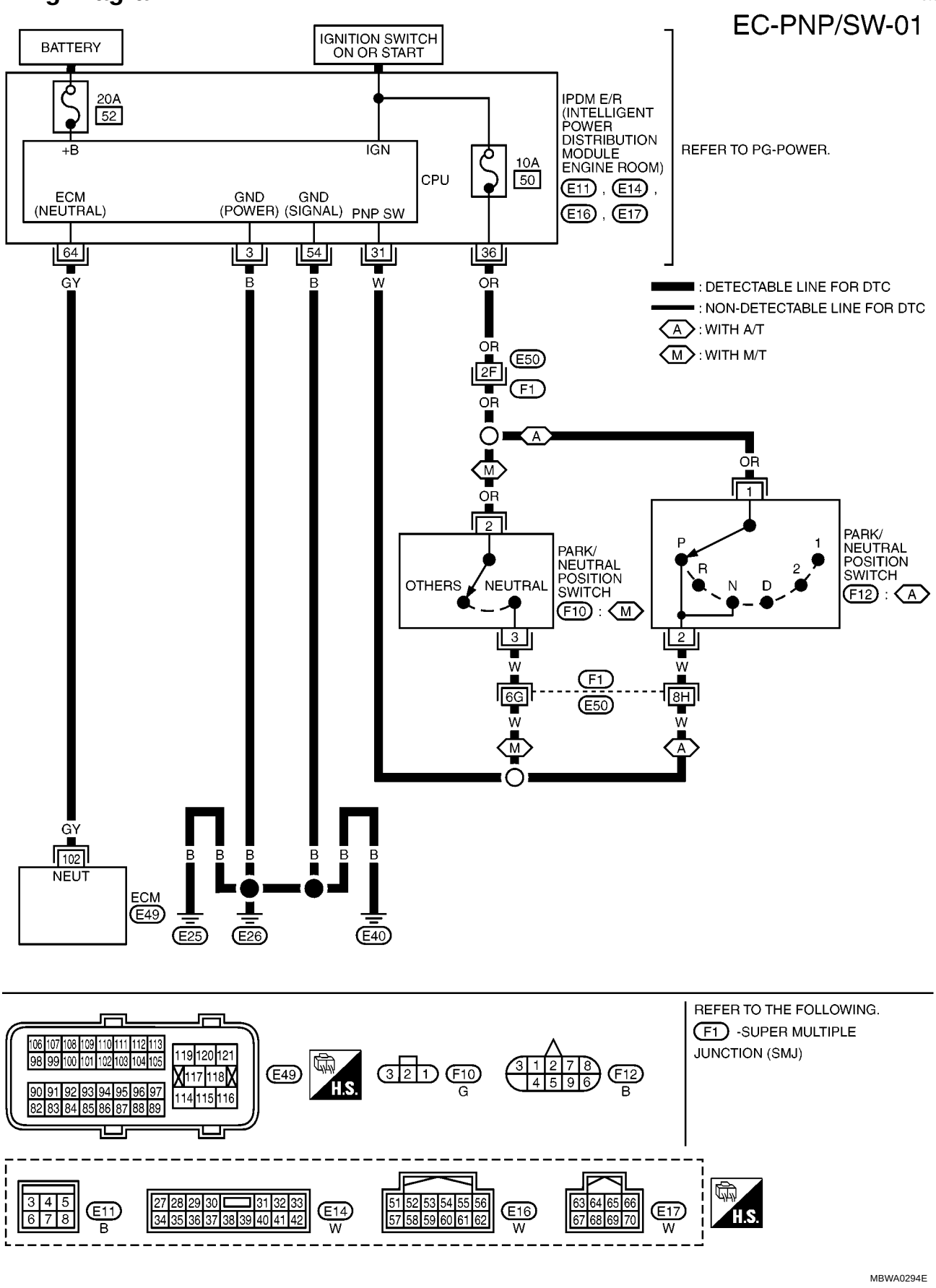
Condition (Gear position)	Voltage V (Known-good data)
N and P position (A/T) Neutral position (M/T)	Approx. 0
Except the above position	BATTERY VOLTAGE (11 - 14V)

3. If NG, go to EC-392, "Diagnostic Procedure" .



Wiring Diagram

EBS00OC8



MBWA0294E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	GY	PNP switch	**[Ignition switch ON]** ● Shift lever position: P or N (A/T models), Neutral (M/T models).	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)

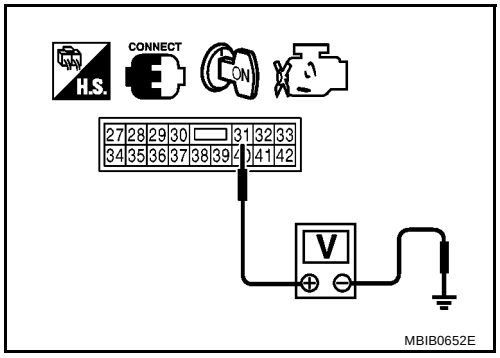
Diagnostic Procedure

EBS00OC9

1. CHECK PNP SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R terminal 31 and ground under following condition.

Shift lever position	Voltage
P or N (A/T models) Neutral (M/T models)	Battery voltage (11- 14V)
Except above position	Approximately 0V

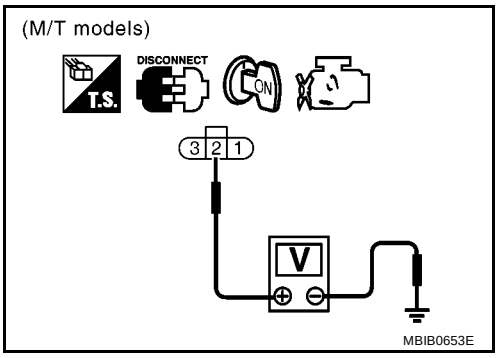


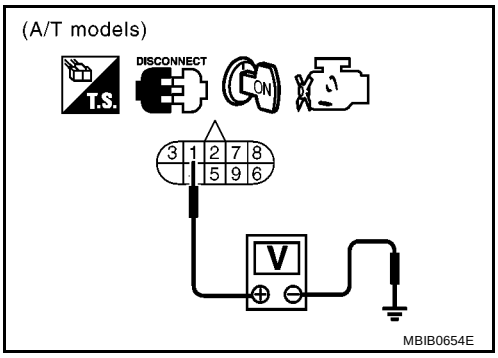
OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between PNP switch terminal 1 (A/T models), 2 (M/T models) and ground with CONSULT-II or tester.





Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PARTS

Check the following.

- 10A fuse
- Harness connectors E50, F1
- IPDM E/R connector E14
- Harness for short or open between PNP switch and fuse

>> Repair or replace harness or connectors.

4. CHECK HARNESS CONTINUTY BETWEEN PNP SWITCH AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E14.
3. Check harness continuity between IPDM E/R terminal 31 and PNP switch terminal 2 (A/T models), 3 (M/T models).

Continuity should exist.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PARTS

Check the following.

- Harness connectors E50, F1
- Harness for short or open between PNP switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK PNP SWITCH

Refer to AT-119, "Component Inspection" (A/T models).

OK or NG

OK >> GO TO 8.
NG >> Replace PNP switch.

7. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E17
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 102 and IPDM E/R terminal 64.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO OT 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

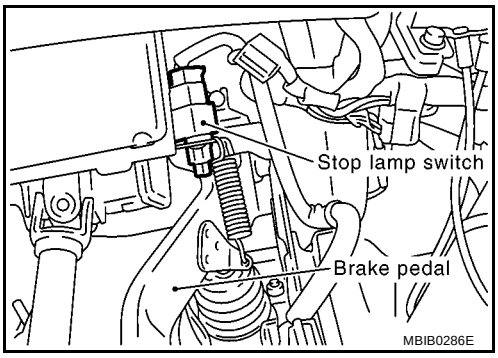
DTC P1805 BRAKE SWITCH

PFP:25320

Description

EBS00OCA

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OCB

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

EBS00OCC

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	● Harness or connectors (Stop lamp switch circuit is open or shorted.) ● Stop lamp switch

FAIL-SAFE MODE

EBS00OCD

When the malfunction is detected, the ECM enters fail-safe mode.

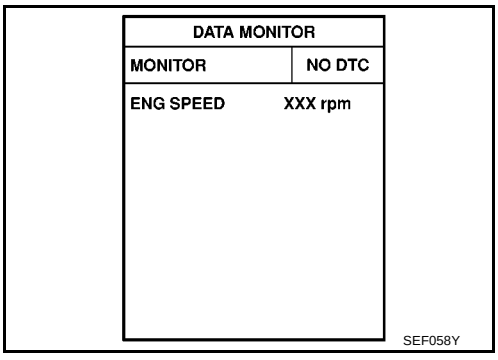
Engine operation condition in fail-fail safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range.Therefore,acceleration will be poor.	
Vehicle condition	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

DTC Confirmation Procedure

EBS00OCE

WITH CONSULT-II

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. If 1st trip DTC is detected, go to EC-398, "Diagnostic Procedure"
.



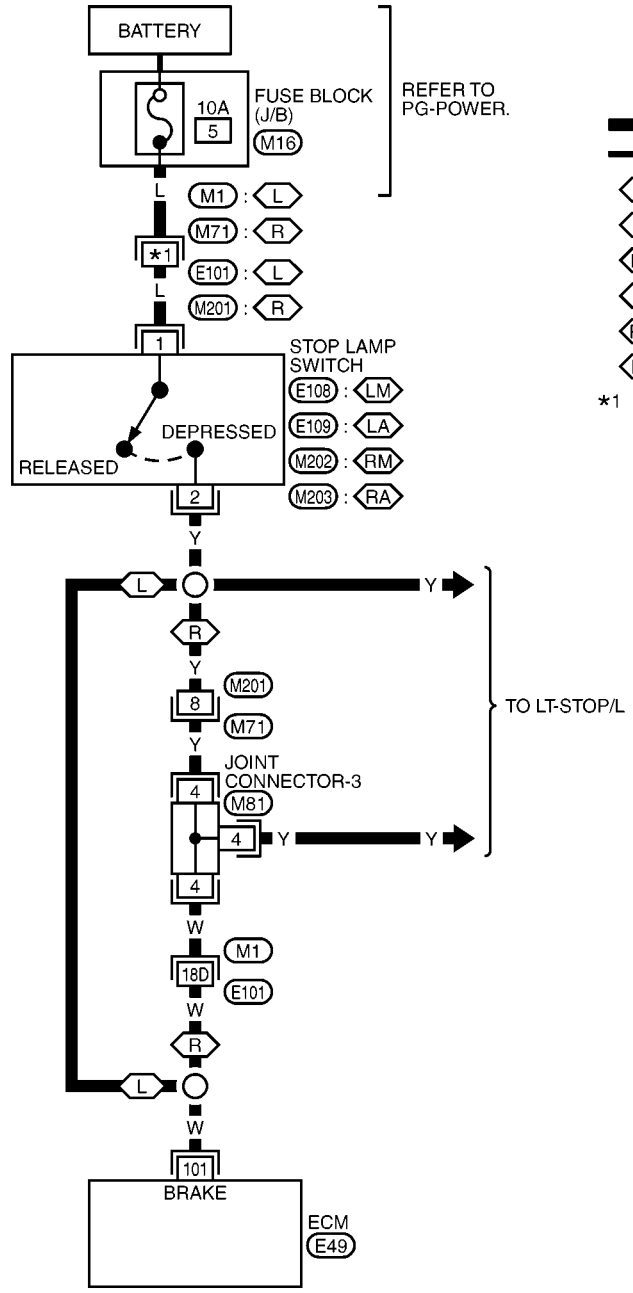
WITH GST

Follow the procedure “WITH CONSULT-II” above.

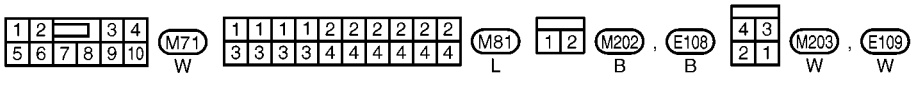
Wiring Diagram

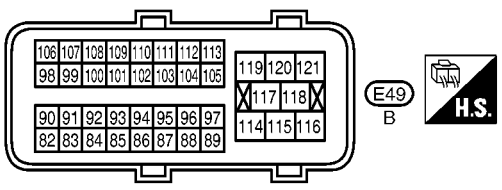
EBS00OCF

EC-BRK/SW-01



: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
L : LHD MODELS
R : RHD MODELS
LM : LHD MODELS WITH M/T
LA : LHD MODELS WITH A/T
RM : RHD MODELS WITH M/T
RA : RHD MODELS WITH A/T
*1 8D : L
4 : R





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MBWA0574E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	W	Stop lamp switch	**[Engine is running]** ● Brake pedal: Fully released	Approximately 0V
			[Engine is running] ● Brake pedal: Depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

EBS00OCG

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

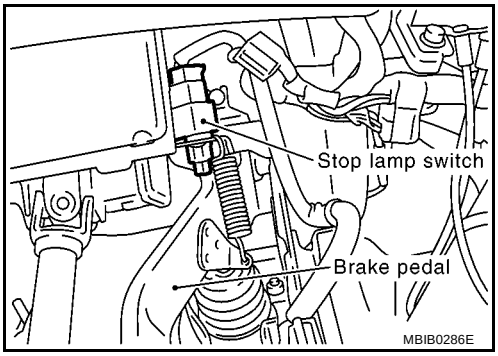
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

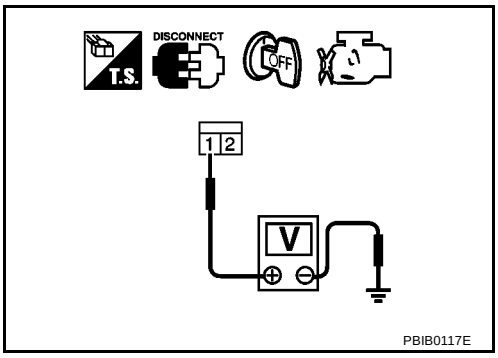
OK >> GO TO 4.
NG >> GO TO 2.

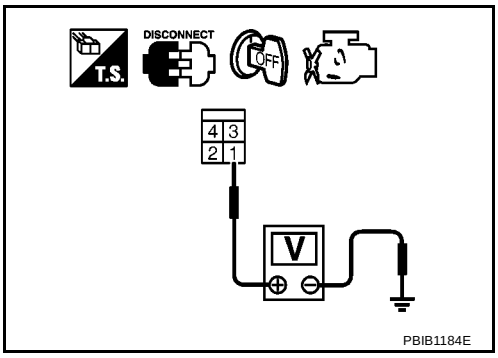
2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.





Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M16
- Harness connectors M1, E101 (LHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open and short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Joint connector-3 (RHD models)
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK STOP LAMP SWITCH

Refer to EC-401, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace stop lamp switch.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

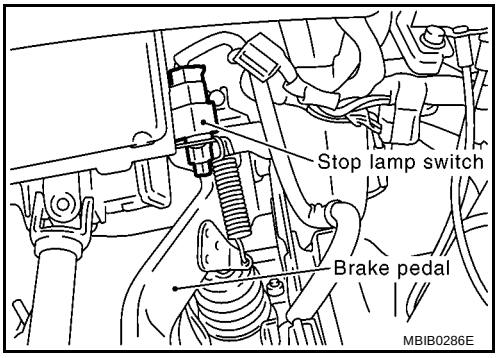
>> **INSPECTION END**

Component Inspection

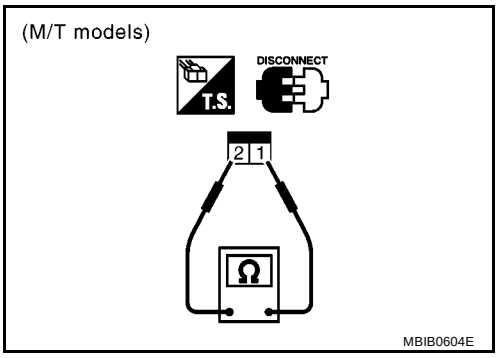
EBS00OCH

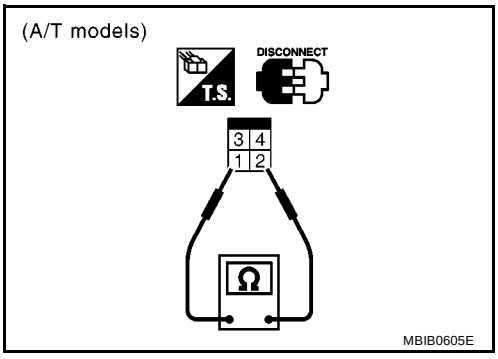
STOP LAMP SWITCH

1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.





Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

If NG, adjust brake pedal installation, refer to BR-6, "BRAKE PEDAL" , and perform step 2 again.

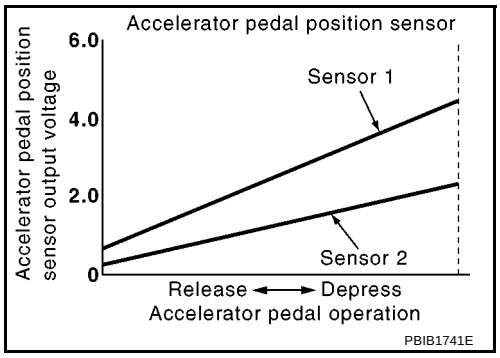
DTC P2122, P2123 APP SENSOR

PFP:18002

Component Description

EBS010C9

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS010CA

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS010CB

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

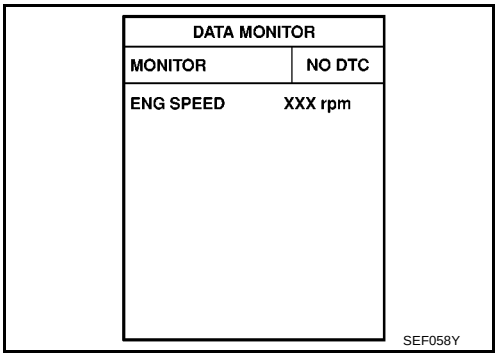
DTC Confirmation Procedure

EBS010CC

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-407, "Diagnostic Procedure" .

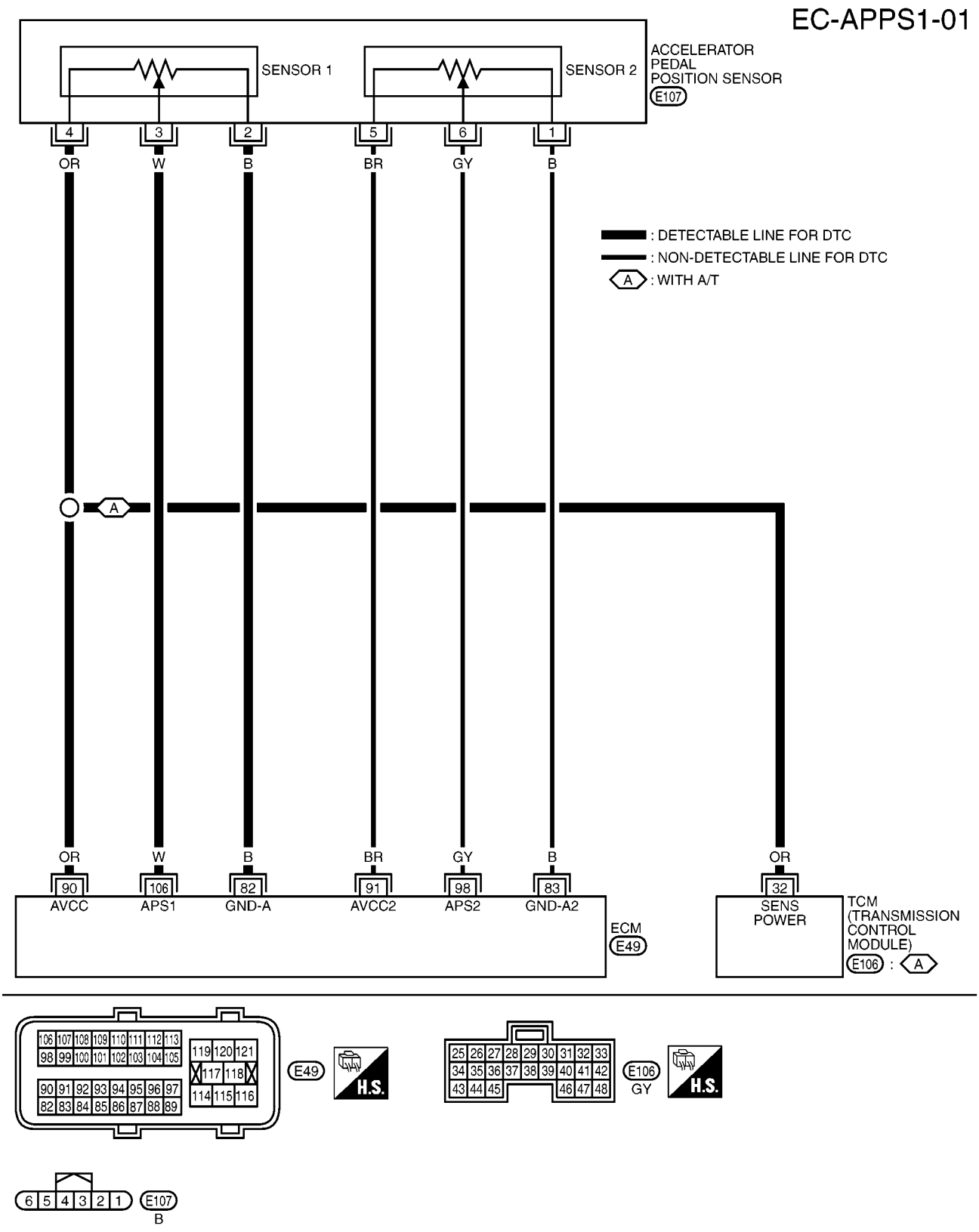


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS010CD



MBWA0279E

Specification data are reference values and are measured between each terminal and ground.

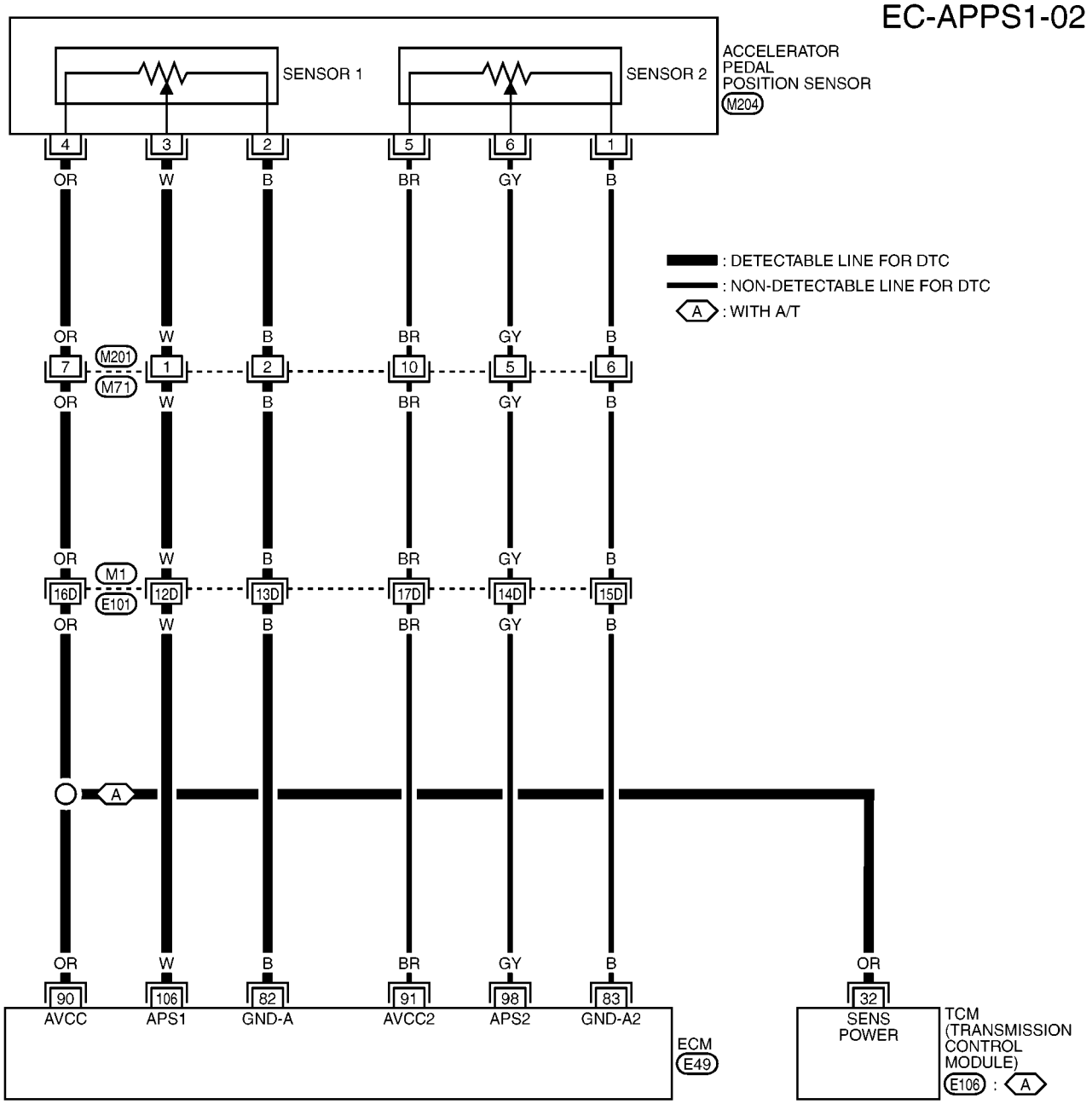
CAUTION:

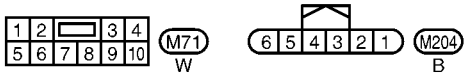
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

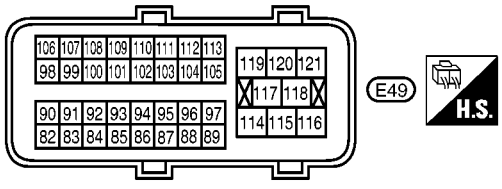
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

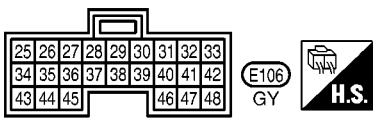
RHD MODELS

EC-APPS1-02









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0280E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

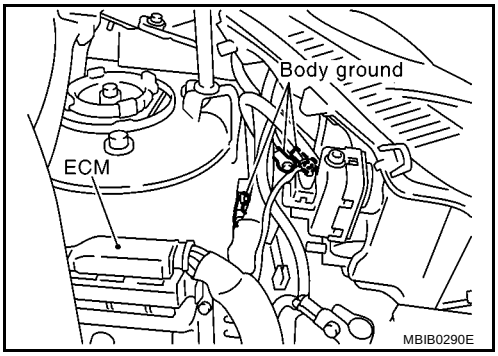
Diagnostic Procedure

EBS010CE

1. RETIGHTEN GROUND SCREWS

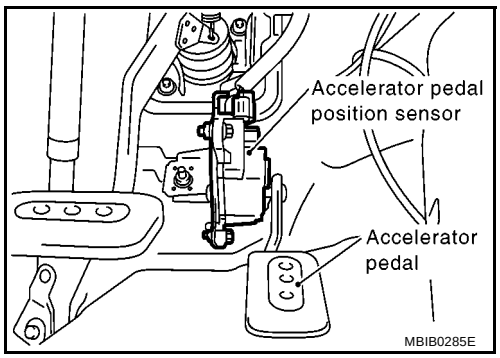
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



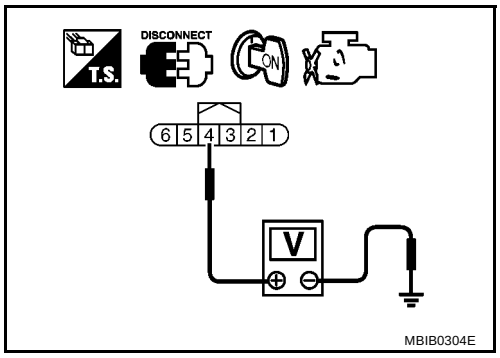
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-409, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

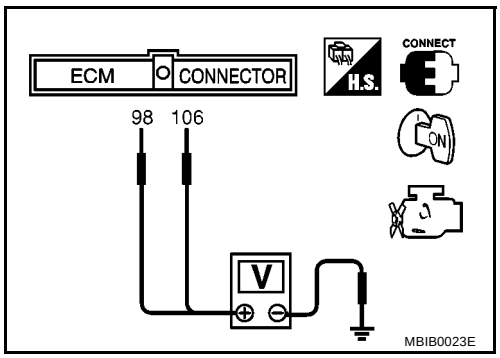
EBS010CF

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS010CG

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

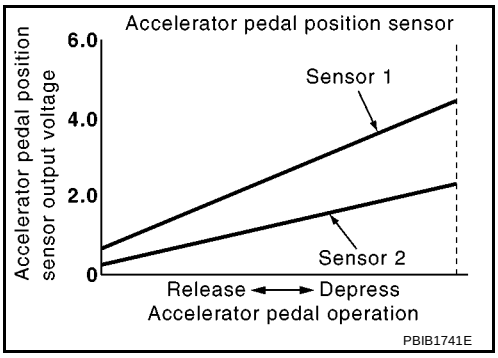
DTC P2127, P2128 APP SENSOR

PFP:18002

Component Description

EBS010CH

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS010CI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differ from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010CJ

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of throttle valve to be slower than the normal condition. So, the acceleration will be poor.

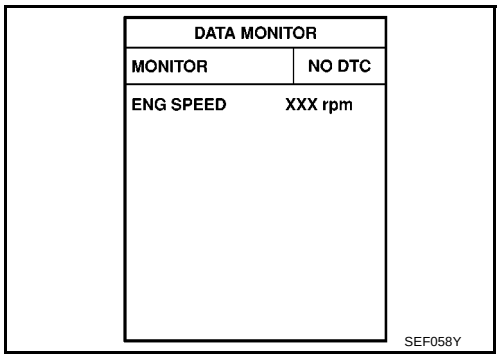
DTC Confirmation Procedure

EBS010CK

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-416, "Diagnostic Procedure" .

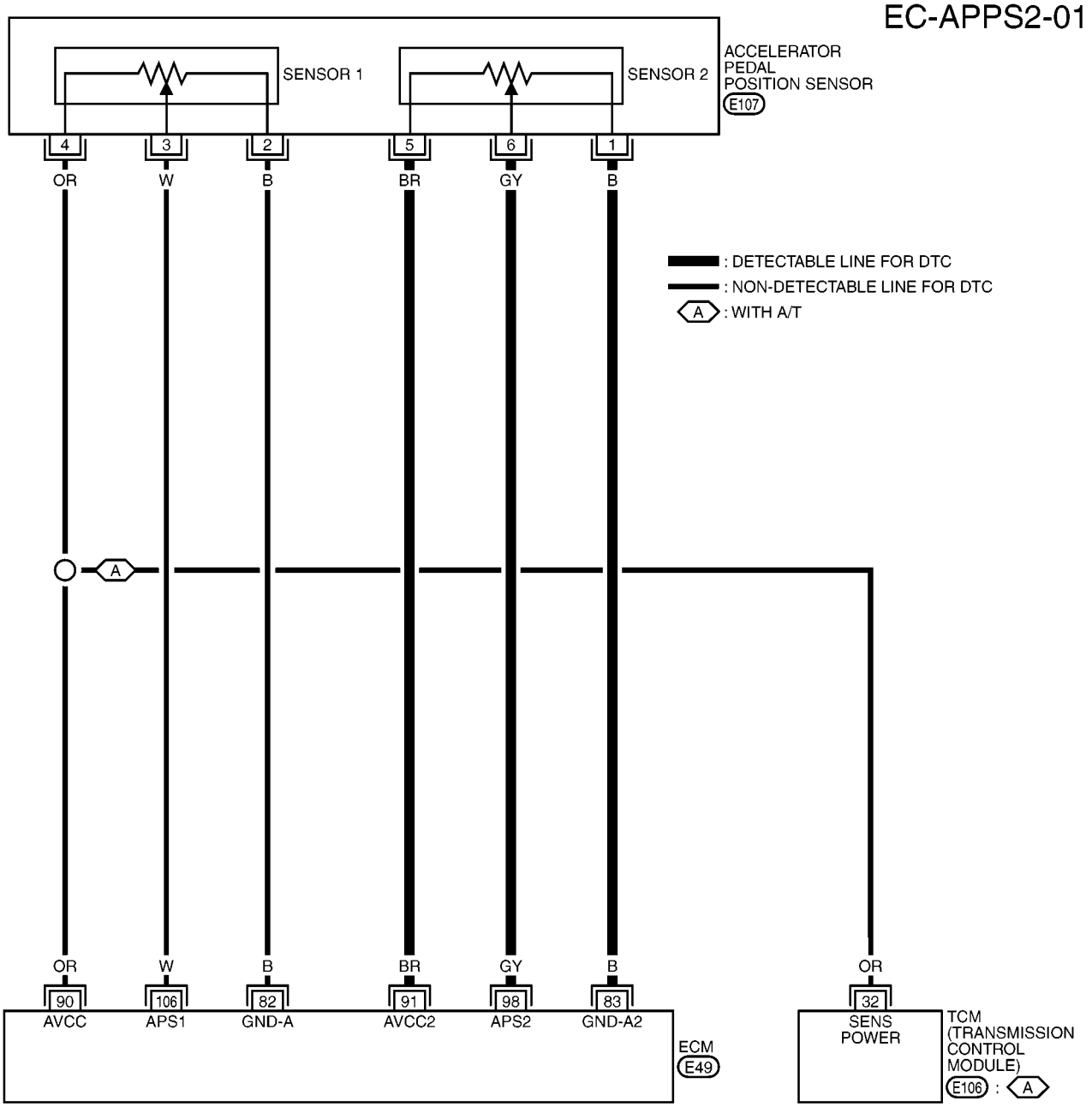


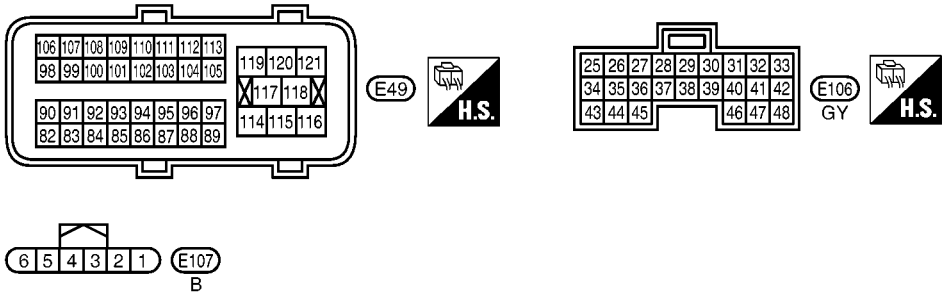
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS010CL





MBWA0292E

Specification data are reference values and are measured between each terminal and ground.

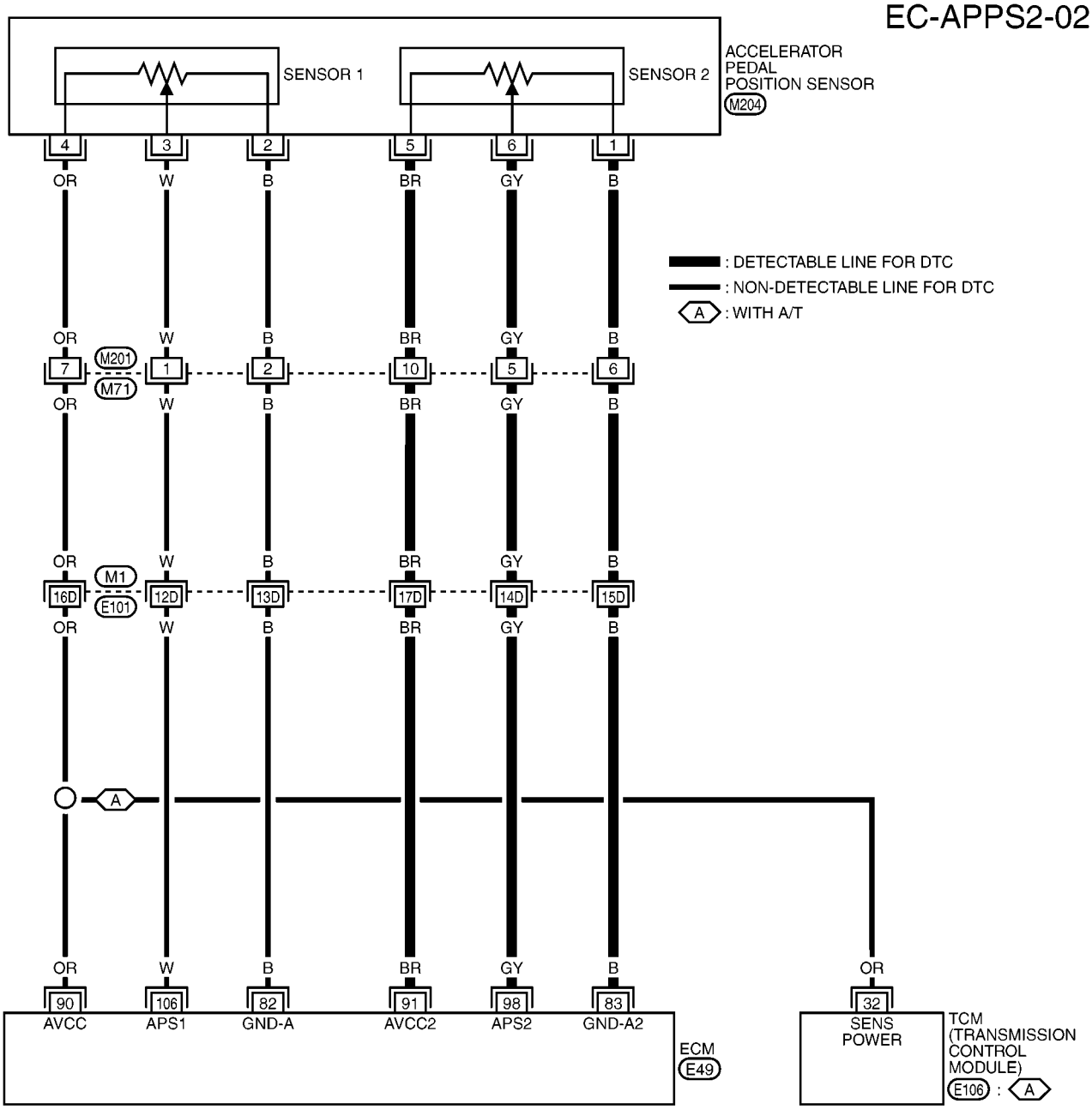
CAUTION:

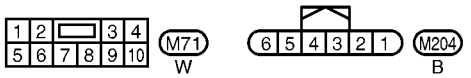
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

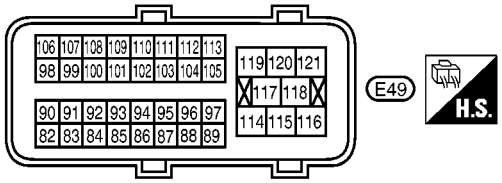
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

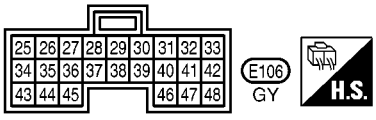
RHD MODELS

EC-APPS2-02









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0293E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

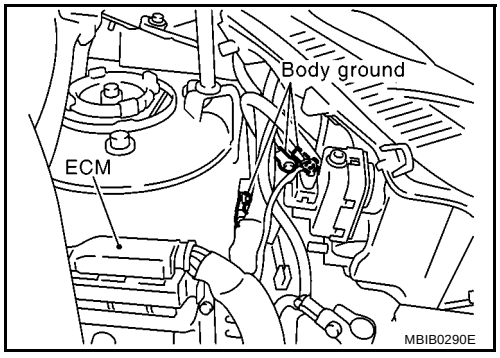
Diagnostic Procedure

EBS010CM

1. RETIGHTEN GROUND SCREWS

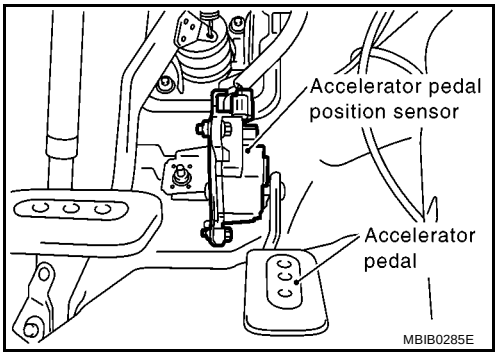
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



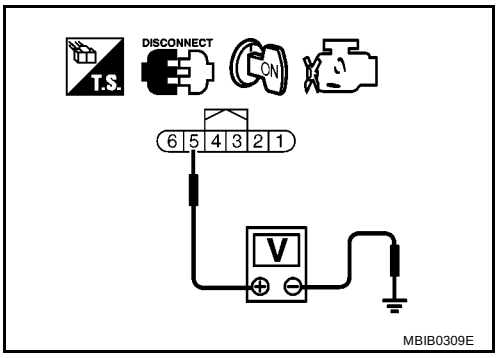
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 83 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-418, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

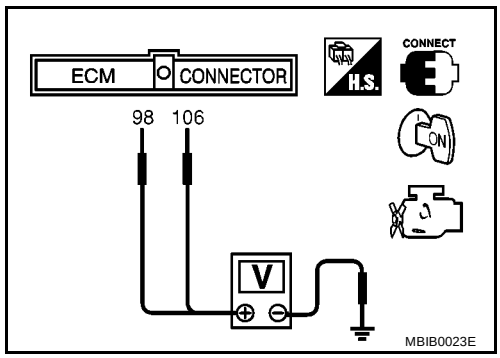
EBS010CN

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS010CO

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

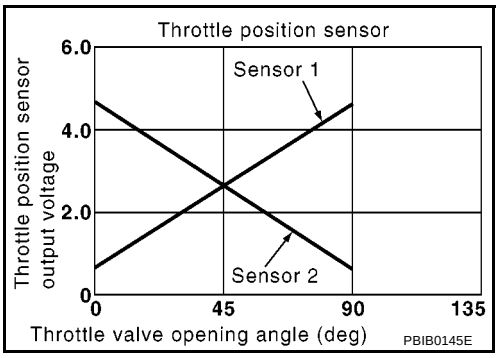
DTC P2135 TP SENSOR

PFP:16119

Component Description

EBS010CP

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS010CQ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010CR

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

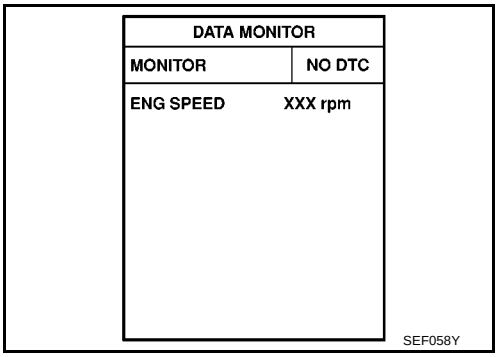
DTC Confirmation Procedure

EBS010CS

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-423, "Diagnostic Procedure" .



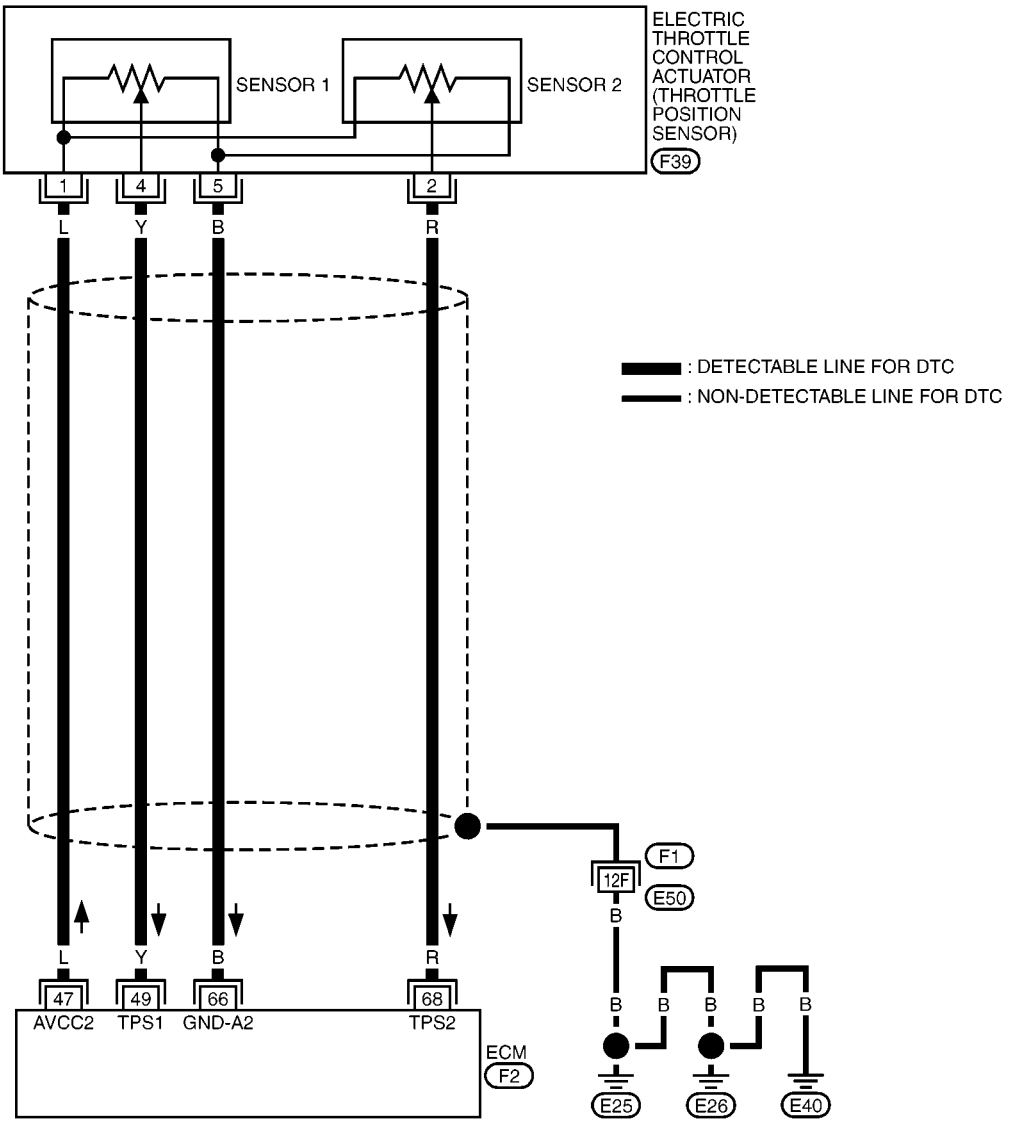
WITH GST

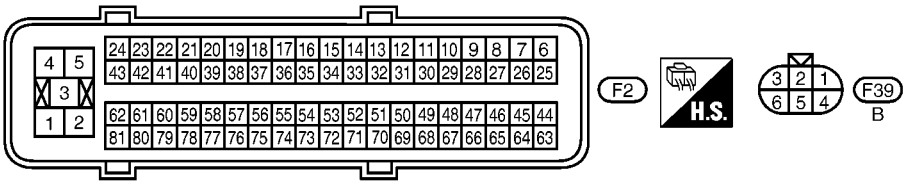
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

EBS010CT

EC-TPS3-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0275E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

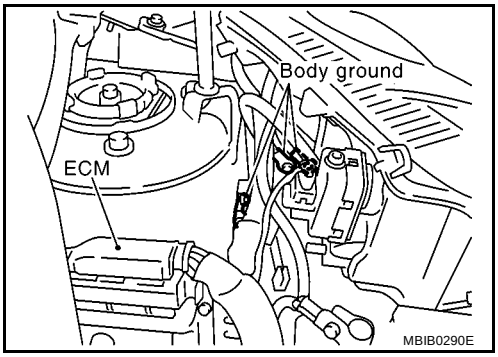
Diagnostic Procedure

EBS010CU

1. RETIGHTEN GROUND SCREWS

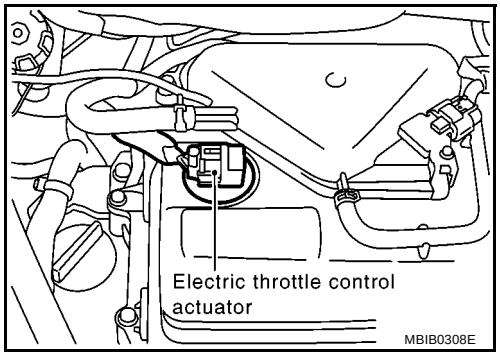
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



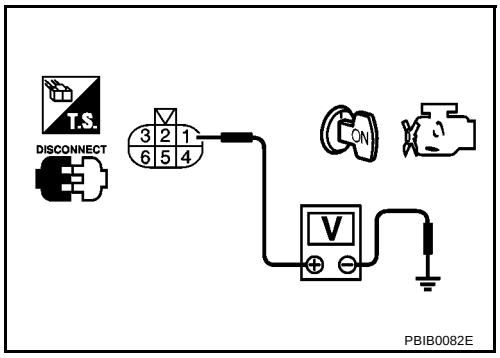
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4, ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-425, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

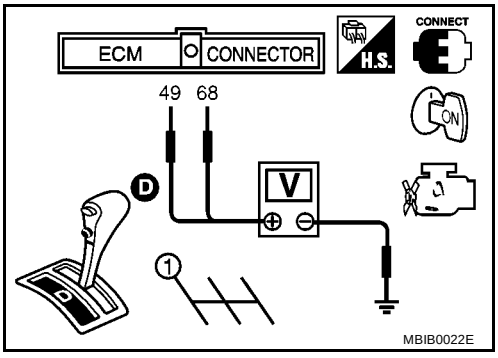
Component Inspection

EBS010CV

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-42, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-42, "Throttle Valve Closed Position Learning" .
8. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS010CW

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

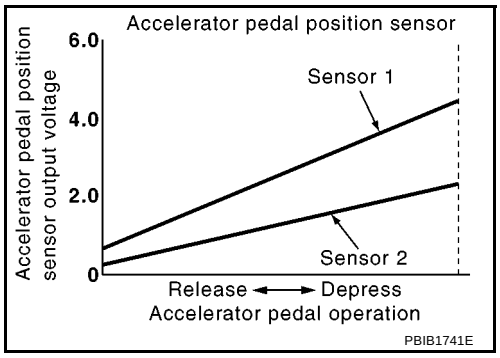
DTC P2138 APP SENSOR

PFP:18002

Component Description

EBS010CX

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS010CY

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS010CZ

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

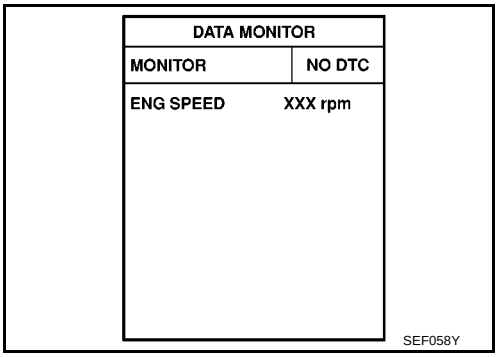
DTC Confirmation Procedure

EBS010D0

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-431, "Diagnostic Procedure" .

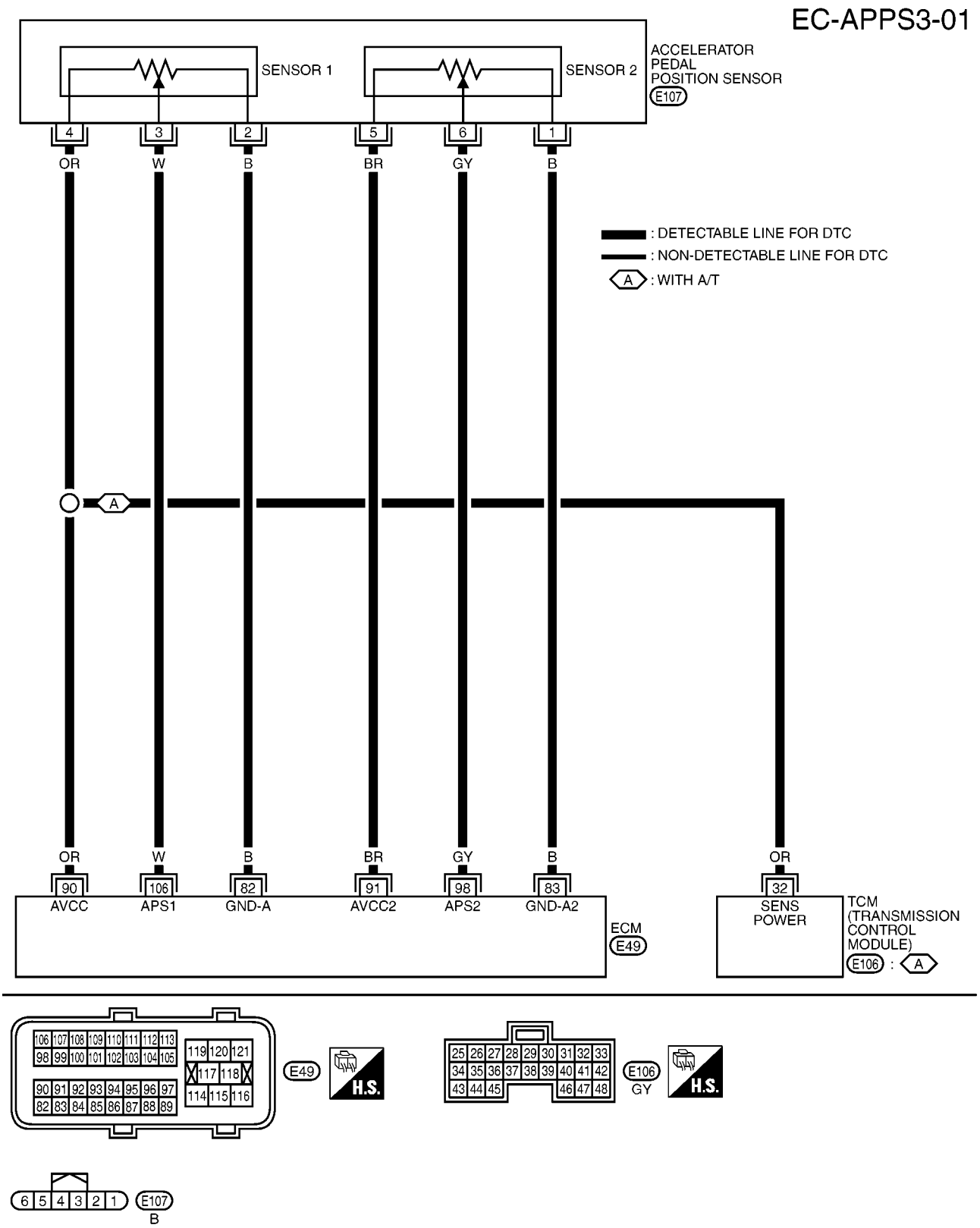


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram
LHD MODELS

EBS010D1



MBWA0277E

Specification data are reference values and are measured between each terminal and ground.

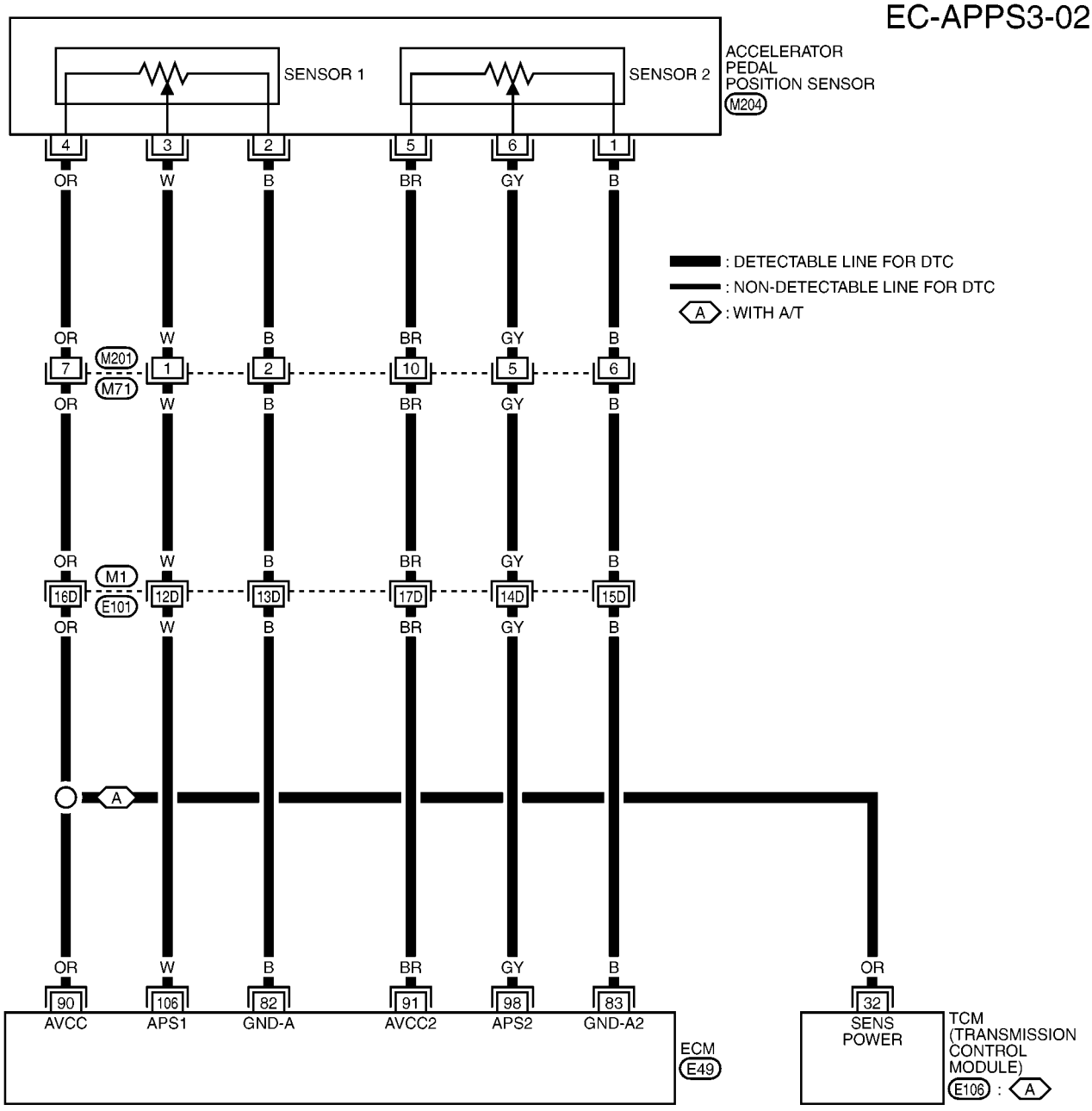
CAUTION:

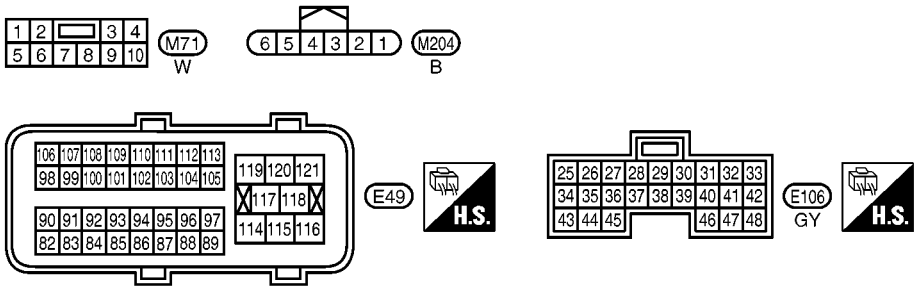
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS3-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0278E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

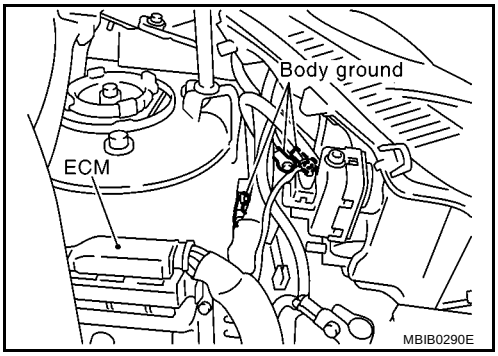
Diagnostic Procedure

EBS010D2

1. RETIGHTEN GROUND SCREWS

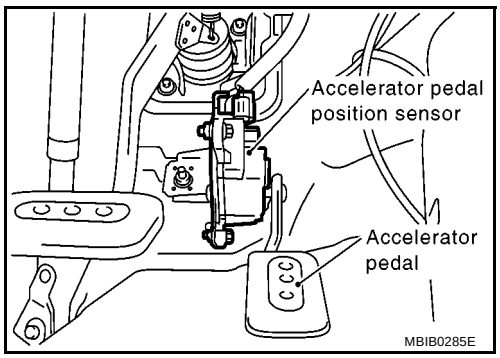
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



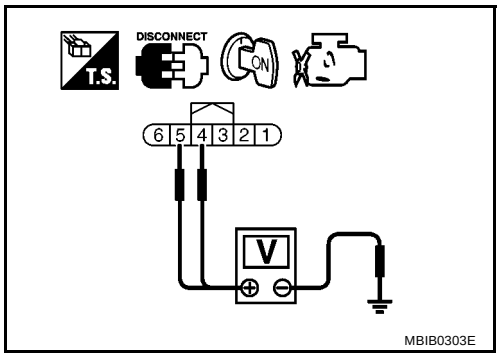
2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminals 4, 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2, ECM terminal 83 and APP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-434, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-42, "Accelerator Pedal Released Position Learning" .
3. Perform EC-42, "Throttle Valve Closed Position Learning" .
4. Perform EC-42, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

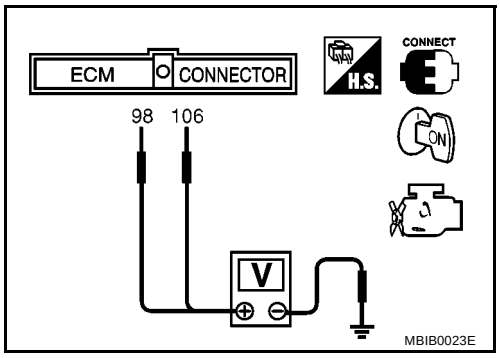
>> **INSPECTION END**

Component Inspection

EBS010D3

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-42, "Accelerator Pedal Released Position Learning" .
6. Perform EC-42, "Throttle Valve Closed Position Learning" .
7. Perform EC-42, "Idle Air Volume Learning" .

Remove and Installation

EBS010D4

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

IGNITION SIGNAL

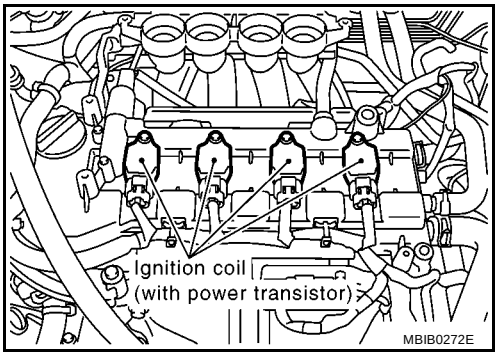
PFP:22448

Component Description

EBS00OCI

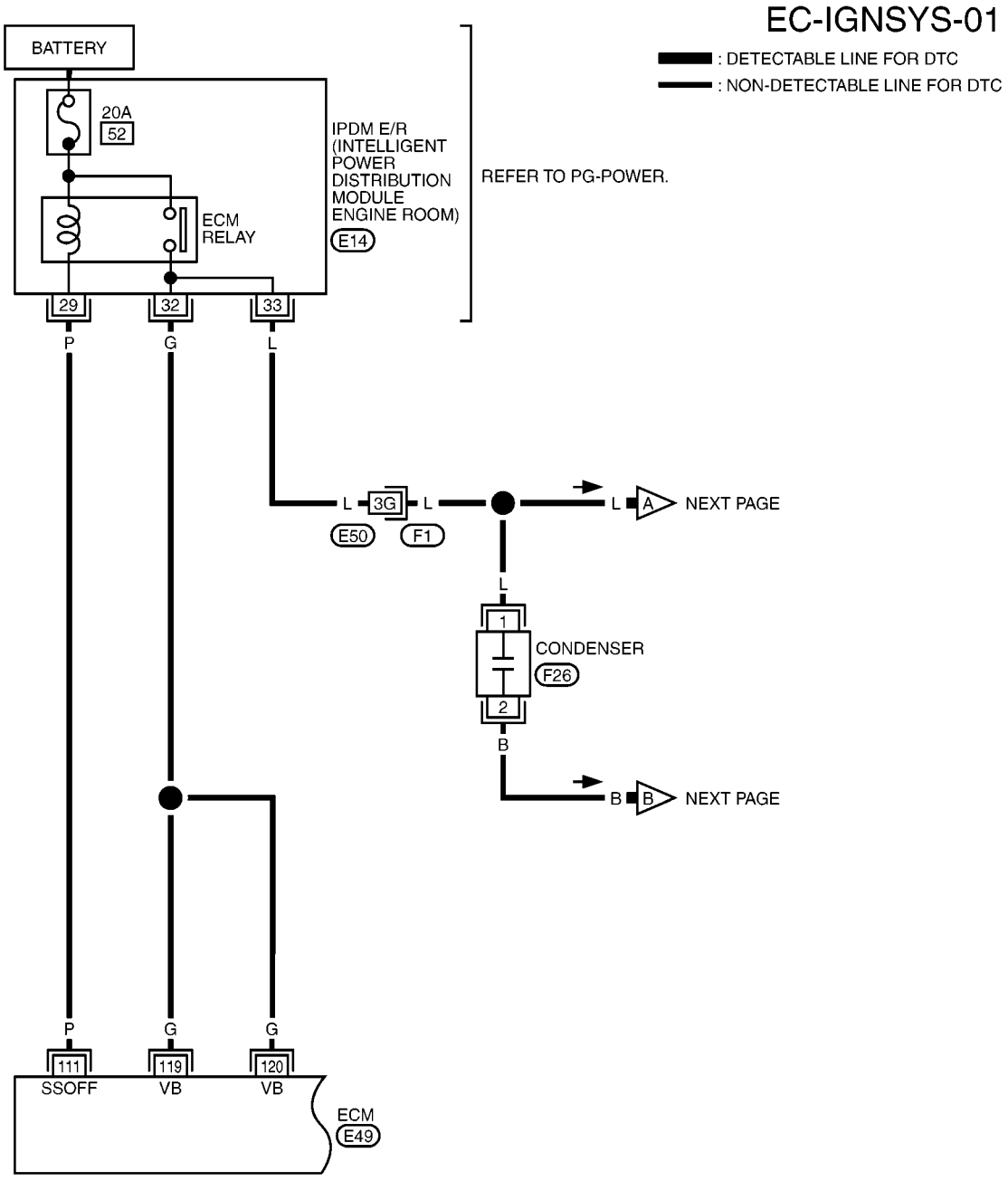
IGNITION COIL & POWER TRANSISTOR

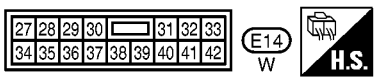
The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.

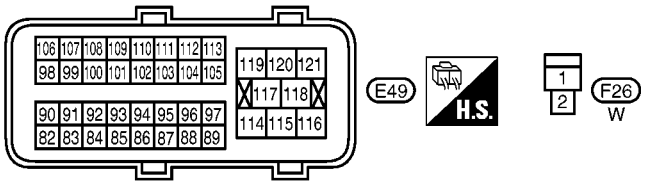


Wiring Diagram

EBS00OCJ







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0296E

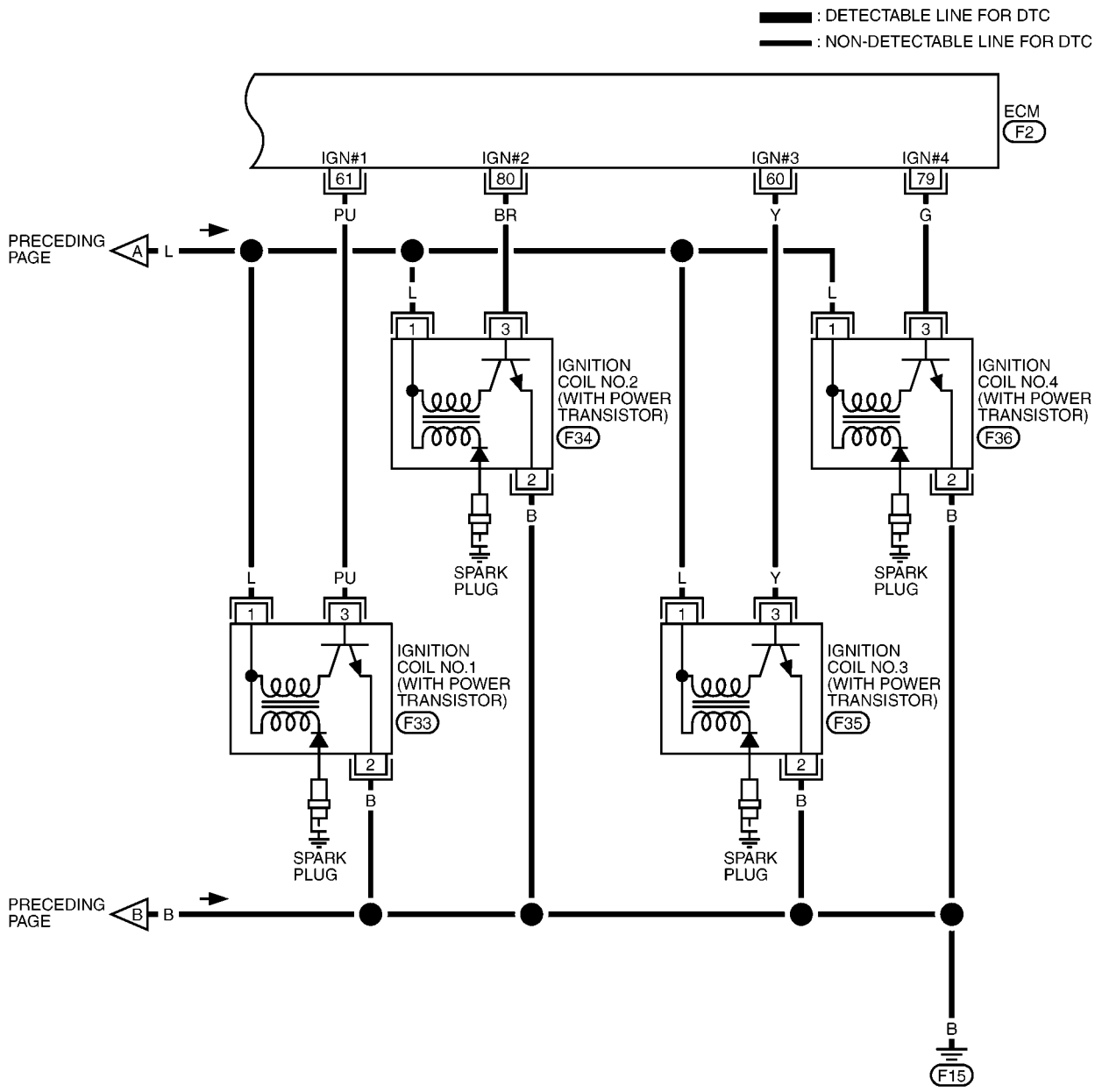
Specification data are reference values and are measured between each terminal and ground.

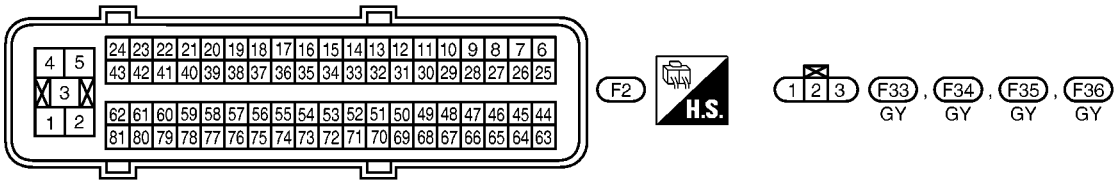
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

EC-IGNSYS-02

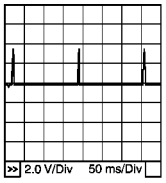
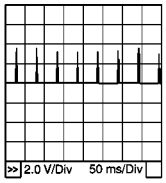




MBWA0297E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
60 61 79 80	Y PU G BR	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - 0.2V★  PBIB0522E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00OCK

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.
Is engine running?

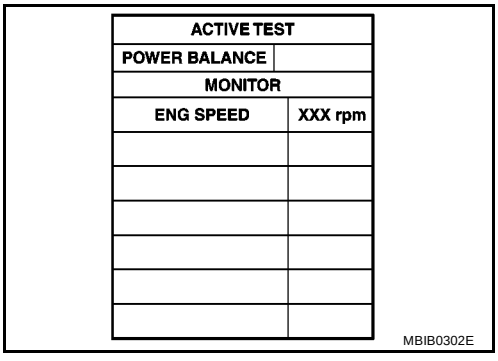
Yes or No

Yes (With CONSULT-II)>>GO TO 2.
Yes (Without CONSULT-II)>>GO TO 3.
No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-II

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
2. Make sure that each circuit produces a momentary engine speed drop.



OK or NG

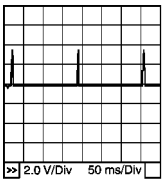
OK >> **INSPECTION END**
NG >> GO TO 9.

3. CHECK OVERALL FUNCTION

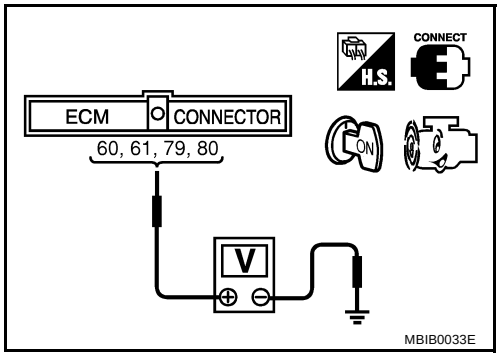
Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 60, 61, 79, 80 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown in the figure.

NOTE:
The pulse cycle changes depending on rpm at idle.



PBIB0521E



MBIB0033E

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

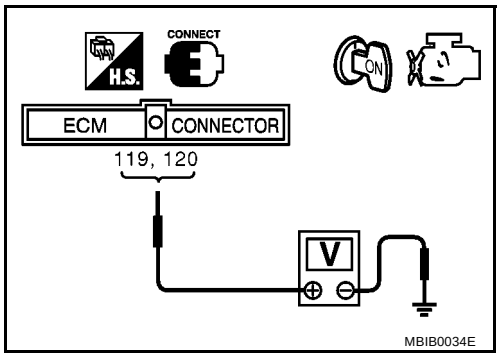
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Go to EC-125, "POWER SUPPLY CIRCUIT FOR ECM"
.



MBIB0034E

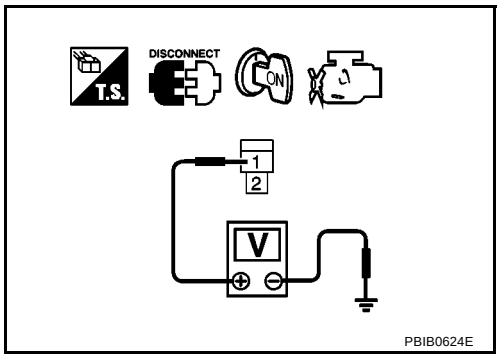
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.



PBIB0624E

6. DETECT MALFUNCTION PART

Check the following.

- IPDM E/R harness connector E14
- Harness connectors E50, F1
- Harness for open or short between IPDM E/R and condenser

>> Repair or replace

7. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser terminal 2 and ground. Refer to Wiring diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to power in harness or connector.

8. CHECK CONDENSER

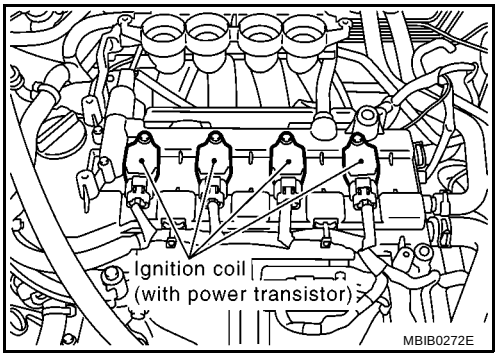
Refer to EC-442, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace condenser.

9. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.

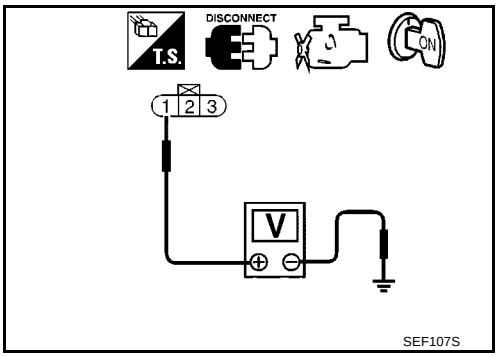


5. Check voltage between ignition coil terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.



10. DETECT MALFUNCTIONING PART

Check harness for open or short between ignition coil and IPDM E/R.

>> Repair or replace harness or connectors.

11. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to power in harness or connectors.

12. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 60, 61, 79, 80 and ignition coil terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-442, "Component Inspection" .

OK or NG

OK >> GO TO 14.
NG >> Replace ignition coil with power transistor.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

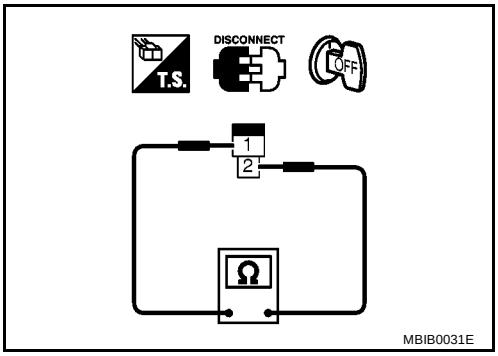
EBS00OCL

CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

3. Check resistance between condenser terminals 1 and 2.

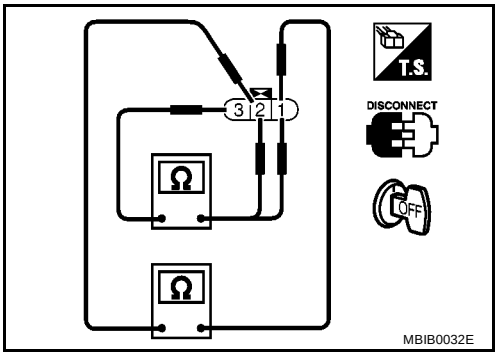
Resistance: Above 1 MΩ at 25°C (77°F)



IGNITION COIL WITH POWER TRANSISTOR

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance Ω [at 25°C (77°F)]
2 and 3	Except 0 or ∞
1 and 2	Except 0
1 and 3	



Removal and Installation

EBS00OCM

IGNITION COIL WITH POWER TRANSISTOR

Refer to EM-27, "IGNITION COIL" .

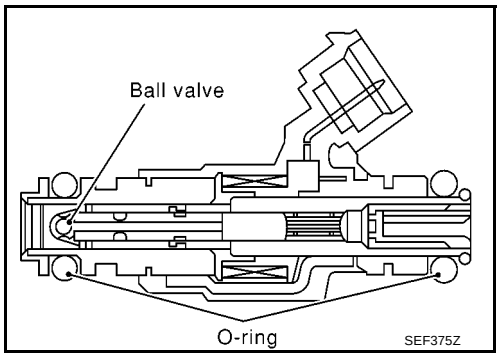
INJECTOR CIRCUIT

PFP:16600

Component Description

EBS00OCN

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OCO

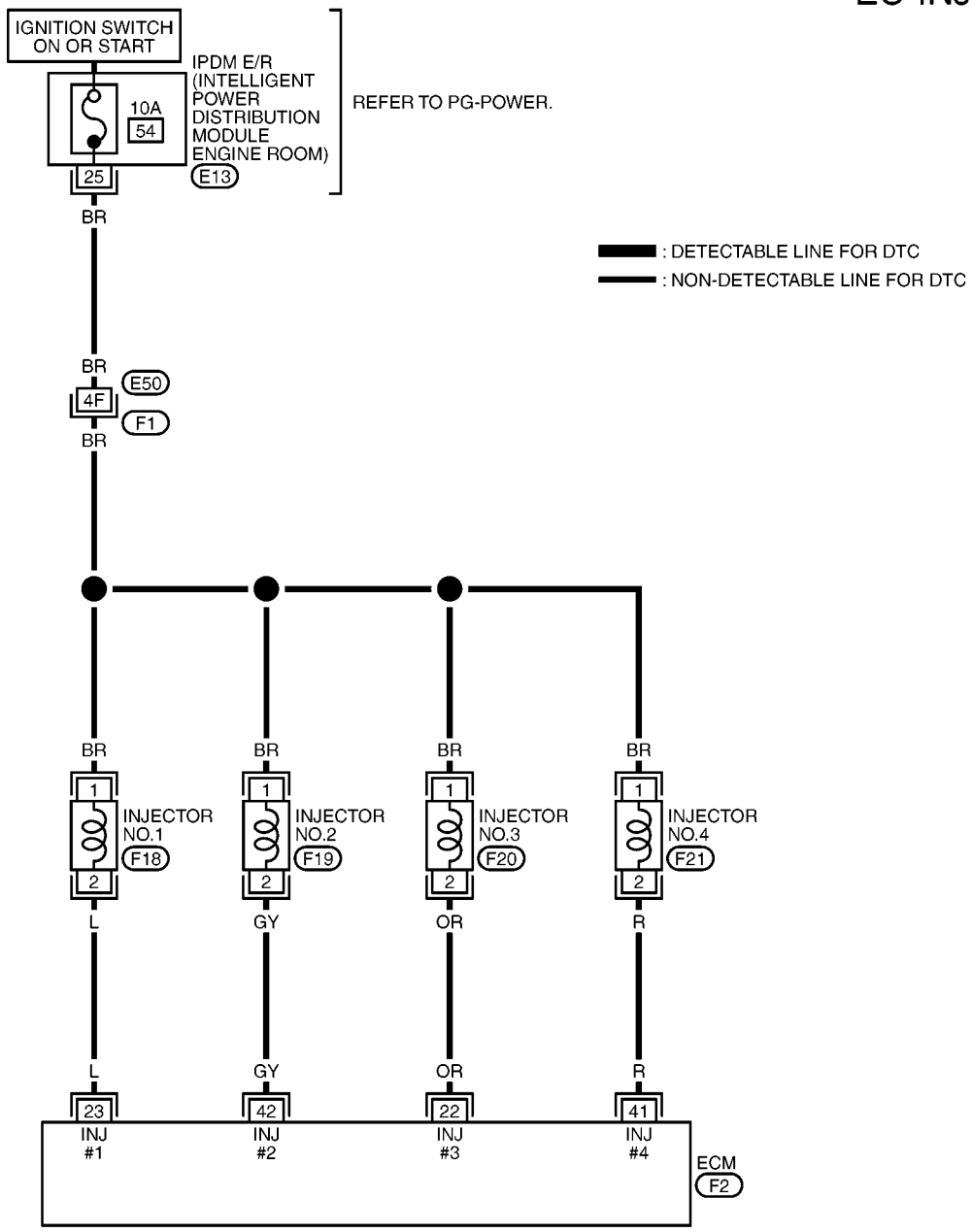
Specification data are reference values.

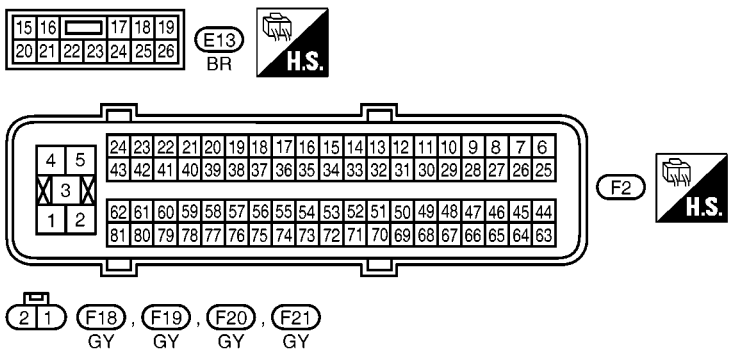
MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
INJ PULSE-B1	● Engine: After warming up ● Shift lever: N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

Wiring Diagram

EBS00OCP

EC-INJECT-01





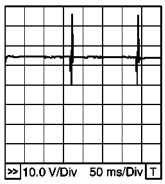
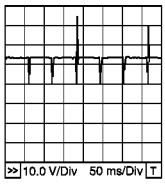
REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0298E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	OR L R GY	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00OCQ

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

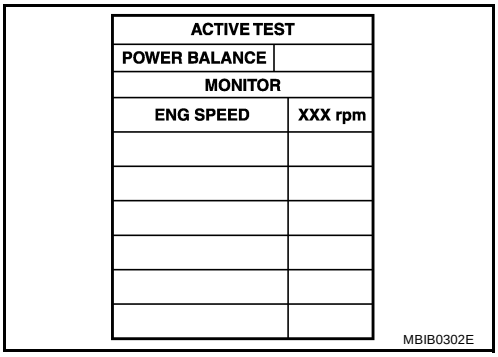
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK OVERALL FUNCTION

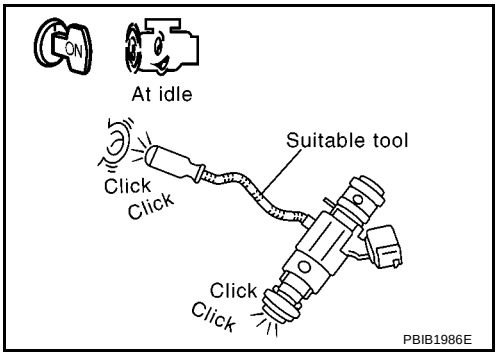
With CONSULT-II

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.
   Clicking noise should be heard.

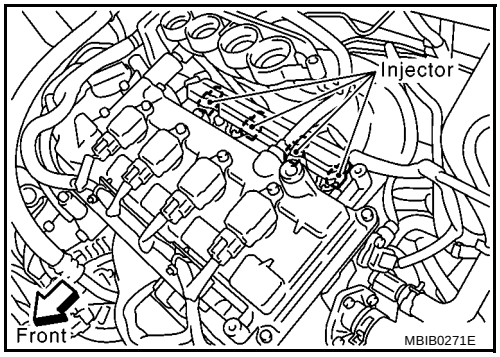


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect injector harness connector.
3. Turn ignition switch ON.

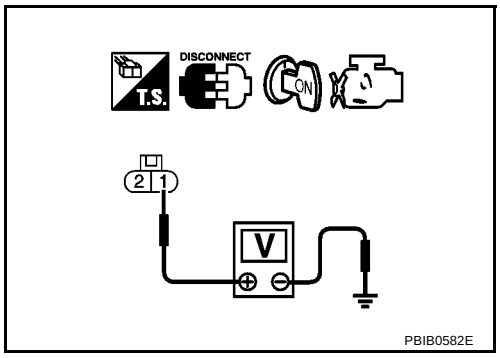


4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 22, 23, 41, 42. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK INJECTOR

Refer to EC-449, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace injector.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

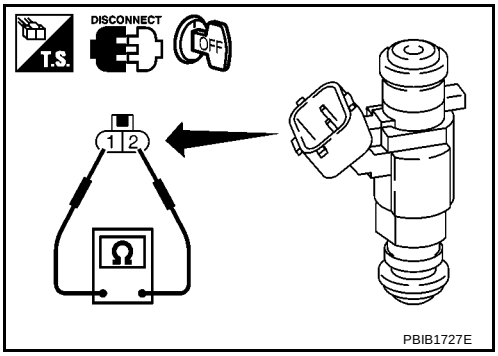
Component Inspection

EBS00OCR

INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 12.1 - 12.9Ω [at 20°C (68°F)]



Removal and Installation

EBS00OCS

INJECTOR

Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .

FUEL PUMP CIRCUIT

PFP:17042

Description

EBS00OCT

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

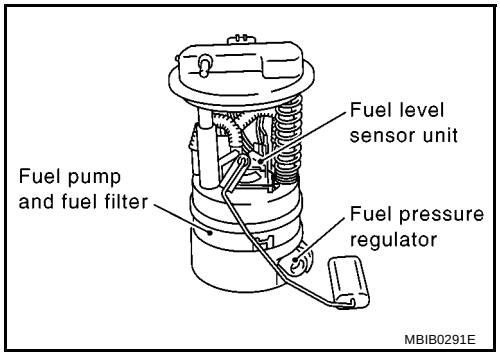
*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OCU

Specification data are reference values.

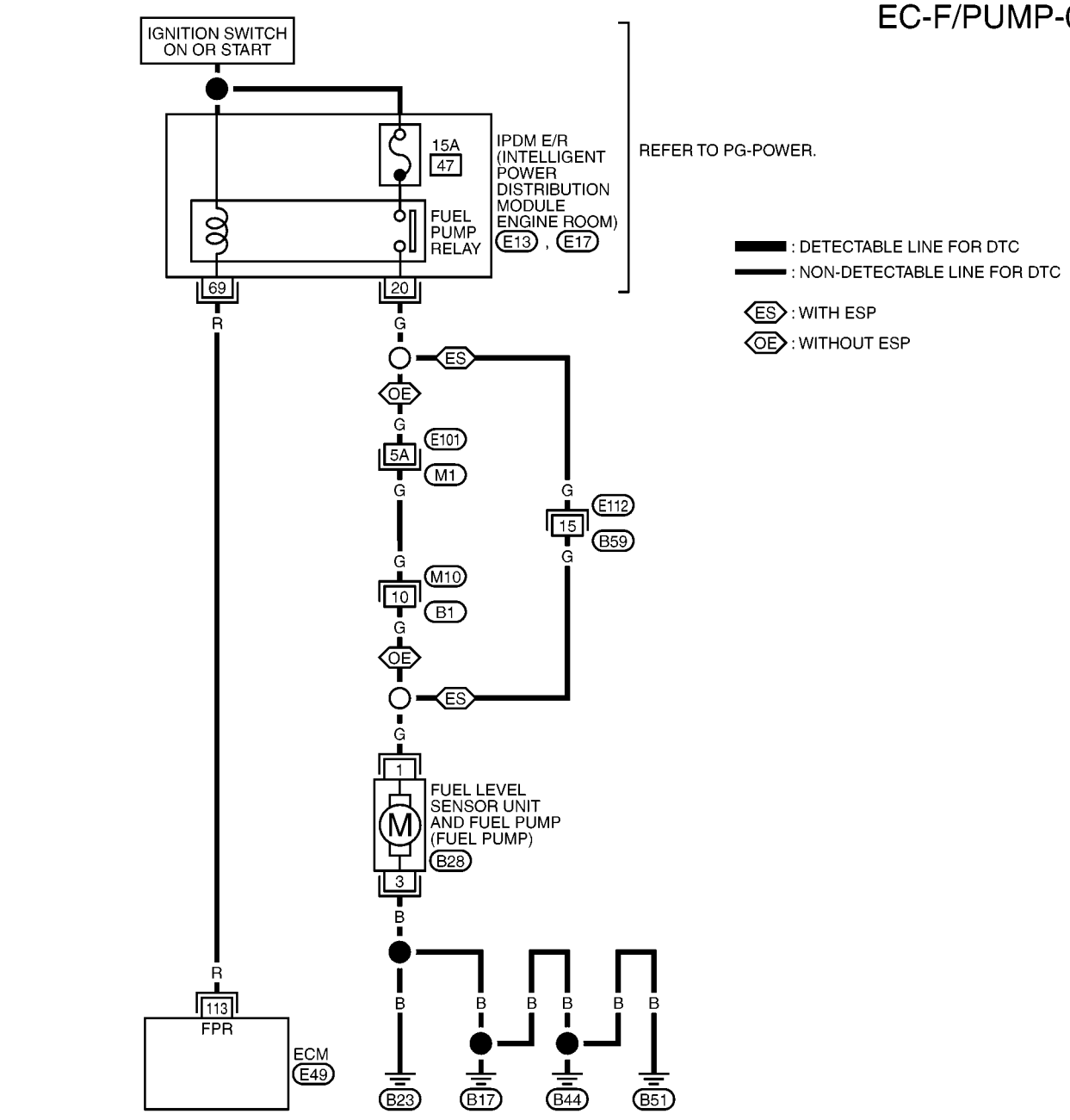
MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking	ON
	● Except above conditions	OFF

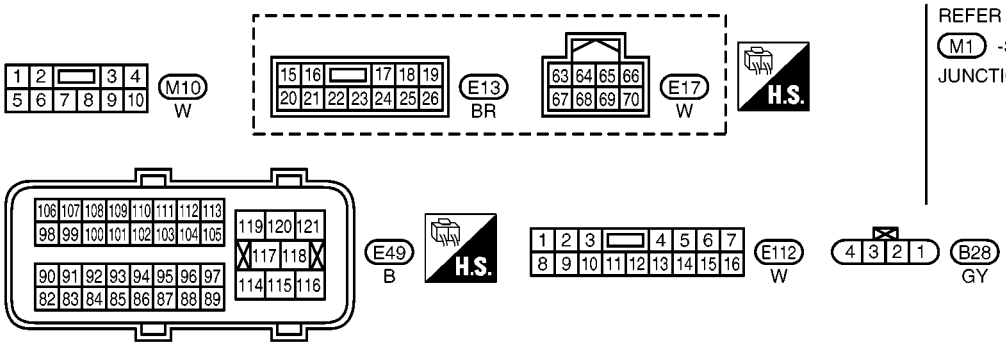
Wiring Diagram

SMA for VIN >SJN**AK12U1309269

EBS00OCV

EC-F/PUMP-01





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0575E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

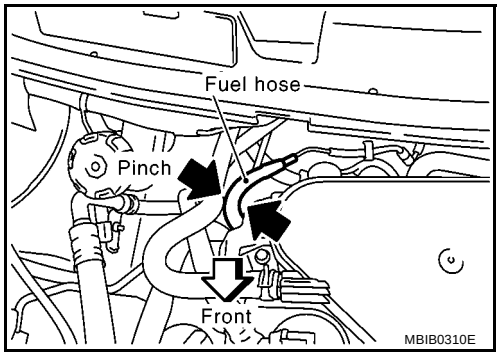
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	R	Fuel pump relay	**[Ignition switch ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

SMA for VIN >SJN**AK12U1309269 EBS00OCW

1. CHECK OVERALL FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.
   Fuel pressure pulsation should be felt on the fuel hose for 1 second after ignition switch is turned ON.



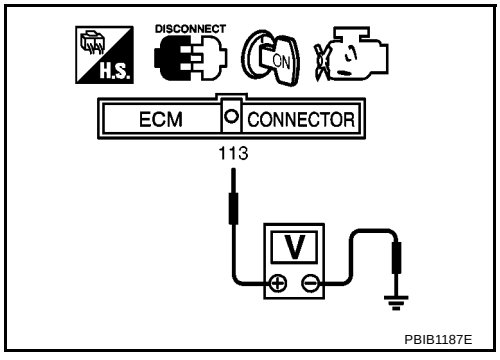
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 113 and ground with CONSULT-II or tester.

Voltage: Battery voltage



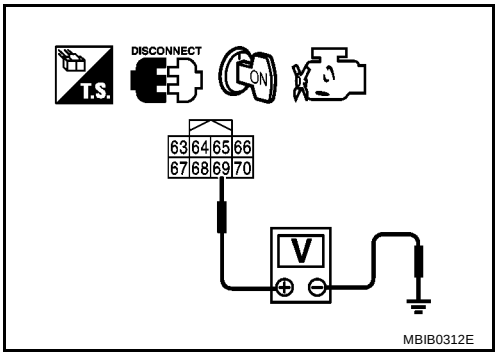
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E17.
3. Turn ignition switch ON.
4. Check voltage between IPDM E/R terminal 69 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 9.

4. DETECT MALFUNCTIONING PART

Check the following.

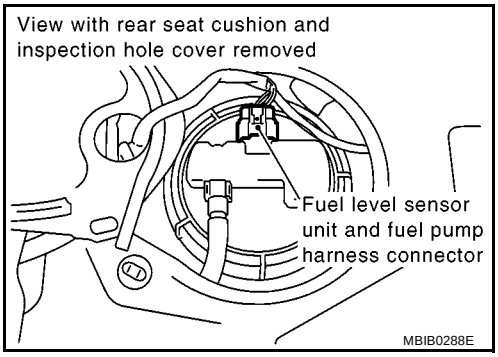
- IPDM E/R connector E17
- Harness for open or short between IPDM E/R and ECM

>> Repair harness or connectors.

5. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check harness continuity between PDM E/R connector E13 terminal 20 and “fuel level sensor unit and fuel pump” terminal 1, “fuel level sensor unit and fuel pump” terminal 3 and body ground.
   Refer to Wiring Diagram.

Continuity should exist.



4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B59, E112 (Models with ESP)
- Harness connectors M1, E101 (Models without ESP)
- Harness connectors B1, M10 (Models without ESP)
- Harness for open or short between “fuel level sensor unit and fuel pump” and IPDM E/R
- Harness for open or short between “fuel level sensor unit and fuel pump” and body ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 113 and IPDM E/R connector E1 terminal 69. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open or short between ECM and IPDM E/R.

8. CHECK FUEL PUMP

Refer to EC-454, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace fuel pump.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R
NG >> Repair or replace harness or connector
>> **INSPECTION END**

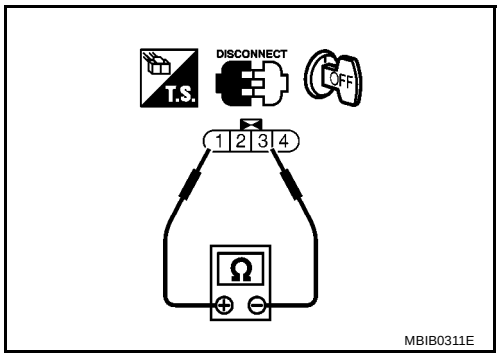
Component Inspection

EBS00OCX

FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check resistance between “fuel level sensor unit and fuel pump” terminals 1 and 3.

Resistance: Approximately 1.0Ω [at 25°C (77°F)]



MBIB0311E

Removal and Installation

EBS00OCY

FUEL PUMP

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

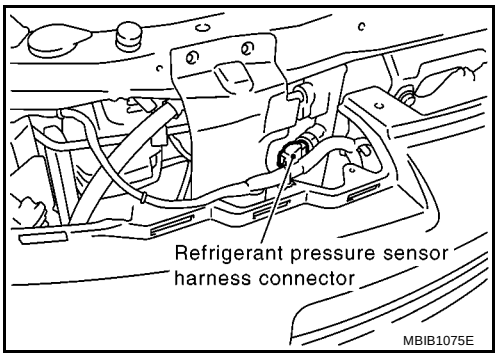
REFRIGERANT PRESSURE SENSOR

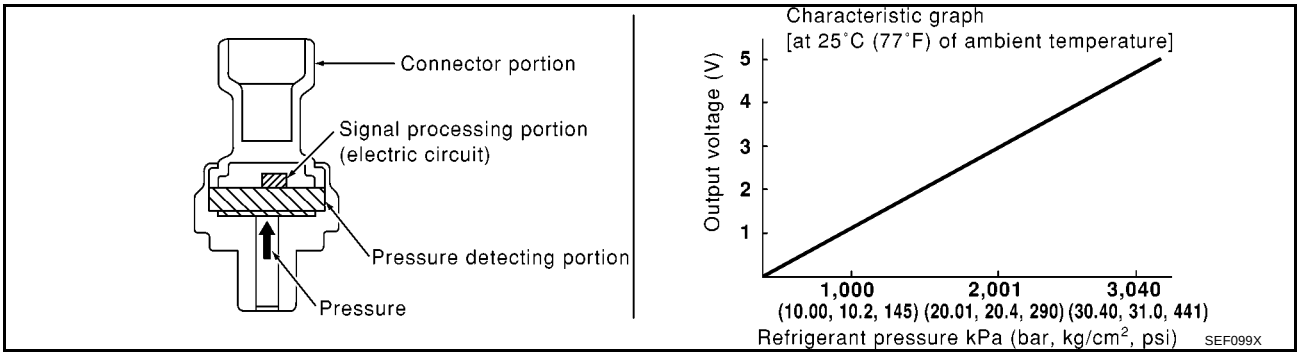
PFP:92136

Component Description

EBS00OCZ

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

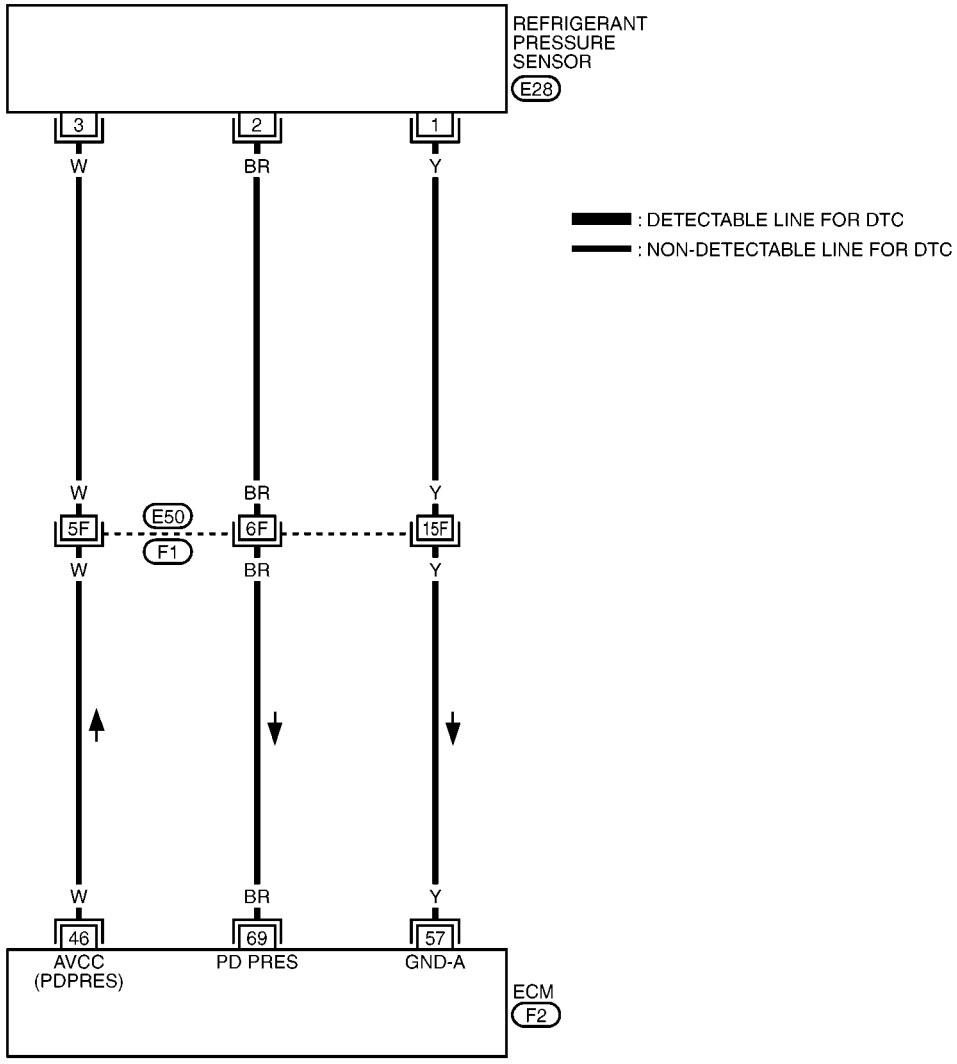


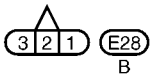


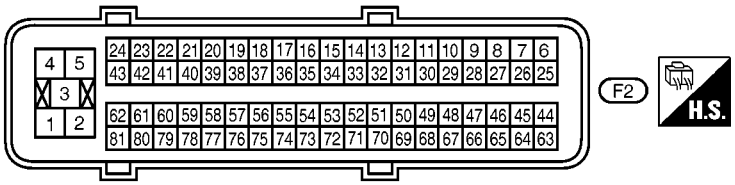
Wiring Diagram

EBS00OD0

EC-RP/SEN-01







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0300E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
46	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch ON]**	Approximately 5V
57	Y	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
69	BR	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are ON. (Compressor operates.)	1.0 - 4.0V

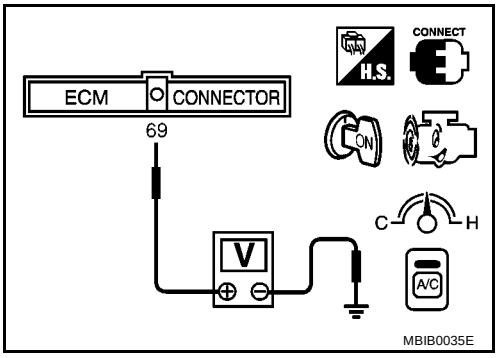
Diagnostic Procedure

EBS00OD1

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch ON.
3. Check voltage between ECM terminal 69 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

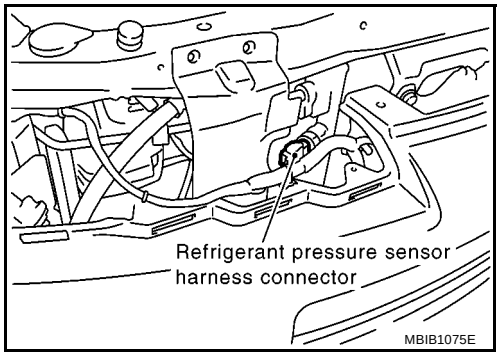


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

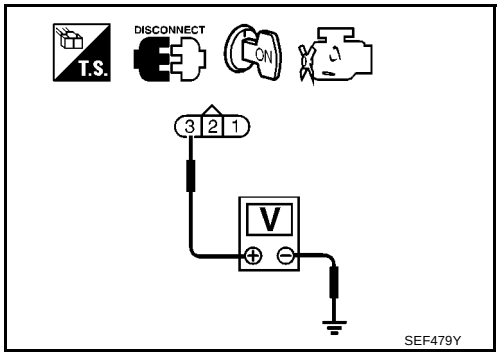
2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch OFF.
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch ON.



5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 57 and refrigerant pressure sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 69 and refrigerant pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-124, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace refrigerant pressure sensor.
NG >> Repair or replace.

Removal and Installation

EBS00OD2

REFRIGERANT PRESSURE SENSOR

Refer to ATC-84, "REFRIGERANT LINES" (Automatic air conditioner models) or MTC-61, "REFRIGERANT LINES" (Manual air conditioner models).

ELECTRICAL LOAD SIGNAL

PFP:25350

Description

EBS00OD3

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from IPDM E/R to ECM.

CONSULT-II Reference Value in Data Monitor Mode

EBS00OD4

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF

Diagnostic Procedure

EBS00OD5

1. INSECTION START

Do you have CONSULT-II?

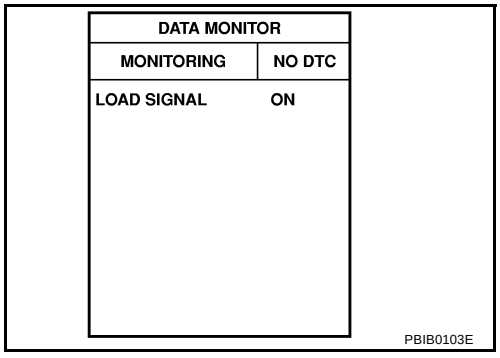
Yes or No

Yes >> GO TO 2.
No >> GO TO 6.

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Connect CONSULT-II and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Condition	Indication
Rear window defogger switch ON	ON
Rear window defogger switch OFF	OFF



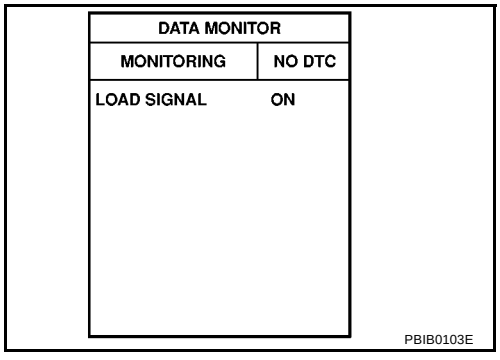
OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check “LOAD SIGNAL” indication under the following conditions.

Condition	Indication
Lighting switch ON at 2nd position	ON
Lighting switch OFF	OFF



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

4. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to GW-14, "REAR WINDOW DEFOGGER" .

>> **INSPECTION END**

5. CHECK HEADLAMP SYSTEM

Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" or LT-42, "HEADLAMP - DAYTIME LIGHT SYSTEM - " .

>> **INSPECTION END**

6. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to GW-14, "REAR WINDOW DEFOGGER" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace

7. CHECK HEADLAMP SYSTEM

Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" or LT-42, "HEADLAMP - DAYTIME LIGHT SYSTEM - " .

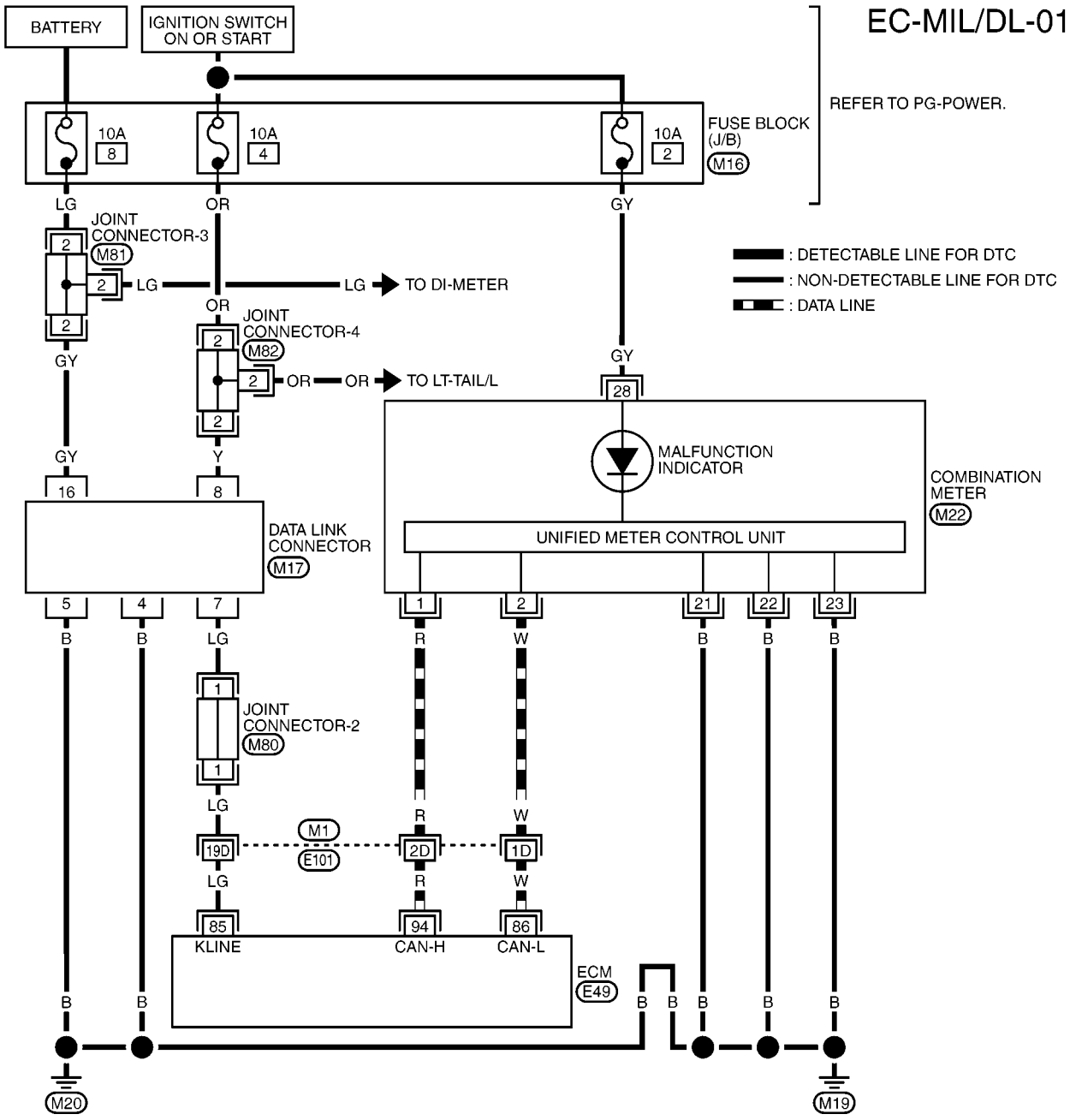
>> **INSPECTION END**

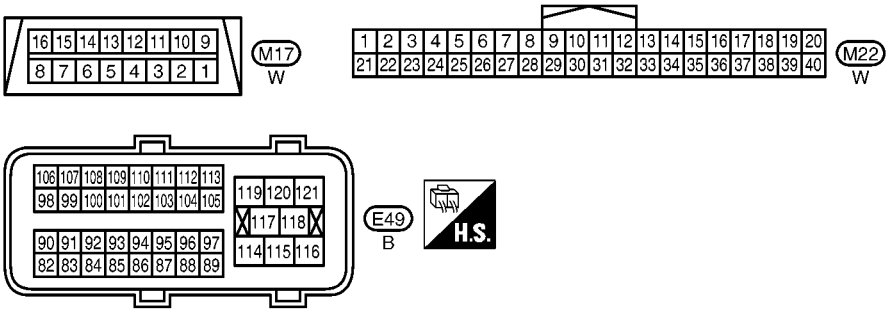
MI & DATA LINK CONNECTORS

PFP:24814

Wiring Diagram (LHD Models)

EBS00OD6



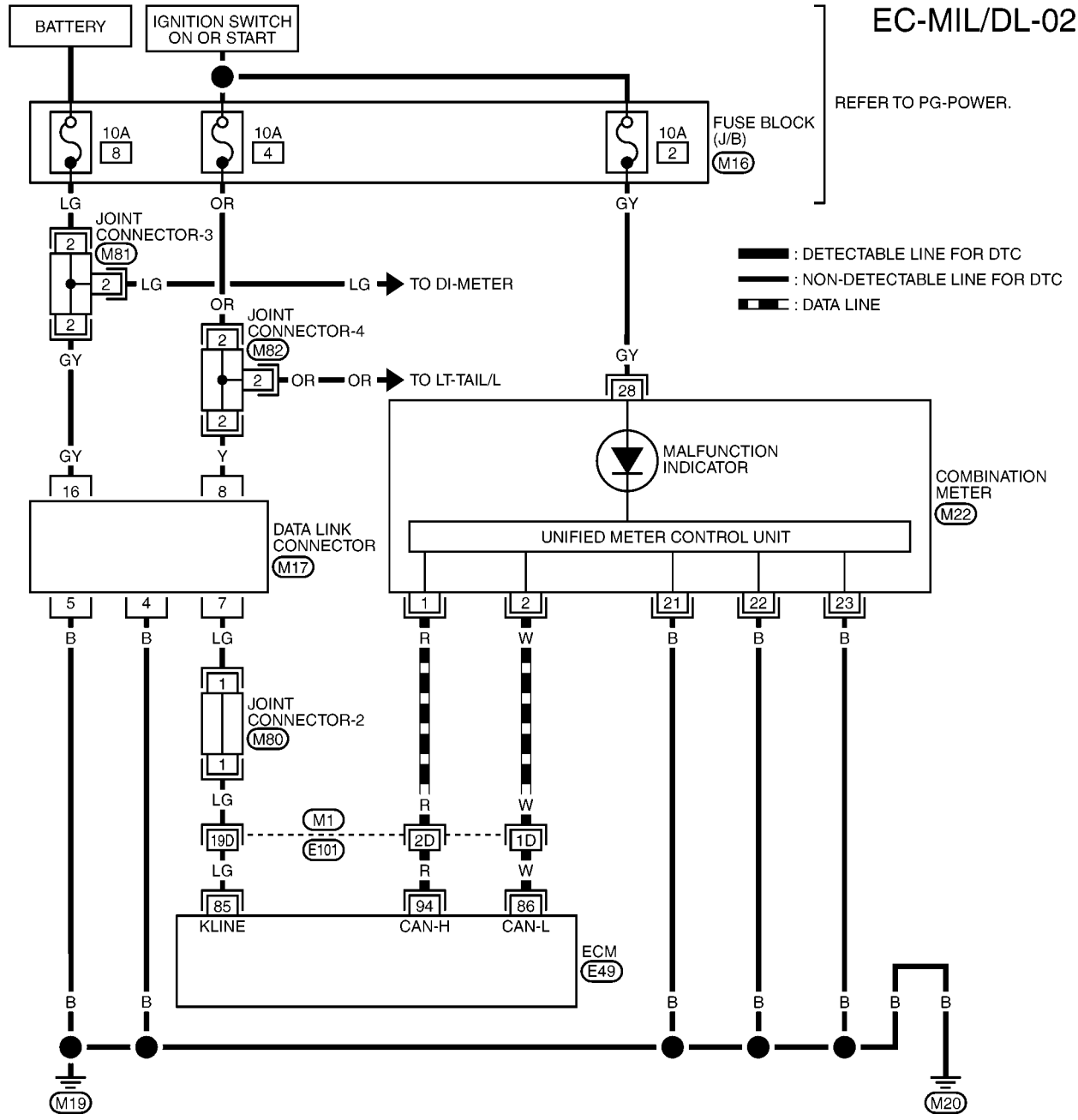


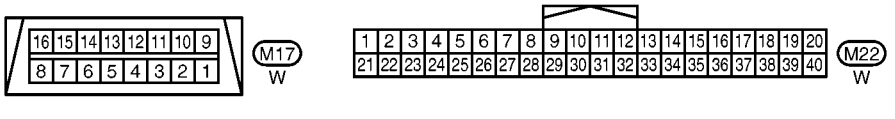
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M80 , M81 , M82 -JOINT CONNECTOR (J/C)

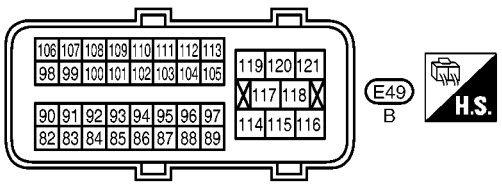
MBWA0576E

Wiring Diagram (RHD Models)

EBS00OD7







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M80, M81, M82 -JOINT CONNECTOR (J/C)

MBWA0577E

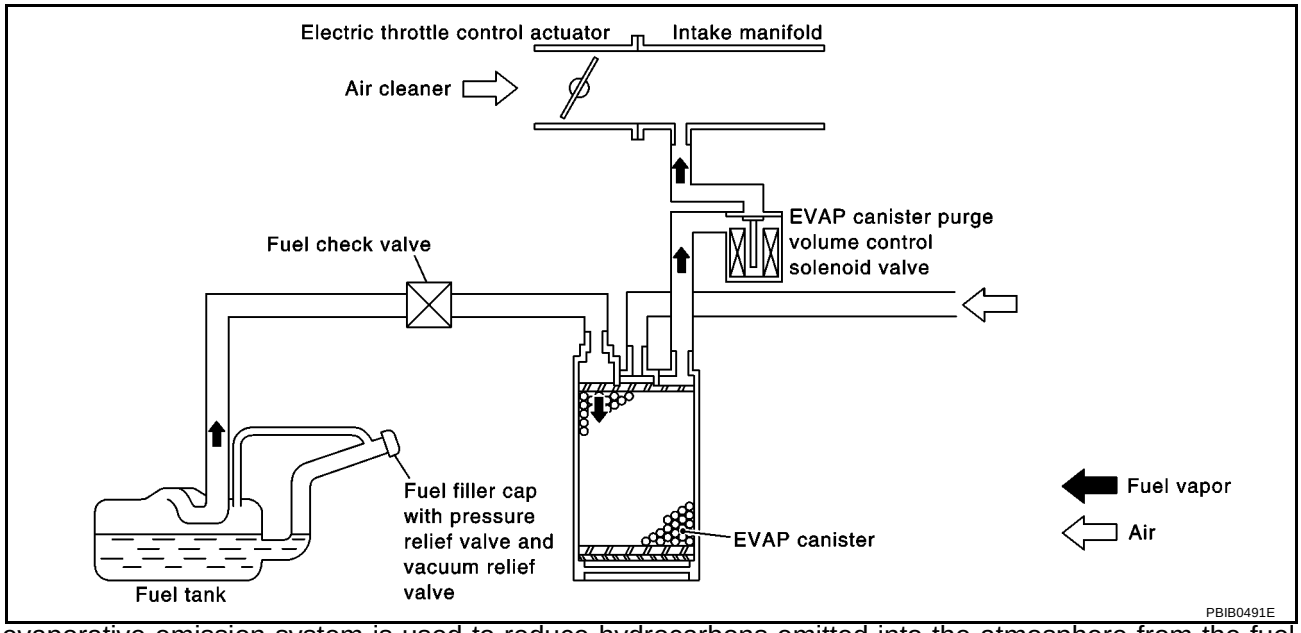
EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description

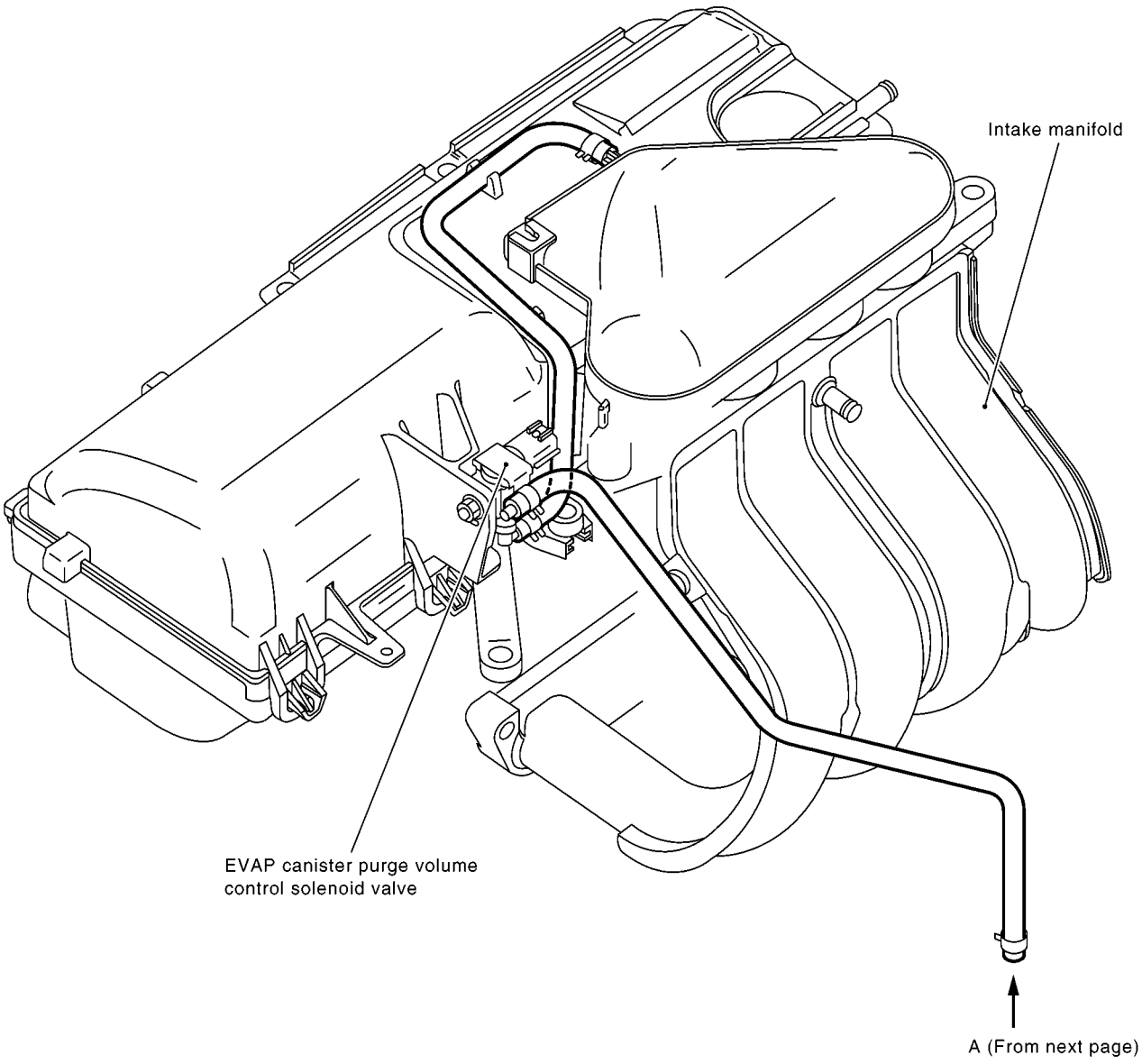
EBS00OD8

SYSTEM DESCRIPTION



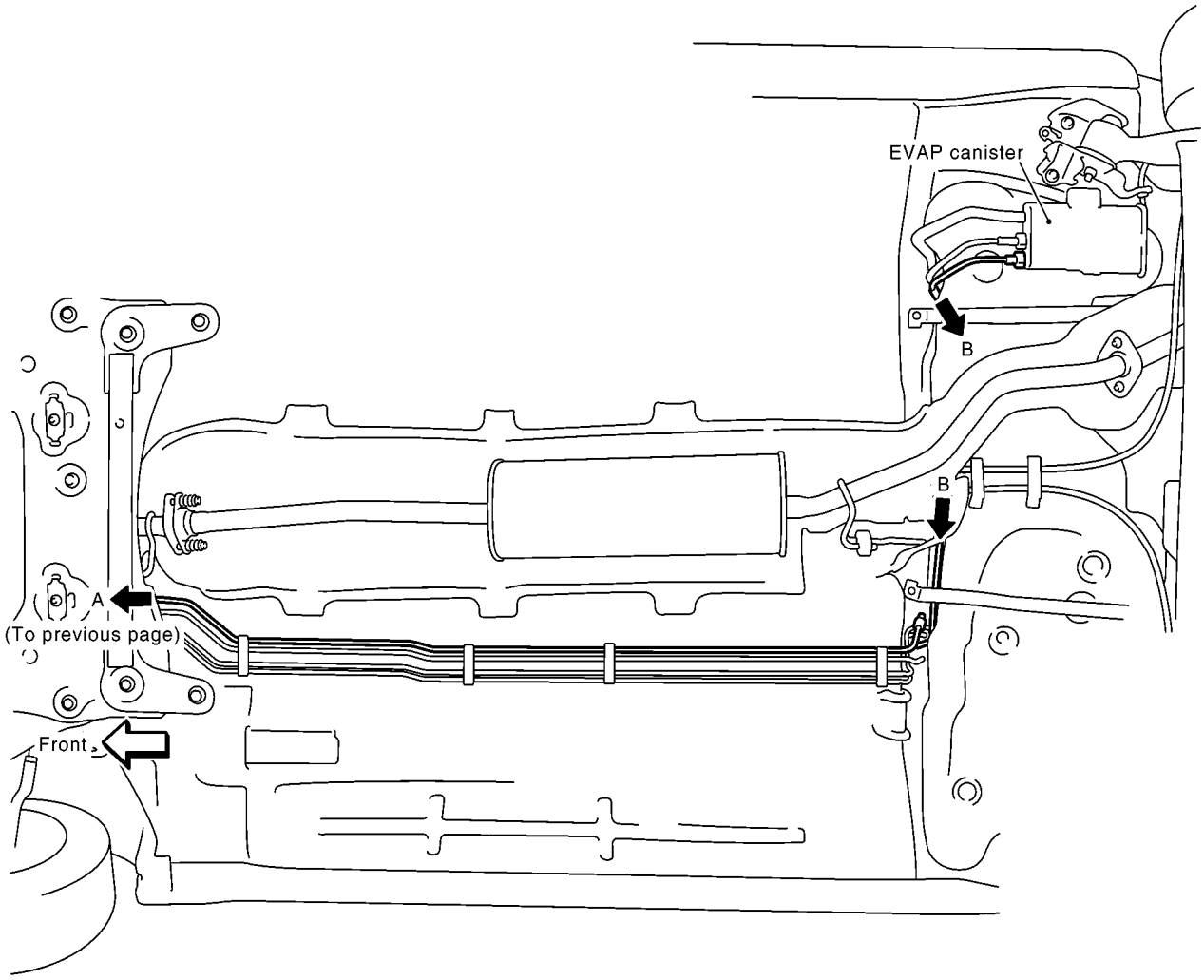
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION LINE DRAWING



NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

MBIB0544E



MBIB0541E

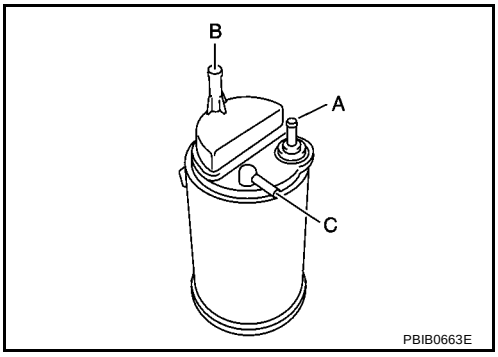
Component Inspection

EBS00OD9

EVAP CANISTER

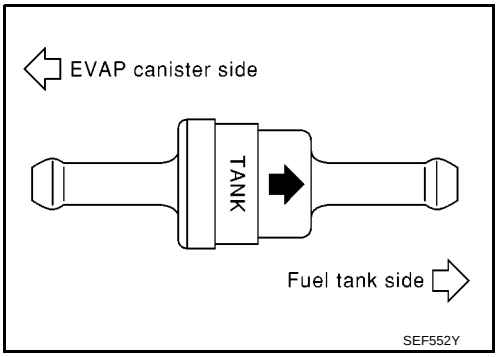
Check EVAP canister as follows:

1. Block port **B** . Orally blow air through port **A** . Check that air flows freely through port **C** .
2. Block port **A** . Orally blow air through port **B** . Check that air flows freely through port **C** .



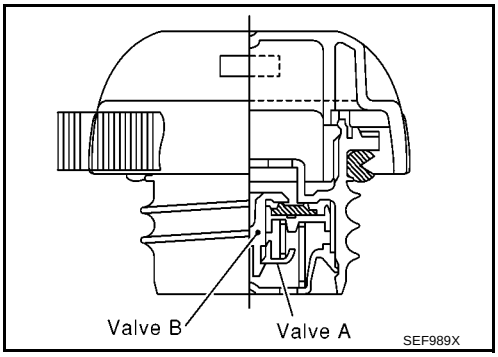
FUEL CHECK VALVE

1. Blow air through connector on fuel tank side. A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.
2. Blow air through connector on EVAP canister side. Air flow should be smoothly directed toward fuel tank side.
3. If fuel check valve is suspected of not properly functioning in steps 1 and 2 above, replace it.



FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

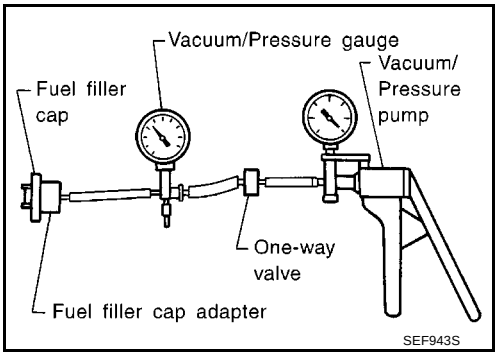
1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

Pressure:	**15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2 , 2.22 - 2.90 psi)**
Vacuum:	**–6.0 to –3.4 kPa (–0.060 to –0.034 bar, –0.061 to –0.035 kg/cm^2 , –0.87 to –0.49 psi)**

3. If out of specification, replace fuel filler cap as an assembly.



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-283, "Component Inspection" .

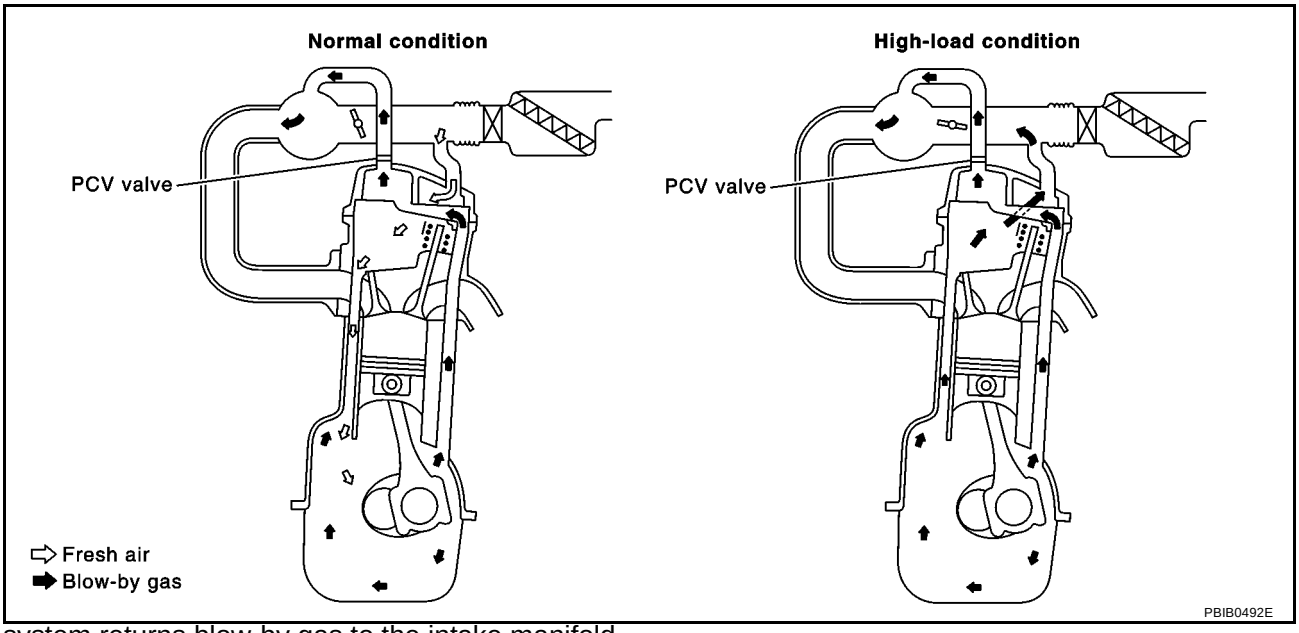
POSITIVE CRANKCASE VENTILATION

PFP:11810

Description

EBS00ODA

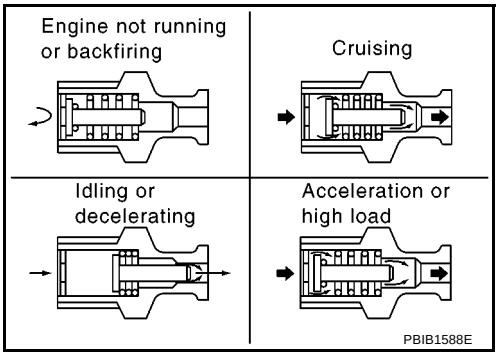
SYSTEM DESCRIPTION



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

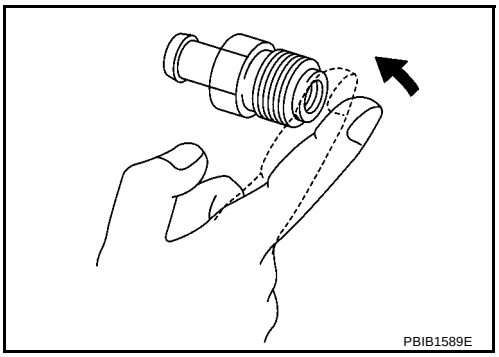


Component Inspection

EBS00ODB

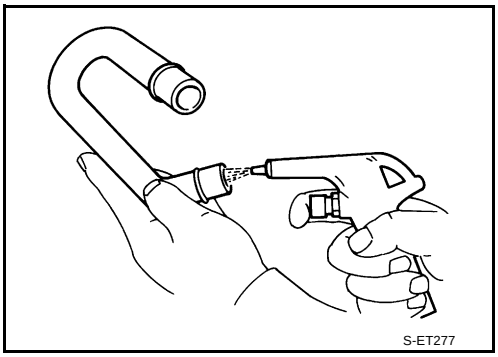
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

EBS00ODC

Fuel pressure at idle	Approximately 350 kPa (3.5bar, 3.57kg/cm^2 , 51psi)

Idle Speed and Ignition Timing

EBS00ODD

Target idle speed	No load*1 (in P or N position)	M/T: 650±50 rpm A/T: 700±50 rpm
Ignition timing	In P or N position	5°±2° BTDC

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

EBS00ODE

Condition	Calculated load value% (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Manifold absolute pressure sensor

EBS00ODF

Supply voltage	Approximately 5.0V
Output voltage at idle	1.4 - 1.5 V*

*: Engine is warmed up to normal operating temperature and running under no-load.

Intake Air Temperature Sensor

EBS00ODG

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

Engine Coolant Temperature Sensor

EBS00ODH

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Heated Oxygen Sensor 1 Heater

EBS00ODI

Resistance [at 25°C (77°F)]	3.3 - 4.0Ω

Heated Oxygen sensor 2 Heater

EBS00ODJ

Resistance [at 25°C (77°F)]	3.3 - 4.0Ω

Crankshaft Position Sensor (POS)

EBS00ODK

Refer to EC-265, "Component Inspection" .

Camshaft Position Sensor (PHASE)

EBS00ODL

Refer to EC-271, "Component Inspection" .

Throttle Control Motor

EBS00ODM

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω

Injector

EBS00ODN

Resistance [at 20°C (68°F)]	12.1 - 12.9Ω

Fuel Pump

EBS00ODO

Resistance [at 25°C (77°F)]	Approximately 1.0Ω

INDEX FOR DTC

PFP:00024

Alphabetical Index

EBS00OJR

Check if the vehicle is a model with Euro-OBD (E-OBD) system or not by the “Type approval number” on the identification plate. Refer to GI-44, "IDENTIFICATION INFORMATION" .

NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-572, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

Items (CONSULT-II screen terms)	DTC*1		Trip	MI lighting up	Reference page
	CONSULT-II*2	ECM*3			
ABSL PRES SEN/CIRC	P0107	0107	2	×	EC-575
ABSL PRES SEN/CIRC	P0108	0108	2	×	EC-575
APP SEN 1/CIRC	P0227	0227	1	×	EC-630
APP SEN 1/CIRC	P0228	0228	1	×	EC-630
APP SEN 1/CIRC	P2122	2122	1	×	EC-733
APP SEN 1/CIRC	P2123	2123	1	×	EC-733
APP SEN 2/CIRC	P1227	1227	1	×	EC-713
APP SEN 2/CIRC	P1228	1228	1	×	EC-713
APP SEN 2/CIRC	P2127	2127	1	×	EC-742
APP SEN 2/CIRC	P2128	2128	1	×	EC-742
APP SENSOR	P0226	0226	1	×	EC-621
APP SENSOR	P2138	2138	1	×	EC-757
BRAKE SW/CIRCUIT	P1805	1805	1	×	EC-726
CAN COMM CIRCUIT	U1000	1000*5	2	—	EC-572
CAN COMM CIRCUIT	U1001	1001*5	2	—	EC-572
CKP SEN/CIRCUIT	P0335	0335	2	×	EC-643
CMP SEN/CIRC-B1	P0340	0340	2	×	EC-650
CTP LEARNING	P1225	1225	2	—	EC-709
CTP LEARNING	P1226	1226	2	—	EC-711
ECM	P0605	0605	1 or 2	× or —	EC-657
ECM BACK UP/CIRC	P1065	1065	2	×	EC-660
ECT SEN/CIRCUIT	P0117	0117	2	×	EC-580
ECT SEN/CIRCUIT	P0118	0118	2	×	EC-580
ENG OVER TEMP	P1217	1217	1	×	EC-689
ETC ACTR	P1121	1121	1	×	EC-664
ETC FUNCTION/CIRC	P1122	1122	1	×	EC-667
ETC MOT	P1128	1128	1	×	EC-678
ETC MOT PWR	P1124	1124	1	×	EC-673
ETC MOT PWR	P1126	1126	1	×	EC-673
HO2S1 (B1)	P0132	0132	2	×	EC-591
HO2S1 (B1)	P0134	0134	2	×	EC-597
HO2S2 (B1)	P0138	0138	2	×	EC-603
INTAKE ERROR	P1171	1171	1	×	EC-683
KNOCK SEN/CIRC-B1	P0327	0327	2	—	EC-639
KNOCK SEN/CIRC-B1	P0328	0328	2	—	EC-639
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	2	—	EC-511

Items (CONSULT-II screen terms)	DTC*1		Trip	MI lighting up	Reference page
	CONSULT-II*2	ECM*3			
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*4	—	Flashing*4	EC-512
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	—	—	—
SENSOR POWER/CIRC	P1229	1229	1	×	EC-722
TCS C/U FUNCTN	P1211	1211	2	—	EC-687
TCS/CIRC	P1212	1212	2	—	EC-688
TP SEN 1/CIRC	P0222	0222	1	×	EC-615
TP SEN 1/CIRC	P0223	0223	1	×	EC-615
TP SEN 2/CIRC	P0122	0122	1	×	EC-585
TP SEN 2/CIRC	P0123	0123	1	×	EC-585
TP SEN 2/CIRC	P1223	1223	1	×	EC-703
TP SEN 2/CIRC	P1224	1224	1	×	EC-703
TP SENSOR	P0221	0221	1	×	EC-609
TP SENSOR	P2135	2135	1	×	EC-751

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by ISO 15031-5.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: When engine is running.
*5: The troubleshooting for this DTC needs CONSULT-II.

DTC No. Index

EBS00OJS

NOTE:
If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-572, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

DTC*1		Items (CONSULT-II screen terms)	Trip	MI lighting up	Reference page
CONSULT-II*2	ECM*3				
No DTC	Flashing*4	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	Flashing*4	EC-512
U1000	1000*5	CAN COMM CIRCUIT	2	—	EC-572
U1001	1001*5	CAN COMM CIRCUIT	2	—	EC-572
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—	—	—
P0107	0107	ABSL PRES SEN/CIRC	2	×	EC-575
P0108	0108	ABSL PRES SEN/CIRC	2	×	EC-575
P0117	0117	ECT SEN/CIRCUIT	2	×	EC-580
P0118	0118	ECT SEN/CIRCUIT	2	×	EC-580
P0122	0122	TP SEN 2/CIRC	1	×	EC-585
P0123	0123	TP SEN 2/CIRC	1	×	EC-585
P0132	0132	HO2S1 (B1)	2	×	EC-591
P0134	0134	HO2S1 (B1)	2	×	EC-597
P0138	0138	HO2S2 (B1)	2	×	EC-603
P0221	0221	TP SENSOR	1	×	EC-609
P0222	0222	TP SEN 1/CIRC	1	×	EC-615
P0223	0223	TP SEN 1/CIRC	1	×	EC-615
P0226	0226	APP SENSOR	1	×	EC-621
P0227	0227	APP SEN 1/CIRC	1	×	EC-630
P0228	0228	APP SEN 1/CIRC	1	×	EC-630
P0327	0327	KNOCK SEN/CIRC-B1	2	—	EC-639
P0328	0328	KNOCK SEN/CIRC-B1	2	—	EC-639
P0335	0335	CKP SEN/CIRCUIT	2	×	EC-643
P0340	0340	CMP SEN/CIRC-B1	2	×	EC-650
P0605	0605	ECM	1 or 2	× or —	EC-657
P1065	1065	ECM BACK UP/CIRC	2	×	EC-660
P1121	1121	ETC ACTR	1	×	EC-664
P1122	1122	ETC FUNCTION/CIRC	1	×	EC-667
P1124	1124	ETC MOT PWR	1	×	EC-673
P1126	1126	ETC MOT PWR	1	×	EC-673
P1128	1128	ETC MOT	1	×	EC-678
P1171	1171	INTAKE ERROR	1	×	EC-683
P1211	1211	TCS C/U FUNCTN	2	—	EC-687
P1212	1212	TCS/CIRC	2	—	EC-688
P1217	1217	ENG OVER TEMP	1	×	EC-689
P1223	1223	TP SEN 2/CIRC	1	×	EC-703
P1224	1224	TP SEN 2/CIRC	1	×	EC-703

DTC*1		Items (CONSULT-II screen terms)	Trip	MI lighting up	Reference page
CONSULT-II*2	ECM*3				
P1225	1225	CTP LEARNING	2	—	EC-709
P1226	1226	CTP LEARNING	2	—	EC-711
P1227	1227	APP SEN 2/CIRC	1	×	EC-713
P1228	1228	APP SEN 2/CIRC	1	×	EC-713
P1229	1229	SENSOR POWER/CIRC	1	×	EC-722
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	2	—	EC-511
P1805	1805	BRAKE SW/CIRCUIT	1	×	EC-726
P2122	2122	APP SEN 1/CIRC	1	×	EC-733
P2123	2123	APP SEN 1/CIRC	1	×	EC-733
P2127	2127	APP SEN 2/CIRC	1	×	EC-742
P2128	2128	APP SEN 2/CIRC	1	×	EC-742
P2135	2135	TP SENSOR	1	×	EC-751
P2138	2138	APP SENSOR	1	×	EC-757

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by ISO 15031-5.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: When engine is running.
*5: The troubleshooting for this DTC needs CONSULT-II.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EBS00OS4

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EBS011UT

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

On Board Diagnostic (OBD) System of Engine and A/T

EBS00OJU

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MI) to warn the driver of a malfunction causing emission deterioration.

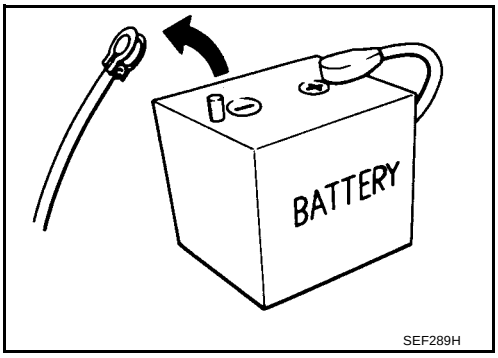
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-99, "HARNESS CONNECTOR" .**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MI to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MI to light up due to the malfunction of the fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM.**

Precaution

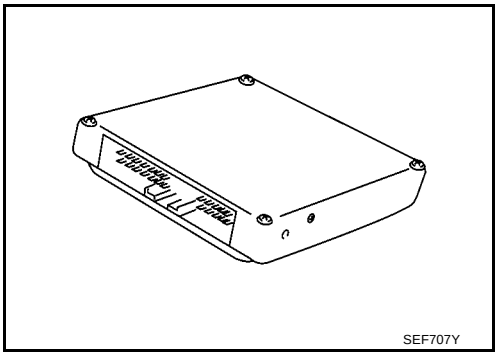
EBS00OJV

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect battery ground cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

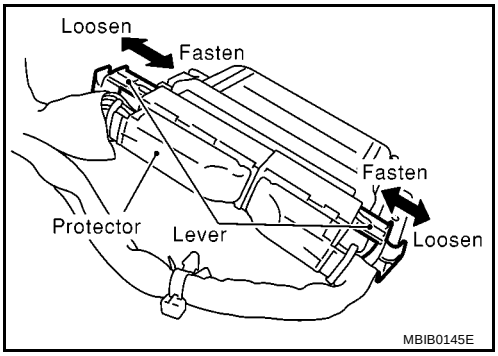


SEF289H

- **Do not disassemble ECM.**
- **If battery cable is disconnected, the memory will return to the initial ECM values.**
  The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.

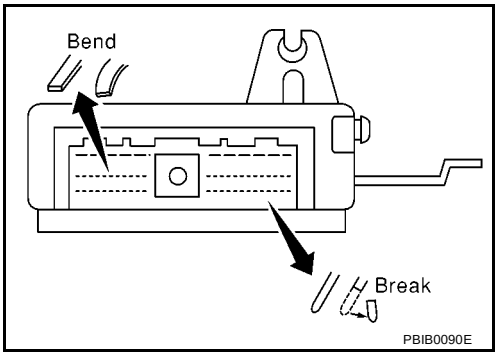

SEF707Y

- **When connecting ECM harness connector, fasten it securely with levers as far as they will go as shown in the figure.**



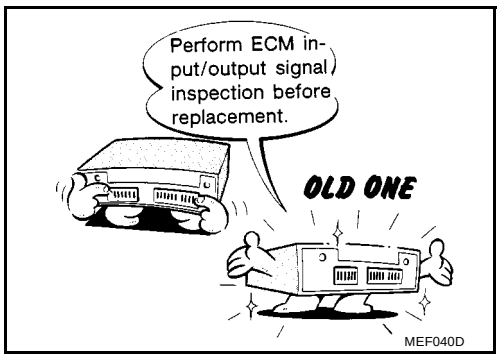
MBIB0145E

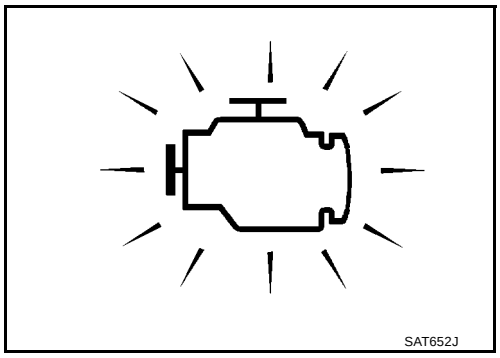
- **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.
- **Securely connect ECM harness connectors.**
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- **Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.**
- **Keep engine control system parts and harness dry.**



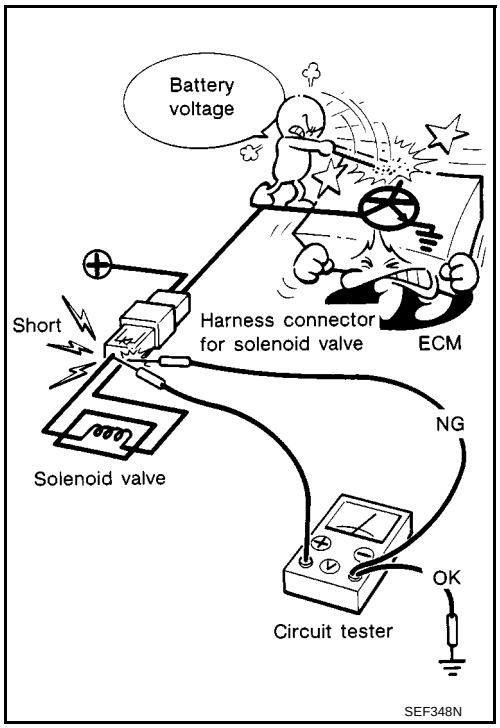
PBIB0090E

- **Before replacing ECM, perform ECM Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-539, "ECM Terminals and Reference Value" .**
- **Handle manifold absolute pressure sensor carefully to avoid damage.**
- **Do not clean air clear element with any type of detergent.**
- **Do not disassemble electric throttle control actuator.**
- **Even a slight leak in the air intake system can cause serious incidents.**
- **Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).**
- **After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check.**
  The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.

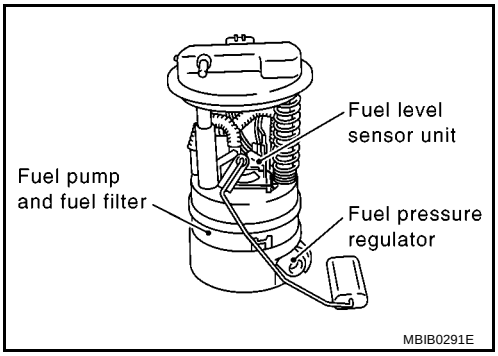




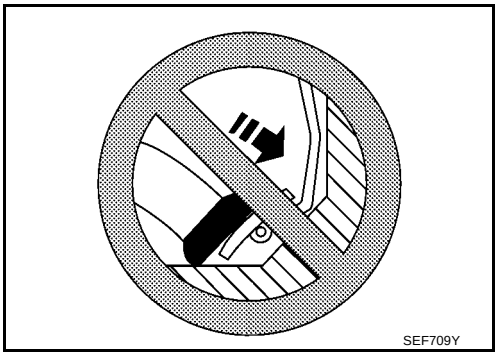
- **When measuring ECM signals with a circuit tester, connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.**
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**



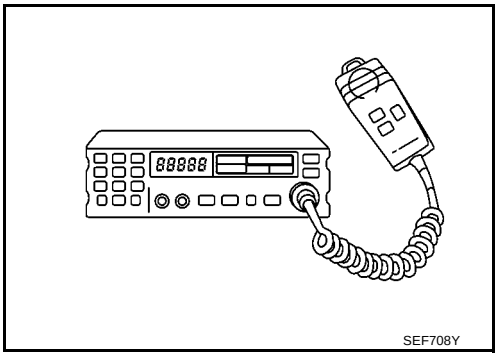
- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**



- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**



- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
  - **Keep the antenna as far as possible from the electronic control units.**
  - **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
    Do not let them run parallel for a long distance.
  - **Adjust the antenna and feeder line so that the standing-wave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**



Wiring Diagrams and Trouble Diagnosis

EBS00OJW

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

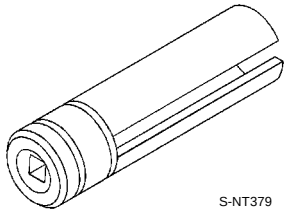
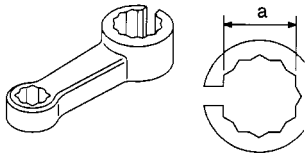
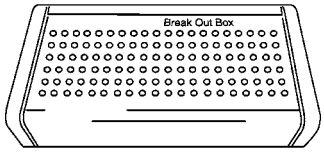
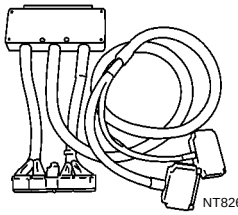
- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"

PREPARATION

PFP:00002

Special Service Tools

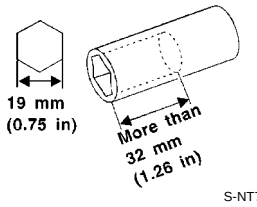
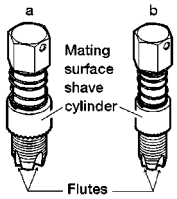
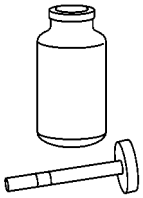
EBS00OJX

Tool number Tool name	Description	
KV10117100 Heated oxygen sensor wrench	 S-NT379	Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 Heated oxygen sensor wrench	 S-NT636	Loosening or tightening heated oxygen sensors **a: 22 mm (0.87 in)**
KV109E0010 Break-out box	 NT825	Measuring ECM signals with a circuit tester
KV109E0080 Y-cable adapter	 NT826	Measuring ECM signals with a circuit tester

Commercial Service Tools

EBS00OJY

Tool name	Description	
Quick connector release	 PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG: Part No. 16441 6N210)
Fuel filler cap adapter	 S-NT653	Checking fuel tank vacuum relief valve opening pressure

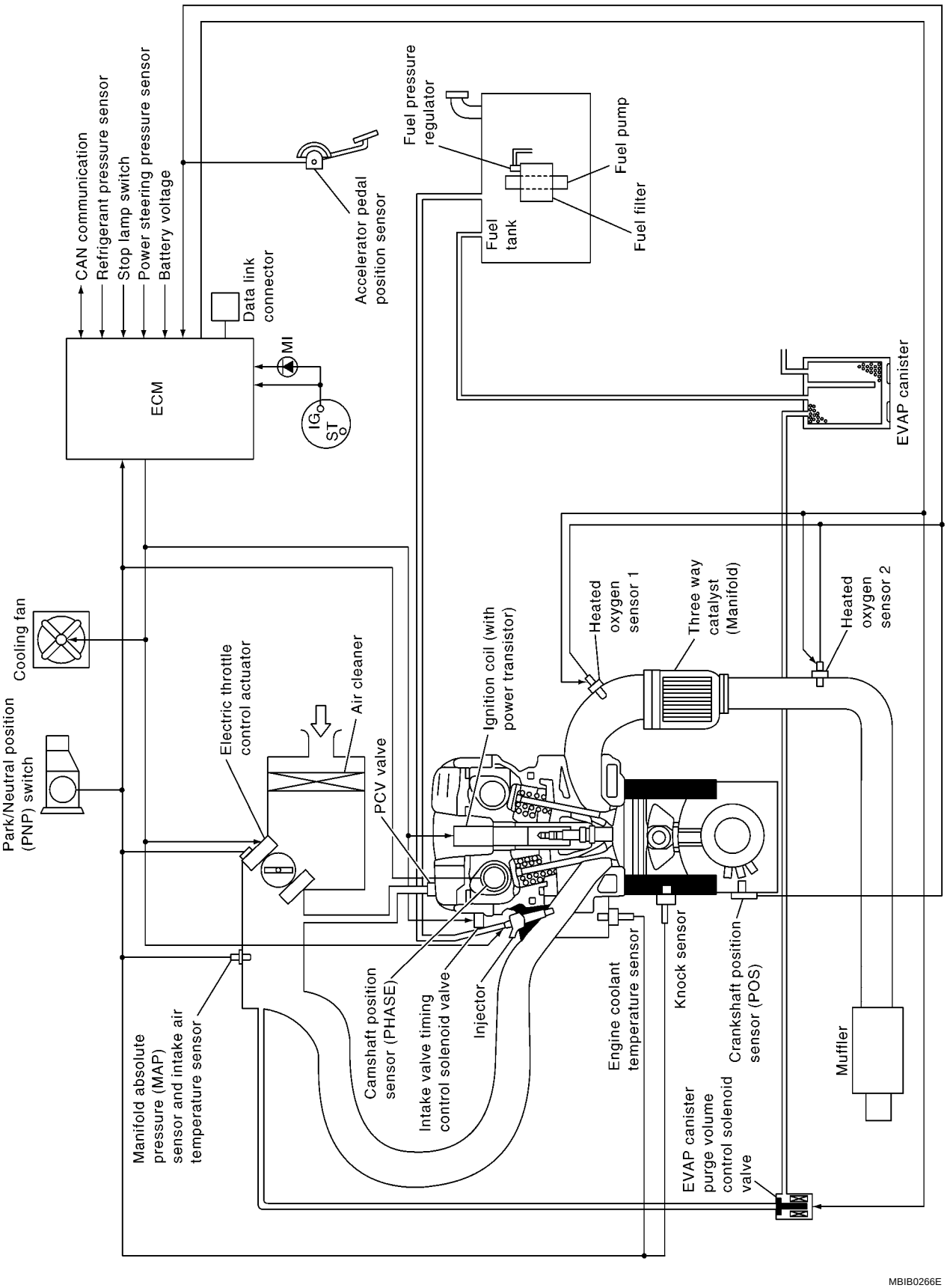
Tool name	Description	
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor
Oxygen sensor thread cleaner ie: (J-43897-18) (J-43897-12)	 AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

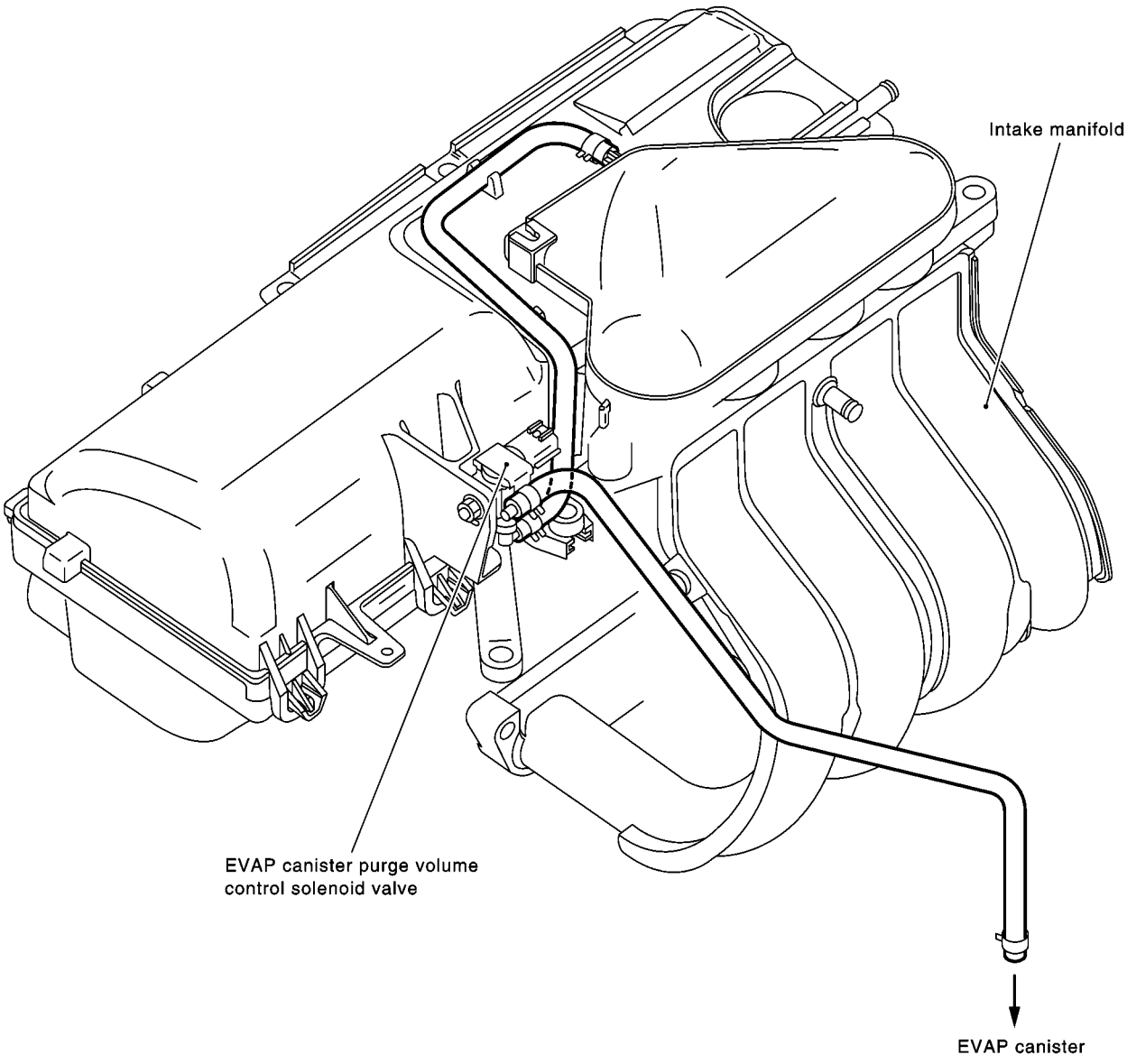
EBS00OJZ



MBIB0266E

Vacuum Hose Drawing

EBS00OK0



NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

MBIB0265E

Refer to EC-482, "System Diagram" for Vacuum Control System.

System Chart

EBS00OK1

Input (Sensor)	ECM Function	Output (Actuator)
● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Manifold absolute pressure sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 ● Throttle position sensor ● Accelerator pedal position sensor ● Park/neutral position (PNP) switch ● Intake air temperature sensor ● Ignition switch ● Battery voltage ● Knock sensor ● Refrigerant pressure sensor ● Stop lamp switch ● Heated oxygen sensor 2*1 ● TCM (Transmission control module) ● ABS actuator and electric unit (control unit)*2 ● Air conditioner switch*2 ● Vehicle speed signal*2 ● Electrical load signal*2	Fuel injection & mixture ratio control	Fuel injectors
	Electronic ignition system	Power transistor
	Fuel pump control	Fuel pump relay
	Idle speed control	Electric throttle control actuator
	On board diagnostic system	MI (On the instrument panel)
	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
	Air conditioning cut control	Air conditioner relay*3
	Cooling fan control	Cooling fan relays*3

*1: This sensor is not used to control the engine system under normal conditions.
*2: This input signal is sent to the ECM through CAN communication line.
*3: This output signal is sent from the ECM through CAN communication line.

Multiport Fuel Injection (MFI) System

EBS00OK2

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*3 and piston position	Fuel injection & mixture ratio control	Fuel injectors
Manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Knock sensor	Engine knocking condition		
Battery	Battery voltage*3		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Vehicle speed signal*2	Vehicle speed		
Air conditioner switch*2	Air conditioner operation		

*1: This sensor is not used to control the engine system under normal conditions.
*2: This signal is sent to the ECM through CAN communication line.
*3: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined

by input signals (for engine speed and intake air volume) from the crankshaft position sensor, the manifold absolute pressure sensor and intake air temperature sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

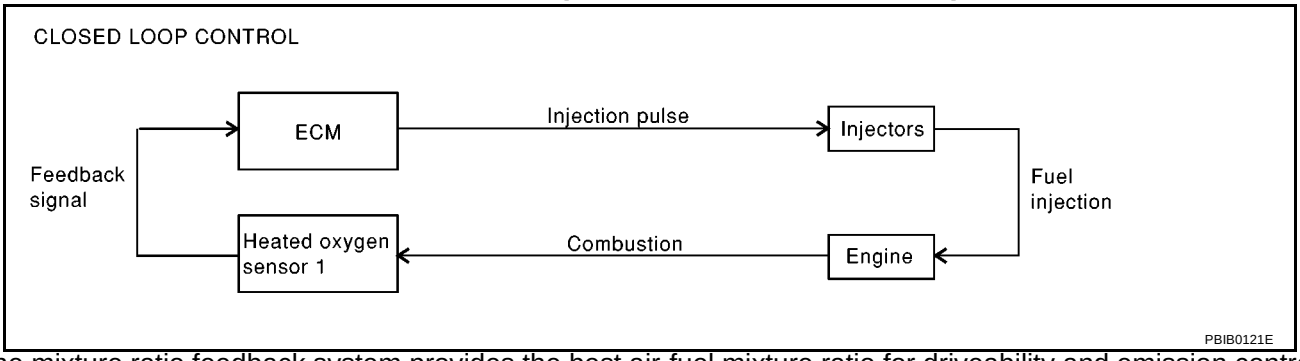
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (A/T models)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-591 . This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

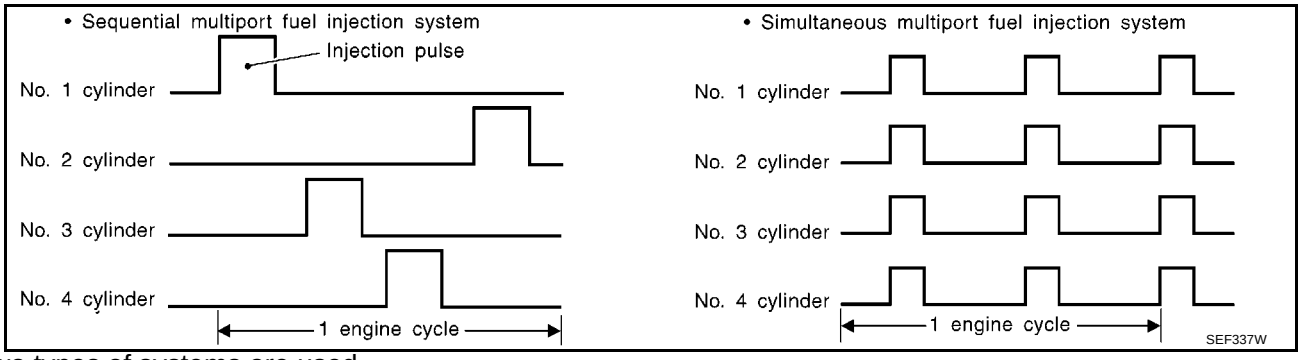
- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (A/T models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as orig-

inally designed. Both manufacturing differences (i.e., manifold absolute pressure sensor silicon diaphragm) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The four injectors will then receive the signals two times for each engine cycle.
This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Electronic Ignition (EI) System

EBS00OK3

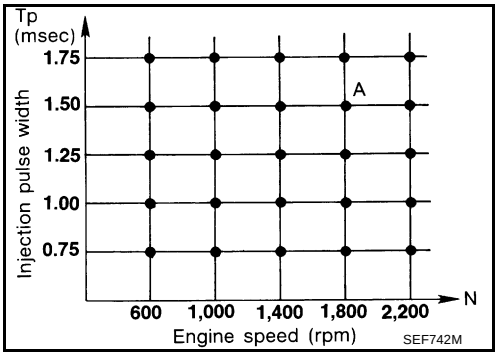
INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2 and piston position	Ignition timing control	Power transistor
manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Battery	Battery voltage*2		
Vehicle speed signal*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.
*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown.
The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.
e.g., N: 1,800 rpm, Tp: 1.50 msec
A °BTDC
During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.



- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control

EBS00OK4

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Air conditioner switch*1	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle valve opening angle		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Refrigerant pressure sensor	Refrigerant pressure		
Vehicle speed signal*1	Vehicle speed		
Battery	Battery voltage*2		

*1: This signal is sent to the ECM through CAN communication line.
*2: ECM determines the start signal status by the signals of engine speed and battery voltage.

SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

Fuel Cut Control (at No Load and High Engine Speed)

EBS00OK5

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM Function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injectors
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Vehicle speed signal*1	Vehicle speed		

*1: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

If the engine speed is above 2,500 rpm with no load (for example, the shift position is neutral and engine speed is over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.
Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

NOTE:
This function is different from deceleration control listed under EC-484, "Multiport Fuel Injection (MFI) System"
.

CAN Communication

EBS01CDB

SYSTEM DESCRIPTION

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

CAN COMMUNICATION UNIT

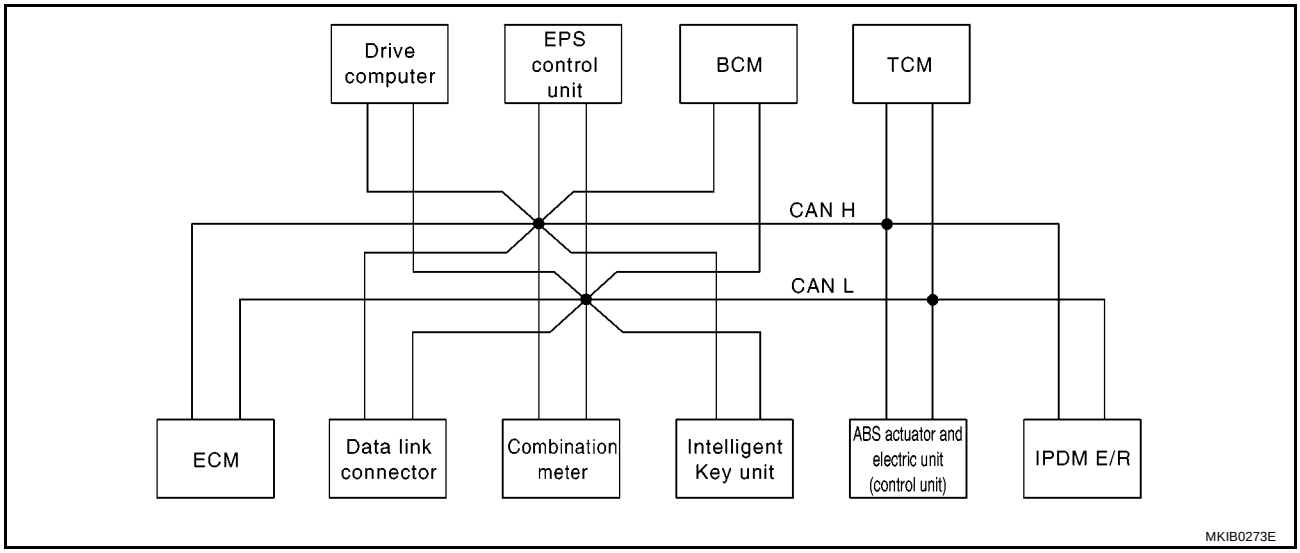
Body type	3door/5door															
Axle	2WD															
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE							
Handle	LHD/RHD															
Brake control	ABS system								ESP system							
Transmission	A/T				M/T				A/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×				
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	EC-490, "TYPE 1/ TYPE 2"				EC-494, "TYPE 3/ TYPE 4"				EC-496, "TYPE 5/ TYPE 6"				EC-499, "TYPE 7/ TYPE 8"			

×: Applicable

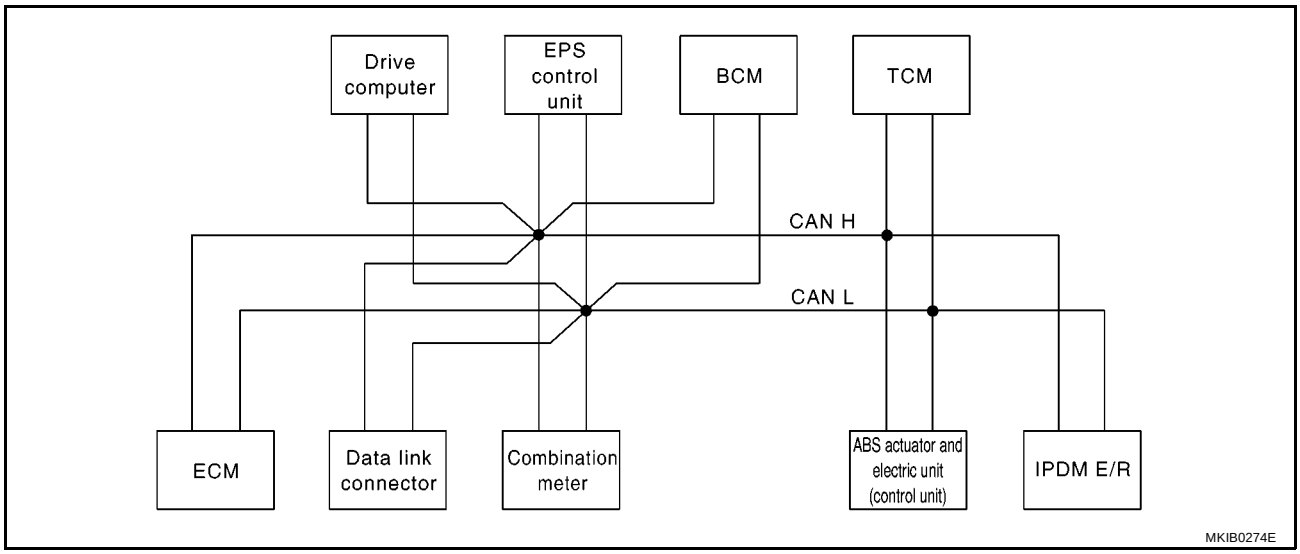
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

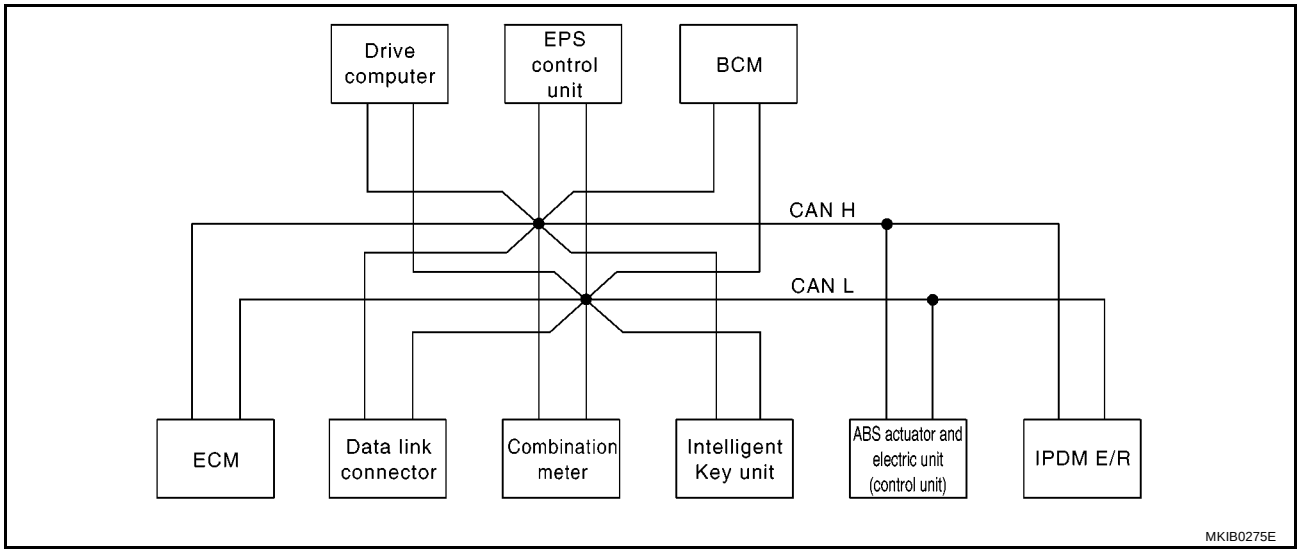
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

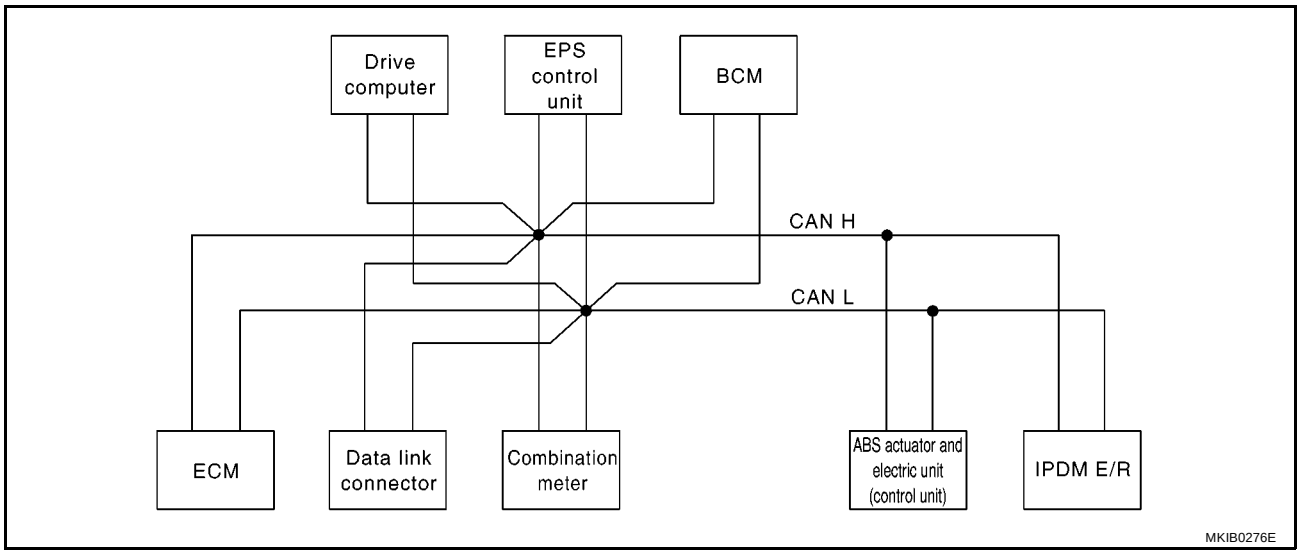
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

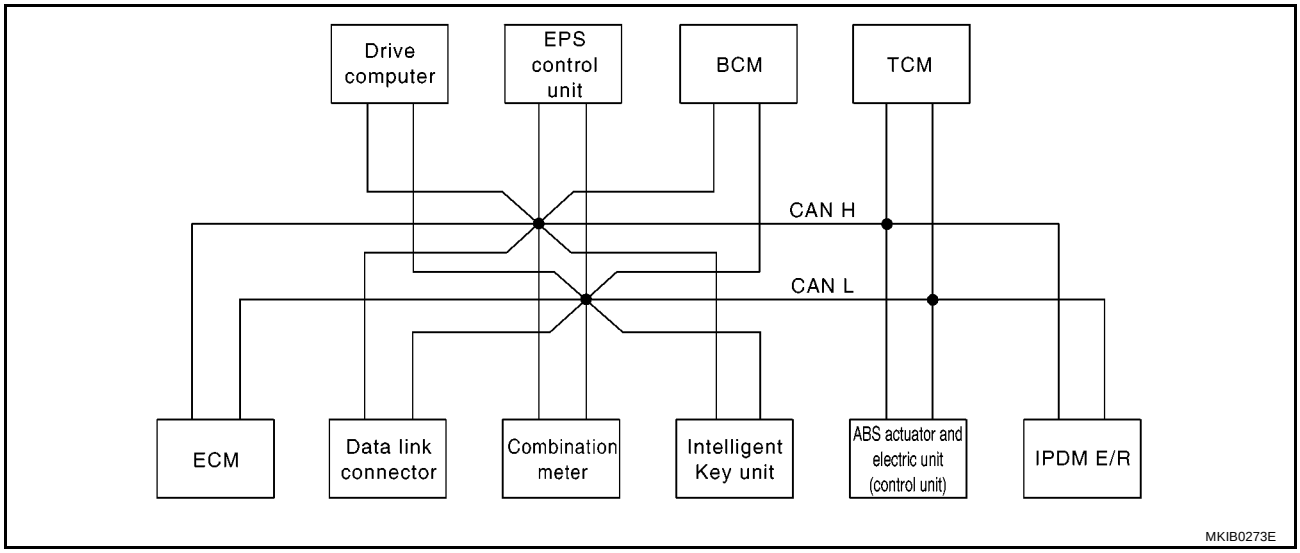
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

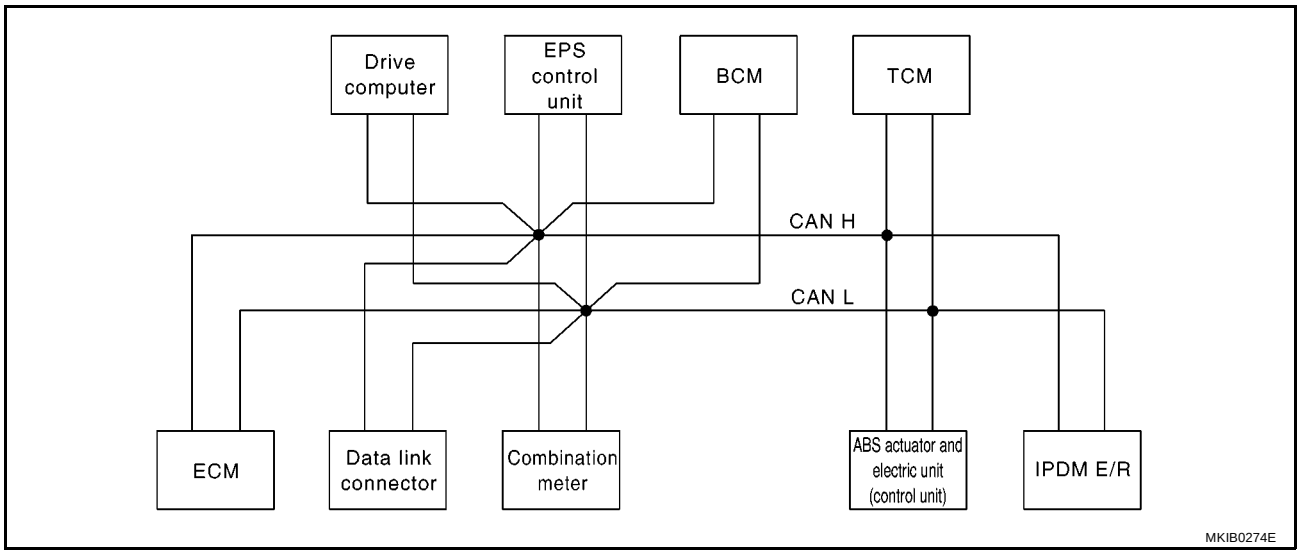
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

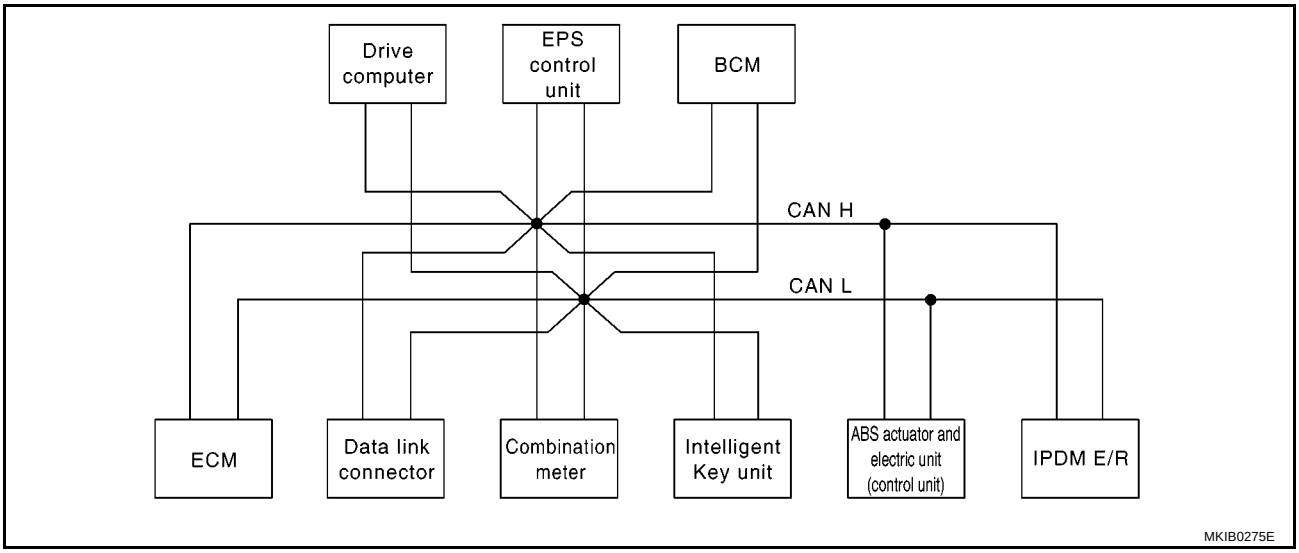
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

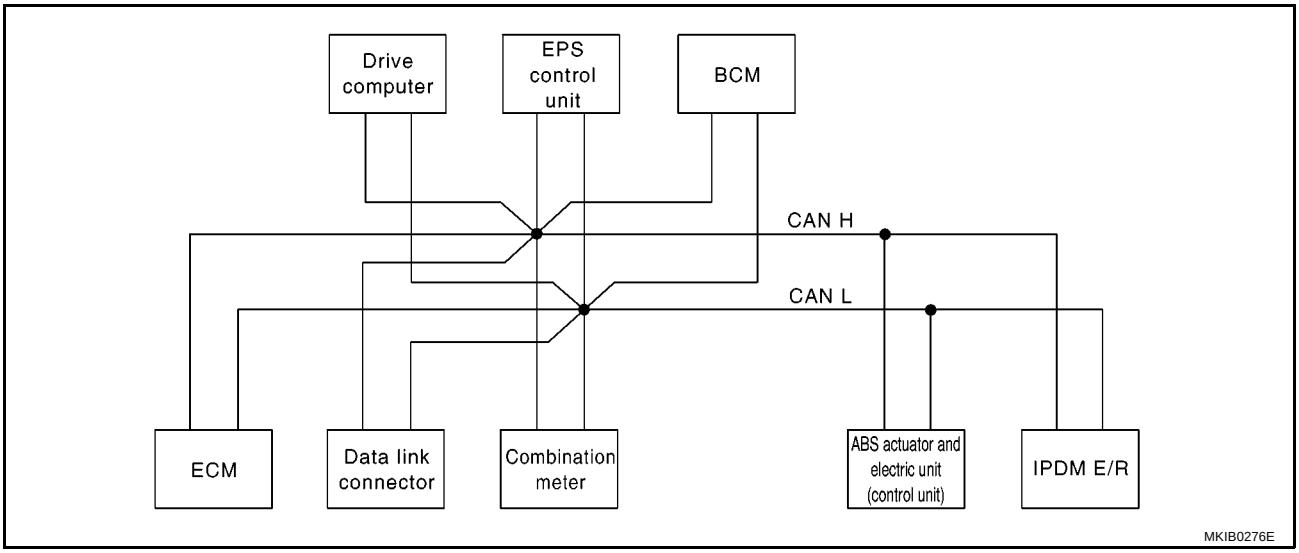
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

BASIC SERVICE PROCEDURE

PFP:00018

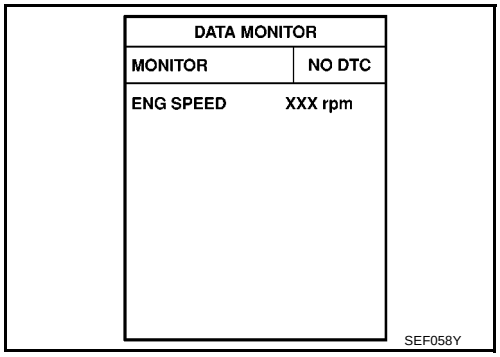
Idle Speed and Ignition Timing Check

EBS00OK7

IDLE SPEED

With CONSULT-II

Check idle speed in “DATA MONITOR” mode with CONSULT-II.



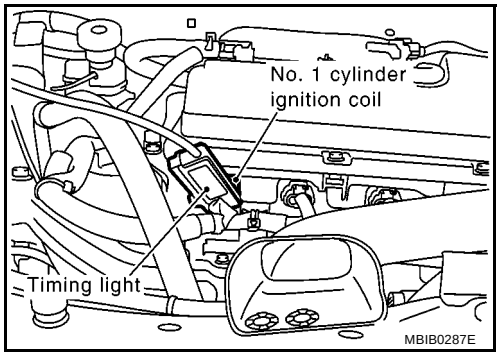
Without CONSULT-II

Check idle speed by installing the pulse type tachometer clamp on the loop wire or on suitable high-tension wire which installed between No. 1 ignition coil and No. 1 spark plug.

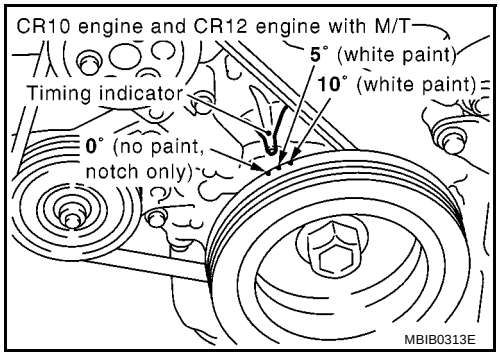
NOTE:
For the method of installing the tachometer, refer to EC-502, "IGNITION TIMING" .

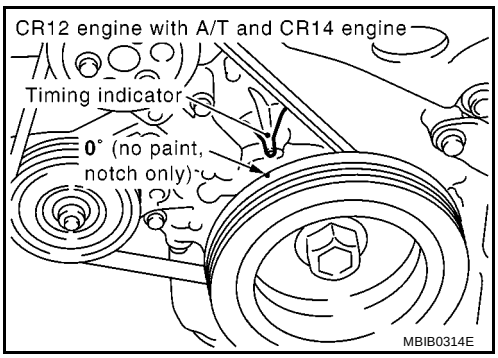
IGNITION TIMING

1. Slide the harness protector of ignition coil No.1 to clear the wires.
2. Attach timing light to the wires as shown in the figure.



3. Check ignition timing.





Accelerator Pedal Released Position Learning

EBS00OK8

DESCRIPTION

Accelerator Pedal Released Position Learning is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF wait at least 10 seconds.

Throttle Valve Closed Position Learning

EBS00OK9

DESCRIPTION

Throttle Valve Closed Position Learning is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

EBS00OKA

DESCRIPTION

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.

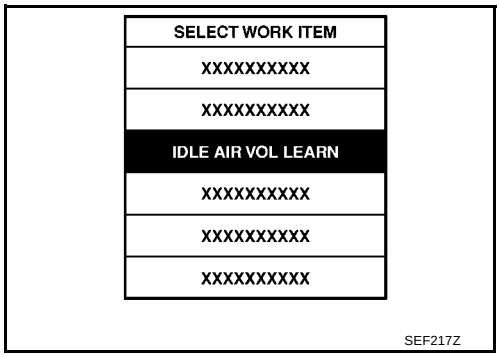
- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)
  On vehicles equipped with daytime light systems, set lighting switch to the 1st position to light only small lamps.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up

For A/T models with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.
For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

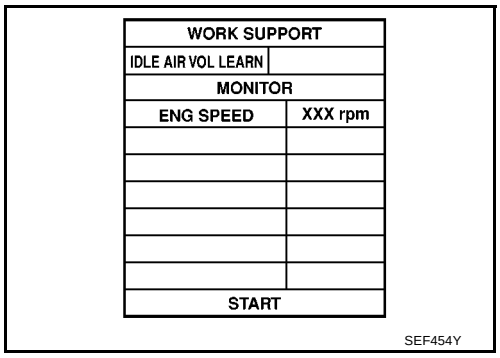
OPERATION PROCEDURE

With CONSULT-II

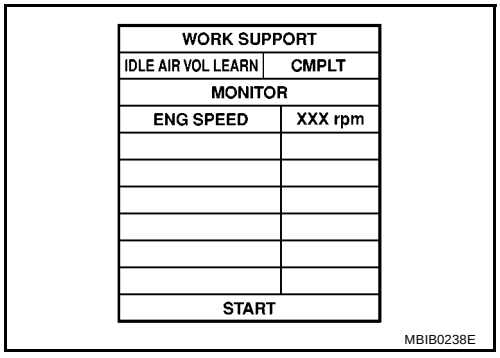
1. Perform EC-503, "Accelerator Pedal Released Position Learning" .
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.



6. Touch “START” and wait 20 seconds.



7. Make sure that “CMPLT” is displayed on CONSULT-II screen. If “CMPLT” is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.



ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 5±2° BTDC A/T: 5±2° BTDC (in P or N position)

Without CONSULT-II

NOTE:

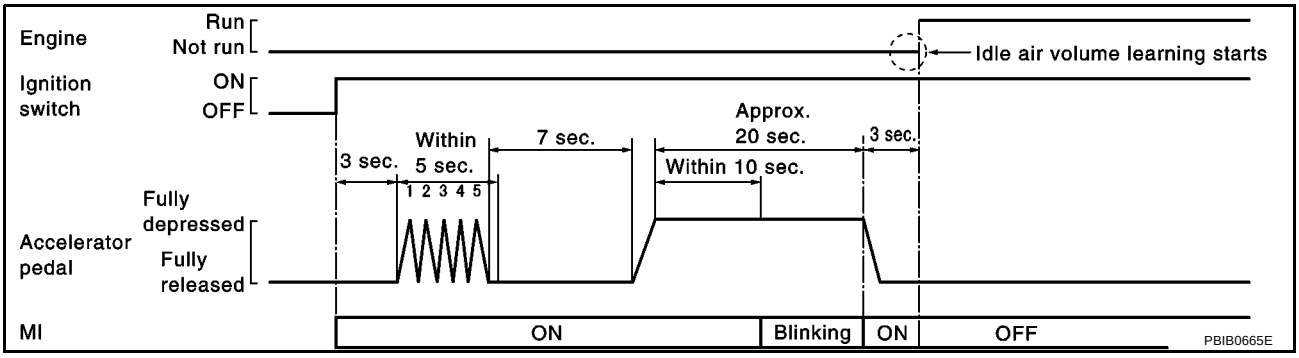
- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform EC-503, "Accelerator Pedal Released Position Learning" .
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.

5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.

8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MI stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MI turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 5±2° BTDC A/T: 5±2° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. **Check that throttle valve is fully closed.**
2. **Check PCV valve operation.**
3. **Check that downstream of throttle valve is free from air leakage.**
4. **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.**
   It is useful to perform EC-561, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle air volume learning all over again:**
   - **Engine stalls.**
   - **Erroneous idle.**

Fuel Pressure Check

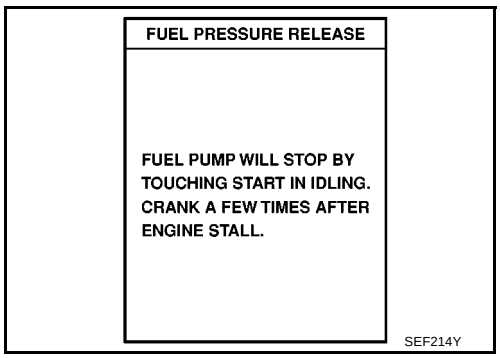
EBS00OKB

FUEL PRESSURE RELEASE

With CONSULT-II

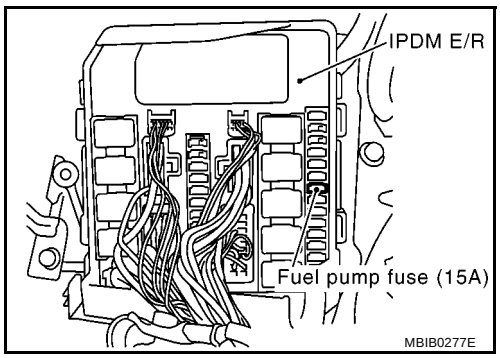
1. Turn ignition switch ON.

2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.



Without CONSULT-II

1. Remove fuel pump fuse located in IPDM E/R.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.



FUEL PRESSURE CHECK

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

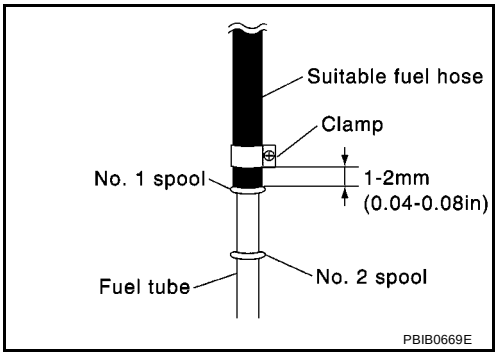
NOTE:
Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because QR engine models do not have fuel return system.

CAUTION:

- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **When installing fuel hose quick connector, refer to EM-16, "AIR CLEANER AND AIR DUCT" .**

1. Release fuel pressure to zero. Refer to EC-505, "FUEL PRESSURE RELEASE" .
2. Prepare fuel hose and fuel hose clamp for fuel pressure check, and connect fuel pressure gauge.
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.
3. Remove fuel hose. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
   - Do not twist or kink fuel hose because it is plastic hose.
   - Do not remove fuel hose from quick connector.
   - Keep the original fuel hose to be free from intrusion of dust or foreign substances with a suitable cover.

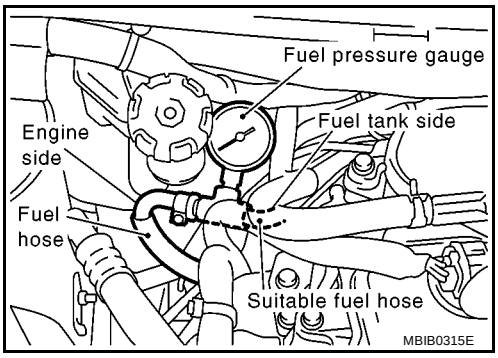
4. Install the fuel pressure gauge as shown in the figure.
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube and No.1 spool.
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



   Tightening torque:

   1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)

   - Make sure that clamp screw does not contact adjacent parts.



5. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
6. Turn ignition switch ON, and check for fuel leakage.
7. Start engine and check for fuel leakage.
8. Read the indication of fuel pressure gauge.
   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.

   At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2 , 51 psi)
9. If result is unsatisfactory, go to next step.
10. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

EBS00OKC

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information
Diagnostic Trouble Code (DTC)
Freeze Frame data
1st Trip Diagnostic Trouble Code (1st Trip DTC)
1st Trip Freeze Frame data

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data
CONSULT-II	×	×	×	×
ECM	×	×*	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator (MI) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-520 .)

Two Trip Detection Logic

EBS00OKD

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MI will not light up at this stage. <1st trip>
If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MI lights up. The MI lights up at the same time when the DTC is stored. <2nd trip>
The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.
When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is a malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system has malfunction and MI circuit is open by means of operating fail-safe function.
The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Emission-related Diagnostic Information

EBS00OKE

DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.
If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MI will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MI lights up. In other words, the DTC is stored in the ECM memory and the MI lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored.
For fail-safe items, DTC is stored in the ECM memory even in the 1st trip.
Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"
When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step II, refer to EC-516, "WORK FLOW" . Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

With CONSULT-II

CONSULT-II displays the DTC in “SEFL-DIAG RESULTS” mode. Examples: P0117, P0340, P1065, etc. (CONSULT-II also displays the malfunctioning component or system.)

Without CONSULT-II

The number of blinks of the MI in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0107, 0340 etc.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].

DTC display

SELF DIAG RESULTS	
DTC RESULTS	TIME
CKP SEN/CIRCUIT [P0335]	0

1st trip DTC display

SELF DIAG RESULTS	
DTC RESULTS	TIME
CKP SEN/CIRCUIT [P0335]	1t

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FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II. For details, see EC-549, "Freeze Frame Data and 1st Trip Freeze Frame Data" .
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

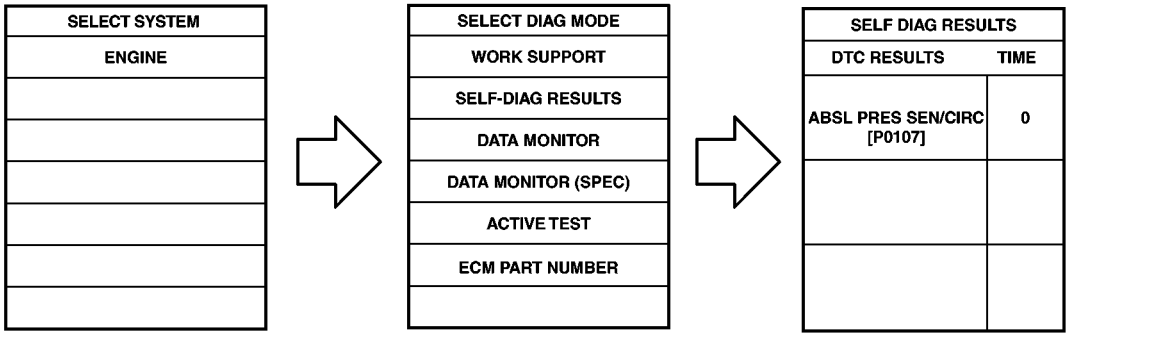
With CONSULT-II

The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Touch “ENGINE”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the ECM will be erased.)

How to erase DTC (With CONSULT-II)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” again.



2. Turn **CONSULT-II** “ON” and touch “ENGINE”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the ECM will be erased.)

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Without CONSULT-II

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.
2. Wait at least 10 seconds and then turn it ON (engine stopped) again.
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to EC-512, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - Freeze frame data
  - 1st trip freeze frame data
  - Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NATS (Nissan Anti-theft System)

EBS00OKF

- **If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to BL-223, "NATS(Nissan Anti-Theft System)" .**
- **Confirm no self-diagnostic results of NATS is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NATS system and registration of all NATS ignition key IDs must be carried out with CONSULT-II using NATS program card.**
  Therefore, be sure to receive all keys from vehicle owner.
  Regarding the procedures of NATS initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS.

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

SEF515Y

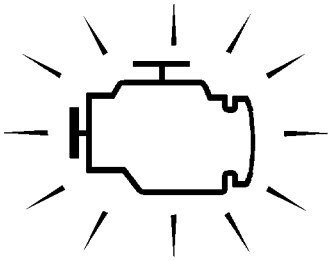
Malfunction Indicator (MI)

EBS00OKG

DESCRIPTION

The MI is located on the instrument panel.

1. The MI will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MI does not light up, refer to DI-65, "WARNING LAMPS" or see EC-838 .
2. When the engine is started, the MI should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction.



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ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position Engine stopped	BULB CHECK	This function checks the MI bulb for damage (blown, open circuit, etc.). If the MI does not come on, check MI circuit.
	Engine running	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MI will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MI in the 1st trip. ● One trip detection diagnoses

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode II	Ignition switch in ON position Engine stopped	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system has a malfunction and MI circuit is open by means of operating fail-safe function.
The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the a malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

MI Flashing without DTC

If the ECM is in Diagnostic Test Mode II, MI may flash when engine is running. In this case, check ECM diagnostic test mode. EC-512, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
How to switch the diagnostic test (function) modes, and details of the above functions are described later, EC-512, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- Others

HOW TO SWITCH DIAGNOSTIC TEST MODE

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

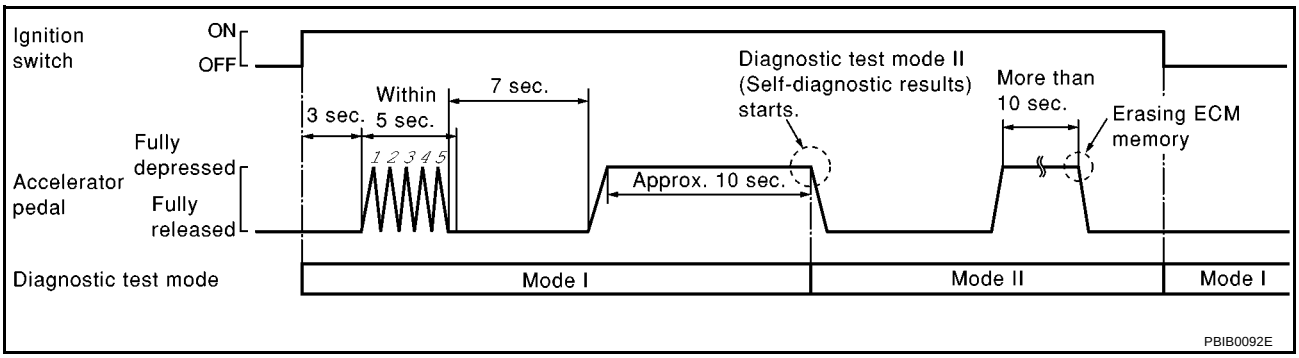
How to Set Diagnostic Test Mode II (Self-diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly five times within 5 seconds.

a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.

3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MI starts blinking.
4. Fully release the accelerator pedal.

ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).



How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to EC-512, "How to Set Diagnostic Test Mode II (Self-diagnostic Results)" .
2. Start Engine.
   ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results). Refer to EC-512, "How to Set Diagnostic Test Mode II (Self-diagnostic Results)" .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
   The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MI on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to DI-65, "WARNING LAMPS" or see EC-838 .

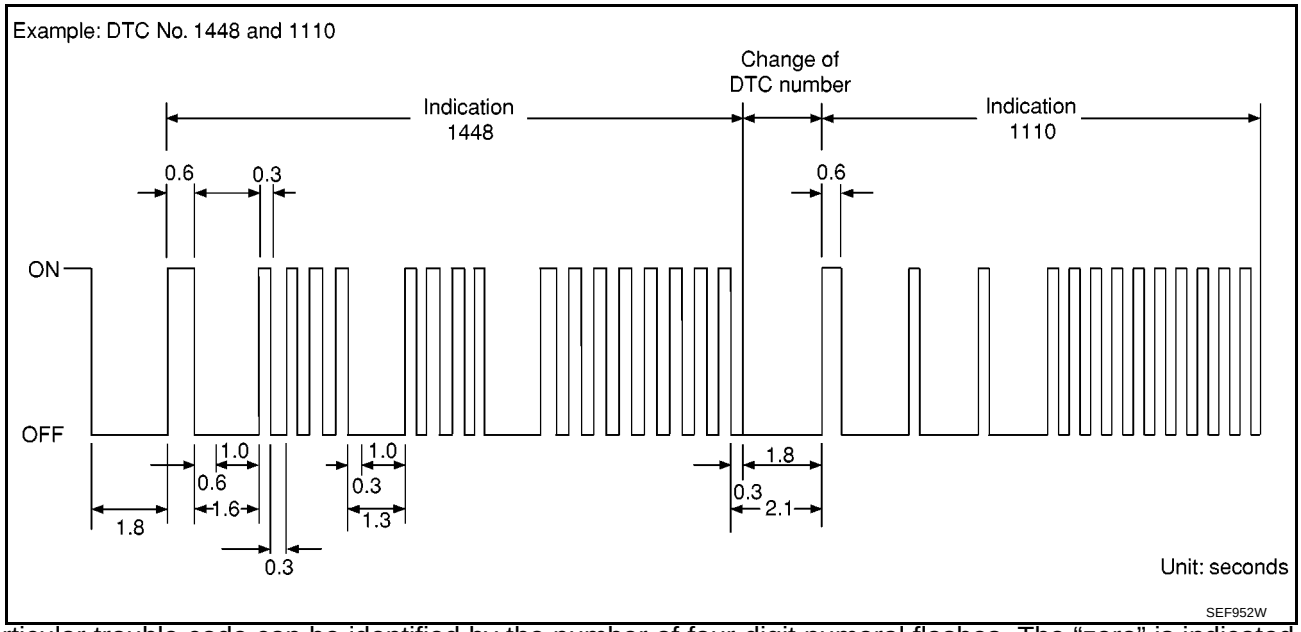
DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MI	Condition
ON	When the malfunction is detected.
OFF	No malfunction.

- These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MI as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MI does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MI illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-II. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-472, "INDEX FOR DTC")

How to Erase Diagnostic Test Mode II (Self-diagnostic Results)

The DTC can be erased from the back up memory in the ECM by depressing accelerator pedal. Refer to EC-512, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .

- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MI displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MI	Fuel mixture condition in the exhaust gas	Air-fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MI comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.

TROUBLE DIAGNOSIS

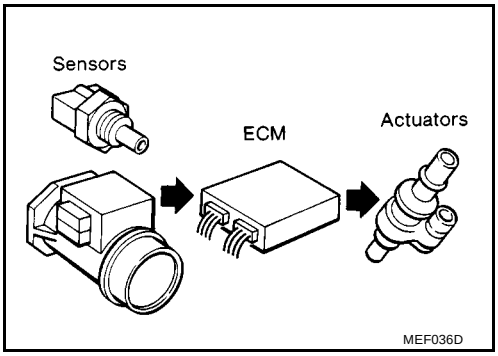
PFP:00004

Trouble Diagnosis Introduction

EBS00OKI

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only may not find the cause of the incidents. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the Work Flow on EC-516 .
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A Diagnostic Worksheet like the example on EC-518 should be used.
Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.



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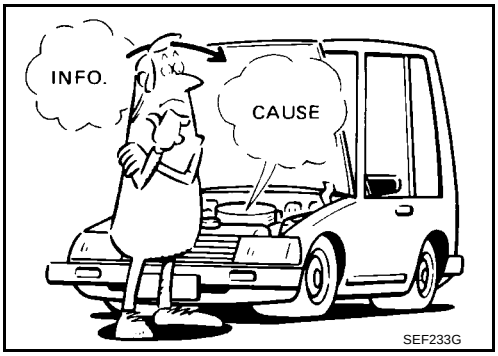

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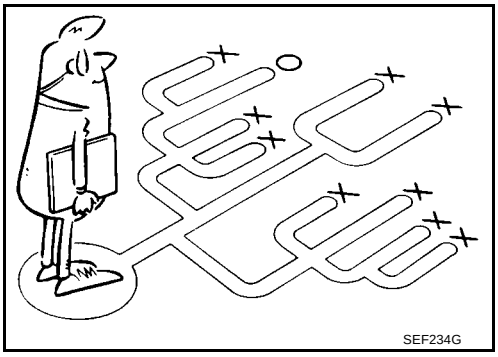
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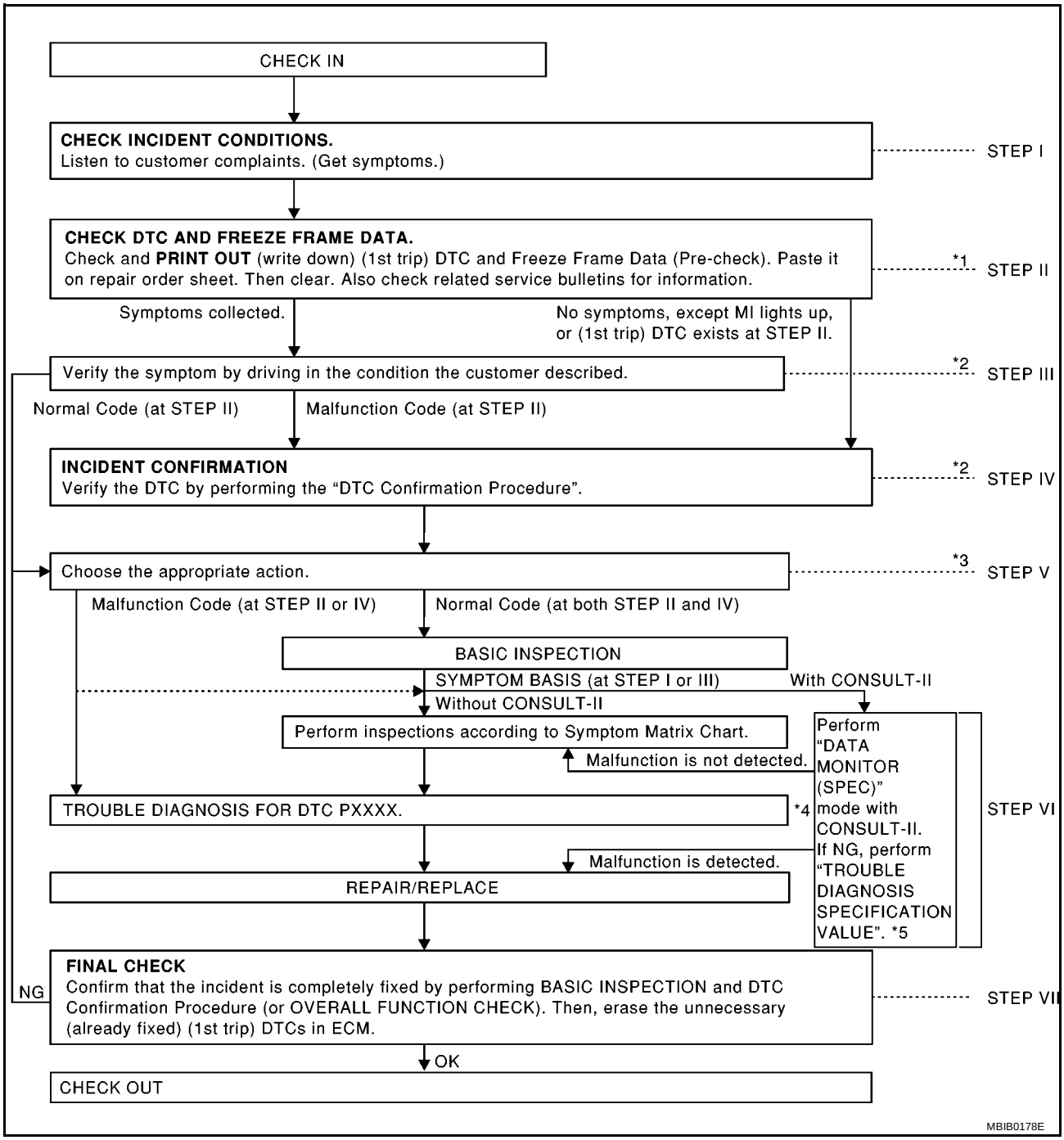
WORK FLOW

Flow Chart



*1 If time data of “SELF-DIAG RESULTS” is other than [0] or [1t], perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*2 If the incident cannot be verified, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*3 If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to EC-567, "POWER SUPPLY CIRCUIT FOR ECM" .

*4 If malfunctioning part cannot be detected, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

*5 EC-561, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE"

Description for Work Flow

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the DIAGNOSTIC WORK SHEET, EC-518 .
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II) the (1st trip) DTC and the (1st trip) freeze frame data, then erase the DTC and the data. (Refer to EC-510 .) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. If the incident cannot be verified, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The Symptom Matrix Chart will be useful. See EC-527 .) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The DIAGNOSTIC WORK SHEET and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) DTC by driving in (or performing) the DTC Confirmation Procedure. Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in “DATA MONITOR (AUTO TRIG)” mode and check real time diagnosis results. If the incident cannot be verified, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" . In case the DTC Confirmation Procedure is not available, perform the Overall Function Check instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified check is an effective alternative. The NG result of the Overall Function Check is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-522 .) If COSULT-II is available, perform “DATA MONITOR (SPEC)” mode with CONSULT-II and proceed to the TOROUBLE DIAGNOSIS – SPECIFICATION VALUE. (Refer to EC-561 .) (If malfunction is detected, proceed to PERAIR/REPLACE.) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-527 .)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) Harness Layouts. Gently shake the related connectors, components or wiring harness with CONSULT-II set in “DATA MONITOR (AUTO TRIG)” mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-539 , EC-555 . The Diagnostic Procedure in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to Circuit Inspection in GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" . Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the DTC Confirmation Procedure and confirm the normal code [DTC No. P0000] is detected. If the incident is still detected in the final check, perform STEP VI by using a method different from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION")

DIAGNOSTIC WORKSHEET

Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

Worksheet Sample

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Fuel and fuel filler cap		☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.	
Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions		☐ Not affected	
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp		☐ Turned on ☐ Not turned on	

MTBL0017

DTC Inspection Priority Chart

EBS00OKJ

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:
If DTC U1000 and/or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000 and U1001. Refer to EC-572, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

Priority	Detected items (DTC)
1	● U1000 U1001 CAN communication line ● P0107 P0108 Manifold absolute pressure sensor ● P0117 P0118 Engine coolant temperature sensor ● P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor ● P0221 P0222 P0223 P1223 P1224 P1225 P1226 Throttle position sensor ● P0226 P0227 P0228 P1227 P1228 Accelerator pedal position sensor ● P0327 P0328 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0605 ECM ● P1171 Intake error ● P1229 Sensor power supply ● P1610-P1615 NATS ● P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor
2	● P0132 P0134 Heated oxygen sensor 1 ● P0138 Heated oxygen sensor 2 ● P1065 ECM power supply ● P1122 Electric throttle control function ● P1124 P1126 Throttle control motor relay ● P1128 Throttle control mother ● P1805 Brake switch
3	● P1121 Electric throttle control actuator ● P1211 ESP control unit ● P1212 ESP communication line ● P1217 Engine over temperature (OVERHEAT)

Fail-safe Chart

EBS00OKK

- When the DTC listed bellow is detected, the ECM enters fail-safe mode and the MI lights up.

DTC No.	Detected items	Engine operating condition in fail-safe mode
P0107 P0108	Manifold absolute pressure sensor circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.
P0117 P0118	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-II displays the engine coolant temperature decided by ECM.
		Condition: Just as ignition switch is turned ON or Start — Engine coolant temperature decided (CONSULT-II display): 40°C (104°F)
		Condition: More than approx. 4 minutes after ignition ON or Start — Engine coolant temperature decided (CONSULT-II display): 80°C (176°F)
		Condition: Except as shown above — Engine coolant temperature decided (CONSULT-II display): 40 - 80°C (104 - 176°F) (Depends on the time)
		When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.
P0122 P0123 P0222 P0223 P2135	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P0221 P0222 P0223 P1223 P1224	Throttle position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P0226 P0227 P0228 P1227 P1228	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.
P1121	Electric throttle control actuator	(When electric throttle control actuator does not function properly due to the return spring malfunction:) ECM controls the electric throttle control actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
		(When throttle valve opening angle in fail-safe mode is not in specified range:) ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
		(When ECM detects the throttle valve is stuck open:) While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.
P1122	Electric throttle control function	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1124 P1126	Throttle control motor relay	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1128	Throttle control motor	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P1171	Intake air	When accelerator pedal is depressed, engine speed will not rise more than 2,500 rpm due to fuel cut.

DTC No.	Detected items	Engine operating condition in fail-safe mode
P1229	Sensor power supply	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.
P2122 P2123 P2127 P2128 P2138	Accelerator pedal position sensor	The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

- When there is an open circuit on MI circuit, the ECM can not warn the driver by lighting MI up when there is a malfunction on engine control system.
  Therefore, when electrical controlled throttle and part of ECM related diagnoses is continuously detected as NG for 5 trips, ECM warns the driver that engine control system has a malfunction and MI circuit is open by means of operating fail-safe function.
  The fail-safe function also operate when above diagnoses except MI circuit are detected, and demands the driver to repair the malfunction.

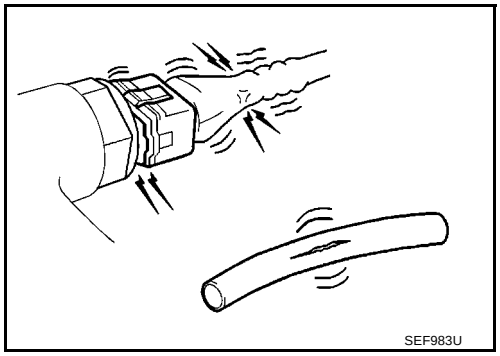
Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Basic Inspection

EBS00OKL

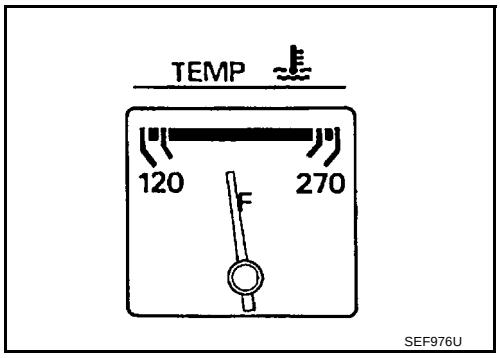
1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
- Harness connectors for improper connections
- Wiring harness for improper connections, pinches and cut
- Vacuum hoses for splits, kinks and improper connections
- Hoses and ducts for leaks
- Air cleaner clogging
- Gasket


SEF983U

3. Confirm that electrical or mechanical loads are not applied.
- Headlamp switch is OFF.
- Air conditioner switch is OFF.
- Rear window defogger switch is OFF.
- Steering wheel is in the straight-ahead position, etc.

4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
Ensure engine stays below 1,000 rpm.

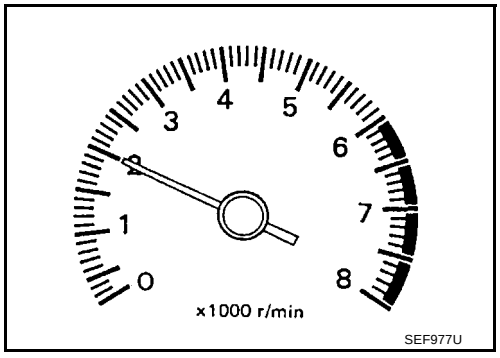


SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II.

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



SEF977U

2. REPAIR OR REPLACE

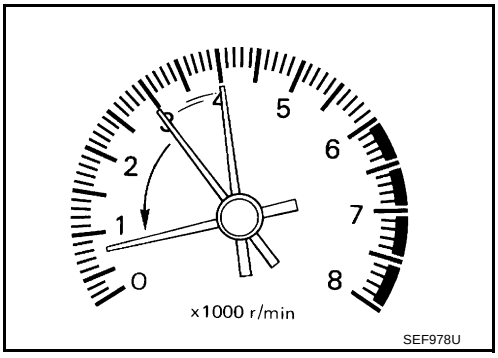
Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3

3. CHECK TARGET IDLE SPEED

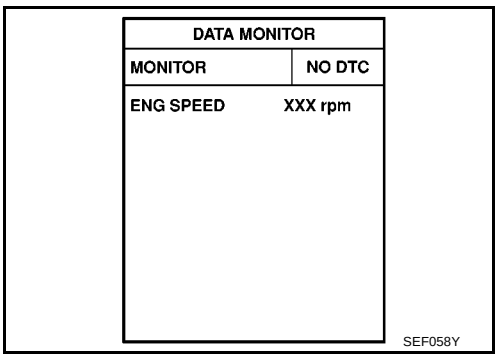
With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)



Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-503, "Throttle Valve Closed Position Learning" .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-503, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 7.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-650 .
- Check crankshaft position sensor (POS) and circuit. Refer to EC-643 .

OK or NG

OK >> GO TO 9.
NG >> 1. Repair or replace.
2. GO TO 4.

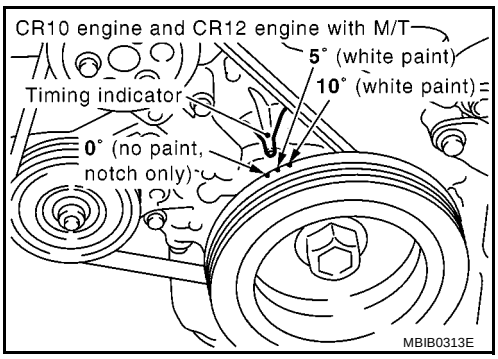
9. CHECK ECM FUNCTION

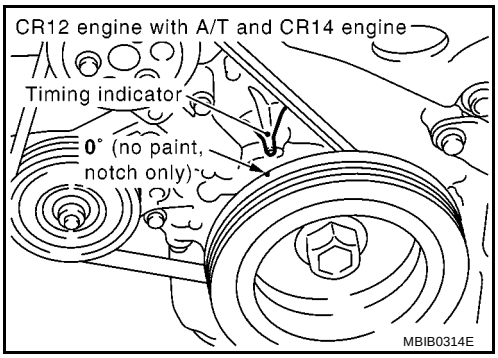
1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to EC-511, "NATS (Nissan Anti-theft System)" .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.





M/T: 5 ± 2° BTDC
A/T: 5 ± 2° BTDC (in P or N position)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-503, "Throttle Valve Closed Position Learning" .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-503, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.

M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.

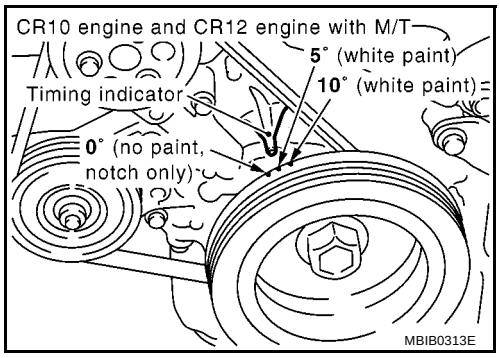
M/T: 650 ± 50 rpm
A/T: 700 ± 50 rpm (in P or N position)

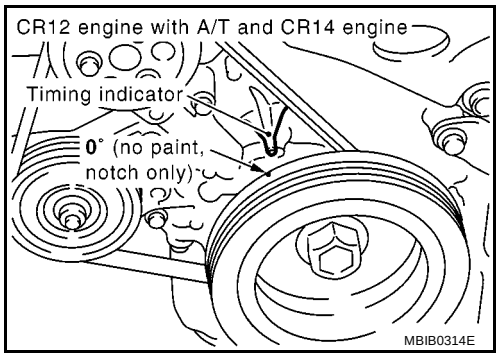
OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.





M/T: 5 ± 2° BTDC
A/T: 5 ± 2° BTDC (in P or N position)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-48, "TIMING CHAIN" .

OK or NG

OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit. Refer to EC-650 .
- Check crankshaft position sensor (POS) and circuit. Refer to EC-643 .

OK or NG

OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NATS system and registration of NATS ignition key IDs. Refer to EC-511, "NATS (Nissan Anti-theft System)" .

>> GO TO 4.

Symptom Matrix Chart

EBS00OKM

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-826
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-505
	Injector circuit	1	1	2	3	2		2	2			2			EC-820
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-840

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-844
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-522
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-664, EC-667, EC-673, EC-678
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-522
	Ignition circuit	1	1	2	2	2		2	2			2			EC-792
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-567
Manifold absolute pressure sensor circuit		1	1	2	2	2		2	2			2			EC-575
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			EC-580
Throttle position sensor circuit			1	2		2	2	2	2	2		2			EC-585, EC-609, EC-615, EC-703, EC-709, EC-711, EC-722, EC-751
Accelerator pedal position sensor circuit				3	2	1	2			2					EC-621, EC-630, EC-713, EC-733, EC-742, EC-757
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-591, EC-597, EC-780
Knock sensor circuit				2	2							3			EC-639
Crankshaft position sensor (POS) circuit		2	2												EC-643
Camshaft position sensor (PHASE) circuit		2	2												EC-650
Vehicle speed signal circuit			2	3		3						3			EC-808
ECM		2	2	3	3	3	3	3	3	3	3	3			EC-657, EC-660
Intake valve timing control solenoid valve circuit		3	3	2		1	3	2	2	3		3			EC-809
PNP switch circuit				3		3	3	3	3	3		3			EC-815

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Refrigerant pressure sensor circuit		2				3	3	3	3		4			EC-831
Electrical load signal circuit						3	3	3	3					EC-836
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	ATC-17 or MTC-17
ABS actuator and electric unit (control unit)			4											BRC-8 or BRC-61

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

SYSTEM — ENGINE MECHANICAL & OTHER

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5	5												FL-8
	Fuel piping			5	5	5		5	5			5			FL-3, EM-30
	Vapor lock														—
	Valve deposit	5		5	5	5		5	5			5			—
	Poor fuel (Heavy weight gasoline, Low octane)														—

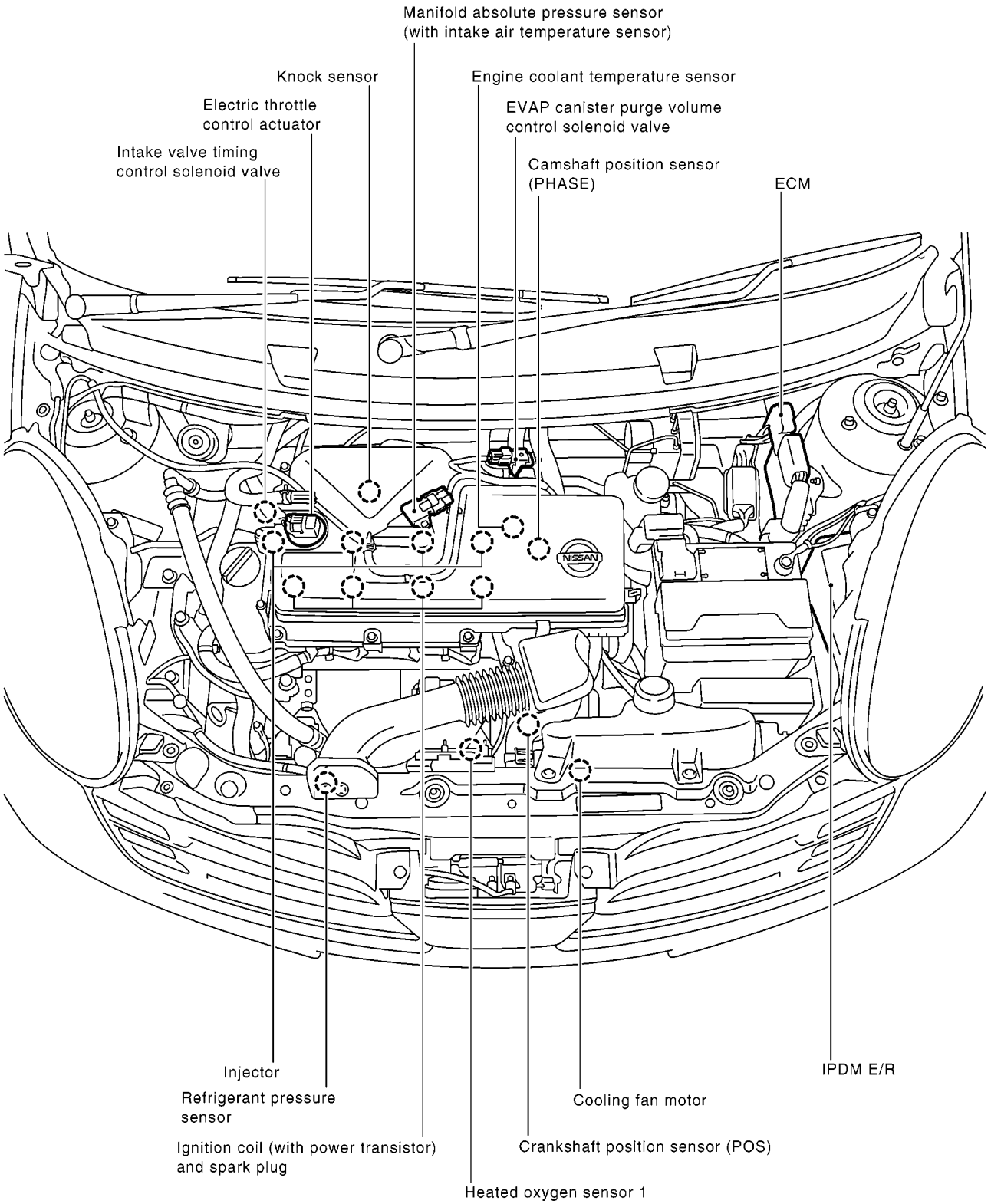
		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Air	Air duct		5	5		5		5	5			5			EM-16
	Air cleaner														
	Air leakage from air duct (Manifold absolute pressure sensor —electric throttle control actuator)	5			5		5			5					
	Electric throttle control actuator														
	Air leakage from intake manifold/ Collector/Gasket														EM-20
Cranking	Battery	1	1	1		1		1	1			1		1	SC-5
	Alternator circuit														SC-15
	Starter circuit	3													SC-39
	Signal plate/Flywheel/Drive plate	6													EM-73
	PNP switch	4													AT-361
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-59
	Cylinder head gasket										4		3		
	Cylinder block	6	6	6	6	6		6	6			6	4		EM-73
	Piston														
	Piston ring														
	Connecting rod														
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5			EM-48
	Camshaft														EM-36
	Intake valve timing control														EM-48
	Intake valve												3		EM-59
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/ Gasket	5	5	5	5	5		5	5			5			EM-22, EX-3
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		EM-24, LU-6 , LU-7 , LU-3
	Oil level (Low)/Filthy oil														LU-4

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5		2	5			CO-11
	Thermostat									5					CO-23
	Water pump														CO-21
	Water gallery														CO-7
	Cooling fan									5					CO-11
	Coolant level (low)/Contaminated coolant														CO-8
NATS (Nissan Anti-theft System)		1	1												EC-511 or BL-223

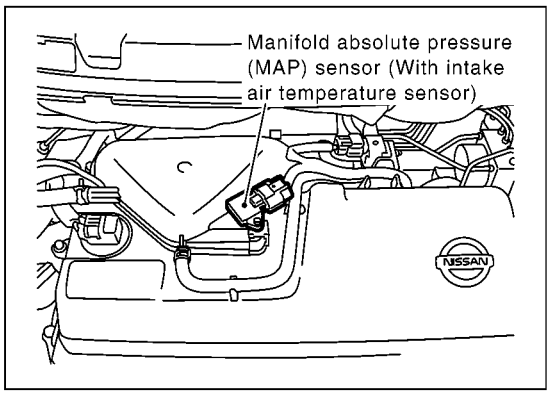
1 - 6: The numbers refer to the order of inspection.

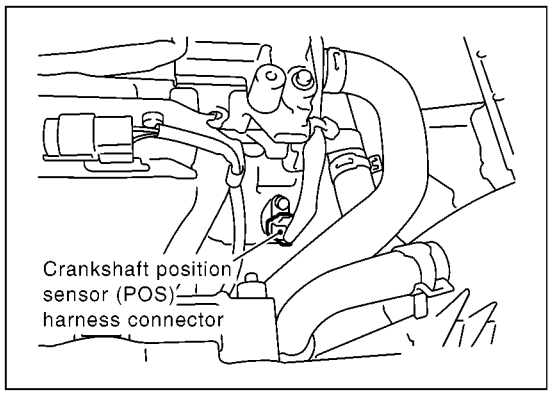
Engine Control Component Parts Location

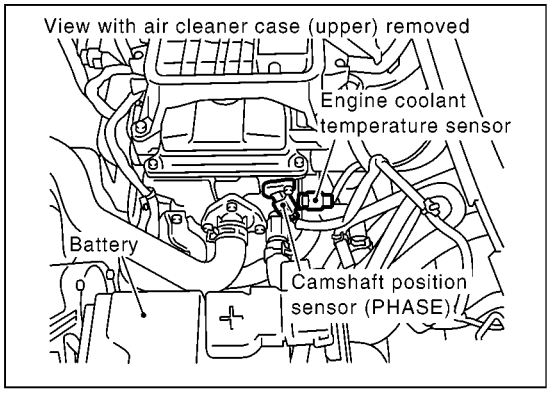
EBS00OKN

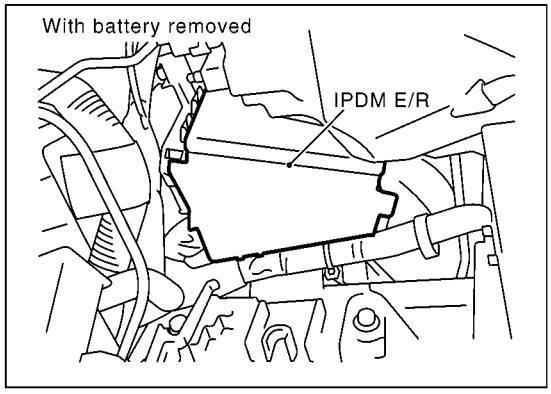


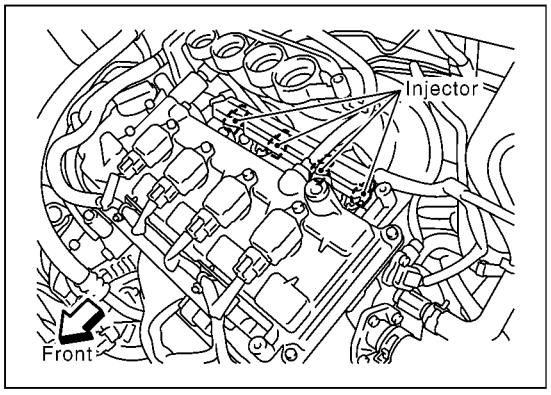
MBIB1069E

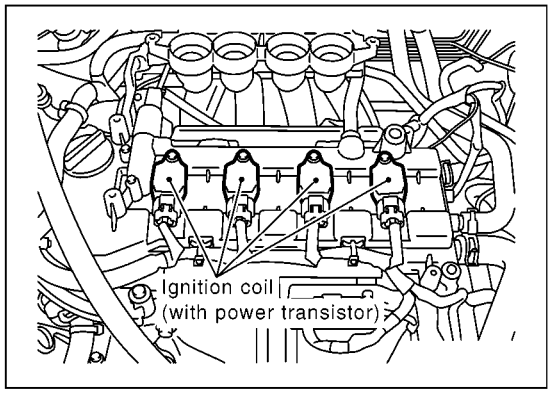

Manifold absolute pressure (MAP) sensor (With intake air temperature sensor)
NISSAN

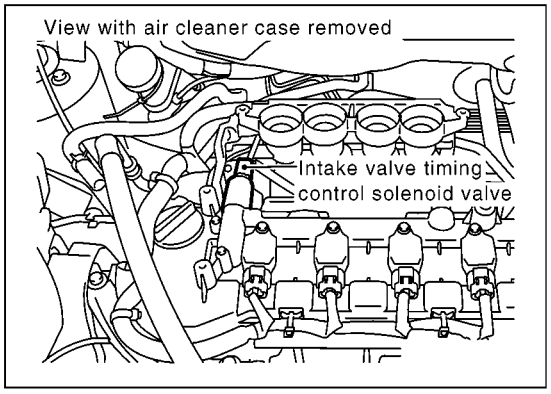

Crankshaft position sensor (POS) harness connector

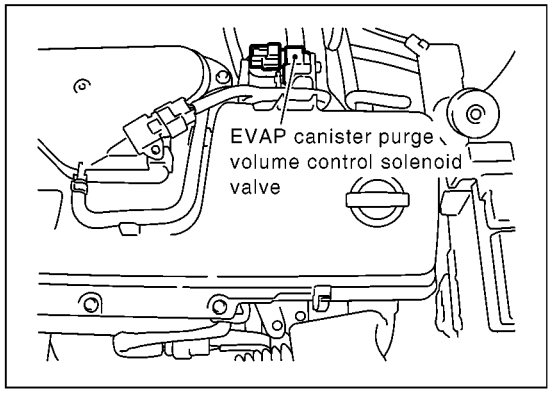

View with air cleaner case (upper) removed
Engine coolant temperature sensor
Battery
Camshaft position sensor (PHASE)


With battery removed
IPDM E/R

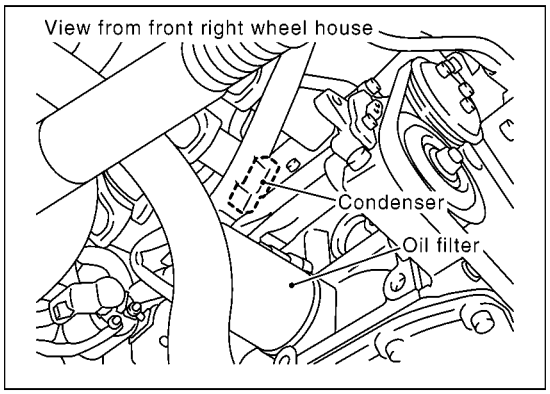

Injector
Front

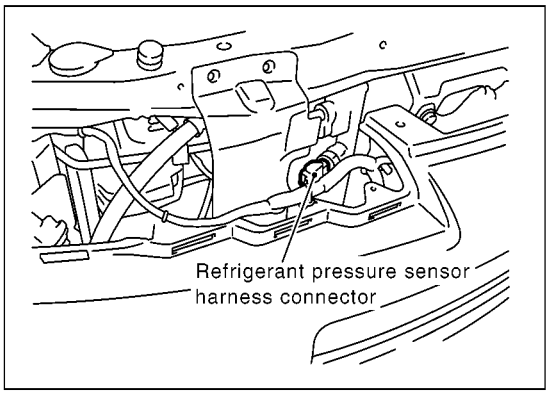

Ignition coil (with power transistor)

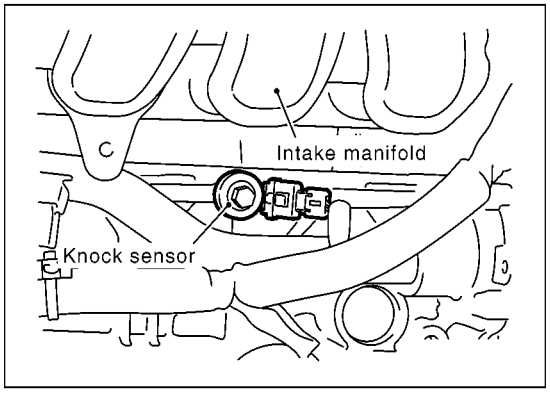

View with air cleaner case removed
Intake valve timing control solenoid valve

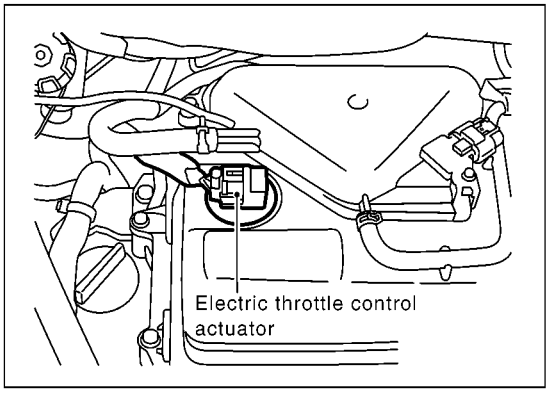

EVAP canister purge volume control solenoid valve

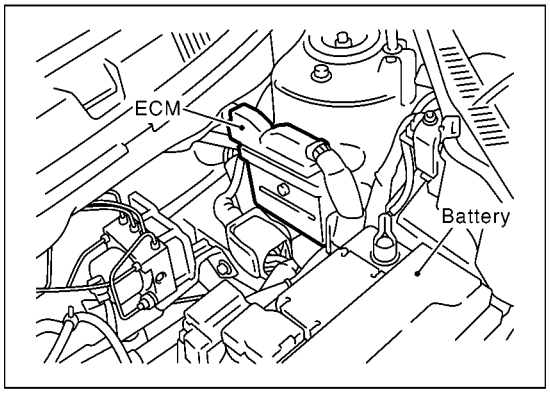
MBIB1070E

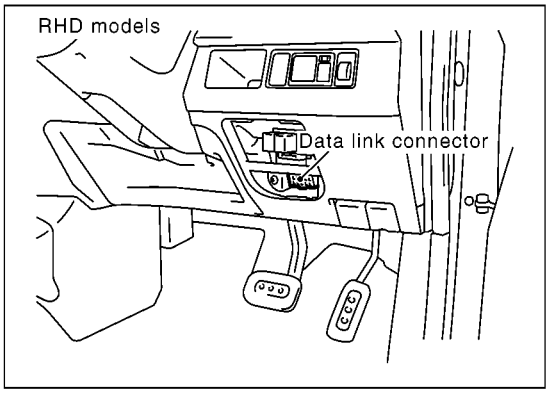

View from front right wheel house
Condenser
Oil filter

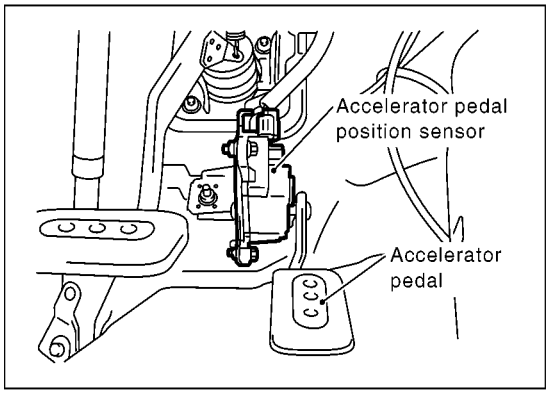

Refrigerant pressure sensor
harness connector

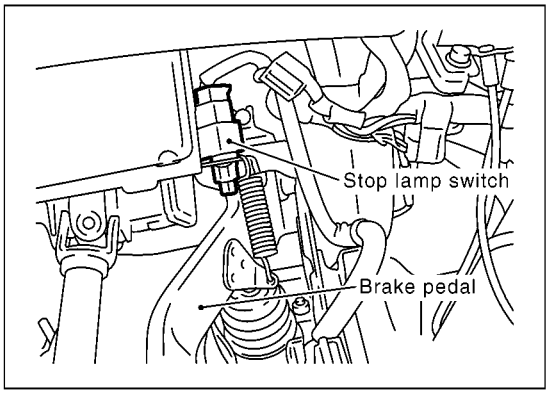

Intake manifold
Knock sensor


Electric throttle control
actuator

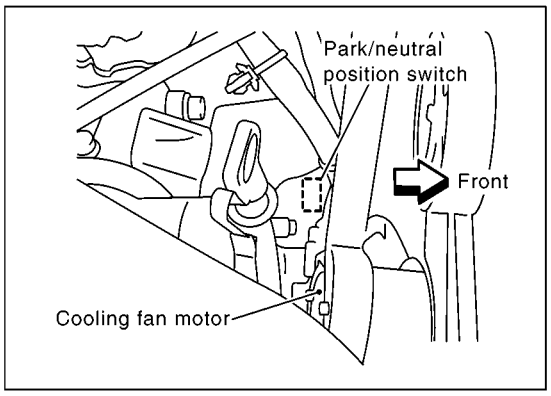

ECM
Battery

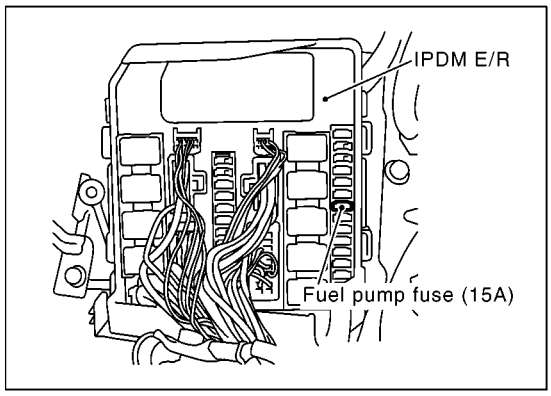

RHD models
Data link connector

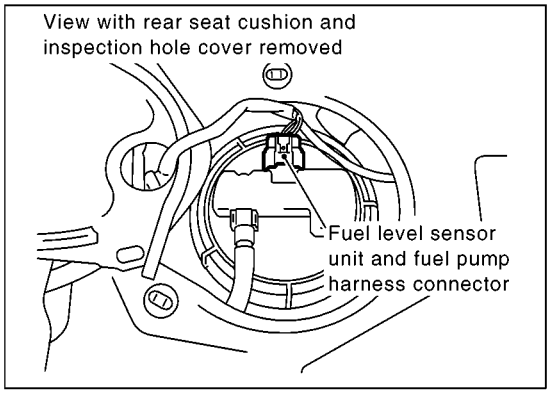

Accelerator pedal
position sensor
Accelerator
pedal

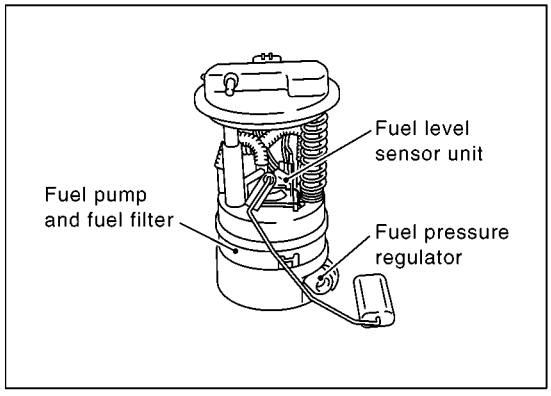

Stop lamp switch
Brake pedal

MBIB1071E

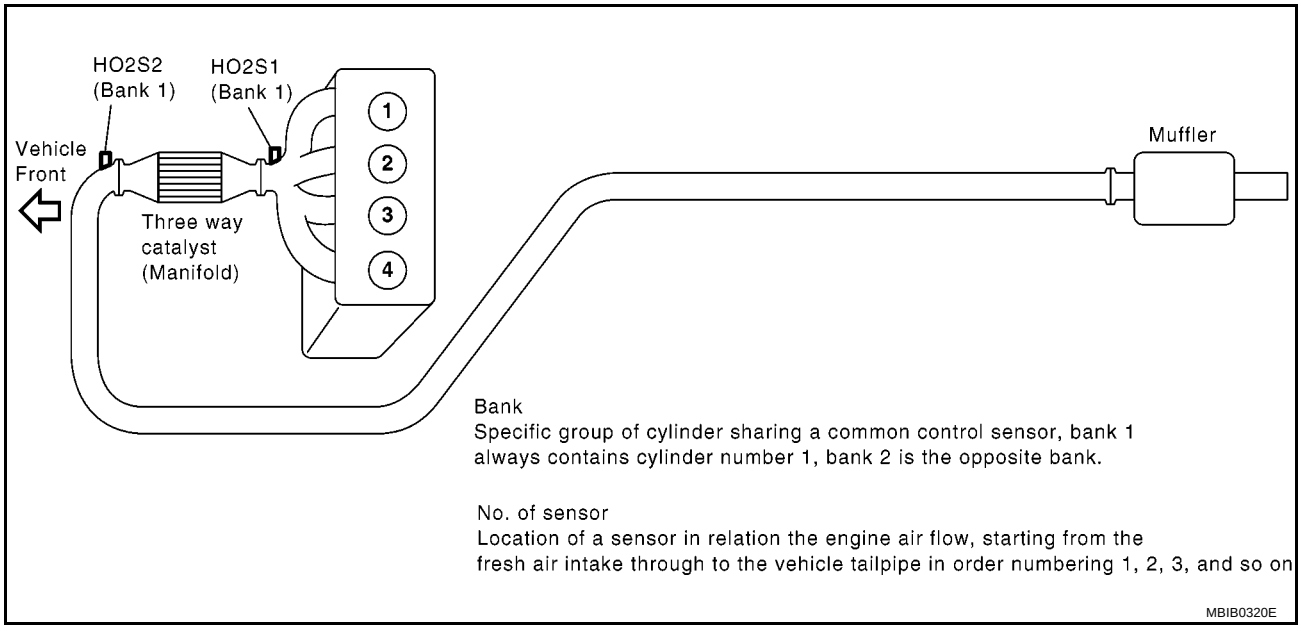

Park/neutral
position switch
Front
Cooling fan motor

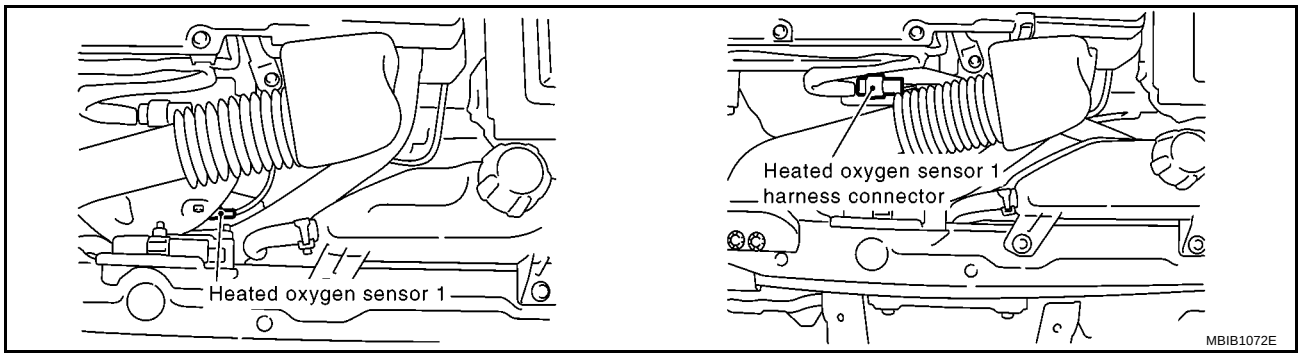

IPDM E/R
Fuel pump fuse (15A)

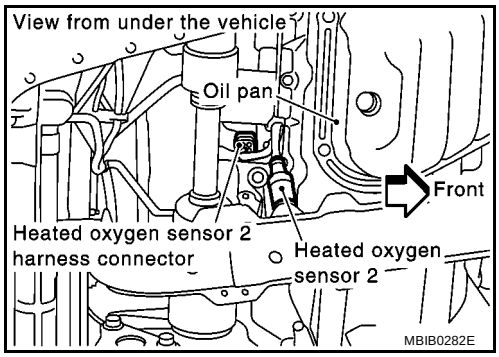

View with rear seat cushion and
inspection hole cover removed
Fuel level sensor
unit and fuel pump
harness connector


Fuel level
sensor unit
Fuel pump
and fuel filter
Fuel pressure
regulator

MBIB0318E

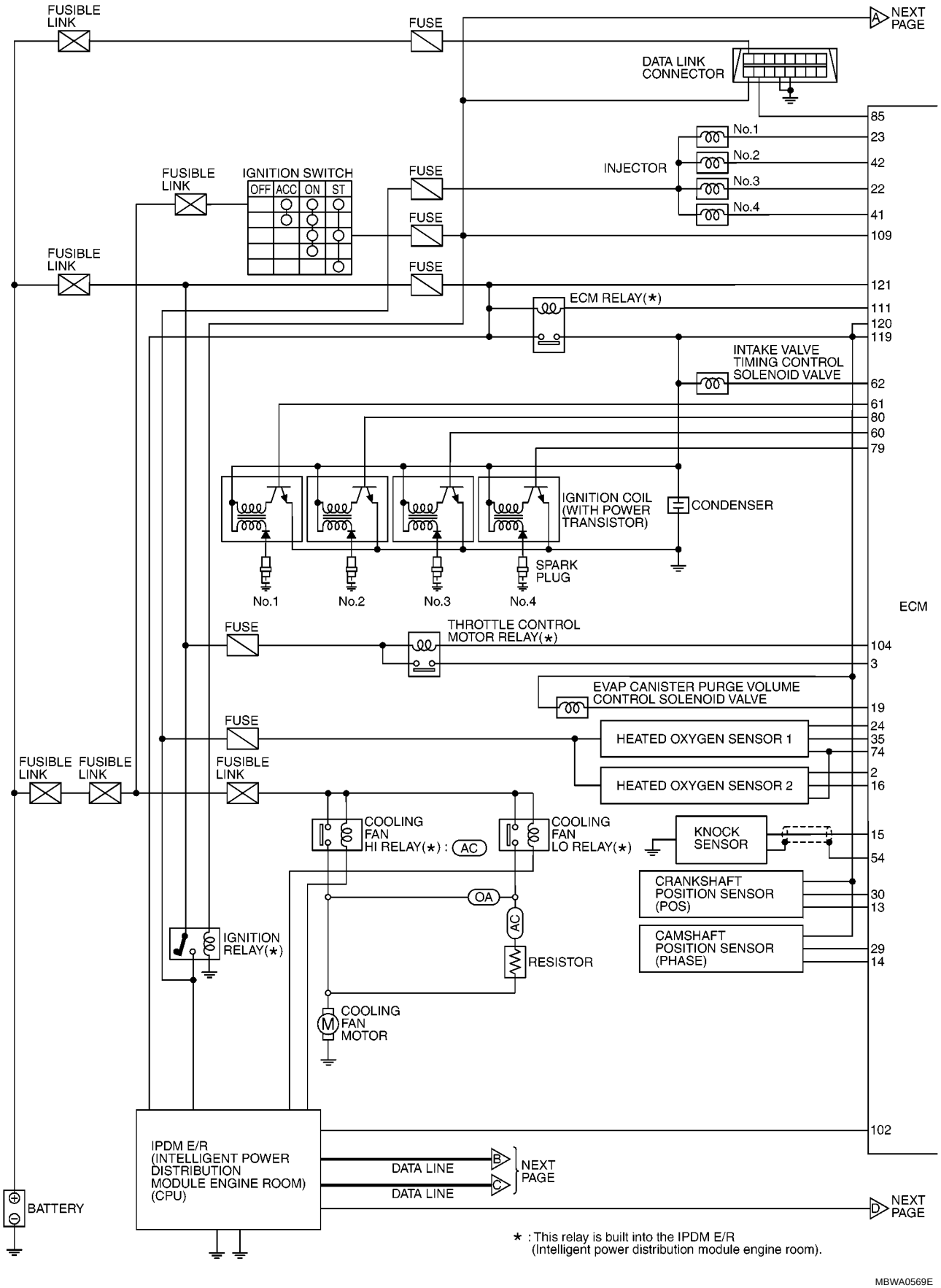

HO2S2
(Bank 1)
HO2S1
(Bank 1)
Vehicle
Front
Three way
catalyst
(Manifold)
1
2
3
4
Muffler
Bank
Specific group of cylinder sharing a common control sensor, bank 1
always contains cylinder number 1, bank 2 is the opposite bank.
No. of sensor
Location of a sensor in relation the engine air flow, starting from the
fresh air intake through to the vehicle tailpipe in order numbering 1, 2, 3, and so on
MBIB0320E

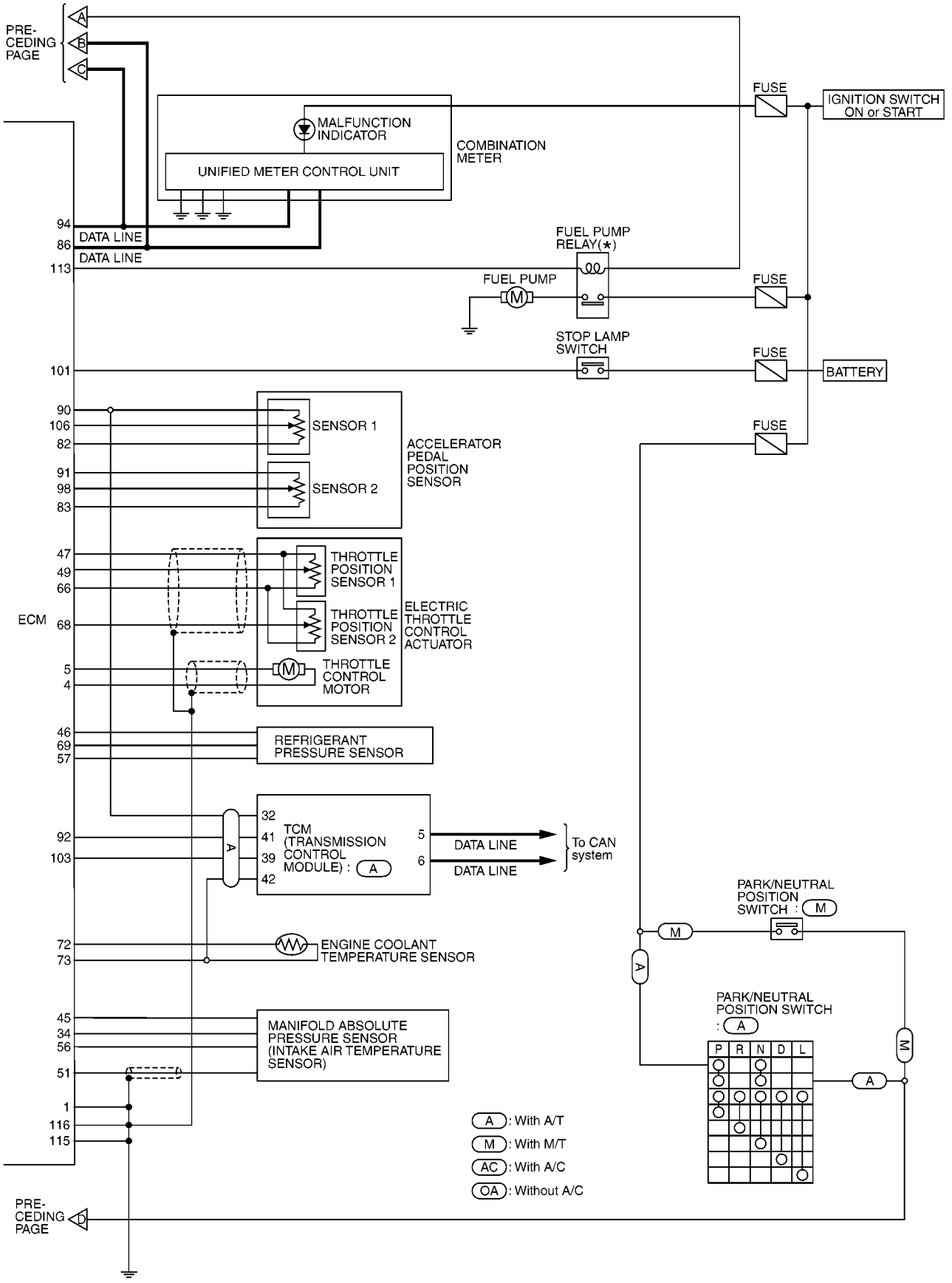

Heated oxygen sensor 1
Heated oxygen sensor 1
harness connector
MBIB1072E


View from under the vehicle
Oil pan
Front
Heated oxygen sensor 2
harness connector
Heated oxygen
sensor 2
MBIB0282E

Circuit Diagram

EBS00OKO

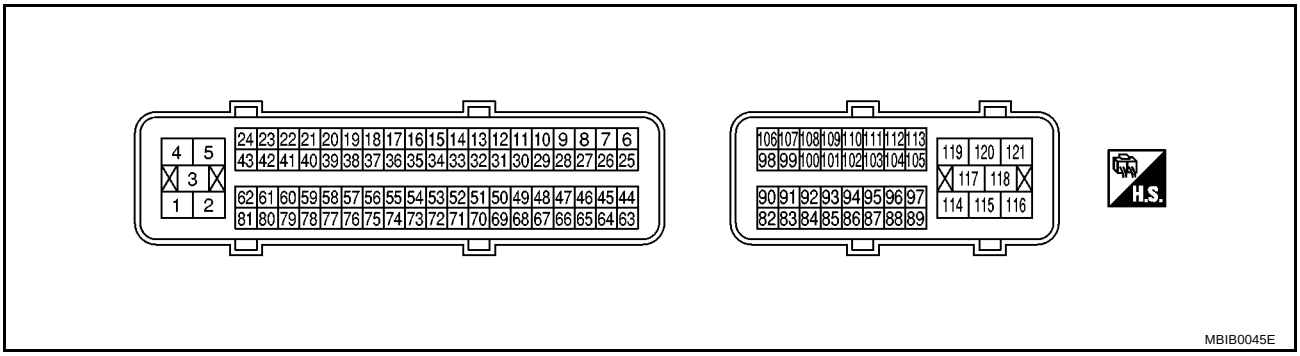



PRE-CEDING PAGE
A
B
C
MALFUNCTION INDICATOR
UNIFIED METER CONTROL UNIT
COMBINATION METER
FUSE
IGNITION SWITCH ON or START
94
DATA LINE
86
DATA LINE
113
FUEL PUMP RELAY(★)
FUEL PUMP
M
FUSE
STOP LAMP SWITCH
FUSE
101
BATTERY
90
106
82
SENSOR 1
ACCELERATOR PEDAL POSITION SENSOR
91
98
83
SENSOR 2
FUSE
47
49
66
THROTTLE POSITION SENSOR 1
ECM
68
THROTTLE POSITION SENSOR 2
ELECTRIC THROTTLE CONTROL ACTUATOR
5
4
M
THROTTLE CONTROL MOTOR
46
69
57
REFRIGERANT PRESSURE SENSOR
32
92
41
TCM (TRANSMISSION CONTROL MODULE) : A
103
39
42
A
5
DATA LINE
6
DATA LINE
To CAN system
PARK/NEUTRAL POSITION SWITCH : M
M
A
72
ENGINE COOLANT TEMPERATURE SENSOR
73
PARK/NEUTRAL POSITION SWITCH : A
45
34
56
MANIFOLD ABSOLUTE PRESSURE SENSOR (INTAKE AIR TEMPERATURE SENSOR)
51
P R N D L
M
A
1
116
115
A : With A/T
M : With M/T
AC : With A/C
OA : Without A/C
PRE-CEDING PAGE
D

MBWA0266E

ECM Harness Connector Terminal Layout

EBS00OKP

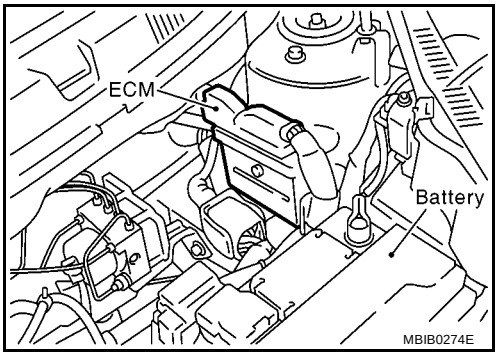


ECM Terminals and Reference Value

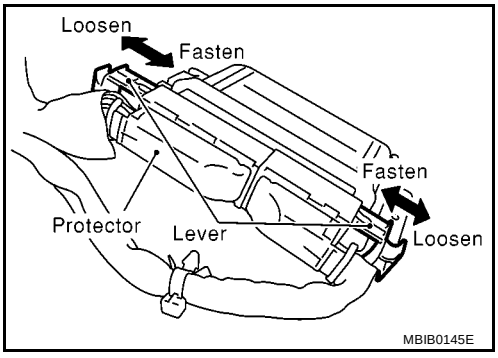
EBS00OKQ

PREPARATION

1. ECM is located left hand side of the engine room.
2. Remove ECM harness protector.



3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown in the figure.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
   - Use extreme care not to touch 2 pins at one time.
   - Data is for comparison and may not be exact.



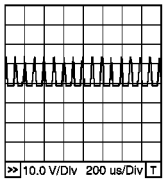
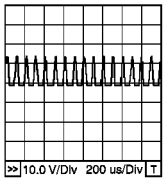
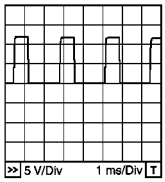
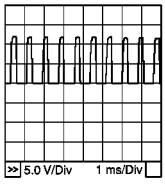
ECM INSPECTION TABLE

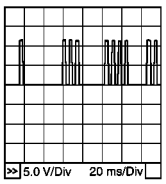
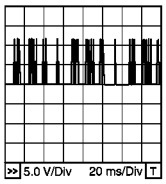
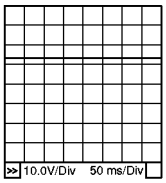
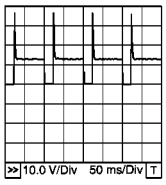
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

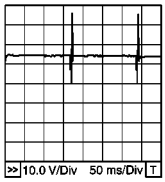
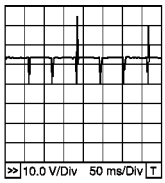
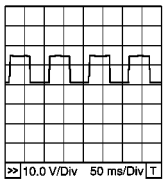
CAUTION:

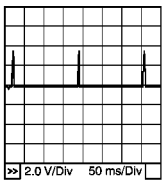
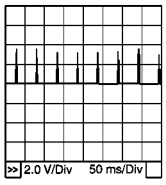
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

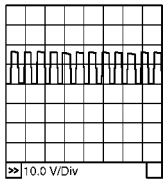
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground

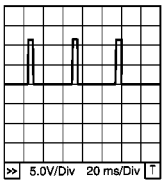
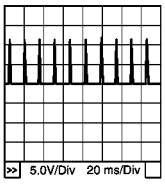
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	GY	Heated oxygen sensor 2 heater	**[Engine is running]** ● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - 1.0V
			[Ignition switch ON] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm (A/T models), 3,800 rpm (M/T models).	BATTERY VOLTAGE (11 - 14V)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
13	Y	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 3.0V★  PBIB0528E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	R	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  PBIB0526E
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
19	LG	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	OR L R GY	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E
24	Y	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed is below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
29	B	Sensor ground (Camshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
30	B	Sensor ground (Crankshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
34	OR	Intake air temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
45	L	Sensor power supply	**[Ignition switch ON]**	Approximately 5V
46	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch ON]**	Approximately 5V
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V
54	—	Sensor ground (Knock sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
56	B	Sensor ground (Manifold absolute pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
57	Y	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
60 61 79 80	Y PU G BR	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - 0.2V★  PBIB0522E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	LG	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● **Warm-up condition** ● When revving engine up to 2,000 rpm quickly	Approximately 4V - BATTERY VOLTAGE (11 - 14V)★  PBIB1790E
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V
69	BR	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are ON (Compressor operates.)	1.0 - 4.0V
72	P	Engine coolant temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
73	B	Sensor ground (Engine coolant temperature sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
85	LG	DATA link connector	**[Ignition switch ON]** ● CONSULT-II is disconnected.	BATTERY VOLTAGE (11 - 14V)
86	W	CAN communication line	**[Ignition switch ON]**	1.0 - 2.5V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
92	GY	Throttle position sensor signal output (A/T models)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Accelerator pedal: Fully released	Approximately 0.8V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Accelerator pedal: Fully depressed	Approximately 4.6V
94	R	CAN communication line	**[Ignition switch ON]**	2.5 - 4.0V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
101	W	Stop lamp switch	**[Ignition switch ON]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch ON] ● Brake pedal: Depressed	BATTERY VOLTAGE (11 - 14V)
102	GY	PNP switch	**[Ignition switch ON]** ● Gear position: P or N (A/T models) Neutral (M/T models)	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE (11 - 14V)
103	L/OR	Tachometer signal output (A/T models)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	10 - 11V★  MBIB0053E
			[Engine is running] ● Engine speed is 2,000 rpm	10 - 11V★  MBIB0054E
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V
109	PU	Ignition switch	**[Ignition switch OFF]**	0V
			[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
113	R	Fuel pump relay	**[Ignition switch ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
119 120	G G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
121	BR	Power supply for ECM (Back-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT-II Function (ENGINE)

EBS00OKR

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output of the specification for Basic fuel schedule, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
ECM part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes

- Freeze frame data
- 1st trip freeze frame data
- Others

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE					
			WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	DATA MONITOR (SPEC)	ACTIVE TEST
				DTC*1	FREEZE FRAME DATA*2			
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×	
		Camshaft position sensor (PHASE)		×		×	×	
		Manifold absolute pressure sensor		×		×	×	
		Engine coolant temperature sensor		×	×	×	×	×
		Heated oxygen sensor 1		×		×	×	
		Heated oxygen sensor 2		×		×	×	
		Vehicle speed signal			×	×	×	
		Accelerator pedal position sensor		×		×	×	
		Throttle position sensor		×		×	×	
		Intake air temperature sensor				×	×	
		Knock sensor		×				
		Refrigerant pressure sensor				×	×	
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×	
		Air conditioner switch				×	×	
		Park/neutral position (PNP) switch				×	×	
		Stop lamp switch		×		×	×	
		Battery voltage				×	×	
		Electrical load signal				×	×	
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Injectors				×	×	×
		Power transistor (Ignition timing)				×	×	×
		Throttle control motor relay		×		×	×	
		Throttle control motor		×				
		EVAP canister purge volume control solenoid valve				×	×	×
		Air conditioner relay				×	×	
		Fuel pump relay	×			×	×	×
		Cooling fan relay		×		×	×	×
		Heated oxygen sensor 1 heater				×	×	
		Heated oxygen sensor 2 heater				×	×	
		Intake valve timing control solenoid valve				×	×	×
		Calculated load value			×	×	×	

X: Applicable

*1: This item includes 1st trip DTCs.

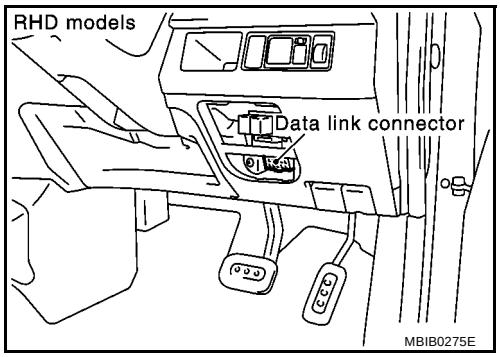
*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-509 .

INSPECTION PROCEDURE

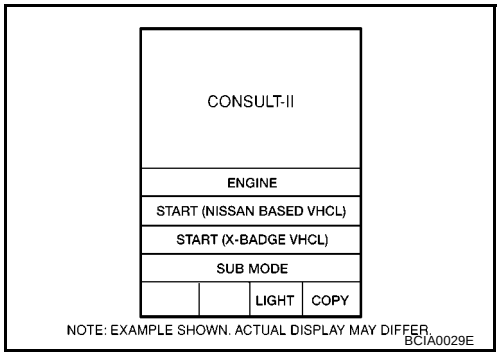
CAUTION:

If CONSULT-II is used with no connection to CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

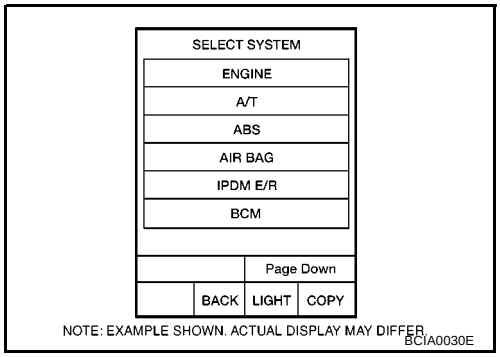
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector, which is located under drivers side dash panel.
3. Turn ignition switch ON.



4. Touch “START(NISSAN BASED VHCL)”.

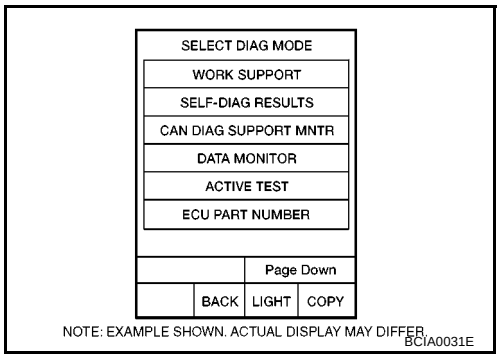


5. Touch “ENGINE”.
   If “ENGINE” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.



WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING START DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing the coefficient of self-learning control value
TARGET IGN TIM ADJ*	● IDLE CONDITION	When adjusting target ignition timing
TARGET IDLE RPM ADJ*	● IDLE CONDITION	When setting target idle speed

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC and 1st trip DTC, refer to EC-472, "INDEX FOR DTC" .

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to EC-472, "INDEX FOR DTC" .)
FUEL SYS-B1	● Fuel injection system status at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. Mode2: Open loop due to detected system malfunction Mode3: Open loop due to driving conditions (power enrichment, deceleration enleanment) Mode4: Closed loop - using oxygen sensor(s) as feedback for fuel control Mode5: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	● “Long-term fuel trim” at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	● “Short-term fuel trim” at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.
VEHICL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	● The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	● The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE
Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
ENG SPEED [rpm]	×	×	● Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	● Accuracy becomes poor if engine speed drops below the idle rpm. ● If the signal is interrupted while the engine is running, an abnormal value may be indicated.
COOLAN TEMP/S [°C] or [°F]	×	×	● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	● When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2S1 (B1) [V]	×	×	● The signal voltage of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1) [V]	×		● The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR (B1) [RICH/LEAN]	×	×	● Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH ... means the mixture became “rich”, and control is being affected toward a leaner mixture. LEAN ... means the mixture became “lean”, and control is being affected toward a rich mixture.	● After turning ON the ignition switch, “RICH” is displayed until air-fuel mixture ratio feedback control begins. ● When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR (B1) [RICH/LEAN]	×		● Display of heated oxygen sensor 2 signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large.	● When the engine is stopped, a certain value is indicated.
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When the engine is stopped, a certain value is indicated. ● This data also includes the data for the air-fuel ratio learning control.
VHCL SPEED SE [km/h] or [mph]	×	×	● The vehicle speed computed from the vehicle speed signal is displayed.	
BATTERY VOLT [V]	×	×	● The power supply voltage of ECM is displayed.	
B/FUEL SCHDL [msec]		×	● “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
ACCEL SEN 1 [V]	×	×	● The accelerator pedal position sensor signal voltage is displayed.	
ACCEL SEN 2 [V]	×			
THRTL SEN 1 [V]	×	×	● The throttle position sensor signal voltage is displayed.	
THRTL SEN 2 [V]	×			
INT/A TEMP SE [°C] or [°F]	×	×	● The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
TURBO BST SEN [V]	×		● The signal voltage of the manifold absolute pressure sensor is displayed.	

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
START SIGNAL [ON/OFF]	×	×	● Indicates start signal status [ON/OFF] computed by the ECM according to the signals of engine speed and battery voltage.	● After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	×	×	● Indicates idle position [ON/OFF] computed by the ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG [ON/OFF]	×	×	● Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL [ON/OFF]	×	×	● [ON/OFF] condition of the power steering oil pressure switch as determined by the power steering oil pressure signal is indicated.	
LOAD SIGNAL [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the electrical load signal. ON ... Rear window defogger switch is ON and/or lighting switch is in 2nd position. OFF ... Both rear window defogger switch and lighting switch are OFF.	
IGNITION SW [ON/OFF]	×		● Indicates [ON/OFF] condition from ignition switch.	
HEATER FAN SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]		×	● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	● When the engine is stopped, a certain computed value is indicated.
IGN TIMING [BTDC]		×	● Indicates the ignition timing computed by ECM according to the input signals.	● When the engine is stopped, a certain value is indicated.
CAL/LD VALUE [%]			● “Calculated load value” indicates the value of the current airflow divided by peak airflow.	
MASS AIRFLOW [g·m/s]			● Indicates the mass air flow computed by ECM according to the signal voltage of manifold absolute pressure sensor.	
PURG VOL C/V [%]			● Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. ● The opening becomes larger as the value increases.	
INT/V TIM (B1) [°CA]			● Indicates [°CA] of intake camshaft advanced angle.	
INT/V SOL (B1) [%]			● The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signals) is indicated. ● The advance angle becomes larger as the value increases.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
AIR COND RLY [ON/OFF]		×	● The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY [ON/OFF]		×	● Indicates the fuel pump relay control condition determined by ECM according to the input signals.	
THRTL RELAY [ON/OFF]		×	● Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN [HI/LOW/OFF]		×	● Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI ... High speed operation LOW ... Low speed operation OFF ... Stop	
HO2S1 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals.	
HO2S2 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals.	
IDL A/V LEARN [YET/CMPLT]			● Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully.	
TRVL AFTER MIL [km] or [mile]			● Distance traveled while MI is activated.	
O2 SEN HTR DTY [%]			● Indicates the heated oxygen sensor 1 heater control valve computed by the ECM according to the input signals.	
AC PRESS SEN [V]	×		● The signal voltage from the refrigerant pressure sensor is displayed.	
Voltage [V]			● Voltage, frequency, duty cycle or pulse width measured by the probe.	● Only “#” is displayed if item is unable to be measured. ● Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]				
DUTY-HI				
DUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		● Indicates the engine speed computed from the signal of the crankshaft position sensor (POS).	
B/FUEL SCHDL [msec]			● “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	● When engine is running specification range is indicated.
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When engine is running specification range is indicated. ● This data also includes the data for the air-fuel ratio learning control.

NOTE:
- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	● Engine: Return to the original trouble condition ● Change the amount of fuel injection using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Fuel injectors ● Heated oxygen sensor 1
IGNITION TIMING	● Engine: Return to the original trouble condition ● Timing light: Set ● Retard the ignition timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Perform Idle Air Volume Learning.
POWER BALANCE	● Engine: After warming up, idle the engine. ● A/C switch: OFF ● Shift lever: N ● Cut off each injector signal one at a time using CONSULT-II.	Engine runs rough or dies.	● Harness and connectors ● Compression ● Fuel injectors ● Power transistor ● Spark plugs ● Ignition coils
COOLING FAN*1	● Ignition switch: ON ● Turn the cooling fan ON and OFF with CONSULT-II.	Cooling fan moves and stops.	● Harness and connectors ● Cooling fan relay ● Cooling fan motor
ENG COOLANT TEMP	● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Engine coolant temperature sensor ● Fuel injectors
FUEL PUMP RELAY	● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay ON and OFF using CONSULT-II and listen to operating sound.	Fuel pump relay makes the operating sound.	● Harness and connectors ● Fuel pump relay

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
PURG VOL CONT/V	● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.	Engine speed changes according to the opening percent.	● Harness and connectors ● Solenoid valve
V/T ASSIGN ANGLE	● Engine: Return to the original trouble condition ● Change intake valve timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Intake valve timing control solenoid valve

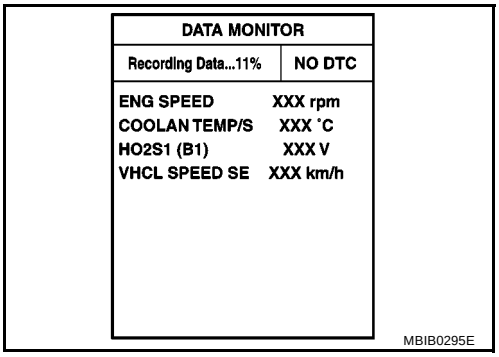
*1:Leaving cooling fan OFF with CONSULT-II while engine is running may cause the engine to overheat.

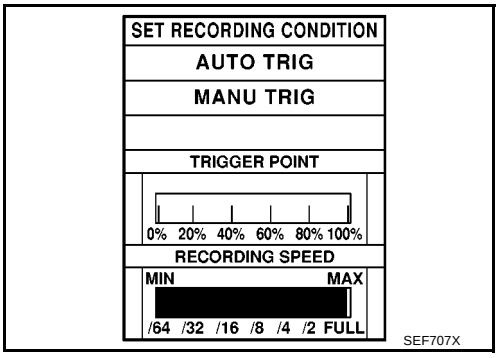
REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

Description

CONSULT-II has two kinds of triggers and they can be selected by touching “SETTING” in “DATA MONITOR” mode.

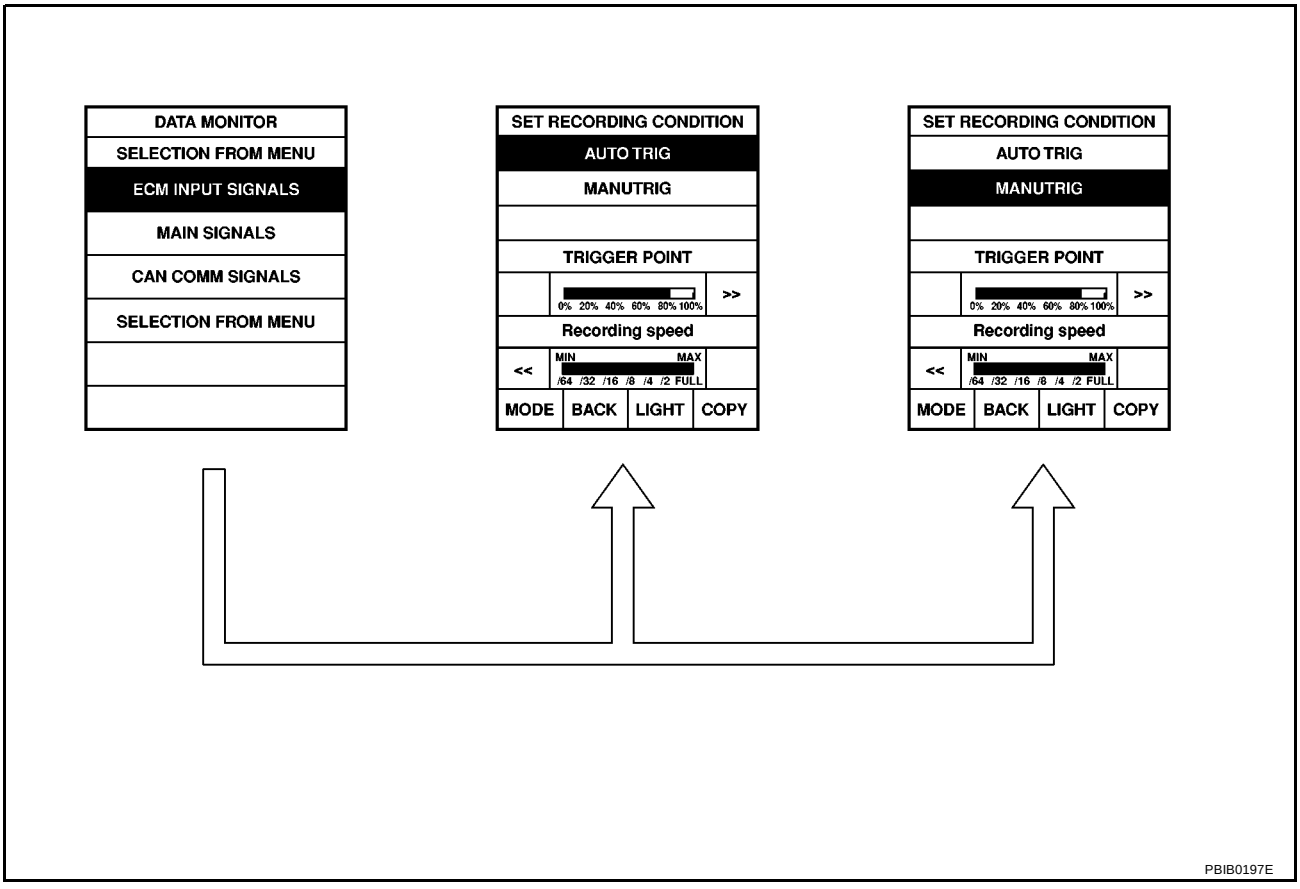
1. “AUTO TRIG” (Automatic trigger):
   - The malfunction will be identified on the CONSULT-II screen in real time.
     In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.
     At the moment a malfunction is detected by ECM, “MONITOR” in “DATA MONITOR” screen is changed to “Recording Data ... xx%” as shown in the figure, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, “REAL-TIME DIAG” screen is displayed. If “STOP” is touched on the screen during “Recording Data ... xx%”, “REAL-TIME DIAG” screen is also displayed.
     The recording time after the malfunction detection and the recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II OPERATION MANUAL.
2. “MANU TRIG” (Manual trigger):
   - DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.
     DATA MONITOR can be performed continuously even though a malfunction is detected.





Operation

1. “AUTO TRIG”
   - While trying to detect the DTC/1st trip DTC by performing the DTC Confirmation Procedure, be sure to select to “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
   - While narrowing down the possible causes, CONSULT-II should be set in “DATA MONITOR (AUTO TRIG)” mode, especially in case the incident is intermittent.
     When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the DTC Confirmation Procedure, the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to Incident Simulation Tests in GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" .)
2. “MANU TRIG”
   - If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OKT

Remarks:
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
  * Specification data may not be directly related to their components signals/values/operations.
  i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION
ENG SPEED	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.		Almost the same speed as the tachometer indication.
B/FUEL SCHDL	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T modes) ● Air conditioner switch: OFF ● No load	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
A/F ALPHA-B1	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	54% - 155%
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	LEAN ←→ RICH
VEH SPEED SE	● Turn drive wheels and compare CONSULT-II value with the speedometer indication.		Almost the same speed as the speedometer indication.
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*2	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRTL SEN1 THRTL SEN2*1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	More than 0.36V
	● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully depressed	Less than 4.75V
TURBO BST SEN	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	At idle	Approximately 1.5V
		At 2,500 rpm	Approximately 1.2V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T models) Neutral (M/T models)	ON
		Shift lever: Except above	OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel is in neutral position. (Forward direction)	OFF
		Steering wheel is turned.	ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF
IGNITION SW	● Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan is operating.	ON
		Heater fan is not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	0° - 10° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s
PURG VOL C/V	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%
INT/V TIM (B1)	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	–5° - 5°CA
		When revving up to 2,000 rpm quickly	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N (A/T models) Neutral (M/T models) ● No load	Idle	0% - 2%
		When revving up to 2,000 rpm quickly	Approx. 0% - 50%
AIR COND RLY	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking		ON
	● Except above conditions		OFF
THRTL RELAY	● Ignition switch: ON		ON

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (210°F)	LOW*2
		Engine coolant temperature is 105°C (212°F) or more	HIGH*2
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm		ON
	● Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.		ON
	● Engine speed: Above 3,600 rpm (A/T models), 3,800 rpm (M/T models)		OFF
TRVL AFTER MIL	● Ignition switch: ON	Vehicle has traveled after MI has turned ON.	0 - 65,535 km (0 - 40,723 mile)
O2SEN HTR DTY	● Engine coolant temperature when engine started: More than 80°C (176°F) ● Engine speed: below 3,600 rpm		Approx. 50%
AC PRESS SEN	● Ignition switch: ON (Engine stopped)		Approx. 0V
	● Engine: Idle ● Air conditioner switch: OFF		1.0 - 4.0V

*1 : Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

*2 : Models without air conditioner, cooling fan operates only ON and OFF operation, but CONSULT-II display will change OFF, LOW and HI depends on engine coolant temperature.

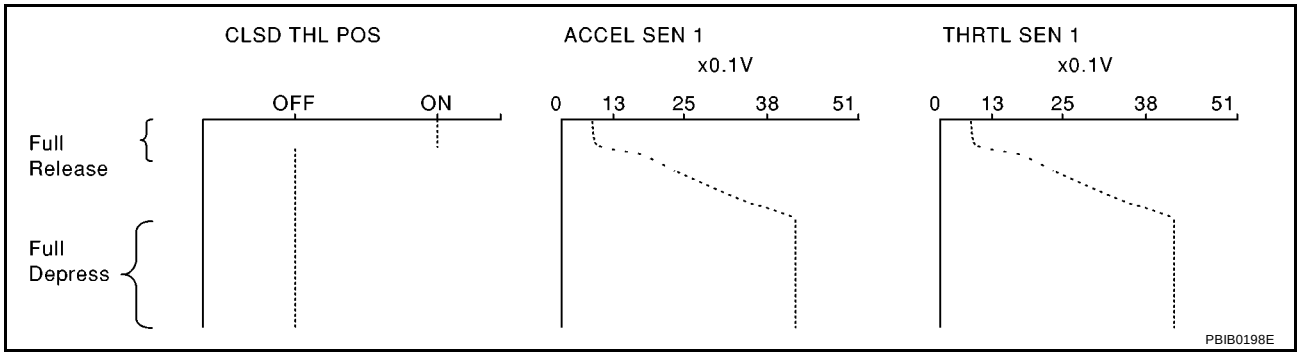
Major Sensor Reference Graph in Data Monitor Mode

EBS00OKU

The following are the major sensor reference graphs in “DATA MONITOR” mode.

CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

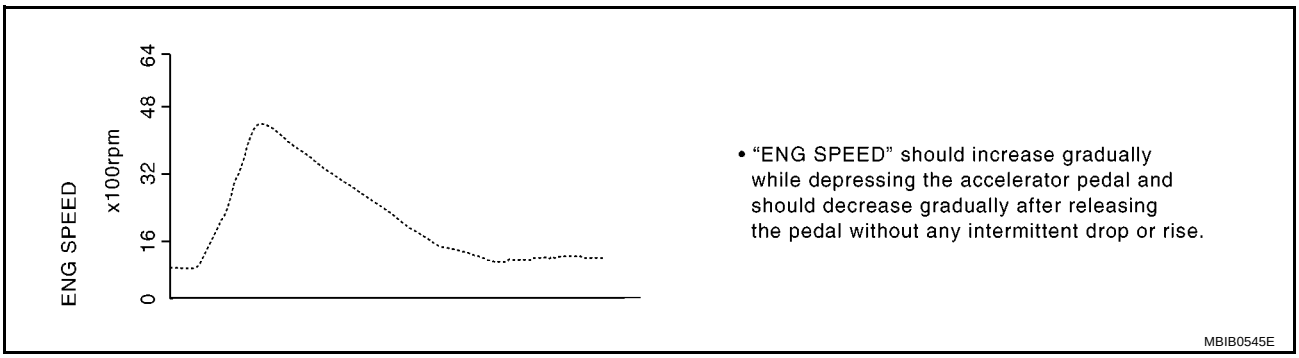
Below is the data for “CLSD THL POS”, “ACCEL SEN 1” and “THRTL SEN 1” when depressing the accelerator pedal with the ignition switch ON and with selector lever in D position (A/T models) or with shift lever in 1st position (M/T models).
The signal of “ACCEL SEN 1” and “THRTL SEN 1” should rise gradually without any intermittent drop or rise after “CLSD THL POS” is changed from “ON” to “OFF”.

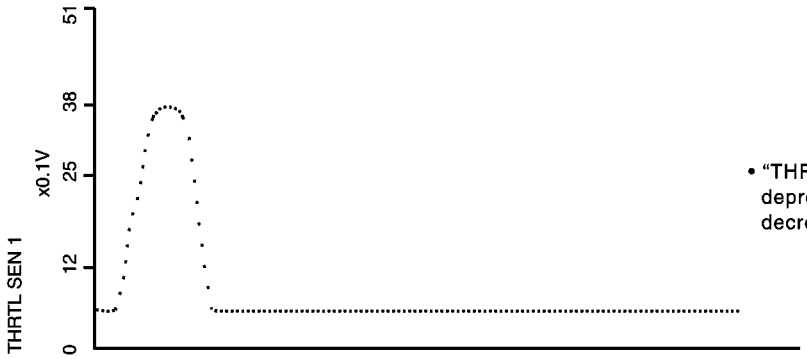


ENG SPEED, THRTL SEN 1, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

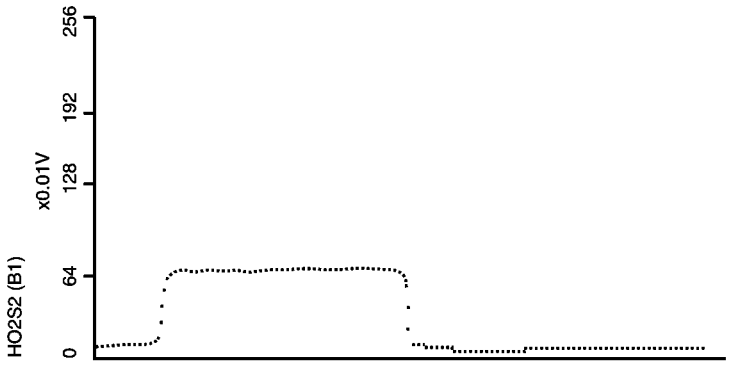
Below is the data for “ENG SPEED”, “THRTL SEN 1”, “HO2S2 (B1)”, “HO2S1 (B1)” and “INJ PULSE-B1” when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

Each value is for reference, the exact value may vary.

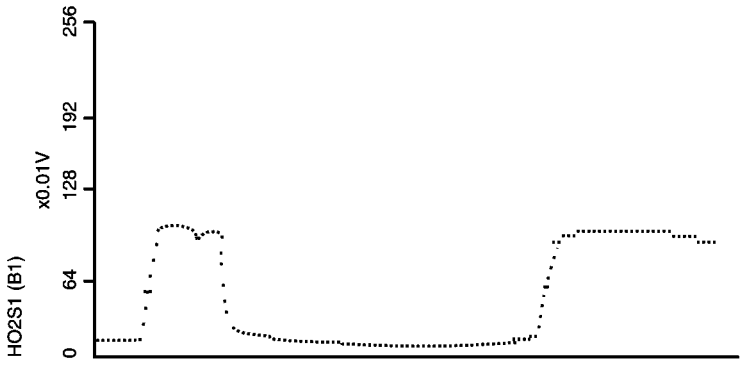




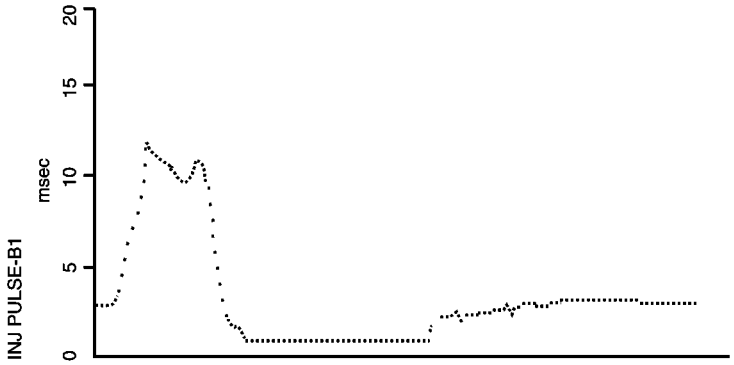
• "THRTL SEN 1" should increase while depressing the accelerator pedal and should decrease while releasing it.



• "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



• "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



• "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

PBIB0668E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

EBS00OKV

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of the Engine Control System. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.
The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MI.
The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)

Testing Condition

EBS00OKW

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (0.983 - 1.043 bar, 1.003 - 1.064 kg/cm^2 , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up*1
- Electrical load: Not applied*2
- Engine speed: Idle

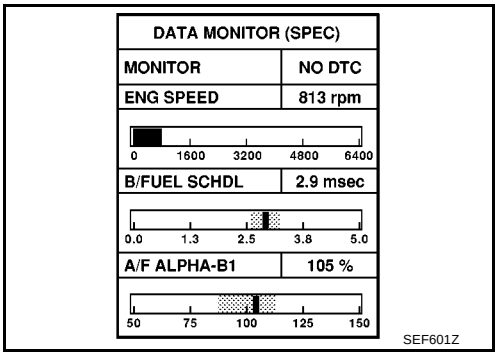
*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates more than 60°C (140°F).
For M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.
*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Steering wheel is straight ahead.

Inspection Procedure

EBS00OKX

NOTE:
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

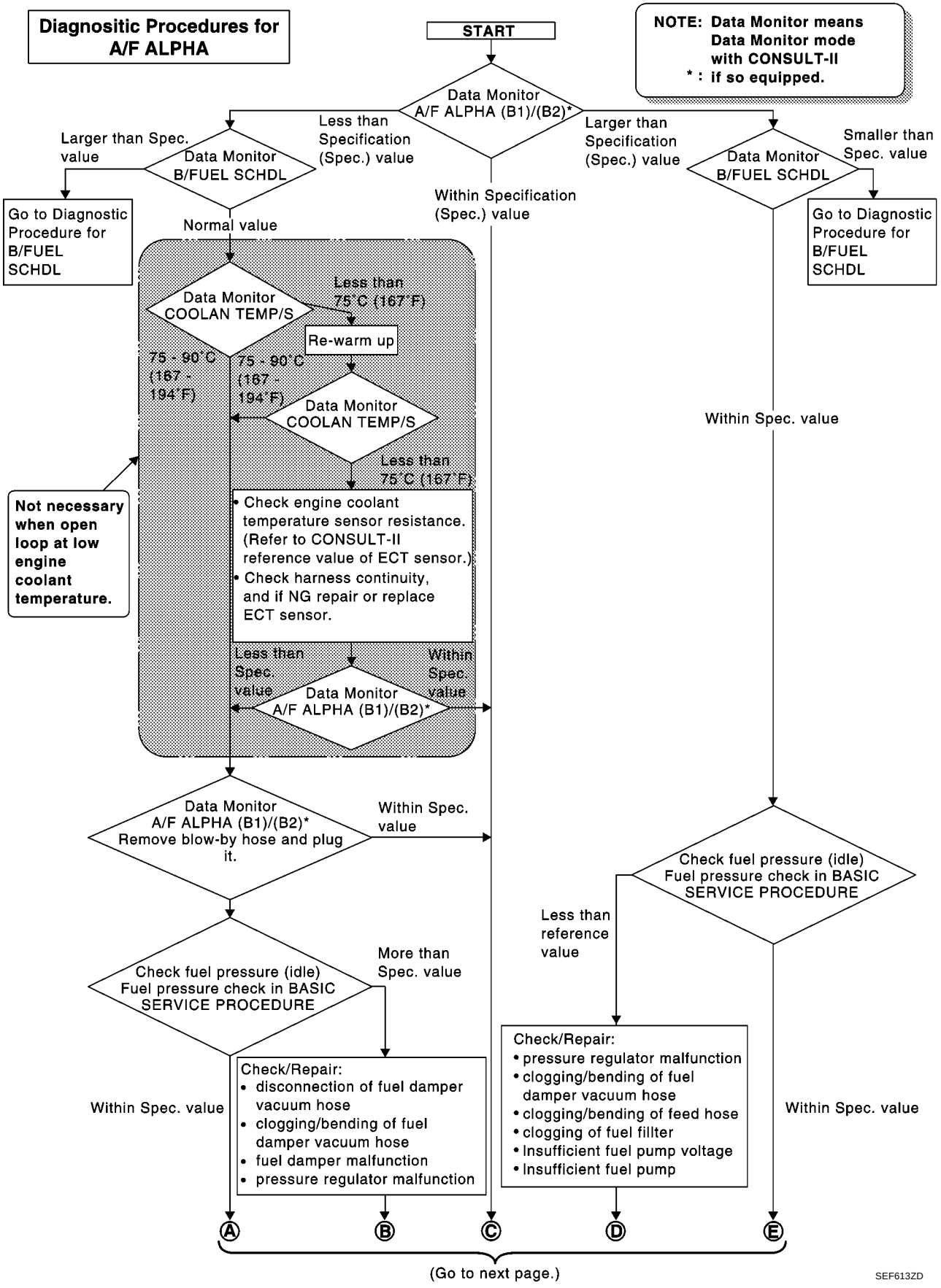
1. Perform EC-522, "Basic Inspection" .
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL” and “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to EC-562, "Diagnostic Procedure" .

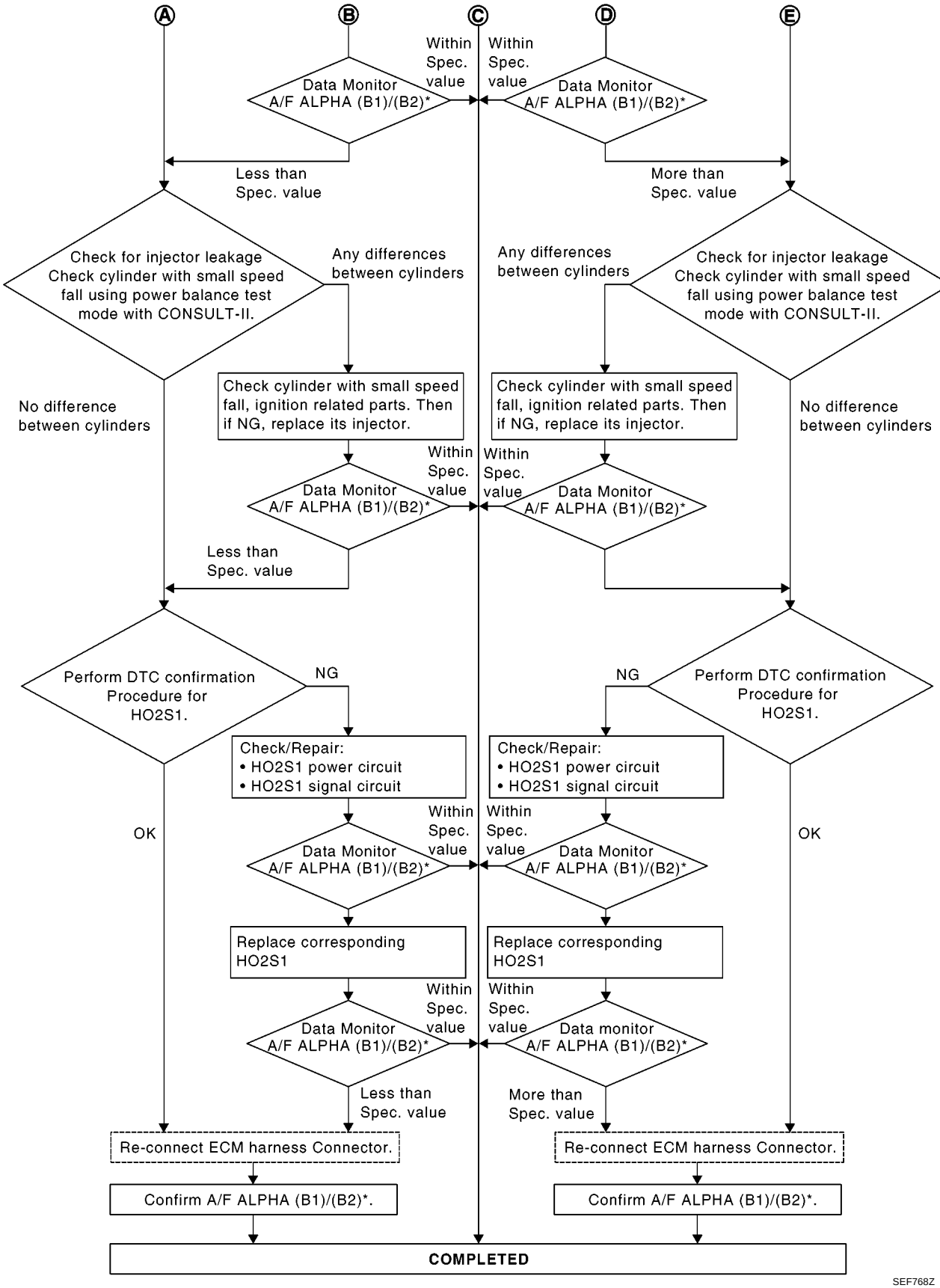


Diagnostic Procedure

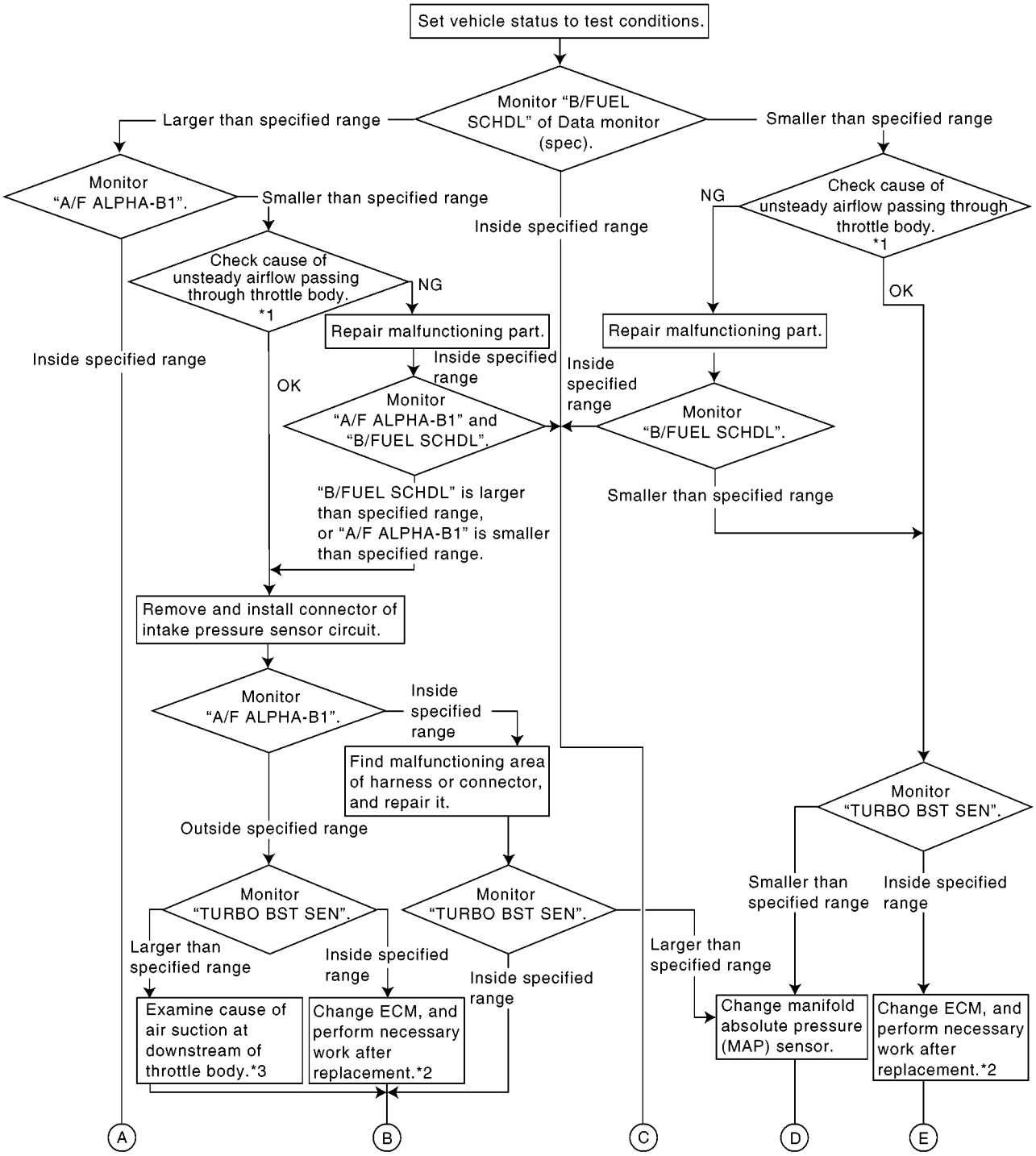
EBS00OKY

CHECK A/F ALPHA–B1




Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Within Spec. value
Data Monitor A/F ALPHA (B1)/(B2)*
Less than Spec. value
More than Spec. value
Check for injector leakage Check cylinder with small speed fall using power balance test mode with CONSULT-II.
Any differences between cylinders
No difference between cylinders
Check cylinder with small speed fall, ignition related parts. Then if NG, replace its injector.
Perform DTC confirmation Procedure for HO2S1.
NG
OK
Check/Repair:
• HO2S1 power circuit
• HO2S1 signal circuit
Replace corresponding HO2S1
Data monitor A/F ALPHA (B1)/(B2)*
Re-connect ECM harness Connector.
Confirm A/F ALPHA (B1)/(B2)*.
COMPLETED
SEF768Z

CHECK B/FUEL SCHDL



*1
Inspection Location
- Crushed air duct
- Improper sealing of air cleaner element
- Unevenly dirty air cleaner element
- Different specification of intake air system part

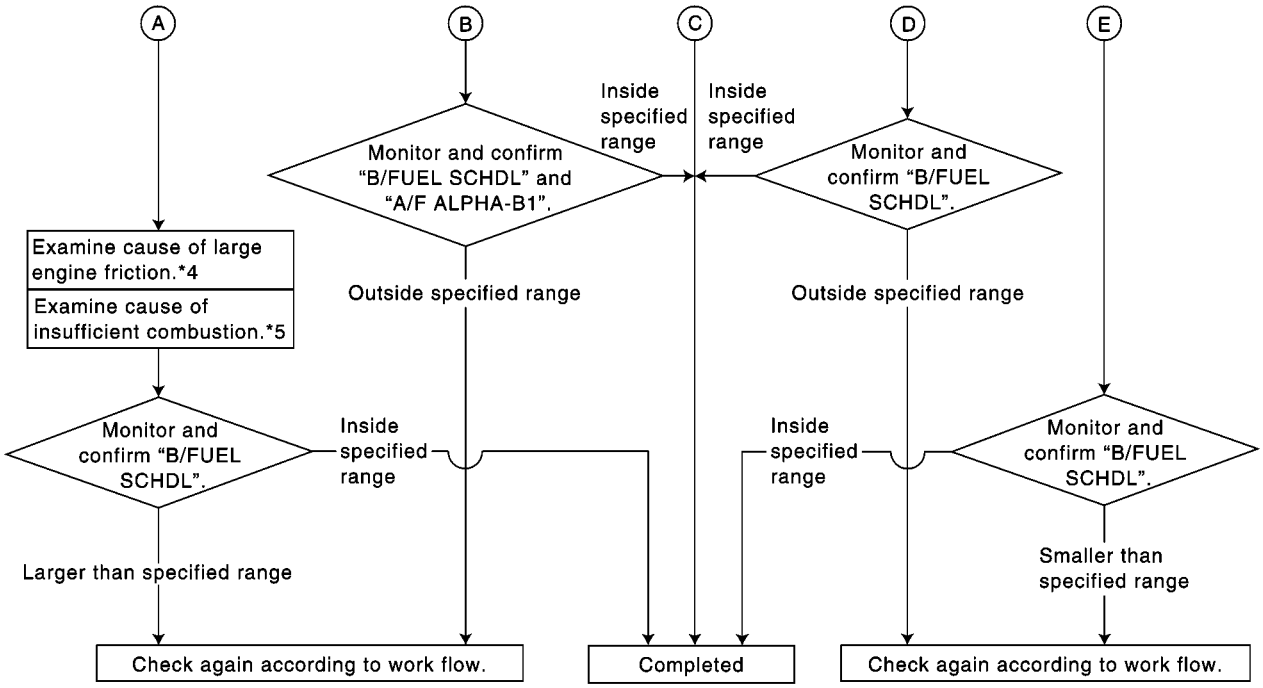
etc.

*2
Refer to ECM Removal and Installation procedure in Service Manual.

*3
Inspection Location
- Disconnection, looseness, or cracks of air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open sticking, breakage, hose disconnection, or cracks of blow-by gas control valve
- Disconnection or cracks of EVAP canister purge hose, open sticking of EVAP canister purge volume control valve
- Improper sealing of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts.
- Improper sealing of intake air system part gasket

etc.

PBIA1516E



*4
Inspection Location
- Overhigh engine oil level
- Engine oil viscosity
- Over-tensioned belt of power steering, alternator, and air conditioner compressor, unusual noise, or binding of pulley
- Unusual noise of engine
- Unusual noise of gear change

etc.

*5
Inspection Location
- EGR valve sticking
- Improper valve clearance
- Malfunction of intake valve timing control function
- Improper installation of camshaft sprocket

etc.

MBIB0658E

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

EBS00OKZ

Intermittent incidents (I/I) may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common I/I Report Situations

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than 0 or [1t].
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
VI	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnostic Procedure

EBS00OL0

1. INSPECTION START

Erase (1st trip) DTCs. Refer to EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.
Refer to GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “Incident Simulation Tests”, “Ground Inspection”.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" , “Incident Simulation Tests”.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace.

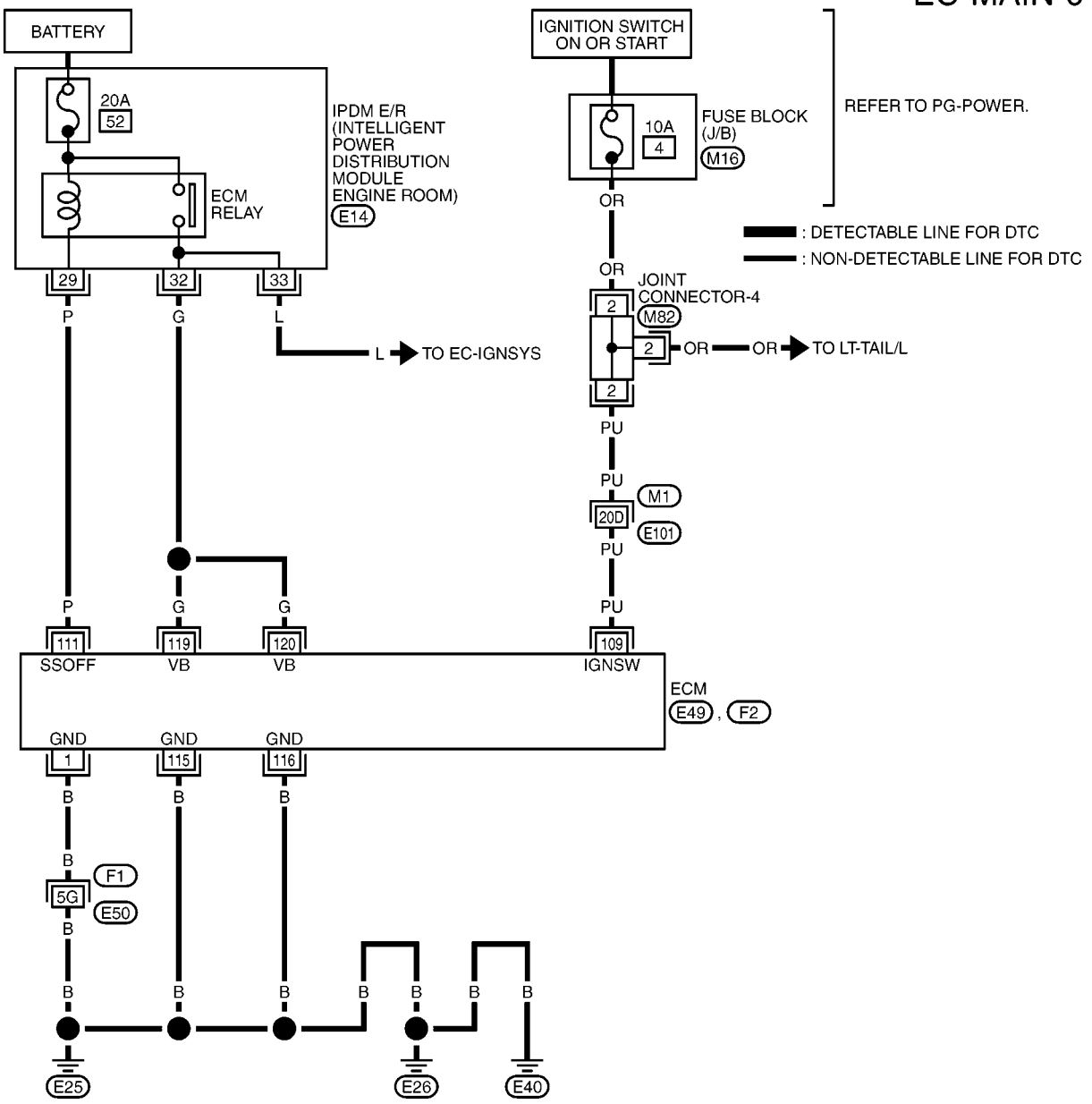
POWER SUPPLY CIRCUIT FOR ECM

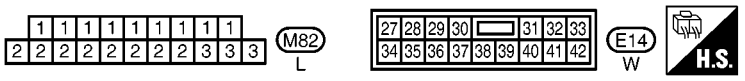
PFP:24110

Wiring Diagram

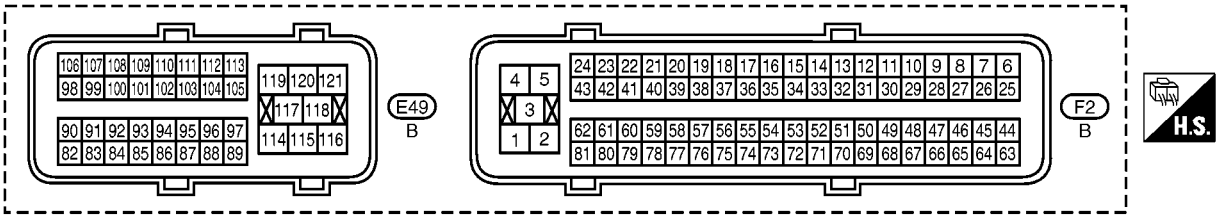
EBS00OL1

EC-MAIN-01





REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)



MBWA0570E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1 115 116	B B B	ECM ground	**[Engine is running]** ● Idle speed	Engine ground
109	PU	Ignition switch	**[Ignition switch OFF]**	0V
			[Ignition switch ON]	BATTERY VOLTAGE (11 - 14V)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	G G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

EBS00OL2

1. INSPECTION START

Start engine.

Is engine running?

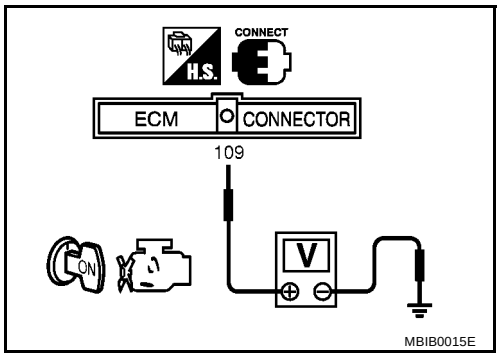
Yes or No

Yes >> GO TO 8.
No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101
- Fuse block (J/B) connector M16
- Joint connector-4
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair harness or connectors.

4. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between ECM and engine ground

>> Repair open circuit or short to power in harness or connectors.

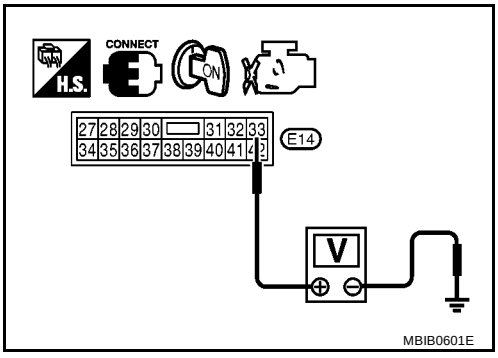
6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Reconnect ECM harness connector.
2. Turn ignition switch ON.
3. Check voltage between IPDE E/R harness connector E14 terminal 33 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

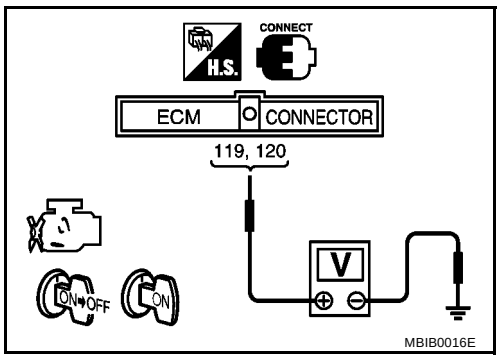
OK >> Go to EC-792, "IGNITION SIGNAL" .
NG >> GO TO 7.



7. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch ON and then OFF.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.



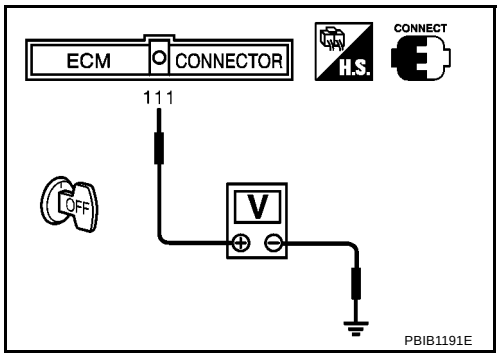
OK or NG

OK >> GO TO 13.
NG (Battery voltage does not exist.)>>GO TO 8.
NG (Battery voltage exists for more than a few seconds.)>>GO TO 13.

8. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 11.
NG >> GO TO 9.

9. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminal 111 and IPDM E/R terminal 29. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK 20A FUSE

1. Disconnect 20A fuse from IPDM E/R.
2. Check 20A fuse.

OK or NG

OK >> GO TO 13.
NG >> Replace 20A fuse.

11. CHECK ECM POWER SUPPLY CIRCUIT-VI

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector.
3. Check harness continuity between ECM terminals 119, 120 and IPDM E/R terminal 32. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminals 1, 115, 116 and engine ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to power in harness or connectors.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R.
NG >> Repair open circuit or short to power in harness or connectors.

DTC U1000, U1001 CAN COMMUNICATION LINE

PFP:23710

Description

EBS00OL3

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

On Board Diagnosis Logic

EBS00OL4

The MI will not light up for these self-diagnoses.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000 1000	CAN communication line	● ECM cannot communicate to other control units. ● ECM cannot communicate for more than the specified time.	● Harness or connectors (CAN communication line is open or shorted.)
U1001 1001			

DTC Confirmation Procedure

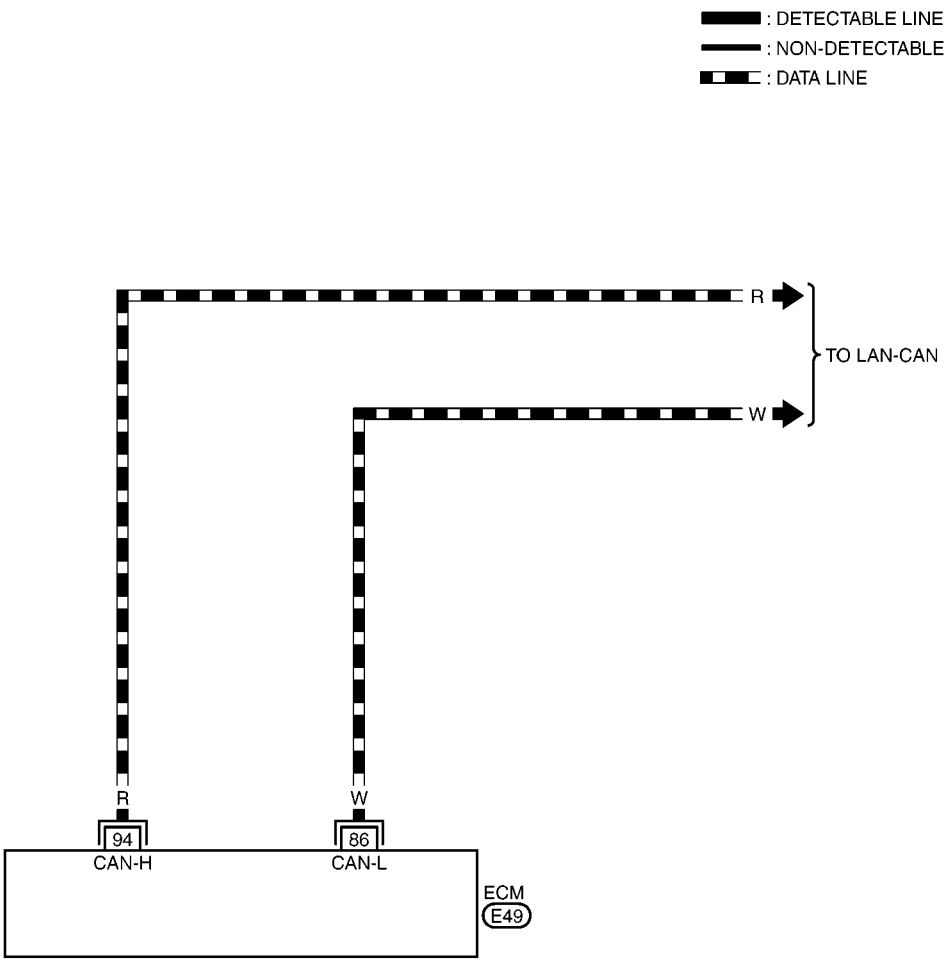
EBS00OL5

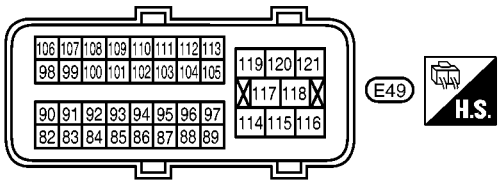
1. Turn ignition switch ON and wait at least 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If 1st trip DTC or DTC is detected, go to EC-574, "Diagnostic Procedure" .

Wiring Diagram

EBS00OL6

EC-CAN-01





MBWA0268E

Diagnostic Procedure

EBS00OL7

Go to LAN-4, "Precautions When Using CONSULT-II" .

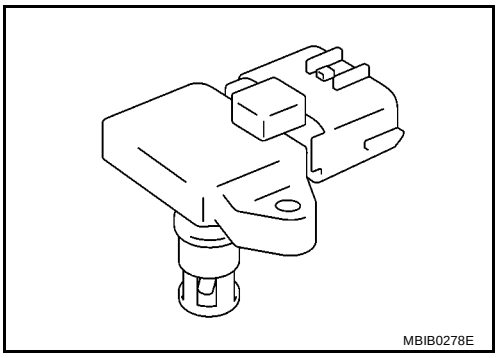
DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR

PFP:22365

Component Description

EBS00OL8

The manifold absolute pressure (MAP) sensor is placed intake manifold corrector. It detects intake manifold pressure and sends the voltage signal to the ECM, ECM uses the signal to compute intake air volume value.
The sensor uses a silicon diaphragm which is sensitive to the change in pressure. As the pressure increase, the voltage rises.


MBIB0278E

On Board Diagnosis Logic

EBS00OL9

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0107 0107	Manifold absolute pressure sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Manifold absolute pressure sensor
P0108 0108	Manifold absolute pressure sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted) ● Manifold absolute pressure sensor ● Intake air leaks

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and MI lights up.

Detected items	Engine operating condition in fail-safe mode
Manifold absolute pressure sensor circuit	Engine speed will not rise more than 2,500 rpm due to the fuel cut.

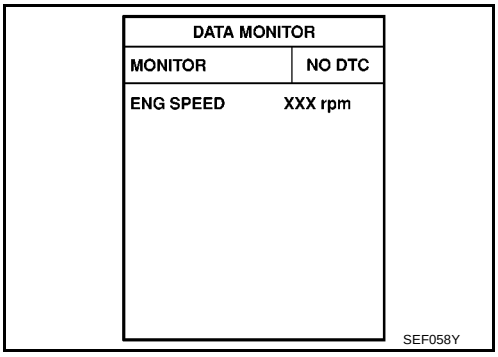
DTC Confirmation Procedure

EBS00OLA

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If the 1st trip DTC is detected, go to EC-577, "Diagnostic Procedure" .



SEF058Y

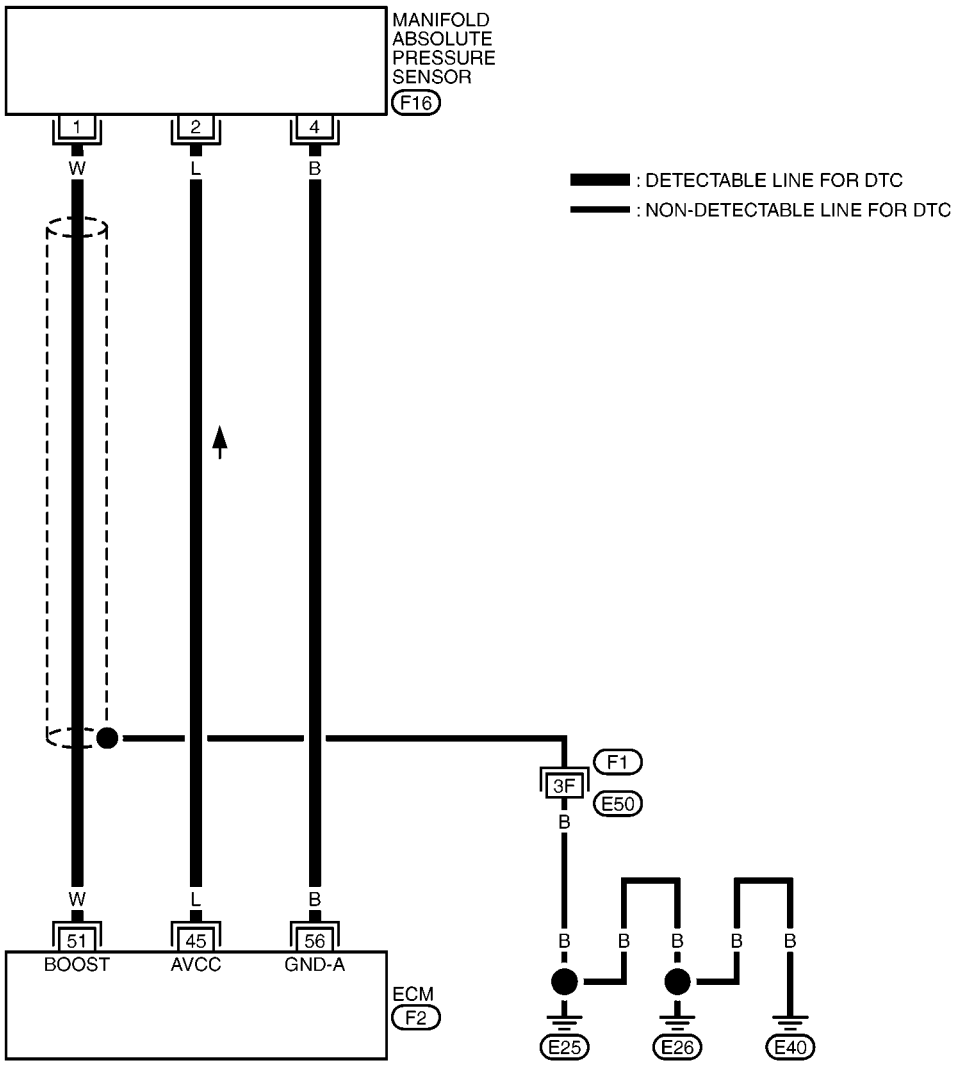
WITHOUT CONSULT-II

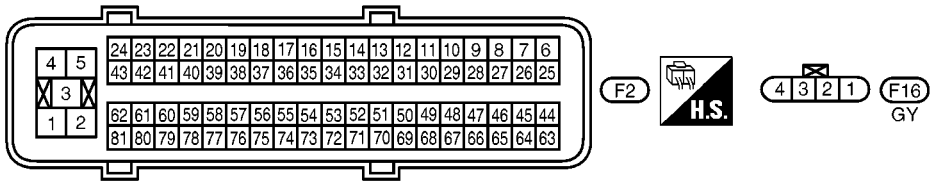
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-577, "Diagnostic Procedure" .

Wiring Diagram

EBS00OLB

EC-AP/SEN-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0304E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

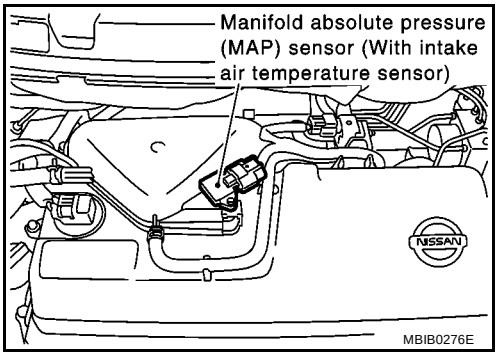
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V

Diagnostic Procedure

EBS00OLC

1. CHECK MAP SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor harness connector.
3. Turn ignition switch ON.

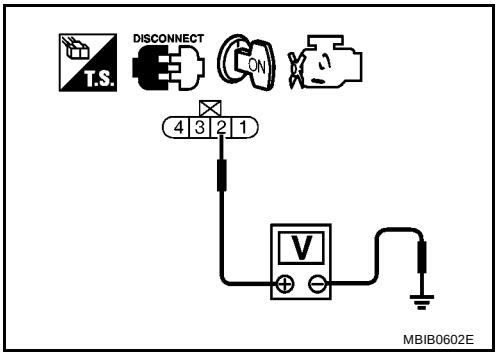


4. Check voltage between MAP sensor terminal 2 and ground.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 2.
NG >> Repair harness or connectors.



2. CHECK MAP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between MAP sensor terminal 4 and ECM terminal 56
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK MAP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAP sensor terminal 1 and ECM terminal 51.
   Refer to Wiring Diagram

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK MAP SENSOR

Refer to EC-578, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace manifold absolute pressure sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

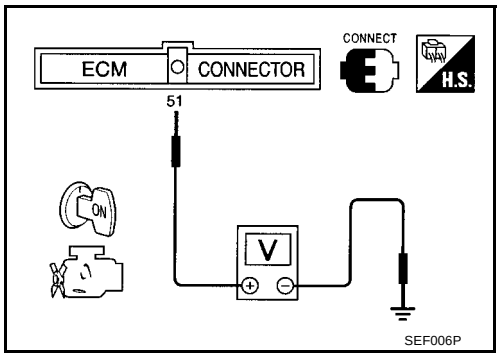
Component Inspection

EBS00OLD

MANIFOLD ABSOLUTE PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 5 seconds and then turn ON.
4. Check voltage between ECM terminal 51 (manifold absolute pressure sensor signal) and ground.

   NOTE:
   - To avoid the affection of intake manifold vacuum, check the voltage 1 or more minutes past after engine is stopped.
   - Because the sensor is absolute pressure sensor, output value may differ depends on atmospheric pressure and altitude.



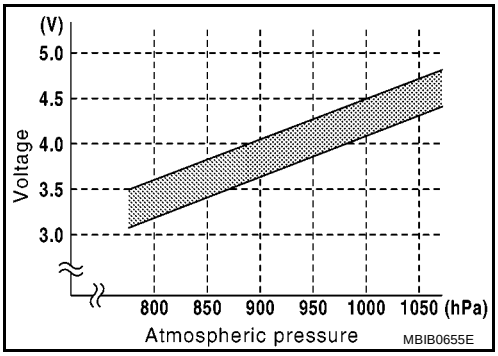
5. Measure the atmospheric pressure.

   NOTE:
   As atmospheric pressure describe on synoptic chart is value at sea level, please compensate the actual pressure with the following chart.

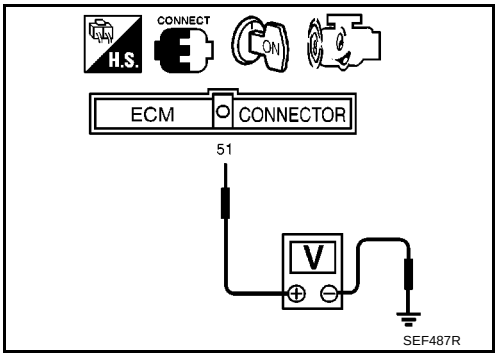
Altitude	Compensated pressure
0m	0hPa
200m	-24hPa
400m	-47hPa
600m	-70hPa
800m	-92hPa
1,000m	-114hPa
1,500m	-168hPa
2,000m	-218hPa

6. Check the manifold absolute pressure sensor value corresponds to the atmospheric pressure.

Atmospheric pressure	Voltage
800hPa	3.2 - 3.6v
850hPa	3.4 - 3.8v
900hPa	3.7 - 4.1v
960hPa	3.9 - 4.3v
1,000hPa	4.1 - 4.5v
1,050hPa	4.3 - 4.7v



7. Start engine and let it idle.
8. Check the voltage between ECM terminal 51 and ground at idling and confirm the voltage difference between engine is stopped and at idling is within following chart.



Intake manifold vacuum	Voltage difference
-40kPa (-300mmHg)	1.6 - 2.0v
-53.3kPa (-400mmHg)	2.2 - 2.6v
-66.7kPa (-500mm)	2.8 - 3.2v
-80kPa (-600mmHg)	3.4 - 3.8v

EBS00OLE

Removal and Installation

MANIFOLD ABSOLUTE PRESSURE SENSOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

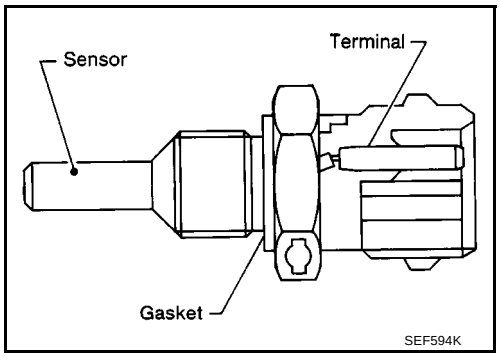
DTC P0117, P0118 ECT SENSOR

PFP:22630

Component Description

EBS00OLF

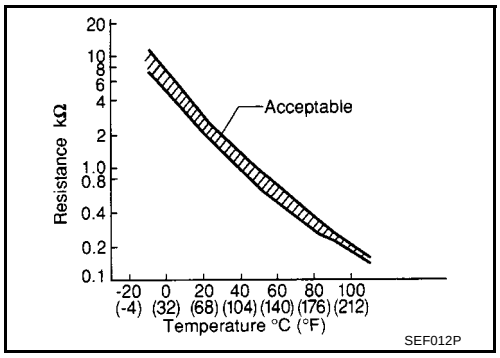
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 72 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

EBS00OLG

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When this malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START. CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
	When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.	

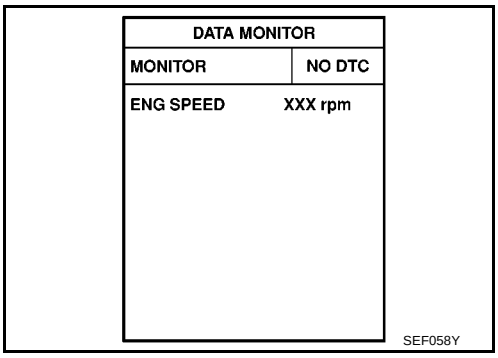
DTC Confirmation Procedure

EBS00OLH

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-583, "Diagnostic Procedure" .



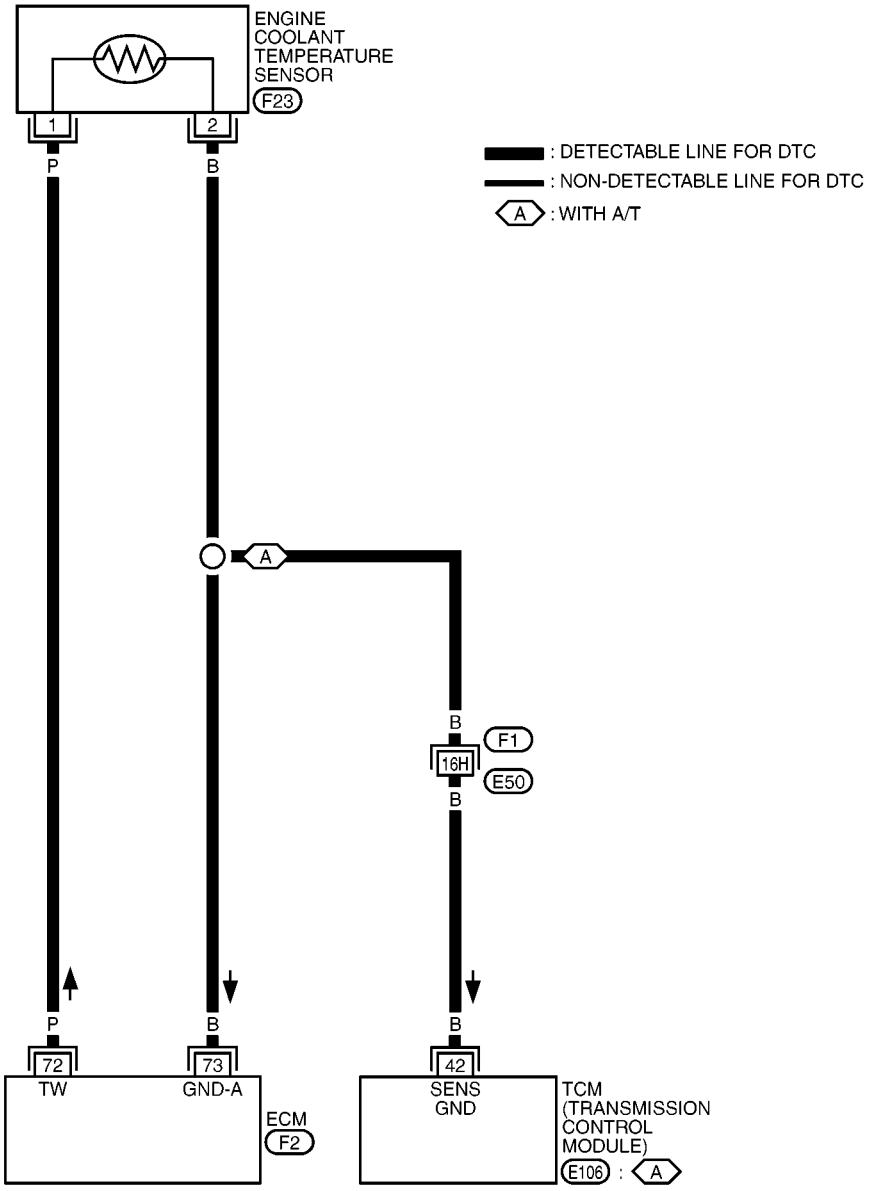
WITHOUT CONSULT-II

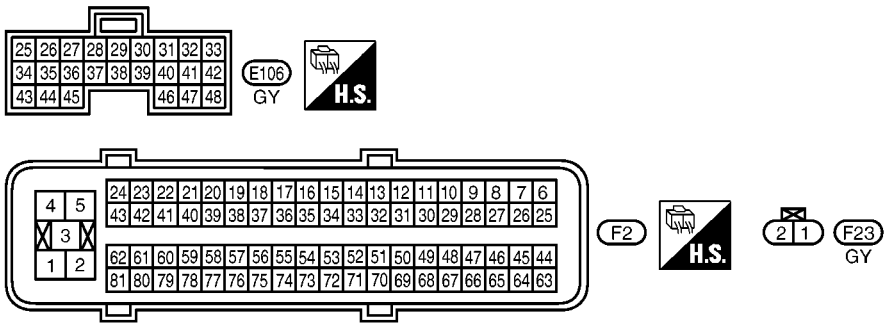
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-583, "Diagnostic Procedure" .

Wiring Diagram

EBS00OLI

EC-ECTS-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

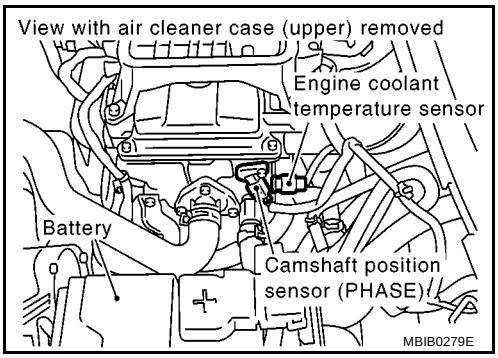
MBWA0271E

Diagnostic Procedure

EBS00OLJ

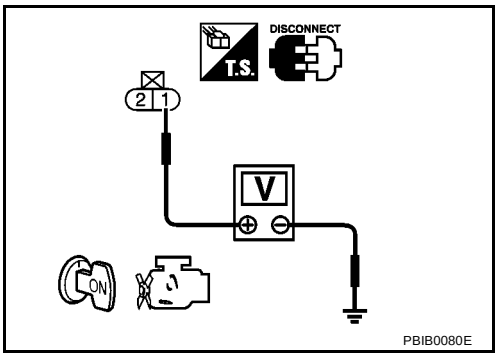
1. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature (ECT) sensor harness connector.
3. Turn ignition switch ON.



4. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect TCM harness connector.
4. Check harness continuity between ECT sensor terminal 2 and ECM terminal 73, TCM terminal 42. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between engine coolant temperature sensor and ECM
- Harness for open or short between engine coolant temperature sensor and TCM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-584, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

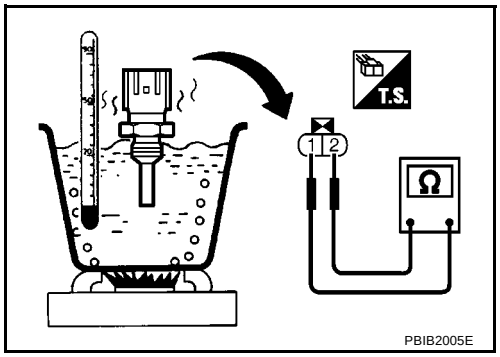
>> **INSPECTION END**

Component Inspection

EBS00OLK

ENGINE COOLANT TEMPERATURE SENSOR

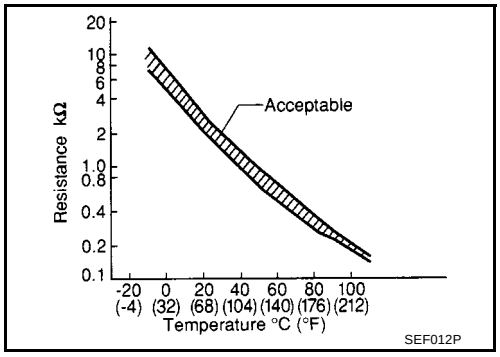
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 72 (Engine coolant temperature sensor) and ground.



2. If NG, replace engine coolant temperature sensor.

Removal and Installation

EBS00OLL

ENGINE COOLANT TEMPERATURE SENSOR

Refer to CO-23, "THERMOSTAT" .

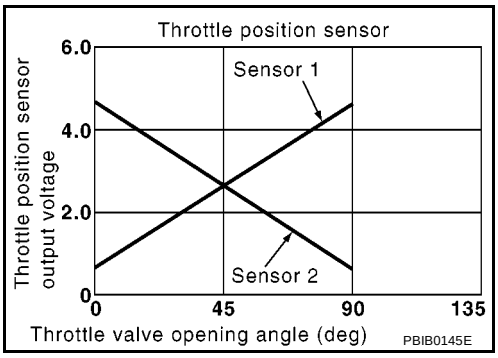
DTC P0122, P0123 TP SENSOR

PFP:16119

Component Description

EBS010D5

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS010D6

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010D7

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (The TP sensor 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

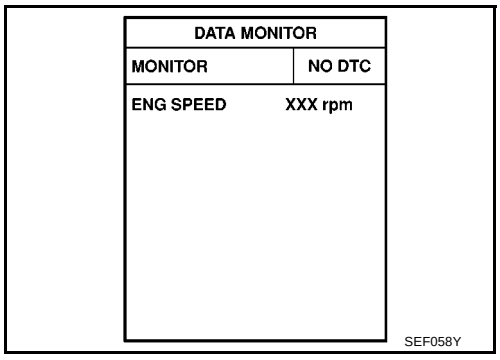
DTC Confirmation Procedure

EBS010D8

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-588, "Diagnostic Procedure" .



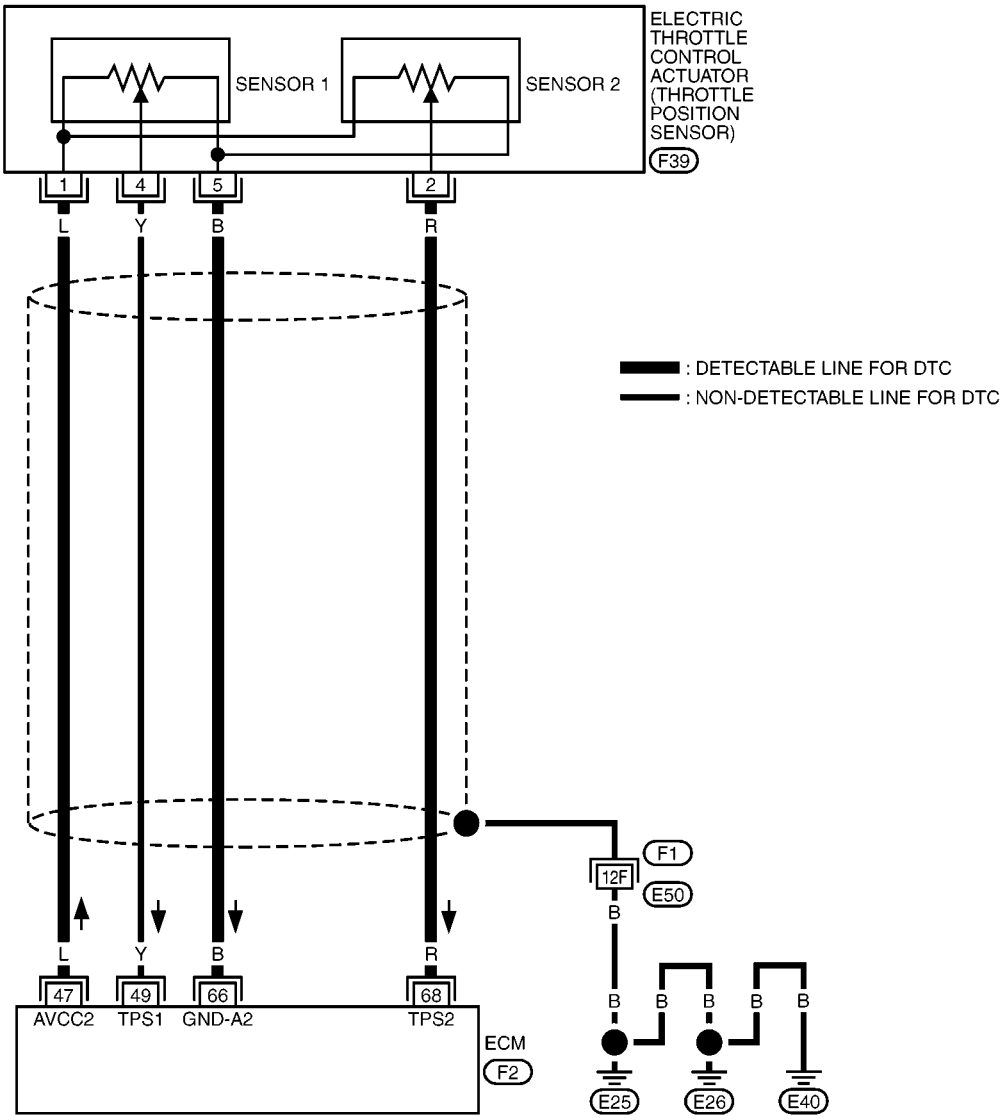
WITHOUT CONSULT-II

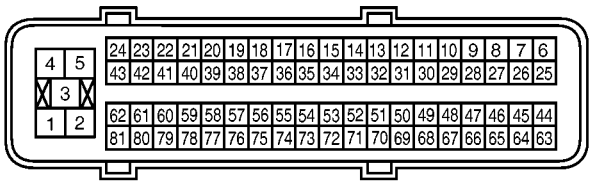
1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-588, "Diagnostic Procedure" .

Wiring Diagram

EBS010D9

EC-TPS2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0291E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

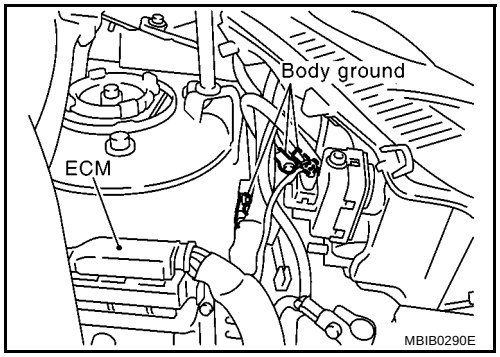
Diagnostic Procedure

EBS010DA

1. RETIGHTEN GROUND SCREWS

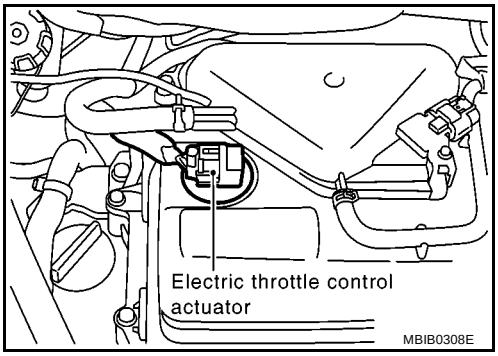
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



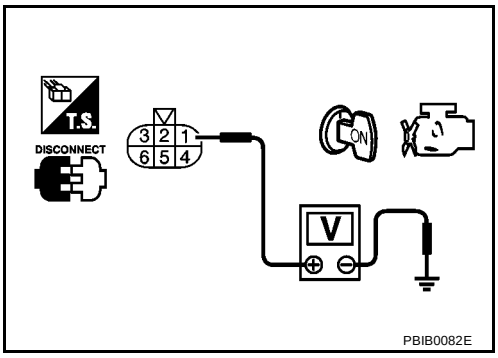
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-590, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

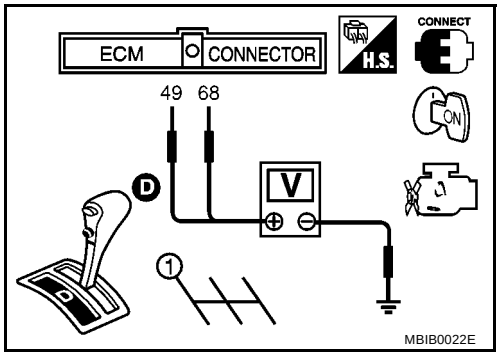
Component Inspection

EBS010DB

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-503, "Throttle Valve Closed Position Learning" .
8. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS010DC

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

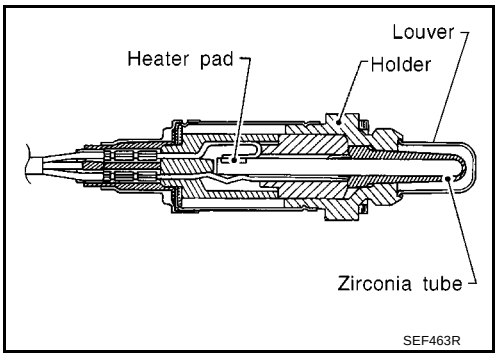
DTC P0132 HO2S1

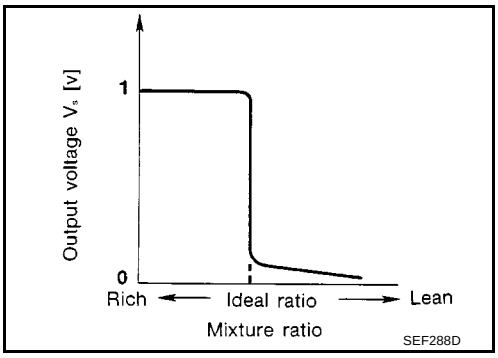
PFP:22690

Component Description

EBS00OLM

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00OLN

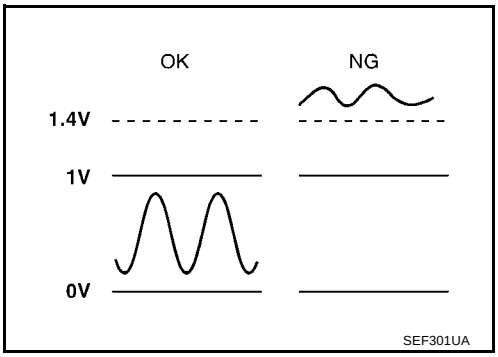
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00OLO

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 1

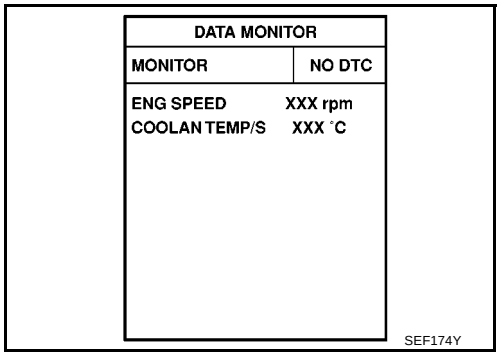
DTC Confirmation Procedure

EBS00OLP

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-594, "Diagnostic Procedure" .



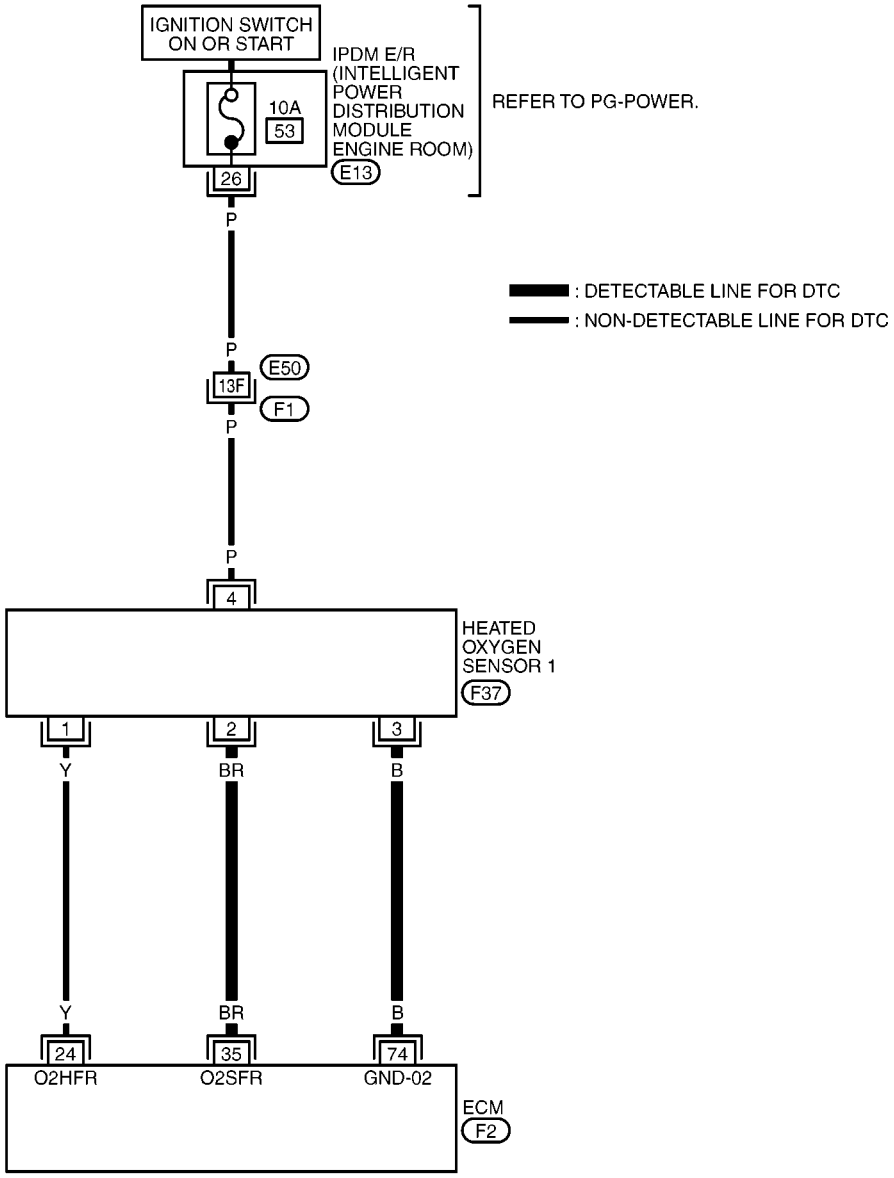
WITHOUT CONSULT-II

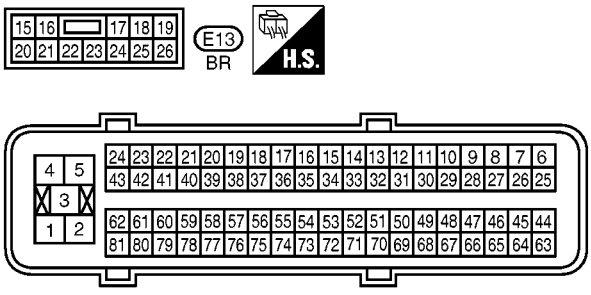
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Restart engine and let it idle for 2 minutes.
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
6. If 1st trip DTC is detected, go to EC-594, "Diagnostic Procedure" .

Wiring Diagram

EBS00OLQ

EC-HO2S1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0272E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

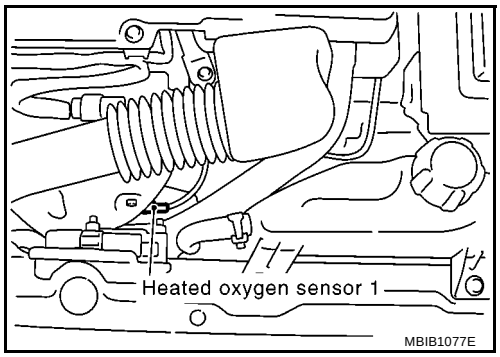
EBS00OLR

1. RETIGHTEN HEATED OXYGEN SENSOR 1

1. Turn ignition switch OFF.
2. Loosen and retighten heated oxygen sensor 1.

Tightening torque: 40 - 60 N·m (4.1 - 6.2 kg-m, 30 - 44 ft-lb)

>> GO TO 2.



2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

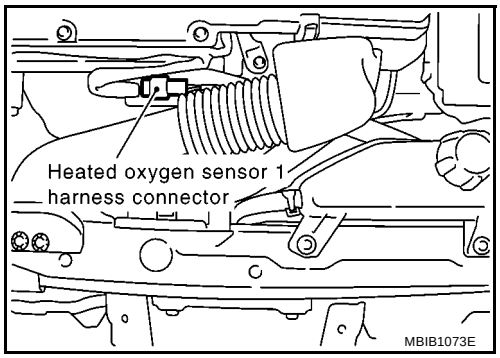
1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground. Refer to Wiring Diagram.

Continuity should not exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector
3. Check connectors for water

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-595, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace malfunctioning heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

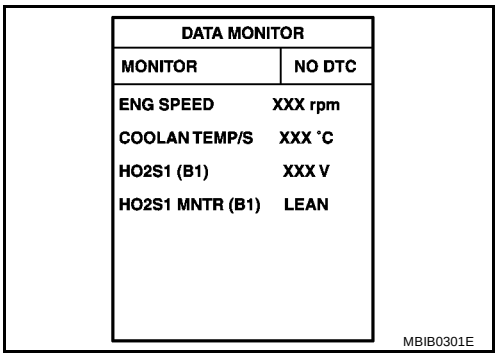
Component Inspection

EBS00OLS

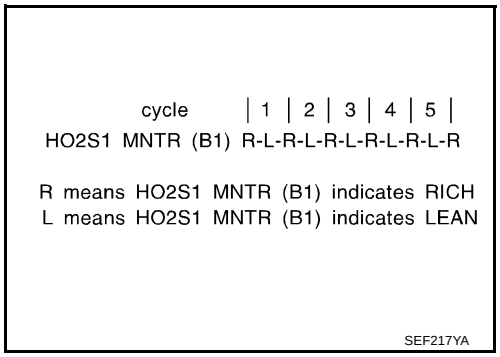
HEATED OXYGEN SENSOR 1

With CONSULT-II

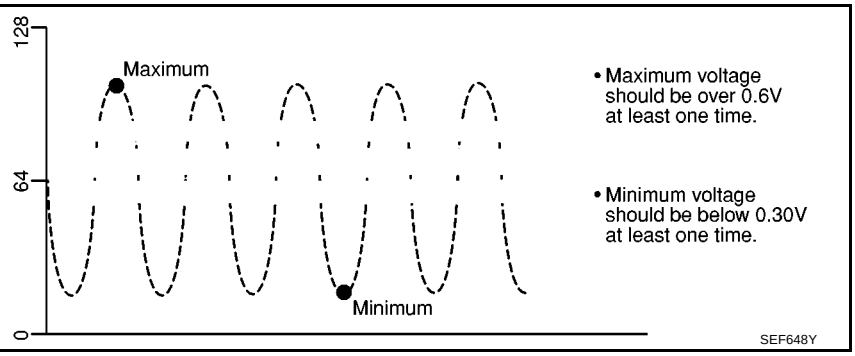
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown in the figure.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX

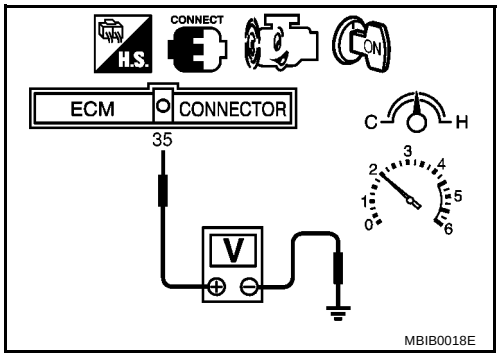


CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OLT

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

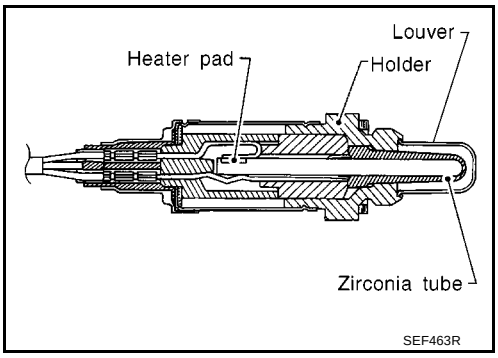
DTC P0134 HO2S1

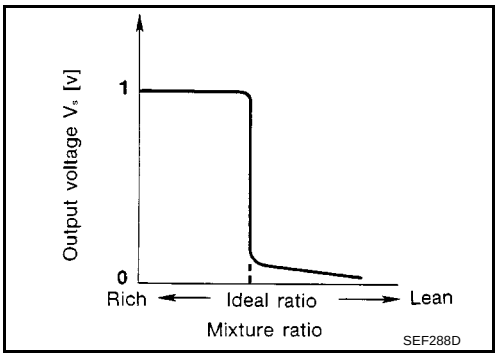
PFP:22690

Component Description

EBS00OLU

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00OLV

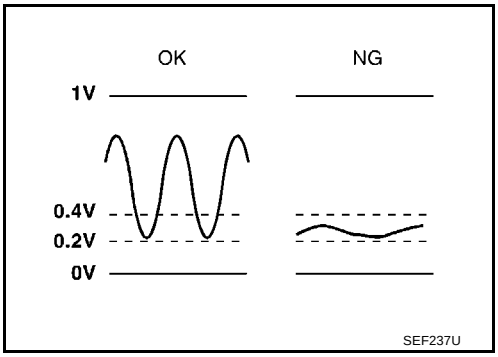
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ⟷ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

EBS00OLW

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 1

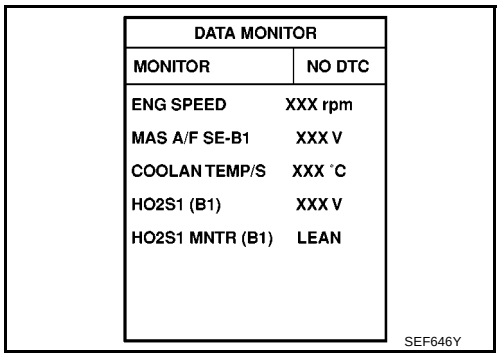
Overall Function Check

EBS00OLY

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a DTC might not be confirmed.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” in “DATA MONITOR” mode with CONSULT-II, and select “H02S1 (B1)”.
3. Hold engine speed at 2,000 rpm under no load.
4. Make sure that the indications do not remain in the range between 0.2V to 0.4V.
5. If NG, go to EC-600, "Diagnostic Procedure" .

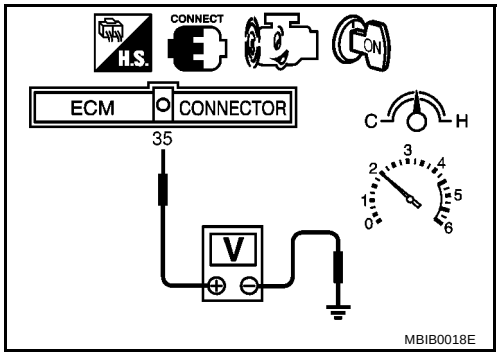


WITHOUT CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage does not remain in the range of 0.2 - 0.4V.

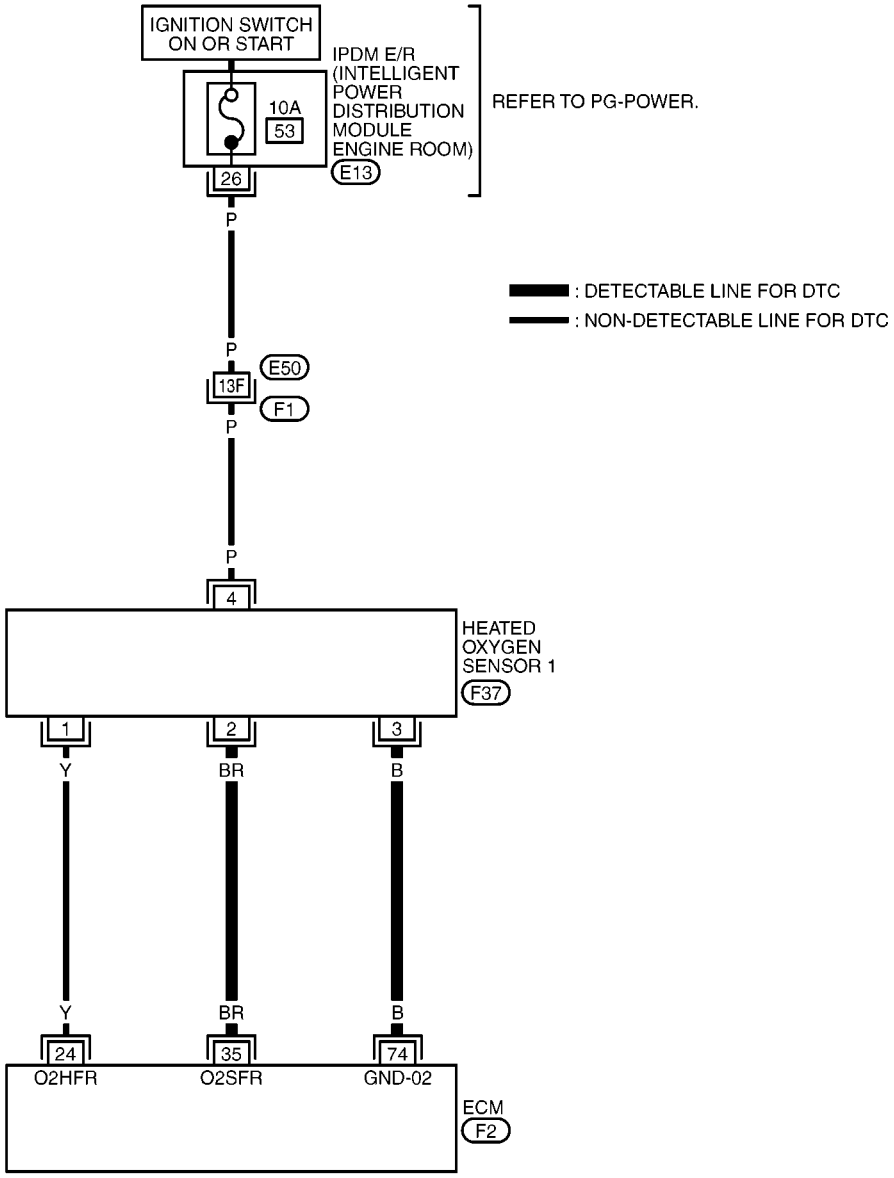
4. If NG, go to EC-600, "Diagnostic Procedure" .

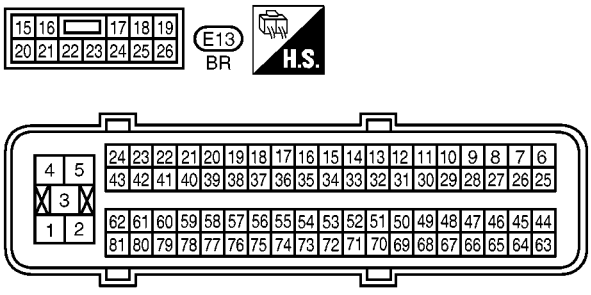


Wiring Diagram

EBS00OLZ

EC-HO2S1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0272E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

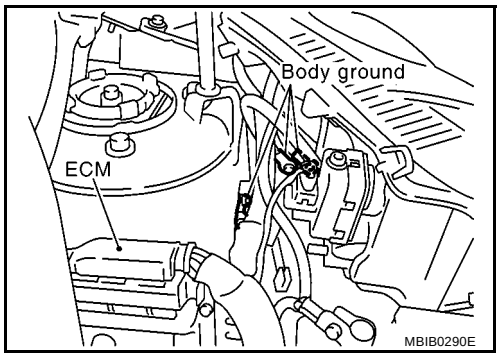
Diagnostic Procedure

EBS00OM0

1. INSPECTION START

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

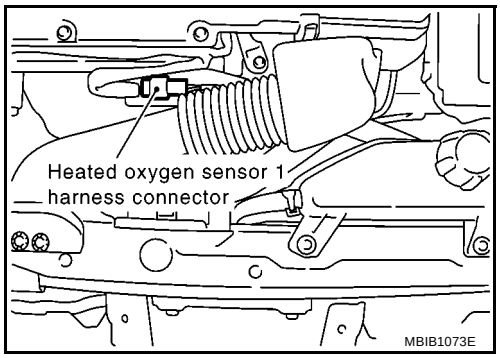
1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-601, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

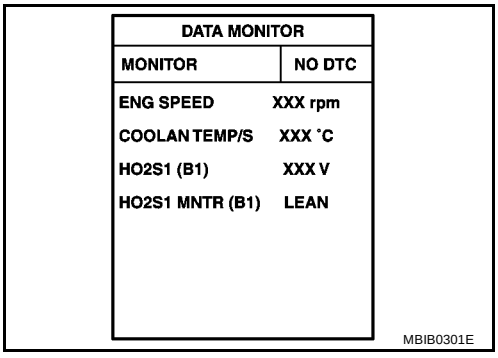
Component Inspection

EBS00OM1

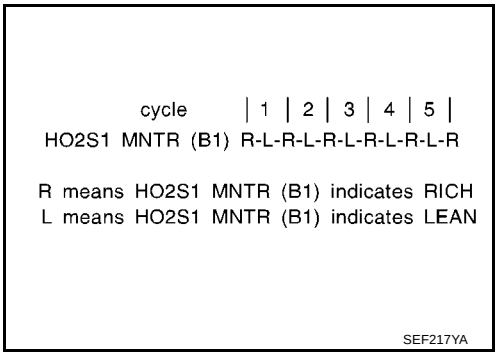
HEATED OXYGEN SENSOR 1

With CONSULT-II

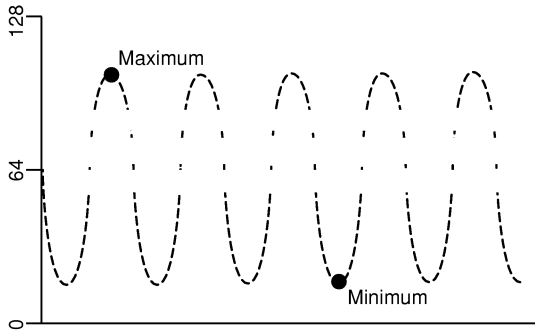
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown in the figure.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



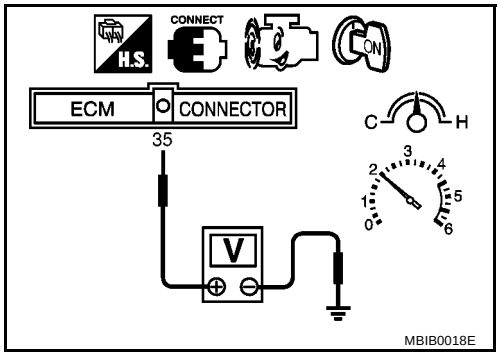
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 (HO2S1 signal) and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OM2

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

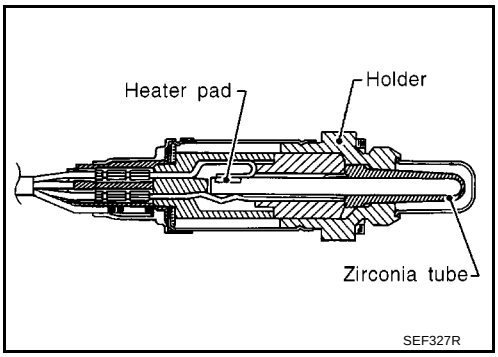
DTC P0138 HO2S2

PFP:226A0

Component Description

EBS00OM3

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OM4

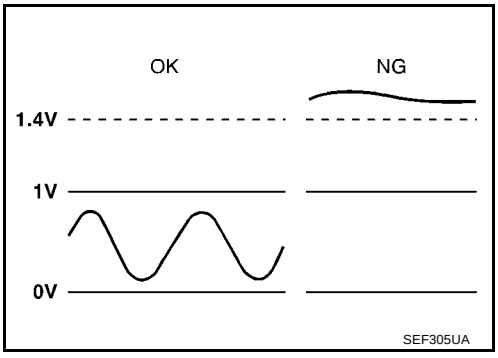
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

EBS00OM5

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2

DTC Confirmation Procedure

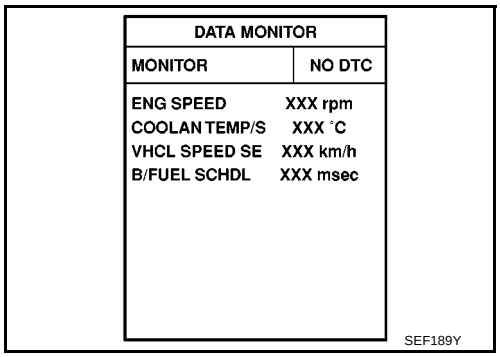
EBS00OM6

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-606, "Diagnostic Procedure" .



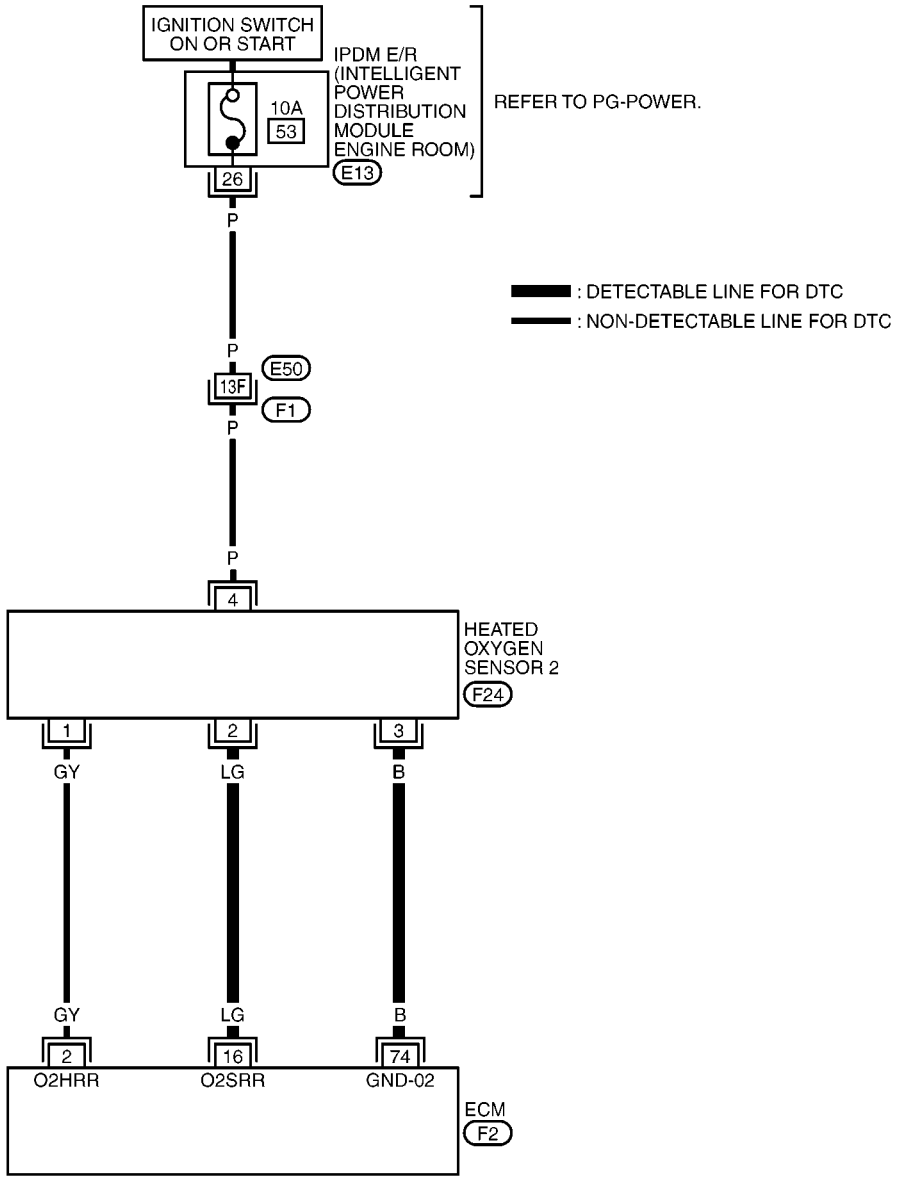
WITHOUT CONSULT-II

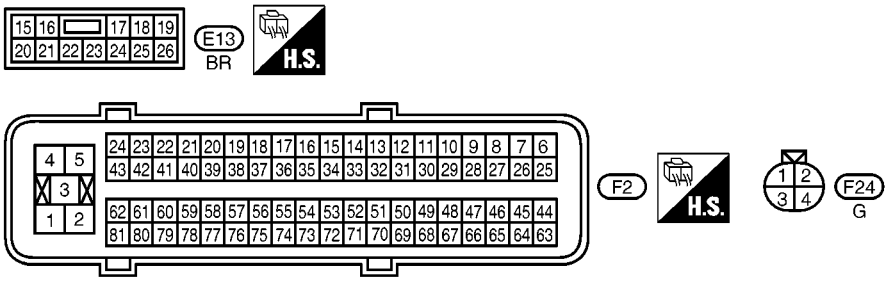
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 2 minutes.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
7. Let engine idle for 2 minutes.
8. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
9. If DTC is detected, go to EC-606, "Diagnostic Procedure" .

Wiring Diagram

EBS00OM7

EC-HO2S2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0273E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

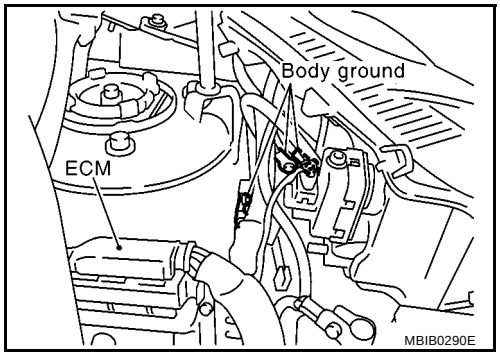
Diagnostic Procedure

EBS00OM8

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

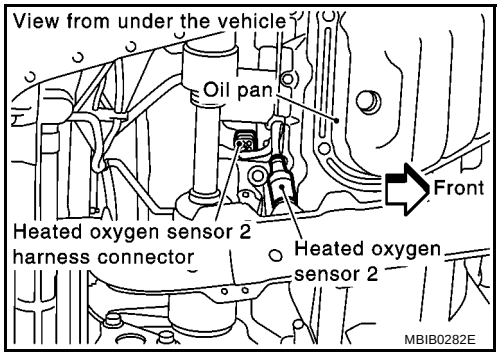
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2. Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground. Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-607, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 2.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

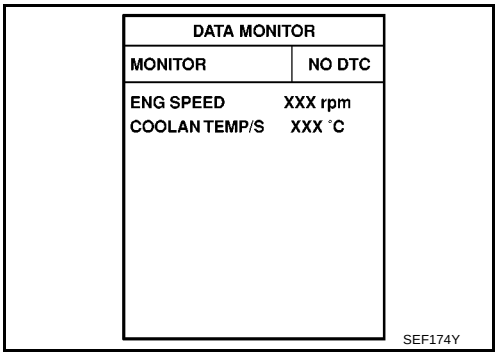
Component Inspection

EBS00OM9

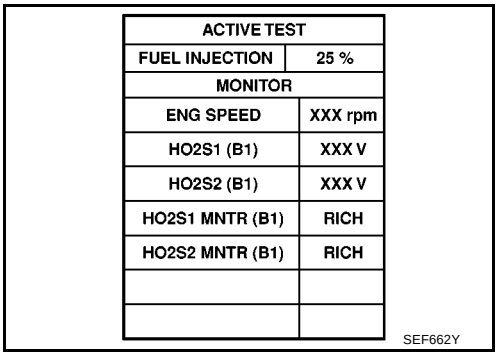
HEATED OXYGEN SENSOR 2

With CONSULT-II

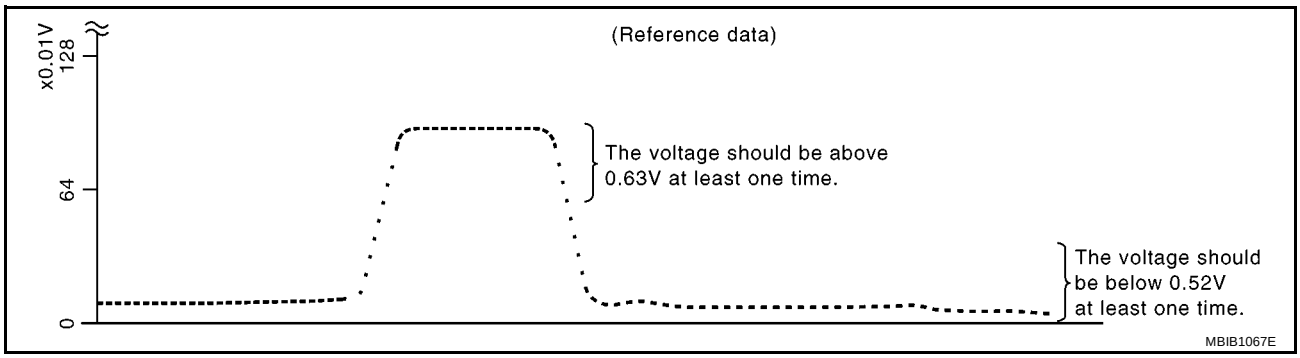
1. Turn ignition switch ON and select ″DATA MONITOR″ mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.



6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2(B1)” as the monitor item with CONSULT-II.



7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



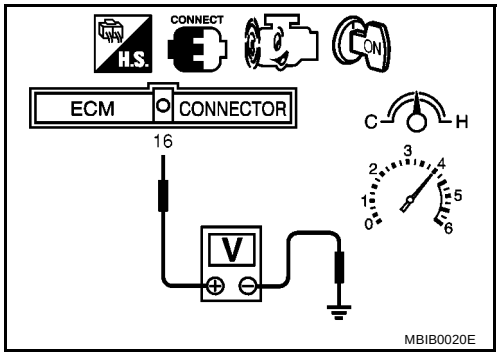
“HO2S2 (B1)” should be above 0.63V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.52V at least once when the “FUEL INJECTION” is −25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.63V at least once during this procedure.
   If the voltage is above 0.63V at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
   The voltage should be below 0.52V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OMA

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

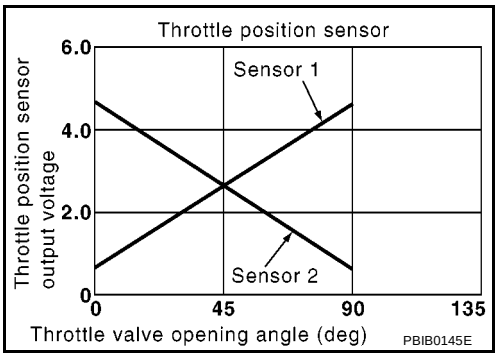
DTC P0221 TP SENSOR

PFP:16119

Component Description

EBS00OMB

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OMC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OMD

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0221 0221	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

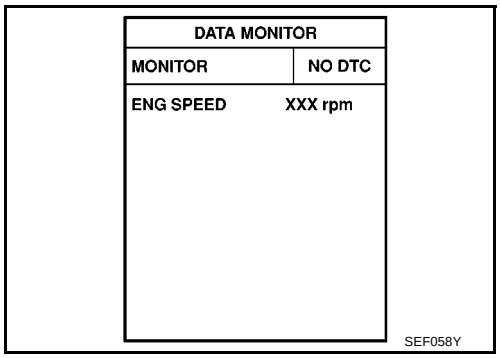
DTC Confirmation Procedure

EBS00OME

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-612, "Diagnostic Procedure" .



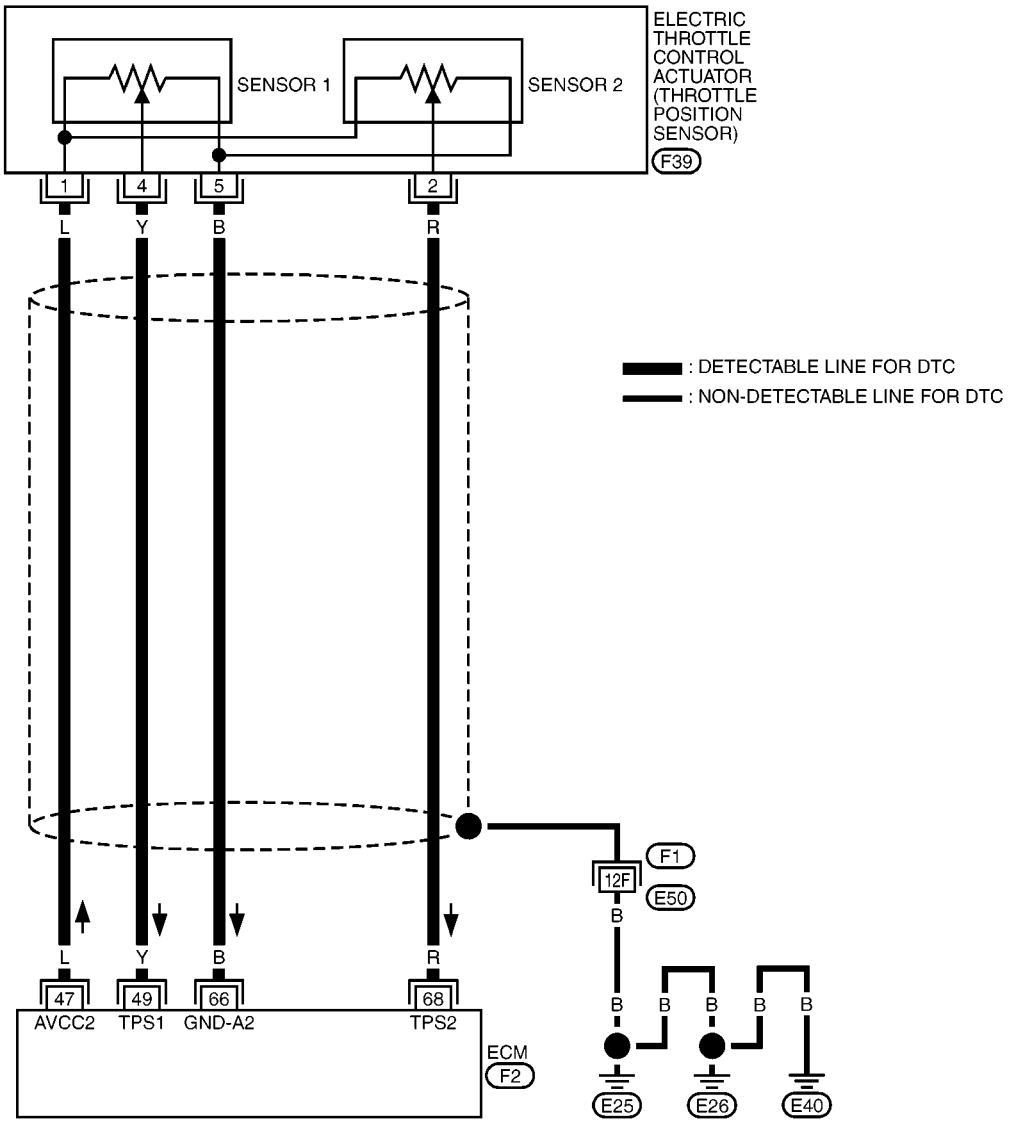
WITHOUT CONSULT-II

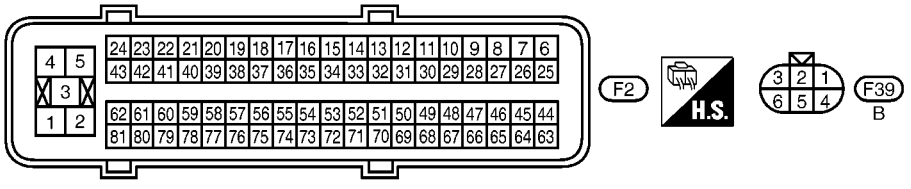
1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-612, "Diagnostic Procedure" .

Wiring Diagram

EBS00OMF

EC-TPS3-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0275E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

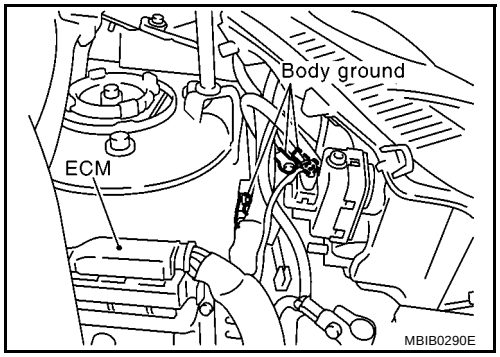
Diagnostic Procedure

EBS00OMG

1. RETIGHTEN GROUND SCREWS

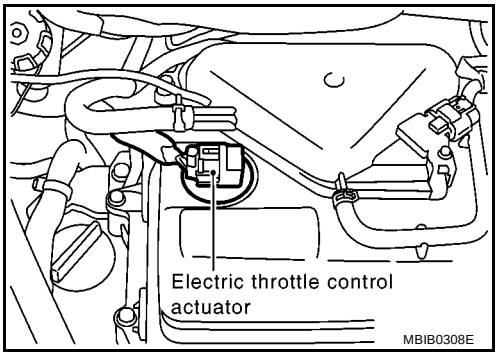
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



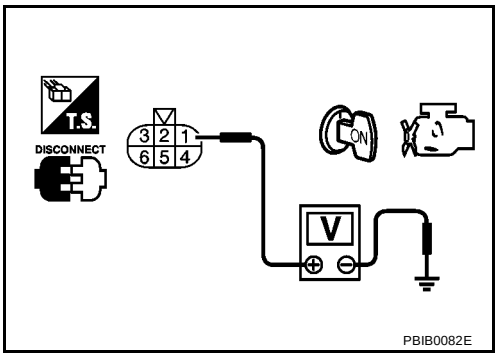
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4, ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-614, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

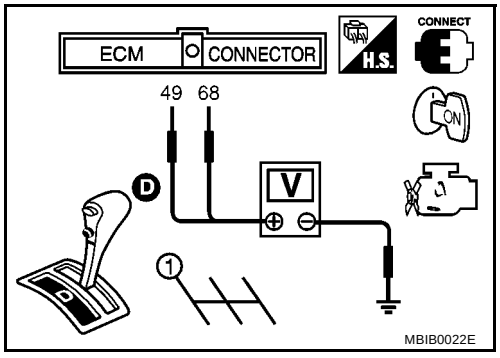
Component Inspection

EBS00OMH

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-503, "Throttle Valve Closed Position Learning" .
8. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OMI

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

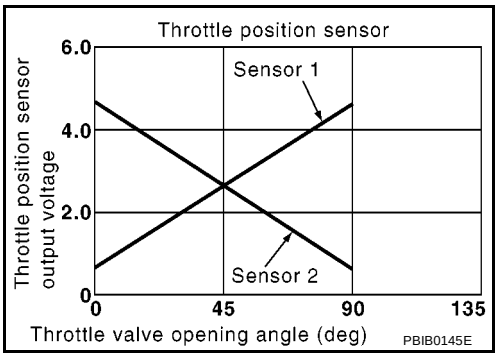
DTC P0222, P0223 TP SENSOR

PFP:16119

Component Description

EBS00OMJ

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. the throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OMK

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OML

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	● Harness or connectors (The TP sensor 1 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

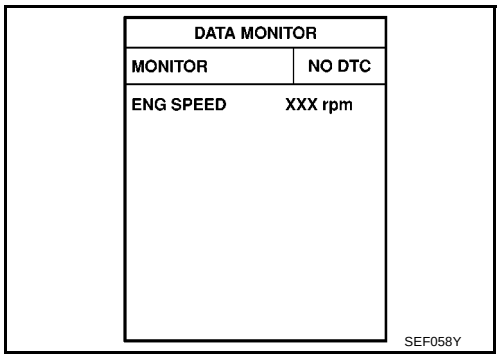
DTC Confirmation Procedure

EBS00OMM

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-618, "Diagnostic Procedure" .



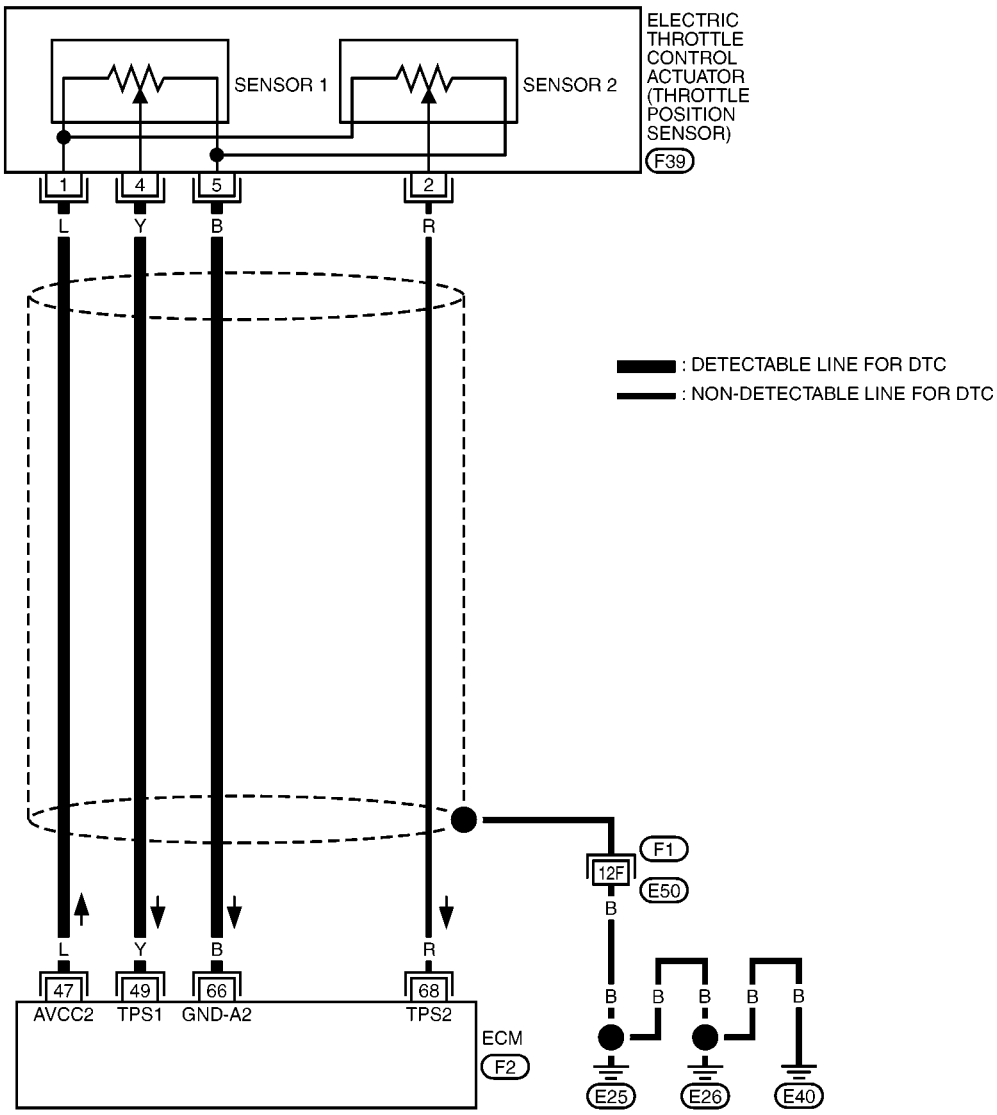
WITHOUT CONSULT-II

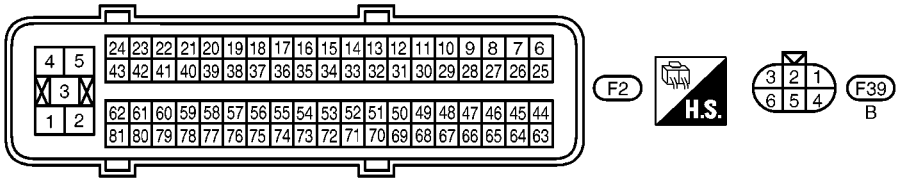
1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-618, "Diagnostic Procedure" .

Wiring Diagram

EBS00OMN

EC-TPS1-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0276E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

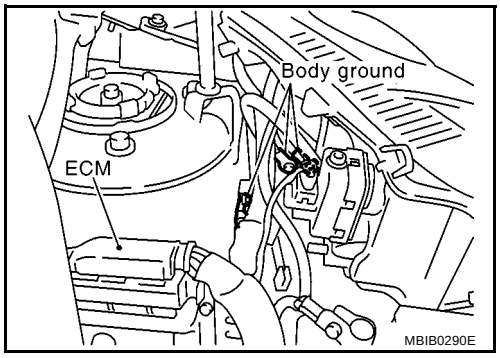
Diagnostic Procedure

EBS00OMO

1. RETIGHTEN GROUND SCREWS

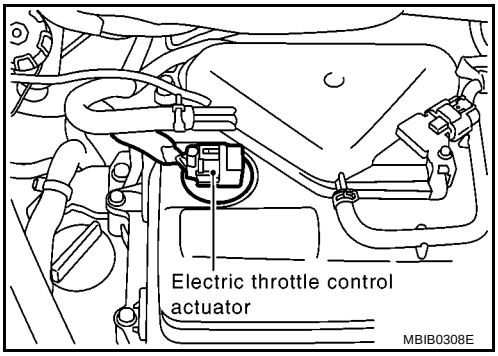
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



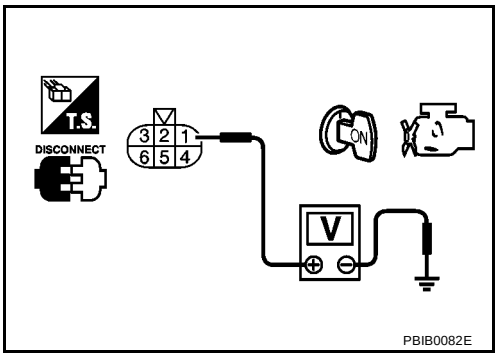
2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-620, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

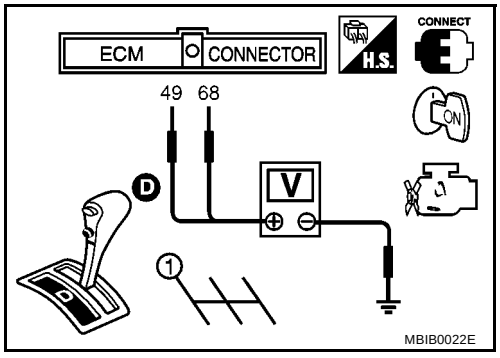
Component Inspection

EBS00OMP

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-503, "Throttle Valve Closed Position Learning" .
8. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OMQ

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

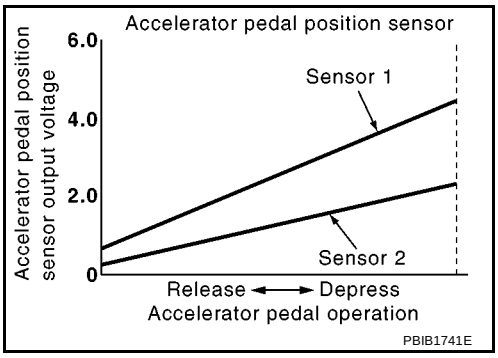
DTC P0226 APP SENSOR

PFP:18002

Component Description

EBS00OMR

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OMS

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS00OMT

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0226 0226	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

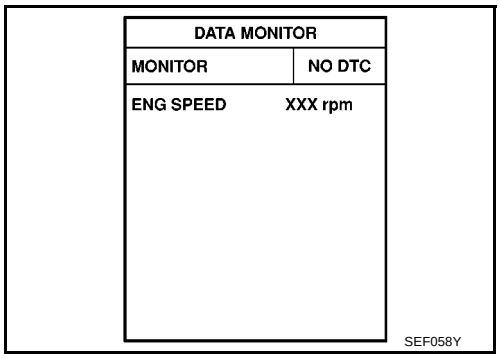
DTC Confirmation Procedure

EBS00OMU

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-626, "Diagnostic Procedure" .

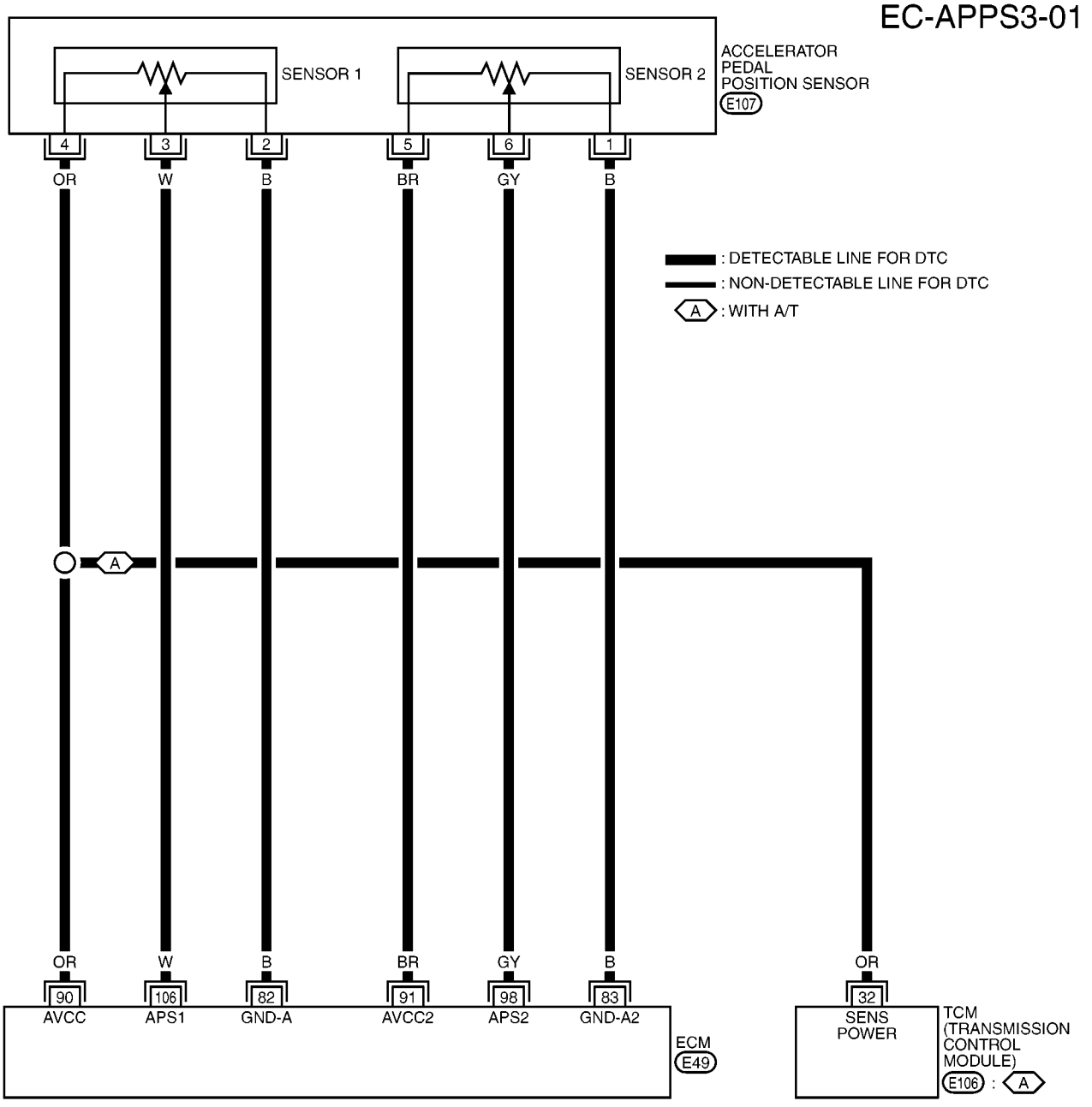


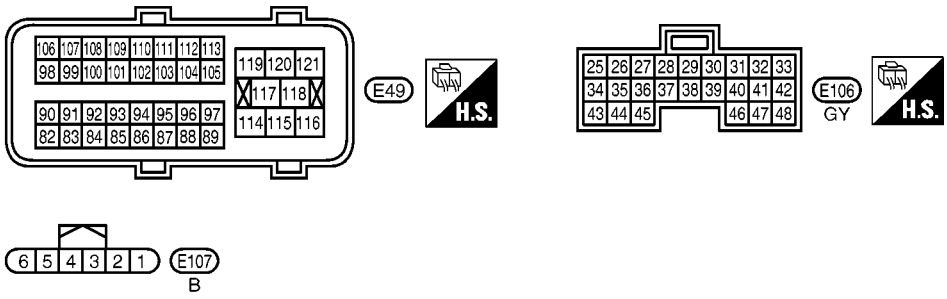
WITHOUT CONSULT-II

1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-626, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS00OMV





MBWA0277E

Specification data are reference values and are measured between each terminal and ground.

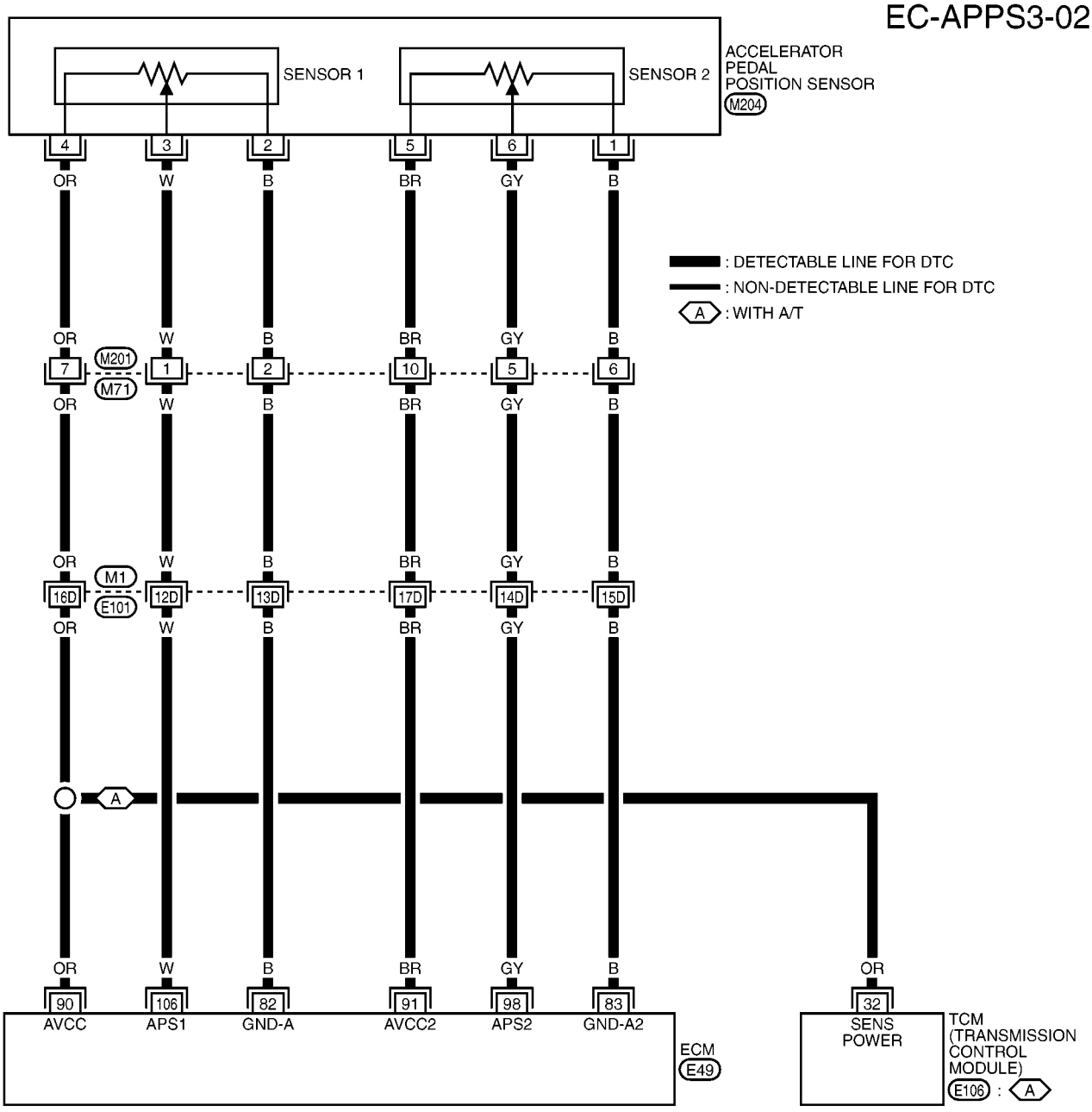
CAUTION:

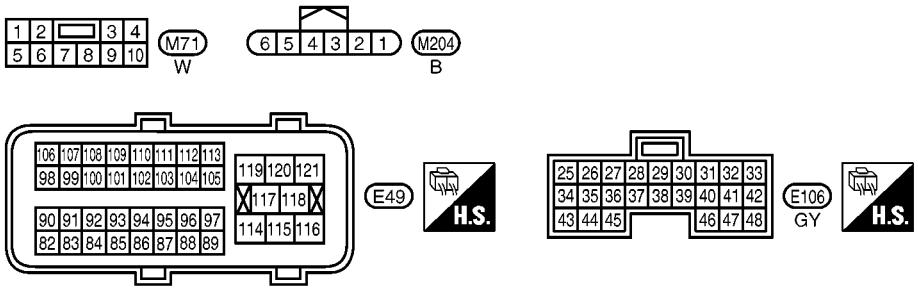
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS3-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0278E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

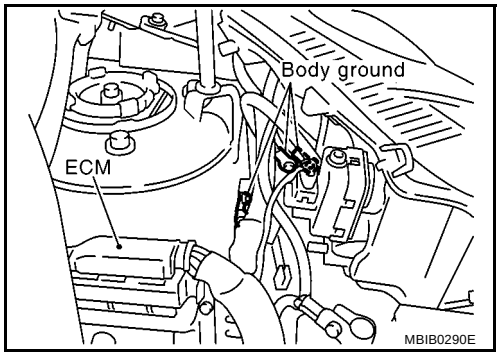
Diagnostic Procedure

EBS00OMW

1. RETIGHTEN GROUND SCREWS

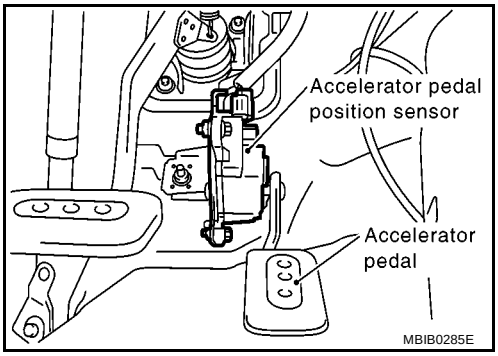
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



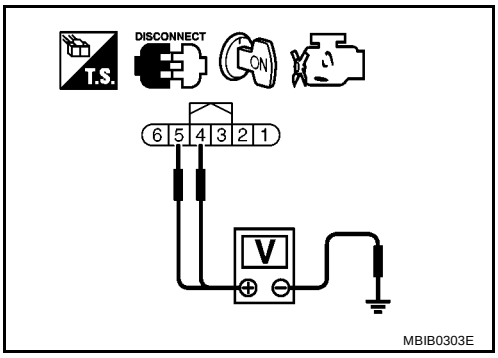
2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminals 4, 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2, ECM terminal 83 and APP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-629, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

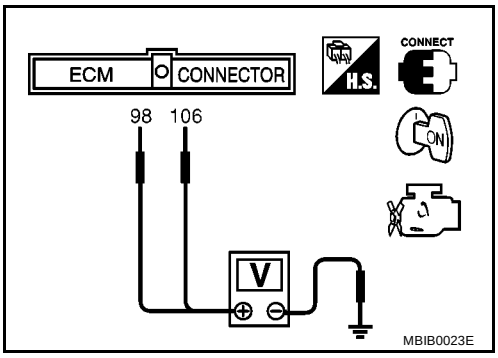
>> **INSPECTION END**

Component Inspection

EBS00OMX

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OMY

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

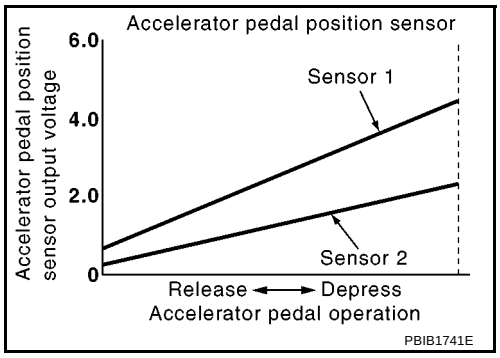
DTC P0227, P0228 APP SENSOR

PFP:18002

Component Description

EBS00OMZ

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00ON0

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS00ON1

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0227 0227	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P0228 0228	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

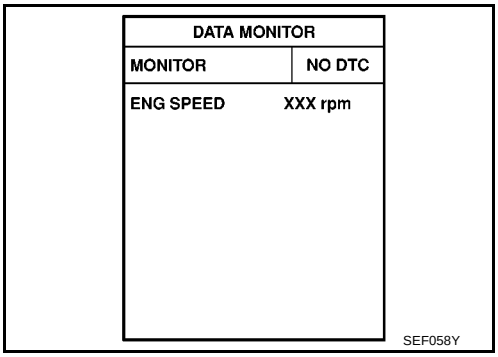
DTC Confirmation Procedure

EBS00ON2

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-635, "Diagnostic Procedure" .

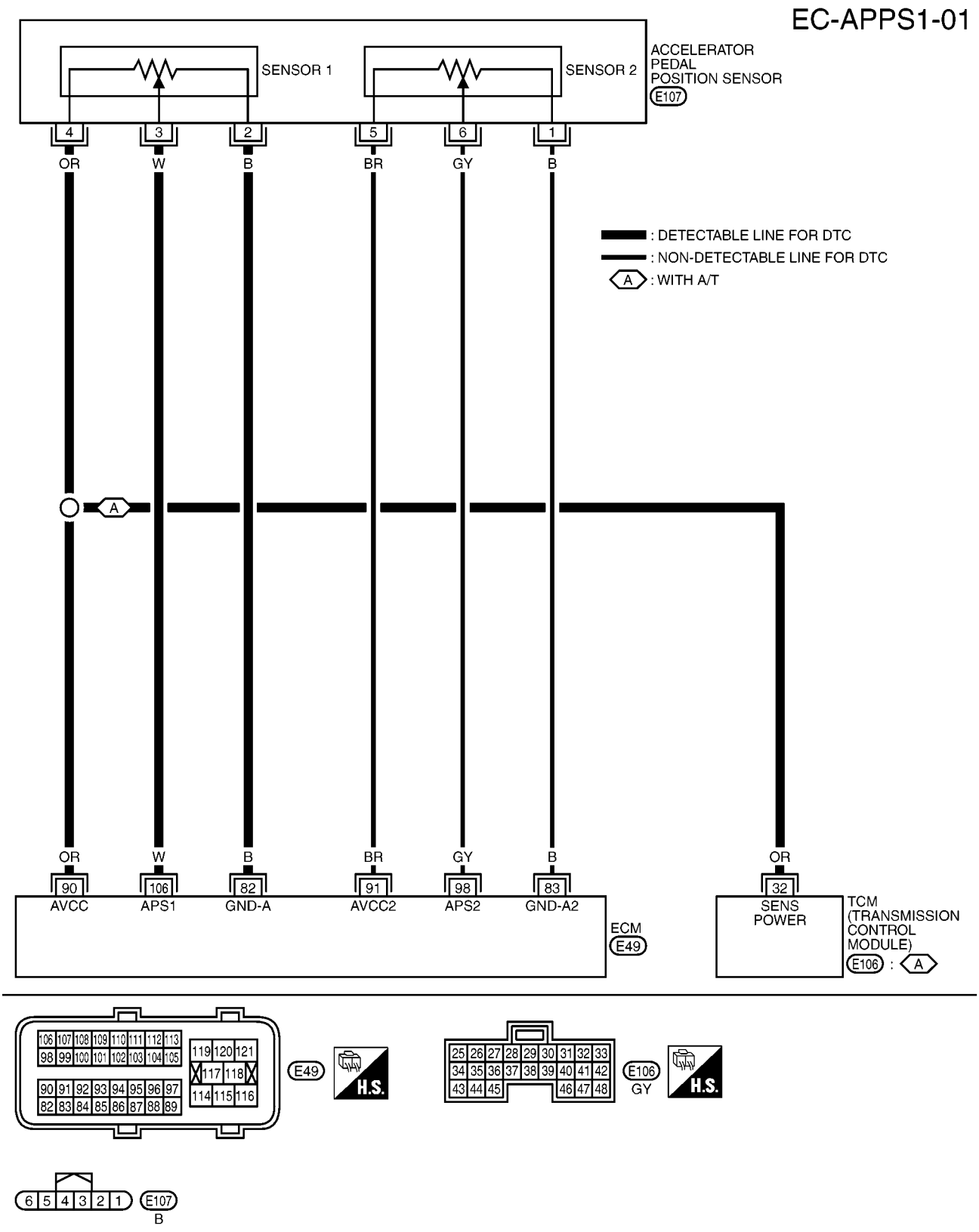


WITHOUT CONSULT-II

1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-635, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS00ON3



MBWA0279E

Specification data are reference values and are measured between each terminal and ground.

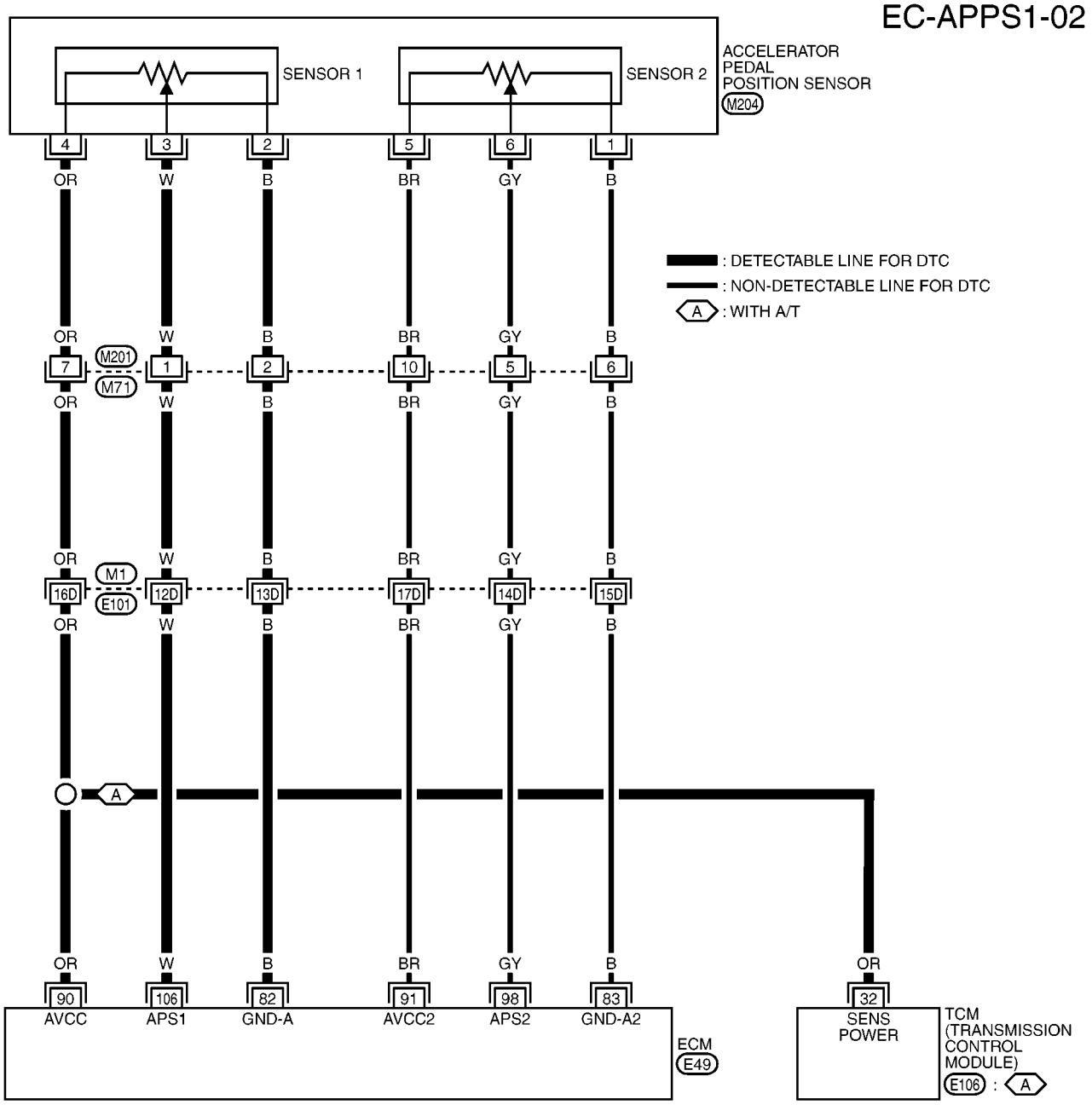
CAUTION:

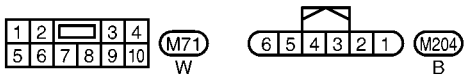
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

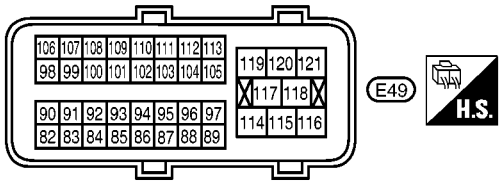
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

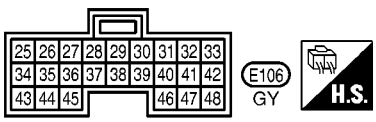
RHD MODELS

EC-APPS1-02









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0280E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

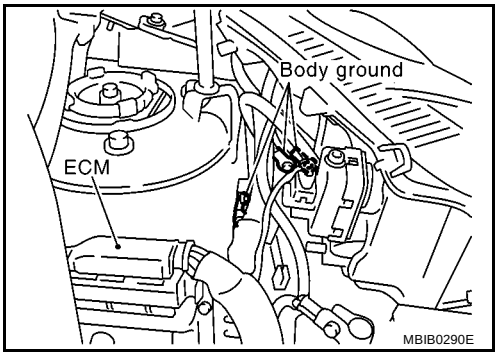
Diagnostic Procedure

EBS00ON4

1. RETIGHTEN GROUND SCREWS

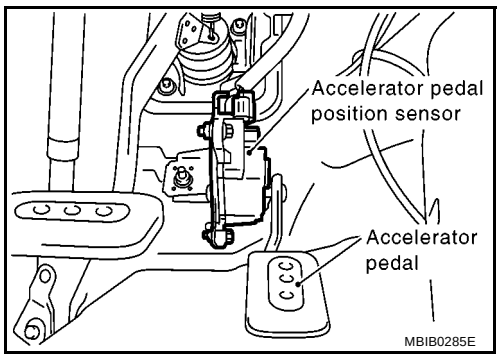
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



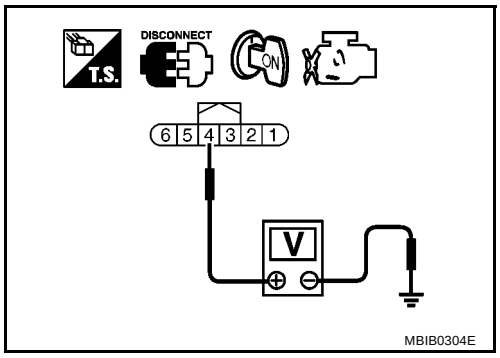
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-637, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

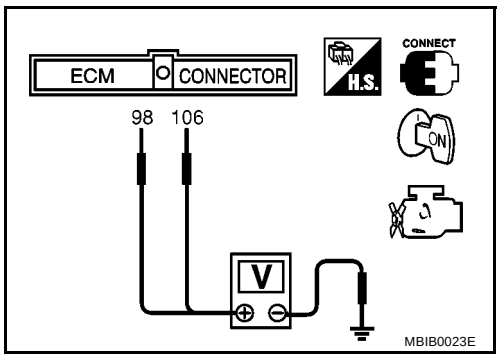
EBS00ON5

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00ON6

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

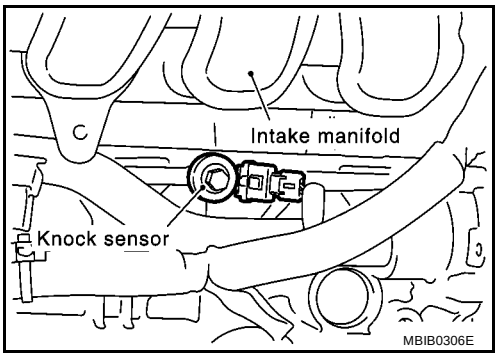
DTC P0327, P0328 KS

PFP:22060

Component Description

EBS00OS6

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



On Board Diagnosis Logic

EBS00OS7

The MI will not light up for these self-diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

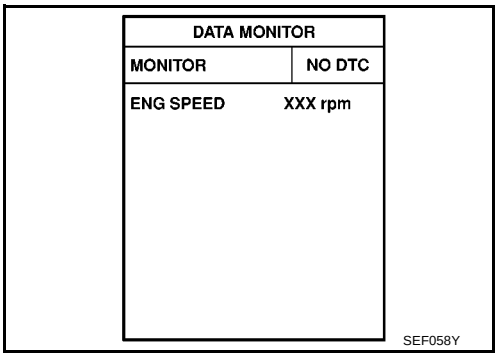
EBS00OS8

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-641, "Diagnostic Procedure" .



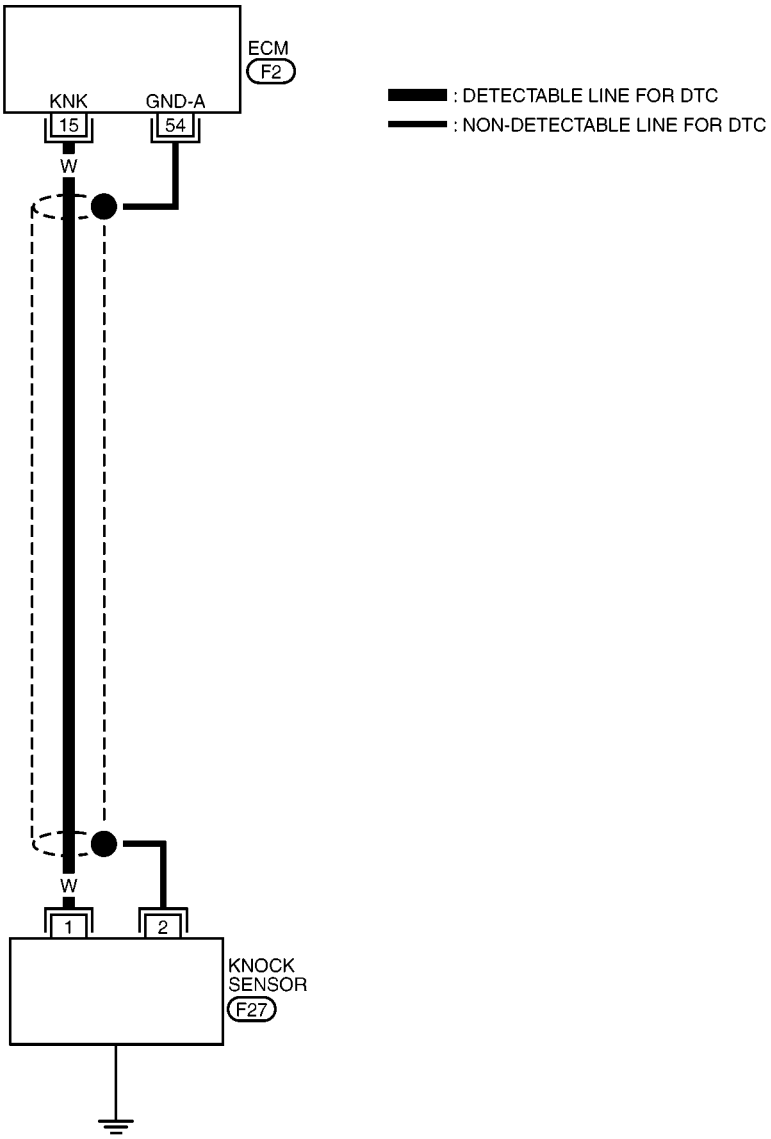
WITHOUT CONSULT-II

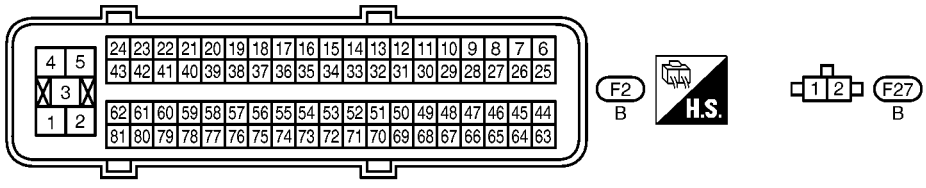
1. Start engine and run it for at least 5 seconds at idle speed.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-641, "Diagnostic Procedure" .

Wiring Diagram

EBS00OS9

EC-KS-01





MBWA1173E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
54	—	Sensor ground (Knock sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

EBS00OSA

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 15 and engine ground. Refer to Wiring Diagram.

   NOTE:
   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

   Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

4. Also check harness for short to ground and short to power.

OK or NG

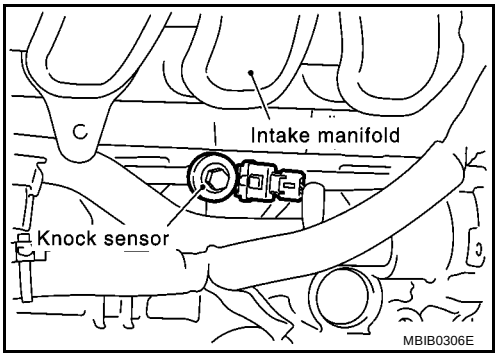
OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

1. Disconnect knock sensor harness connector.
2. Check harness continuity between ECM terminal 15 and knock sensor terminal 1.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK KNOCK SENSOR

Refer to EC-642, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace knock sensor.

4. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 54 and engine ground.

Continuity should exist

2. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to power in harness or connectors.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS00OSB

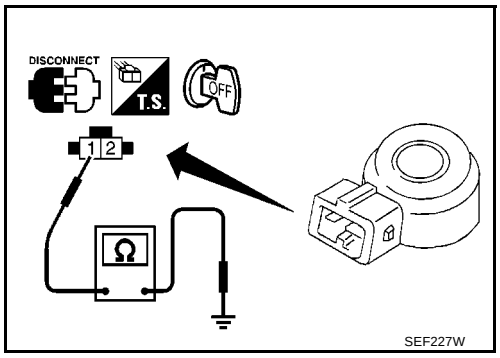
KNOCK SENSOR

Check resistance between knock sensor terminal 1 and ground.

NOTE:
It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

CAUTION:
Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



Removal and Installation

EBS00OSC

KNOCK SENSOR

Refer to EM-73, "CYLINDER BLOCK" .

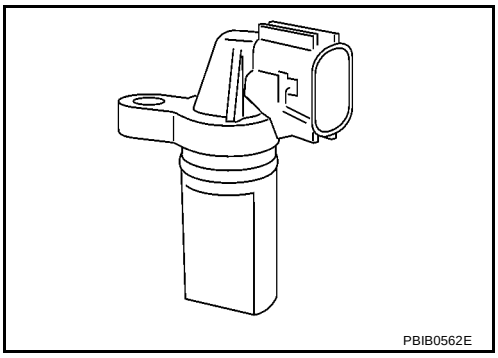
DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

EBS00ONA

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.
The sensor consists of a permanent magnet and Hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.


PBIB0562E

CONSULT-II Reference Value in Data Monitor Mode

EBS00ONB

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	● Tachometer: Connect ● Run engine and compare CONSULT-II value with the tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

EBS00ONC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	● The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. ● The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. ● The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Crankshaft position sensor (POS) ● Signal plate

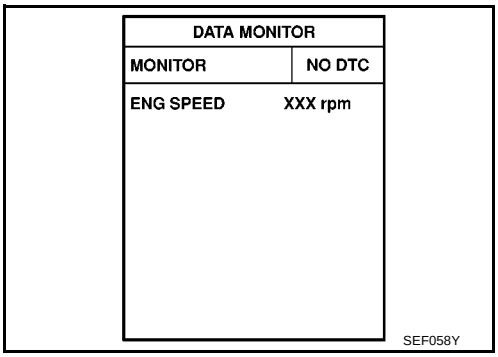
DTC Confirmation Procedure

EBS00OND

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-646, "Diagnostic Procedure" .



SEF058Y

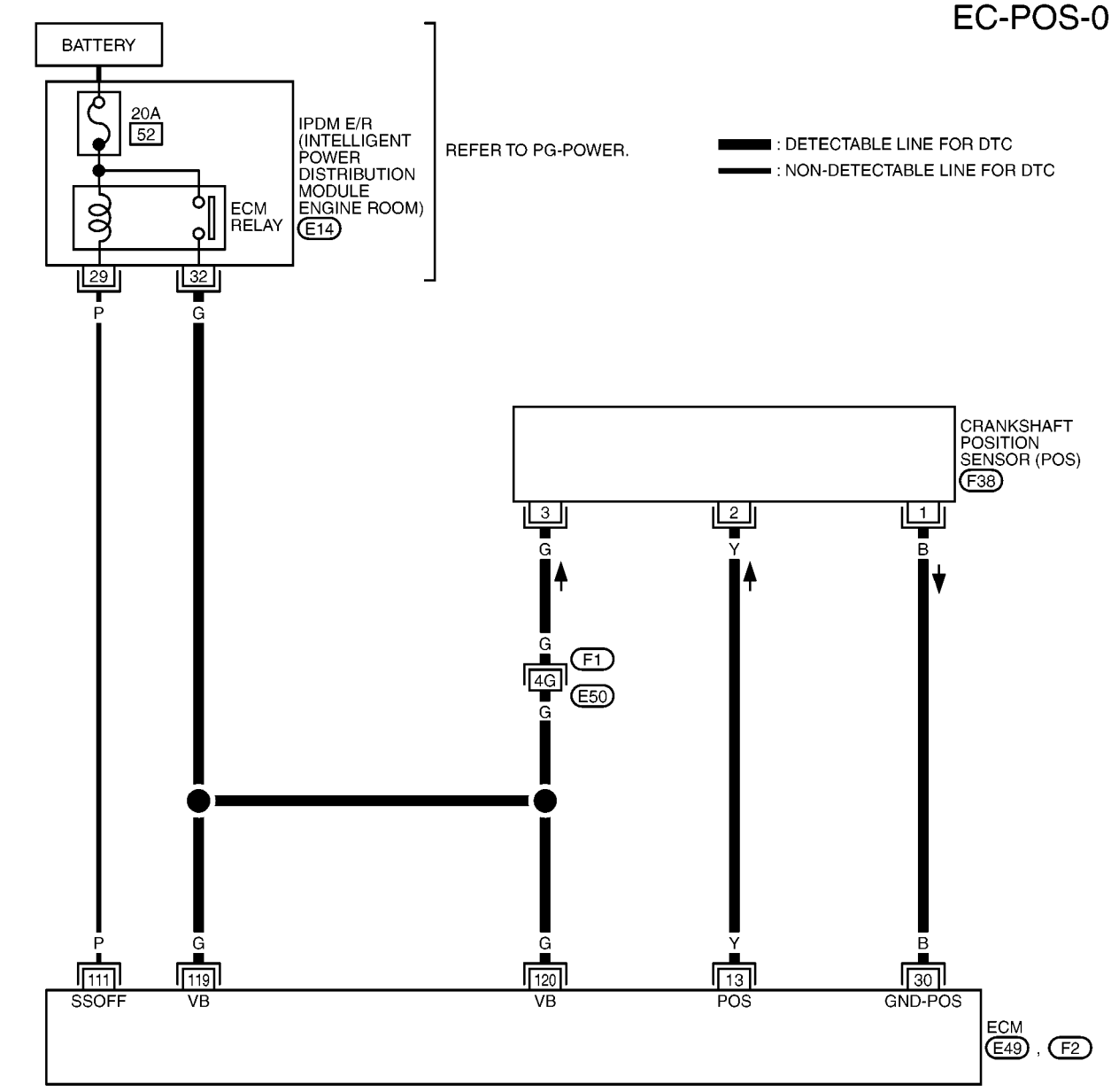
WITHOUT CONSULT-II

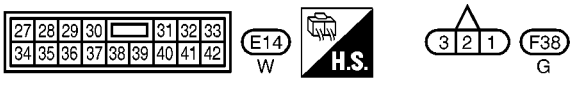
1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-646, "Diagnostic Procedure" .

Wiring Diagram

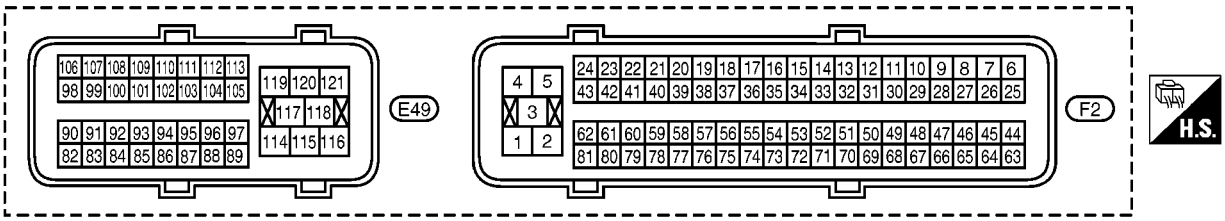
EBS00ONE

EC-POS-01





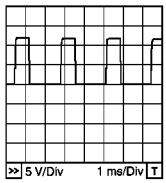
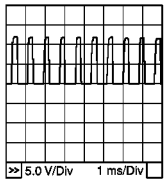
REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)



MBWA0282E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	Y	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 3.0V★  PBIB0528E
30	B	Sensor ground (Crankshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

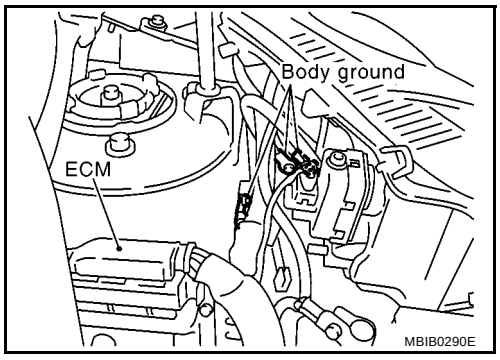
Diagnostic Procedure

EBS00ONF

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

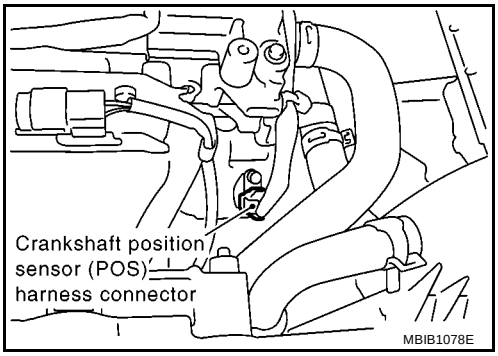
>> GO TO 2.



MBIB0290E

2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.
2. Turn ignition switch ON.



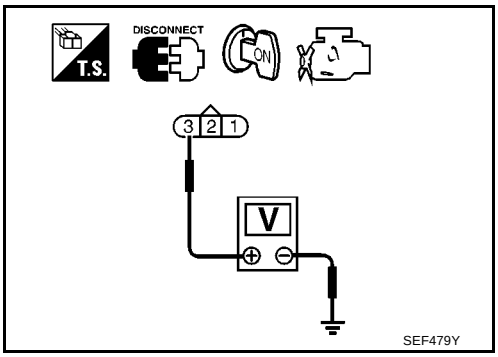
3. Check voltage between CKP sensor (POS) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between crankshaft position sensor (POS) and ECM
- Harness for open or short between crankshaft position sensor (POS) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 30 and CKP sensor (POS) terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 13 and CKP sensor (POS) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-648, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace crankshaft position sensor (POS).

7. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 8.
NG >> Replace the signal plate.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

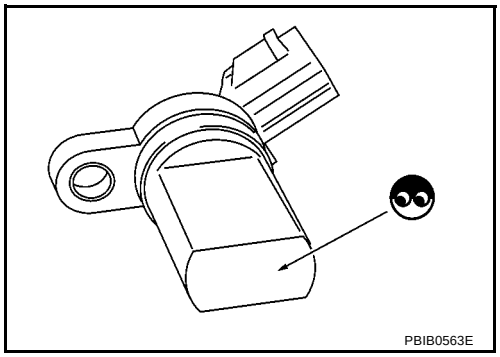
>> **INSPECTION END**

Component Inspection

EBS00ONG

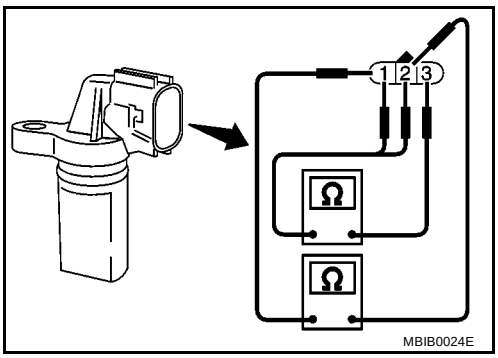
CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 2 (-)	
2 (+) - 1 (-)	



6. If NG, replace crankshaft position sensor (POS).

Removal and Installation

CRANKSHAFT POSITION SENSOR (POS)

EBS00ONH

Refer to EM-73, "CYLINDER BLOCK" .

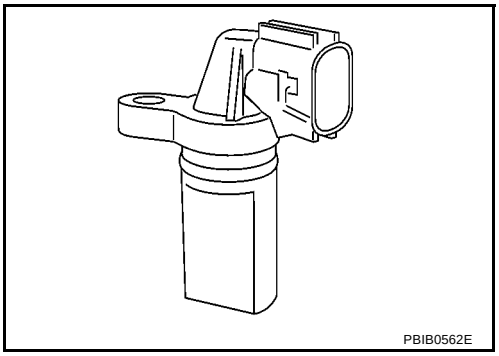
DTC P0340 CMP SENSOR (PHASE)

PFP:23731

Component Description

EBS00ONI

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.


PBIB0562E

On Board Diagnosis Logic

EBS00ONJ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	● The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. ● The cylinder No. signal is not set to ECM during engine running. ● The cylinder No. signal is not in the normal pattern during engine running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Camshaft position sensor (PHASE) ● Camshaft (Intake) ● Starter motor (Refer to SC-39 .) ● Starting system circuit (Refer to SC-39 .) ● Dead (Weak) battery

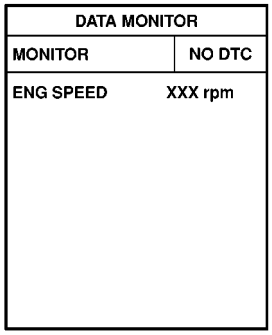
DTC Confirmation Procedure

EBS00ONK

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to EC-653, "Diagnostic Procedure" .
   If 1st trip DTC is not detected, go to next step.
5. Maintain engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to EC-653, "Diagnostic Procedure" .



SEF058Y

WITHOUT CONSULT-II

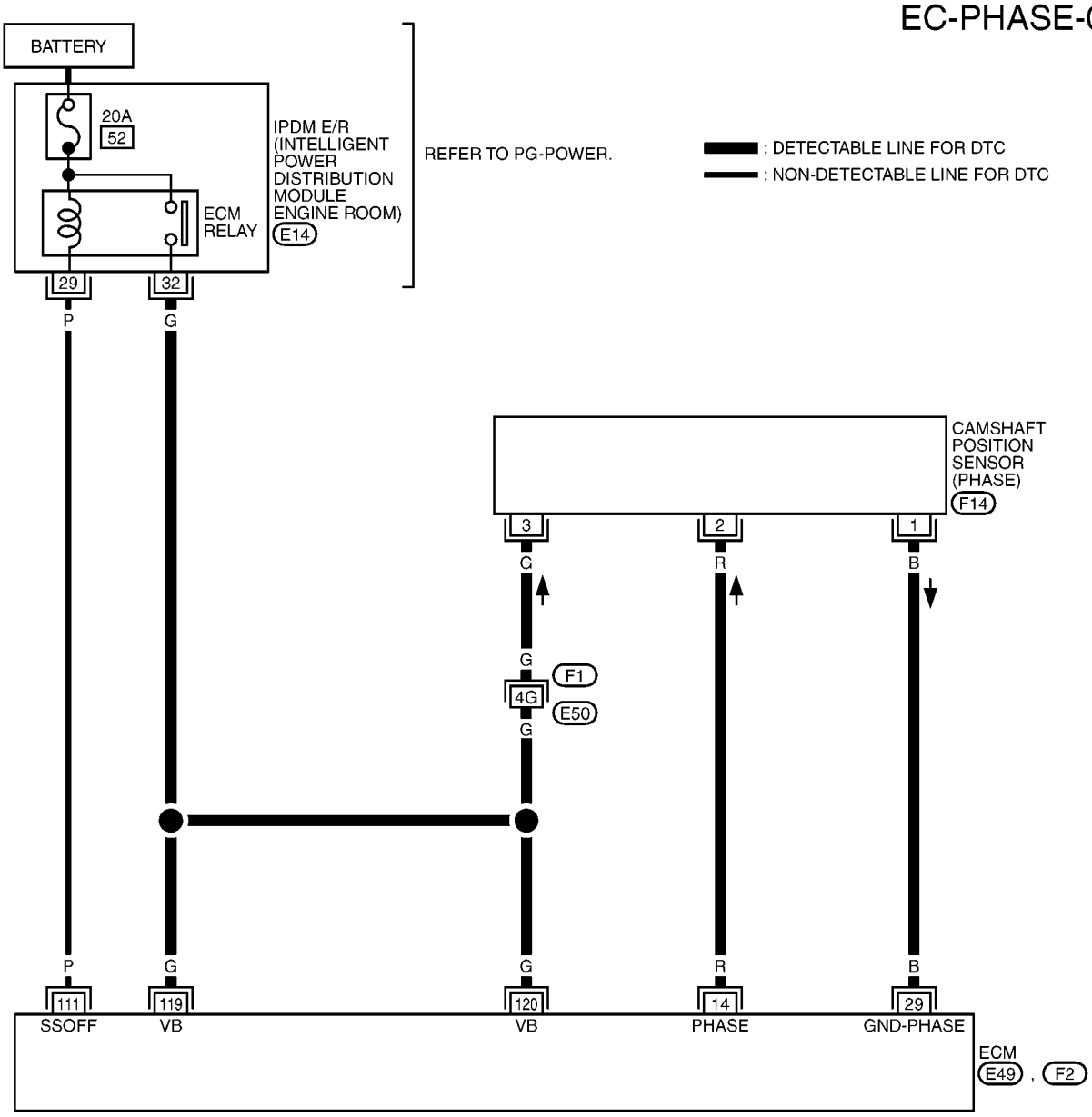
1. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-653, "Diagnostic Procedure" .
   If 1st trip DTC is not detected, go to next step.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Start engine and maintain engine speed at more than 800 rpm for at least 5 seconds.

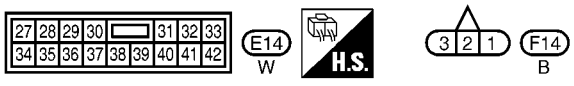
7. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
8. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
9. If DTC is detected, go to EC-653, "Diagnostic Procedure" .

Wiring Diagram

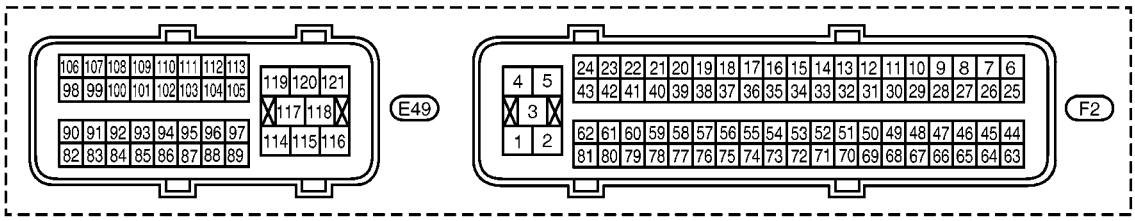
EBS00ONL

EC-PHASE-01





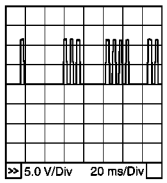
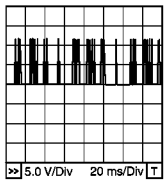
REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)



MBWA0283E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	R	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed is 2,000 rpm.	1.0 - 4.0V★  PBIB0526E
29	B	Sensor ground (Camshaft position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00ONM

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

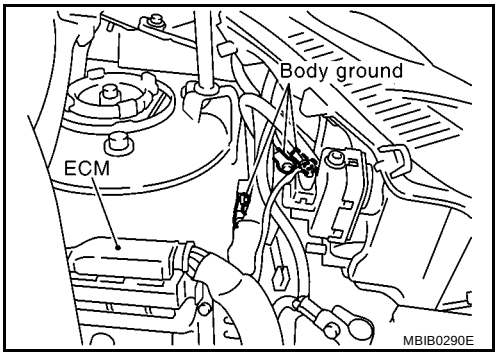
Yes or No

Yes >> GO TO 2.
No >> Check starting system. (Refer to SC-39, "STARTING SYSTEM" .)

2. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

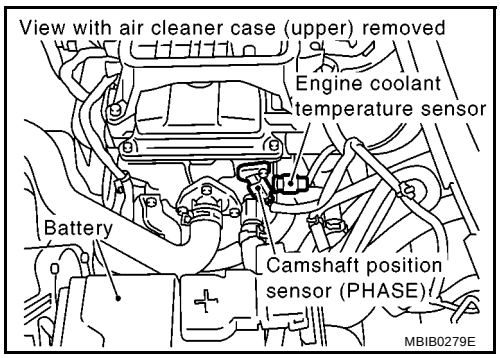
>> GO TO 3.



MBIB0290E

3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

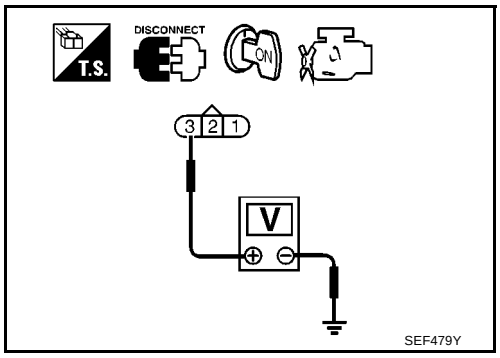
1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.



3. Check voltage between CMP sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage

4. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- Harness for open or short between camshaft position sensor (PHASE) and ECM
- Harness for open or short between camshaft position sensor (PHASE) and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 29 and CMP sensor (PHASE) terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 14 and CMP sensor (PHASE) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-655, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace camshaft position sensor (PHASE).

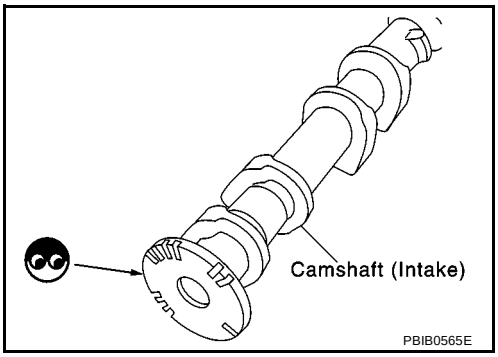
8. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

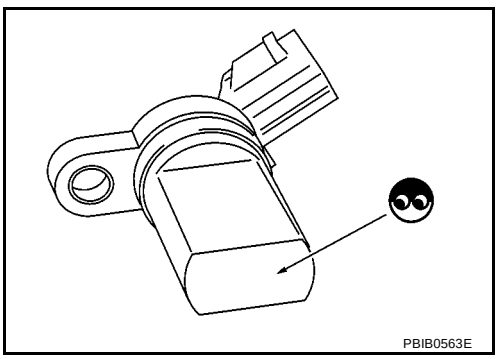
>> **INSPECTION END**

Component Inspection

EBS00ONN

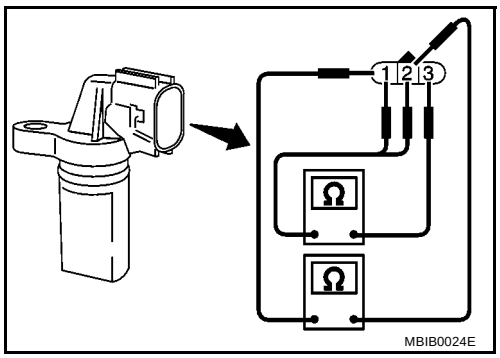
CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 2 (-)	
2 (+) - 1 (-)	



Removal and Installation

EBS00ONO

CAMSHAFT POSITION SENSOR (PHASE)

Refer to EM-36, "CAMSHAFT" .

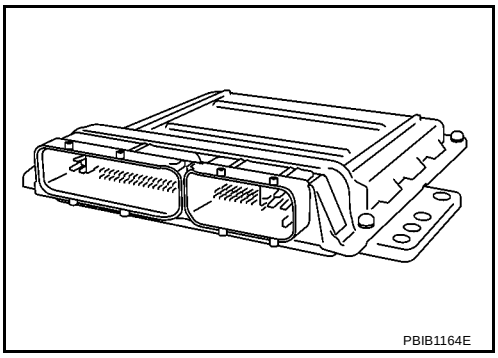
DTC P0605 ECM

PFP:23710

Component Description

EBS00ONP

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.


PBIB1164E

On Board Diagnosis Logic

EBS00ONQ

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

EBS00ONR

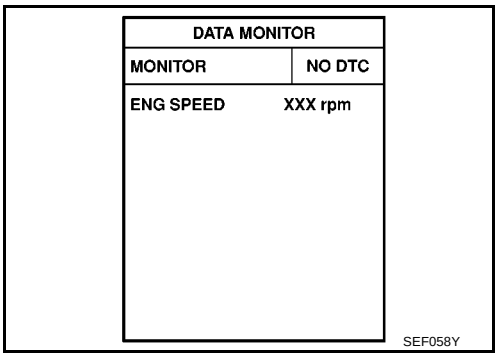
Perform PROCEDURE FOR MALFUNCTION A first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B. If there is no malfunction on PROCEDURE FOR MALFUNCTION B, perform PROCEDURE FOR MALFUNCTION C.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-659, "Diagnostic Procedure" .



SEF058Y

Without CONSULT-II

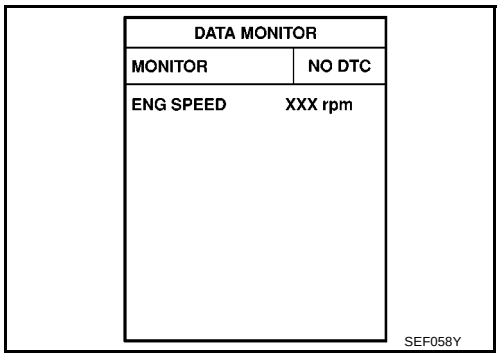
1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.

4. If DTC is detected, go to EC-659, "Diagnostic Procedure" .

PROCEDURE FOR MALFUNCTION B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. If 1st trip DTC is detected, go to EC-659, "Diagnostic Procedure" .



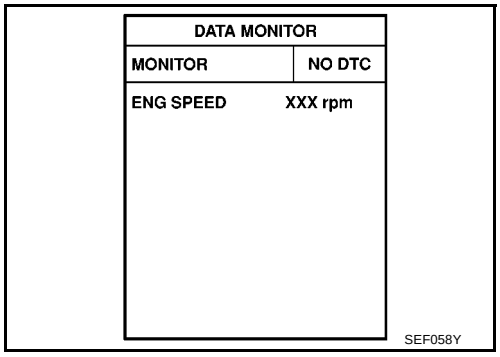
Without CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-659, "Diagnostic Procedure" .

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. Repeat step 3 for 32 times.
5. If 1st trip DTC is detected, go to EC-659, "Diagnostic Procedure" .



Without CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Repeat step 2 for 32 times.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If 1st trip DTC is detected, go to EC-659, "Diagnostic Procedure" .

Diagnostic Procedure

EBS00ONS

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-657 .
5. Is the 1st trip DTC P0605 displayed again?

Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
3. **Perform DTC Confirmation Procedure.**
   See EC-657 .
4. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-511, "NATS (Nissan Anti-theft System)" .
3. Perform EC-503, "Accelerator Pedal Released Position Learning" .
4. Perform EC-503, "Throttle Valve Closed Position Learning" .
5. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

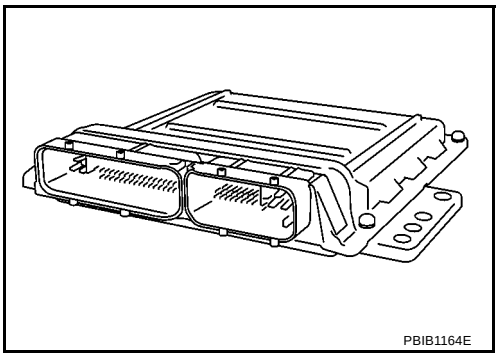
DTC P1065 ECM POWER SUPPLY

PFP:23710

Component Description

EBS00ONT

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the idle air volume learning value memory, etc.


PBIB1164E

On Board Diagnosis Logic

EBS00ONU

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	● Harness or connectors [ECM power supply (back-up) circuit is open or shorted.] ● ECM

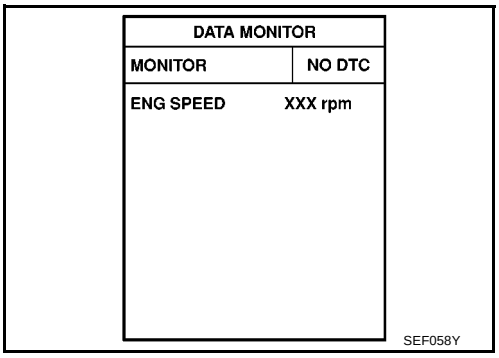
DTC Confirmation Procedure

EBS00ONV

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
5. Repeat steps 3 and 4 for 4 times.
6. If 1st trip DTC is detected, go to EC-662, "Diagnostic Procedure" .



SEF058Y

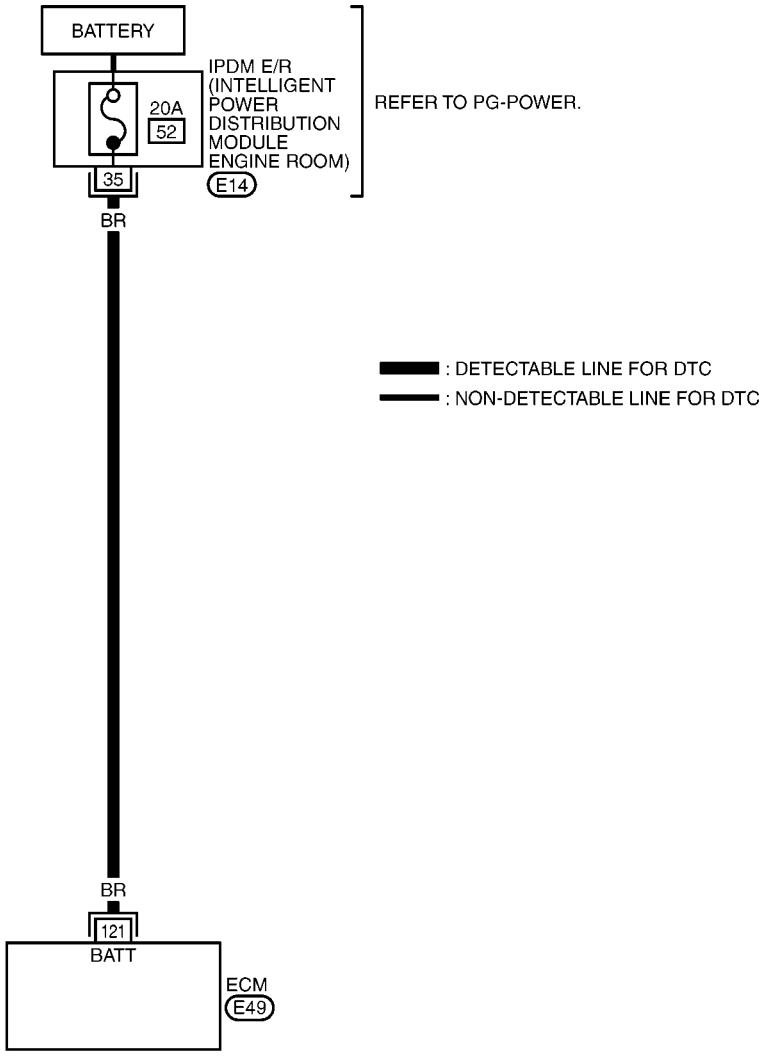
WITHOUT CONSULT-II

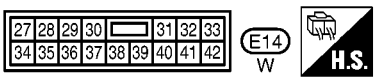
1. Turn ignition switch ON and wait at least 1 second.
2. Start engine and let it idle for 1 second.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Repeat steps 2 and 3 for 4 times.
5. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
6. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
7. If DTC is detected, go to EC-662, "Diagnostic Procedure" .

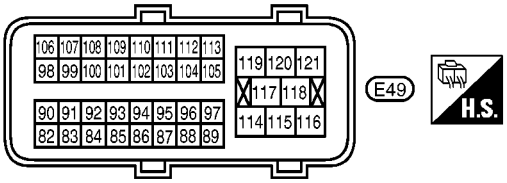
Wiring Diagram

EBS00ONW

EC-ECM/PW-01







MBWA0285E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	BR	Power supply for ECM (Buck-up)	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)

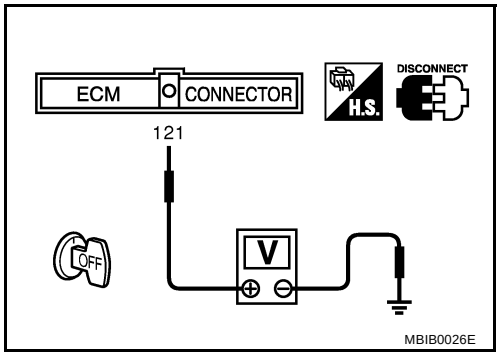
Diagnostic Procedure

EBS00ONX

1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- 20A fuse
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair or replace harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-660 .
5. Is the 1st trip DTC P1065 displayed again?

Without CONSULT-II

1. Turn ignition switch ON.
2. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
3. **Perform DTC Confirmation Procedure.**
   See EC-660 .
4. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes >> GO TO 5.
No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NATS system and registration of all NATS ignition key IDs. Refer to EC-511, "NATS (Nissan Anti-theft System)" .
3. Perform EC-503, "Accelerator Pedal Released Position Learning" .
4. Perform EC-503, "Throttle Valve Closed Position Learning" .
5. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

EBS00ONY

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00ONZ

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	● Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detect the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	The ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P position, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

EBS00OO0

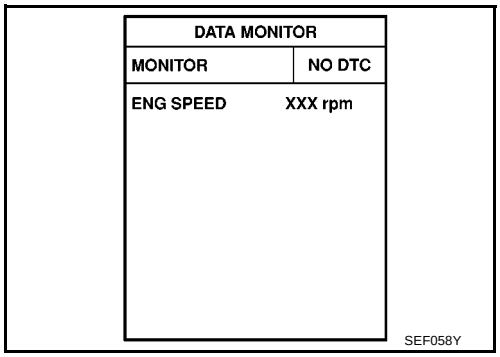
NOTE:

- **Perform PROCEDURE FOR MALFUNCTION A AND B first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION C.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

With CONSULT-II

1. Turn ignition witch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
4. Shift selector lever to P position (A/T models), Neutral position (M/T models).
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Turn ignition witch ON and wait at least 1 second.
7. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
8. Shift selector lever to P position (A/T models), Neutral position (M/T models).



9. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
10. If 1st trip DTC is detected, go to EC-665, "Diagnostic Procedure" .

Without CONSULT-II

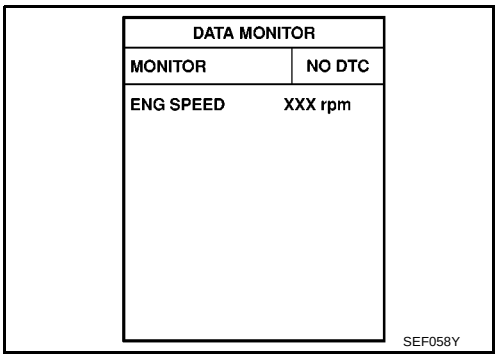
1. Turn ignition switch ON and wait at least 1 second.

2. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
3. Shift selector lever to P position (A/T models), Neutral position (M/T models).
4. Turn ignition switch OFF and wait at least 10 seconds.
5. Turn ignition witch ON and wait at least 1 second.
6. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
7. Shift selector lever to P position (A/T models), Neutral position (M/T models).
8. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
9. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
10. If DTC is detected, go to EC-665, "Diagnostic Procedure" .

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
4. Shift selector lever to N or P position (A/T models), Neutral position (M/T models).
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to EC-665, "Diagnostic Procedure" .



Without CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Shift selector lever to D position (A/T models), 1st position (M/T models) and wait at least 2 seconds.
3. Shift selector lever to N or P position (A/T models), Neutral position (M/T models).
4. Start engine and let it idle for the 3 seconds.
5. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
6. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
7. If DTC is detected, go to EC-665, "Diagnostic Procedure" .

Diagnostic Procedure

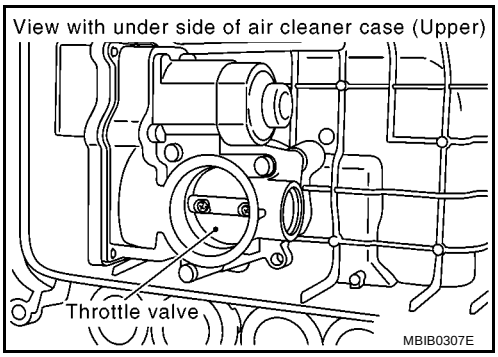
EBS00OO1

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

EBS00OO2

NOTE:
If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-664 or EC-673 .
Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00OO3

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	● Harness or connectors (Throttle control motor circuit is open or shorted.) ● Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

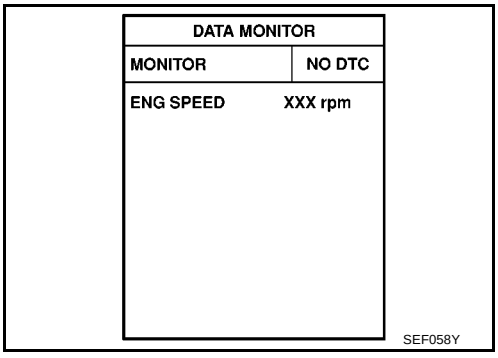
DTC Confirmation Procedure

EBS00OO4

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-669, "Diagnostic Procedure" .



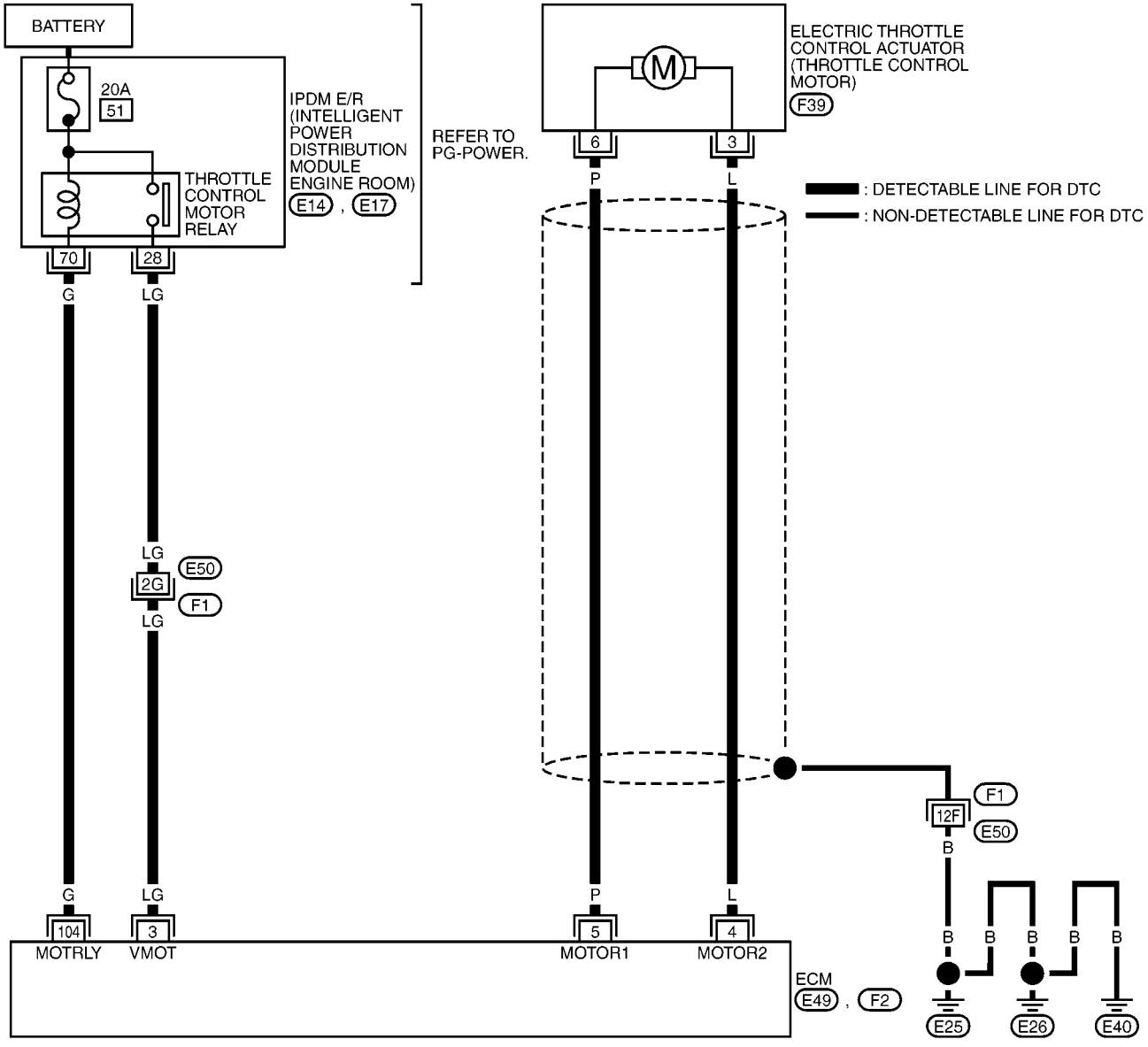
WITHOUT CONSULT-II

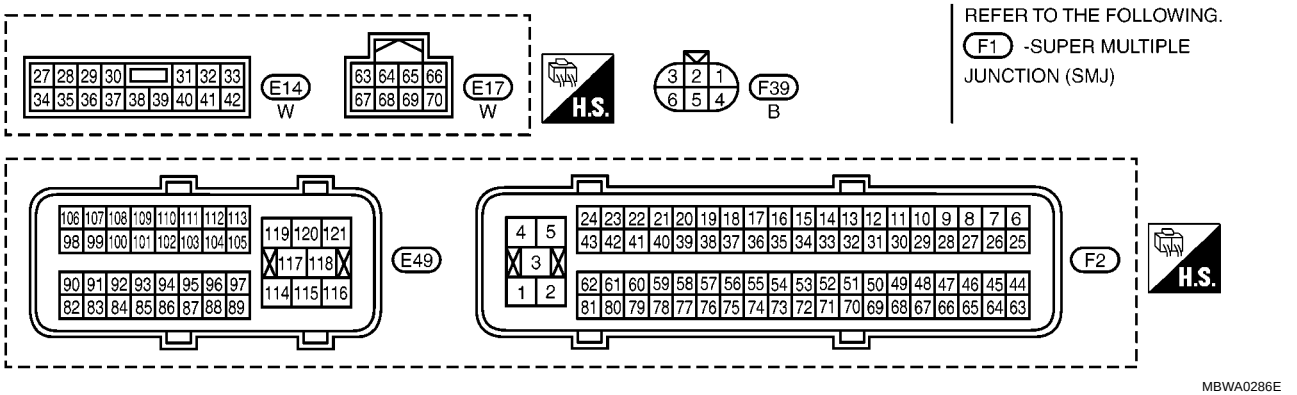
1. Turn ignition switch ON and wait at least 2 seconds.
2. Start engine and let it idle for 5 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to EC-669, "Diagnostic Procedure" .

Wiring Diagram

EBS00OO5

EC-ETC1-01

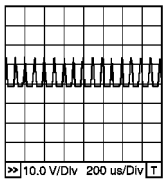
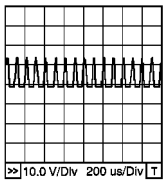




MBWA0286E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

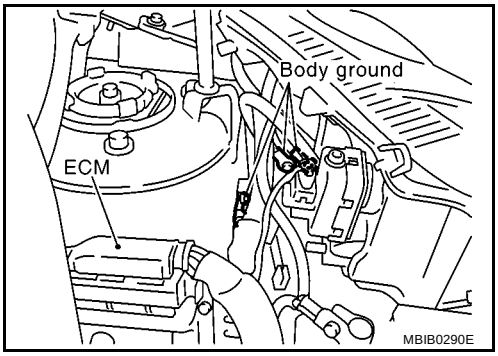
Diagnostic Procedure

EBS00OO6

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.

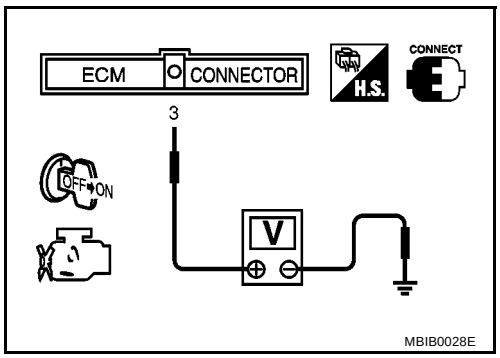


MBIB0290E

2. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT-I

Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)



OK or NG

OK >> GO TO 10.
NG >> GO TO 3.

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E14.
4. Check harness continuity between ECM terminal 3 and IPDM E/R terminal 28. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

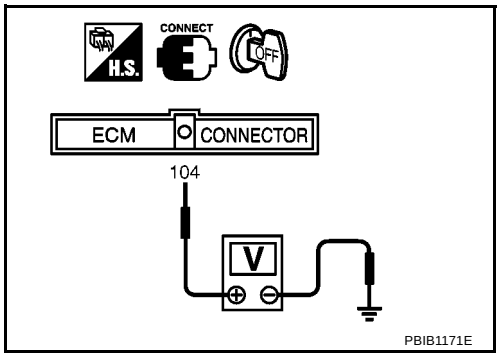
- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch OFF.
3. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E17.
3. Check continuity between ECM terminal 104 and IPDM E/R terminal 70. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector E17
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

OK or NG

OK >> GO TO 9.
NG >> Replace 20A fuse.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

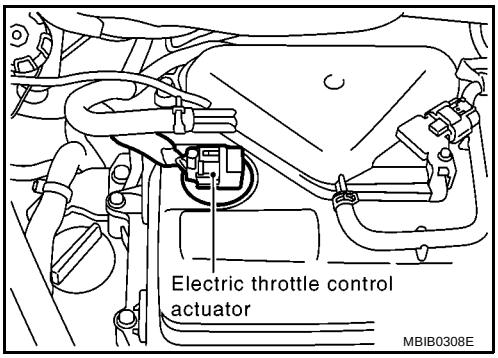
OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connectors.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

Electric throttle control actuator terminal	ECM terminal	Continuity
3	5	Should not exist
	4	Should exist
6	5	Should exist
	4	Should not exist



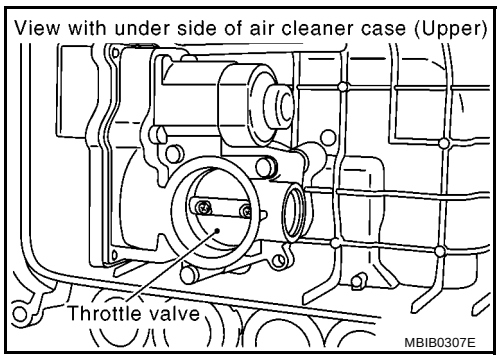
5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair or replace.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 12.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-672, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 14.
NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

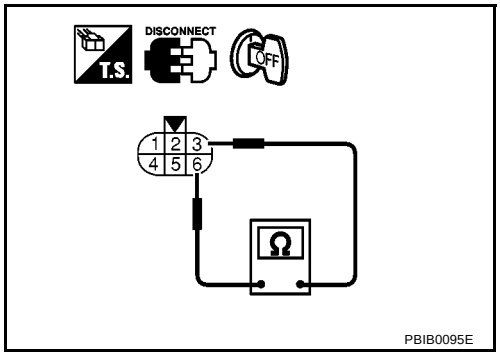
Component Inspection

EBS00OO7

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]



3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-503, "Throttle Valve Closed Position Learning" .
5. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OO8

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PFP:16119

Component Description

EBS00OO9

Power supply for the Throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

EBS00OOA

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

EBS00OOB

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	● Harness or connectors (Throttle control motor relay circuit is shorted.) ● Throttle control motor relay
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	● Harness or connectors (Throttle control motor relay circuit is open.) ● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

EBS00OOC

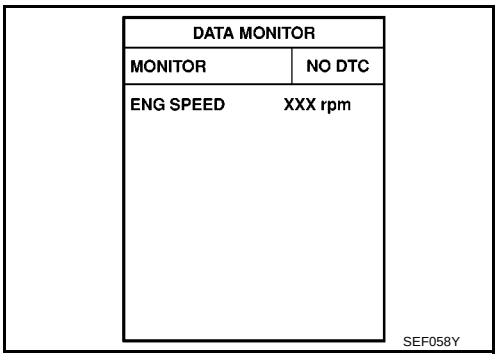
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P1124

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V.

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-676, "Diagnostic Procedure" .



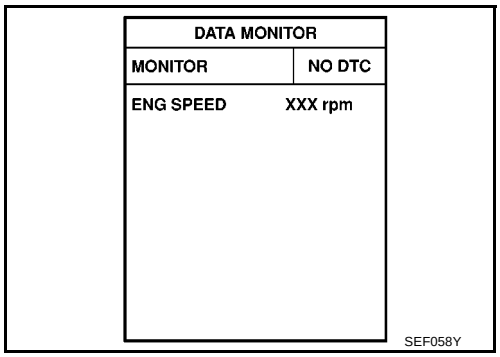
Without CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. If DTC is detected, go to EC-676, "Diagnostic Procedure" .

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-676, "Diagnostic Procedure" .



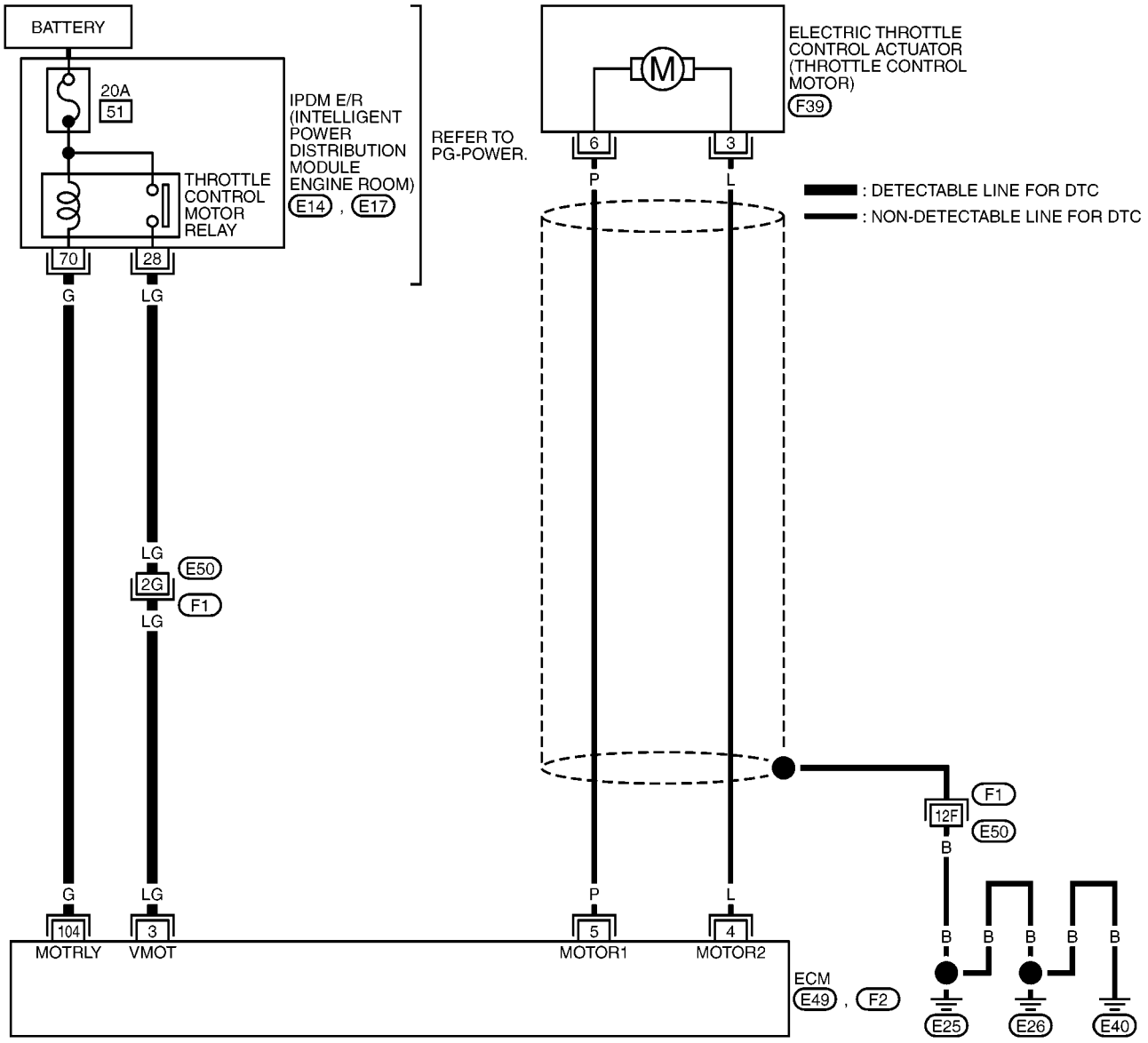
Without CONSULT-II

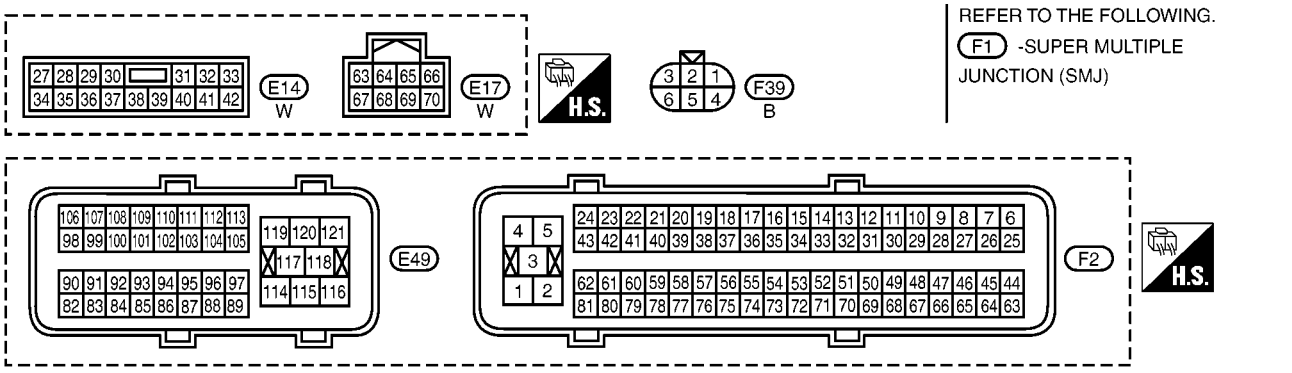
1. Turn ignition switch ON and wait at least 2 second.
2. Start engine and let it idle for 5 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to EC-676, "Diagnostic Procedure" .

Wiring Diagram

EBS00OOD

EC-ETC2-01





MBWA0287E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	LG	Throttle control motor relay power supply	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)
104	G	Throttle control motor relay	**[Ignition switch OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch ON]	0 - 1.0V

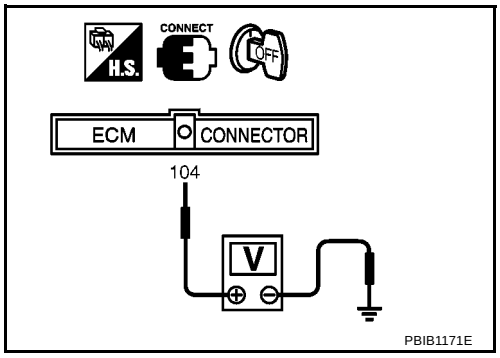
Diagnostic Procedure

EBS00OOE

1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 104 and ground with CONSULT-II or tester.

Voltage: Battery voltage.



OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Disconnect ECM harness connector.
2. Disconnect IPDM E/R harness connector E17.
3. Check continuity between ECM terminal 104 and IPDM E/R terminal 70.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- IPDM E/R harness connector E17
- Harness for open or shot between ECM and IPDM E/R

>> Repair open circuit of short to ground or short to power in harness or connectors.

4. CHECK FUSE

1. Disconnect 20A fuse.
2. Check 20A fuse for blown.

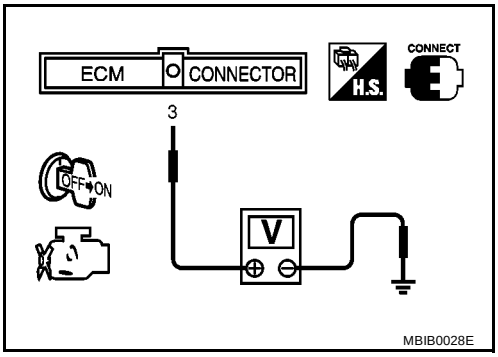
OK or NG

OK >> GO TO 8.
NG >> Replace 20A fuse.

5. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT-I

1. Reconnect all disconnected connectors.
2. Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)



OK or NG

OK >> GO TO 8.
NG >> GO TO 6.

6. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect IPDM E/R harness connector E14.
4. Check continuity between ECM terminal 3 and IPDM E/R terminal 28. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between ECM and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connectors.

DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

Component Description

EBS00OOF

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

EBS00OOG

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	● Harness or connectors (Throttle control motor circuit is shorted.) ● Electric throttle control actuator (Throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

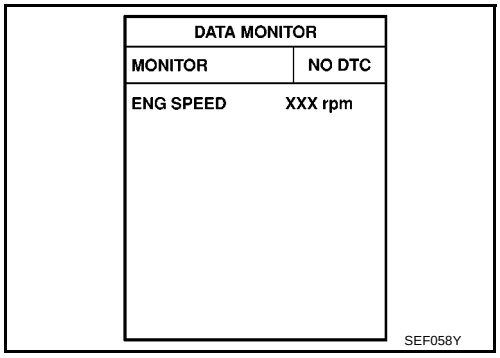
DTC Confirmation Procedure

EBS00OOH

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-680, "Diagnostic Procedure" .



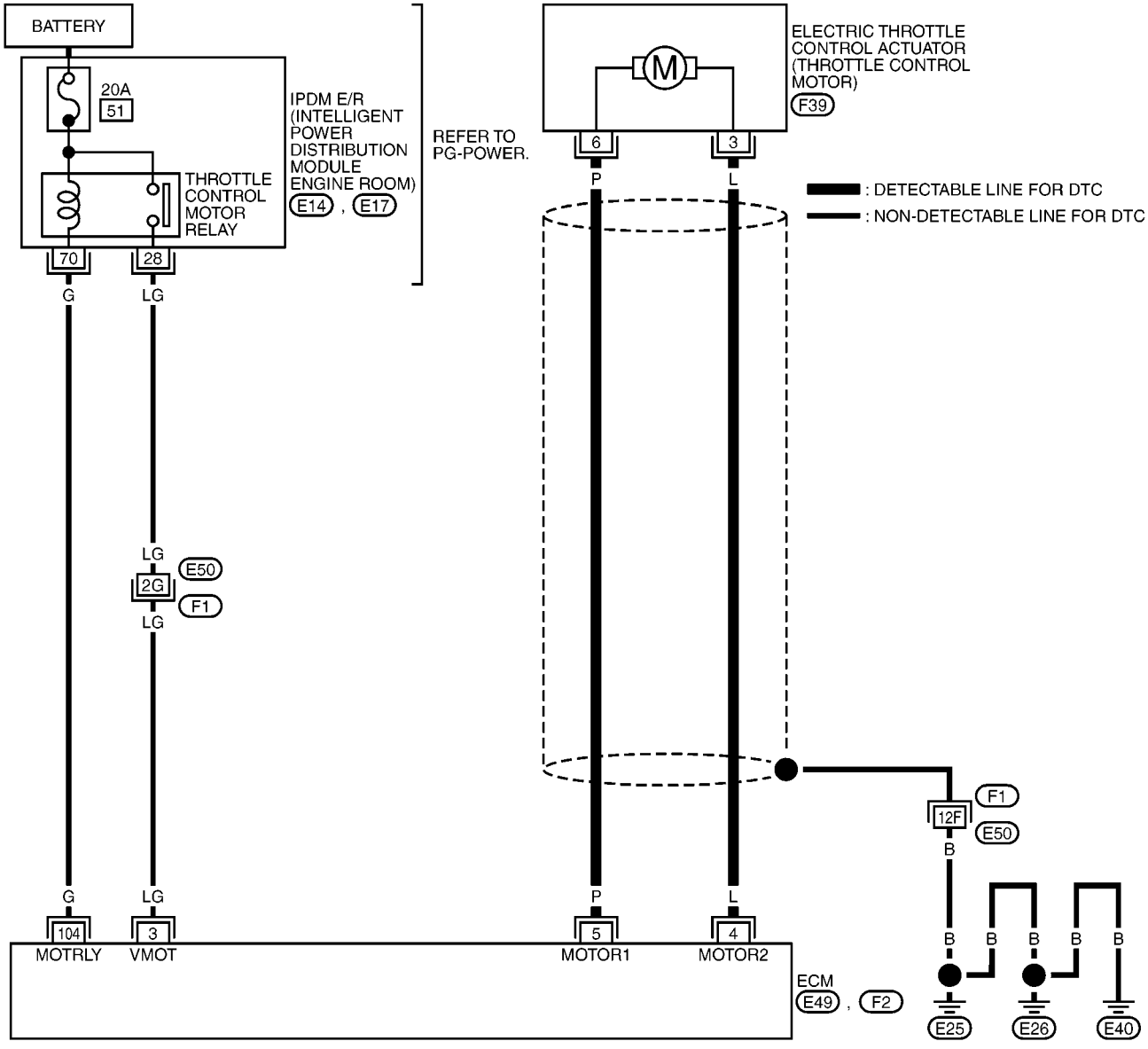
WITHOUT CONSULT-II

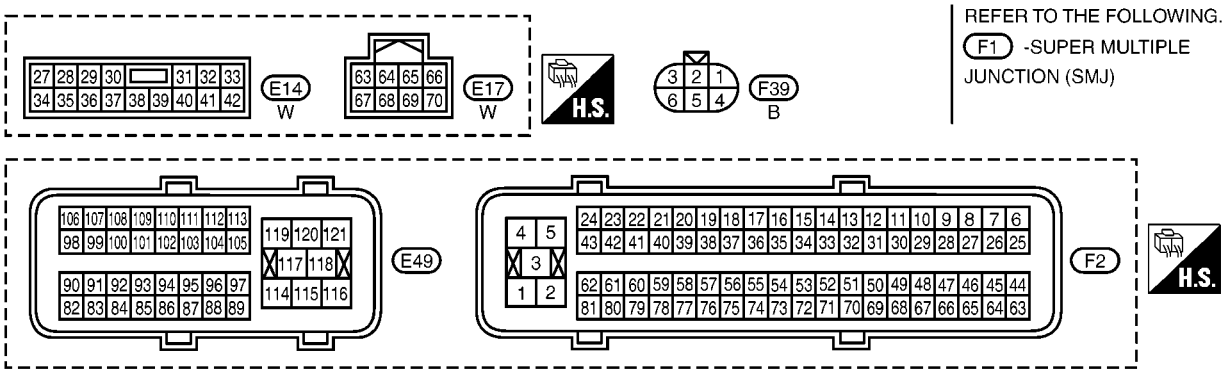
1. Turn ignition switch ON and wait at least 2 second.
2. Start engine and let it idle for 5 seconds.
3. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If DTC is detected, go to EC-680, "Diagnostic Procedure" .

Wiring Diagram

EBS00OOI

EC-ETC3-01



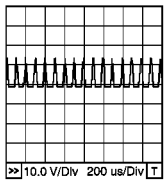
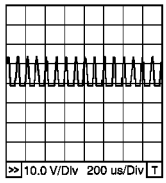


MBWA0288E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	L	Throttle control motor (Close)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Released	0 - 14V★  PBIB0534E
5	P	Throttle control motor (Open)	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

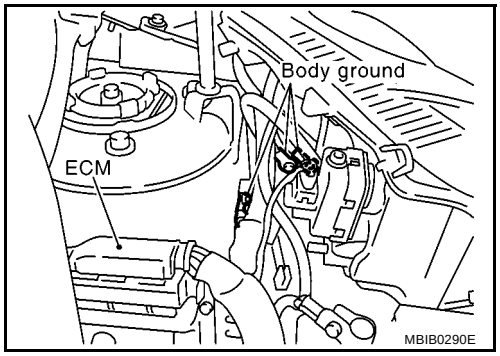
Diagnostic Procedure

EBS00OOJ

1. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

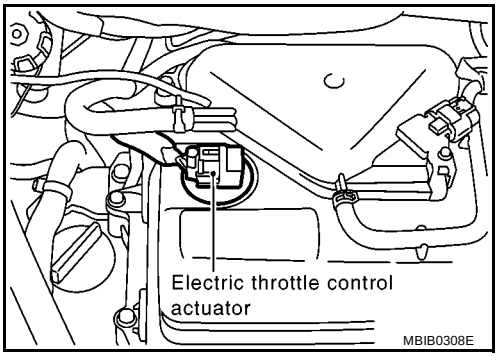
>> GO TO 2.



MBIB0290E

2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between the following terminals. Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK THROTTLE CONTROL MOTOR

Refer to EC-681, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

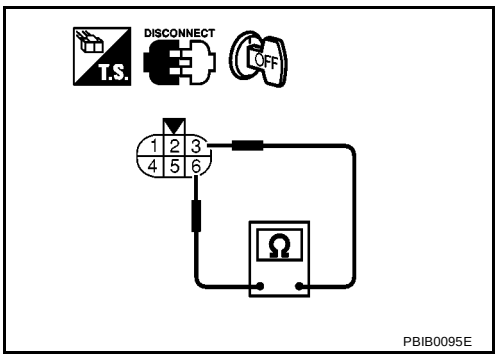
Component Inspection

EBS00OOK

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]



3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-503, "Throttle Valve Closed Position Learning" .
5. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OOL

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

DTC P1171 INTAKE ERROR

PFP:22365

On Board Diagnosis Logic

EBS00OSS

NOTE:
If DTC 1171 is displayed with DTC P0108, first perform the trouble diagnosis for DTC P0108.
Refer to EC-575, "DTC P0107, P0108 MANIFOLD ABSOLUTE PRESSURE SENSOR" .
ECM computes two intake air volume values.
1: Computed from manifold absolute pressure signal and intake air temperature signal.
2: Computed from engine revolution signal and throttle position signal.

In normal condition, value 1 is used for engine control.
If intake air leak occurred between throttle valve and intake air port, manifold absolute pressure sensor signal might increase, and then ECM increases amount of fuel injected. In this case, ECM uses value 2 for engine control instead of value1.
ECM monitors the difference between value 1 and value 2. If the difference is extremely large, ECM judges intake air leak occurs and light up the MI

This diagnosis has one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1171 1171	Intake error	An excessively high voltage from manifold absolute pressure sensor is sent to ECM.	● Harness or connectors (The manifold absolute pressure sensor circuit is open or shorted.) ● Manifold absolute pressure ● Intake air leaks ● Vacuum hoses

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and MI lights up.

Detected items	Engine operating condition in fail-safe mode
Intake air system problem	When accelerator pedal is depressed, engine speed will not rise more than 2,500 rpm due to fuel cut.

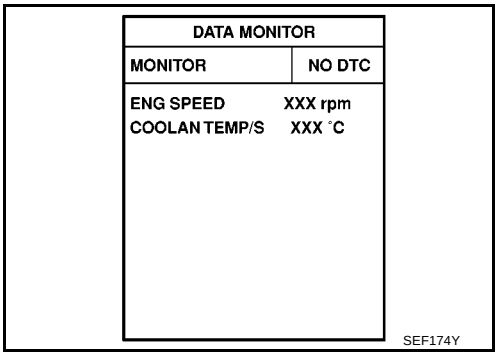
DTC Confirmation Procedure

EBS00OST

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to EC-685, "Diagnostic Procedure" .



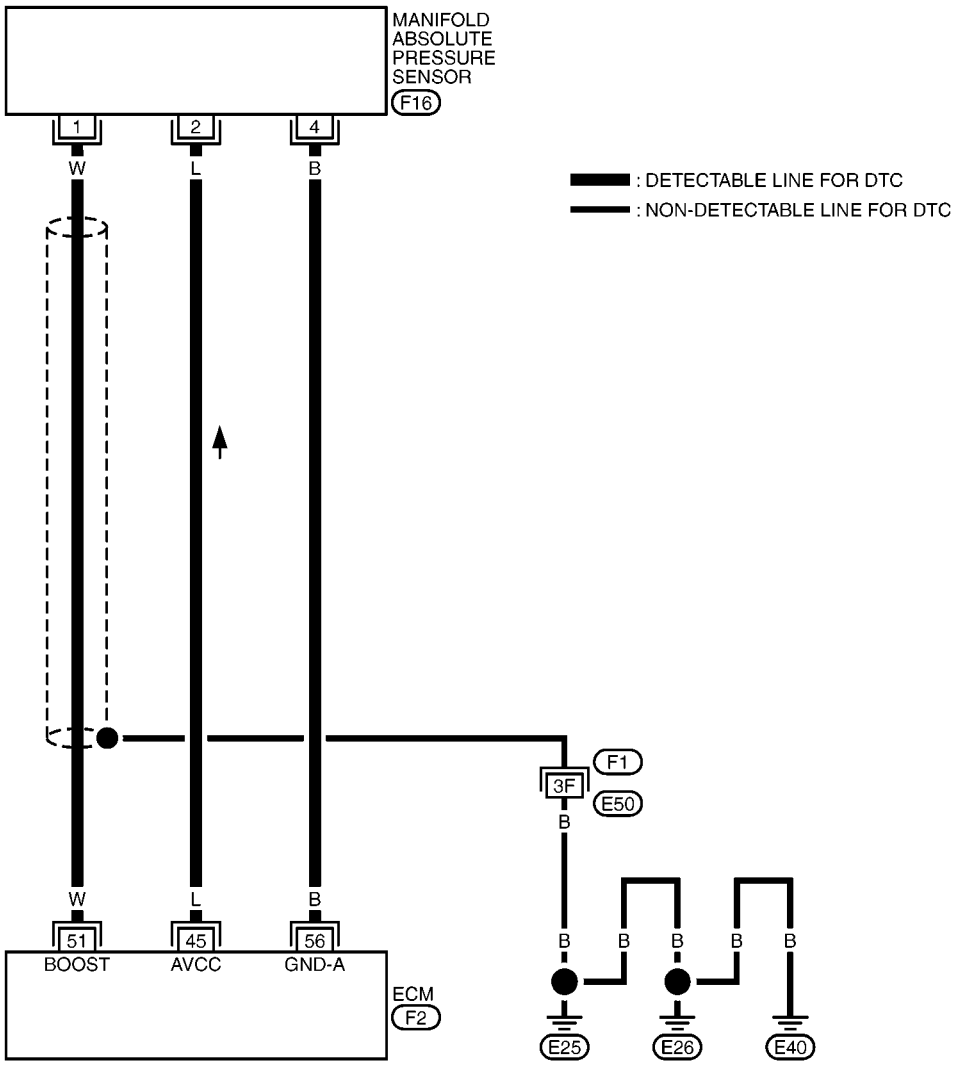
WITHOUT CONSULT-II

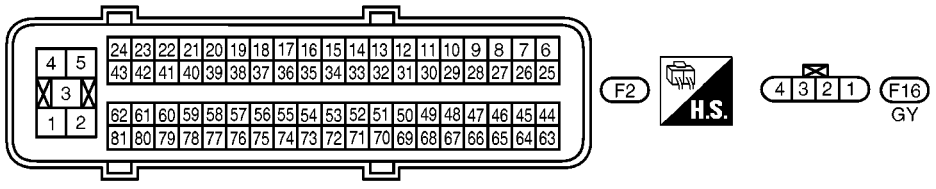
1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If trip DTC is detected, go to EC-685, "Diagnostic Procedure" .

Wiring Diagram

EBS00OSU

EC-AP/SEN-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0304E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	W	Manifold absolute pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 1.5V
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	Approximately 1.2V

Diagnostic Procedure

EBS00OSV

1. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the air cleaner element.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK VACUUM HOSE

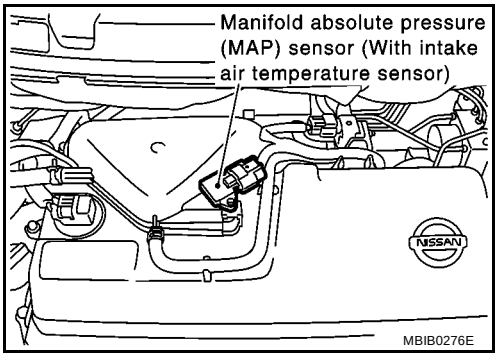
1. Check intake manifold vacuum hoses for clogging or disconnection. Refer to EC-483, "Vacuum Hose Drawing" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

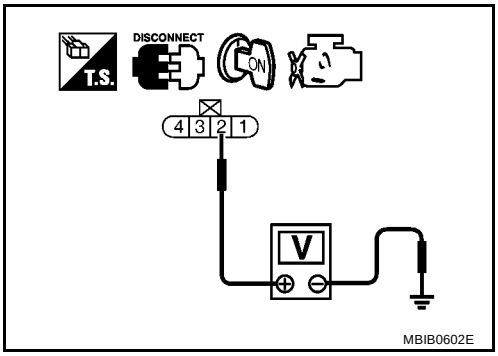
3. CHECK MAP SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor harness connector.
3. Turn ignition switch ON.



4. Check voltage between manifold absolute pressure sensor terminal 2 and ground.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair harness or connectors.

4. CHECK MAP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between manifold absolute pressure sensor terminal 4 and ECM terminal 56. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK MAP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between manifold absolute pressure sensor terminal 1 and ECM terminal 51.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAP SENSOR

Refer to EC-578, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace sensor.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

EBS010DD

The malfunction information related to TCS is transferred through the CAN communication line from “ABS actuator and electric unit (control unit)” to ECM.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS010DE

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	TCS control unit	ECM receives a malfunction information from “ABS actuator and electric unit (control unit)”.	● ABS actuator and electric unit (control unit) ● TCS related parts

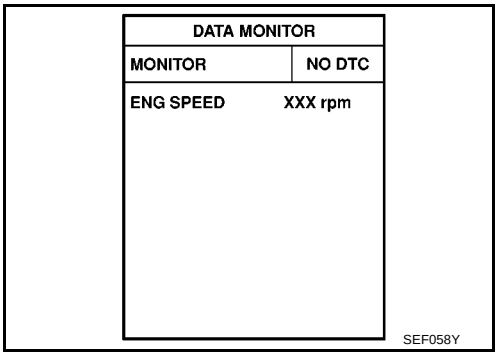
DTC Confirmation Procedure

EBS010DF

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 60 seconds.
4. If 1st trip DTC is detected, go to EC-687, "Diagnostic Procedure"
.



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS010DG

Go to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

EBS010DH

NOTE:
If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-572, "DTC U1000, U1001 CAN COMMUNICATION LINE" .
This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and “ABS actuator and electric unit (control unit)”.
Be sure to erase the malfunction information such as DTC not only for “ABS actuator and electric unit (control unit)” but also for ECM after TCS related repair.

On Board Diagnosis Logic

EBS010DI

The MI will not light up for this self-diagnosis.
Freeze frame data is not stored in the ECM for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from “ABS actuator and electric unit (control unit)” continuously.	● Harness or connectors (The CAN communication line is open or shorted.) ● ABS actuator and electric unit (control unit). ● Dead (Weak) battery

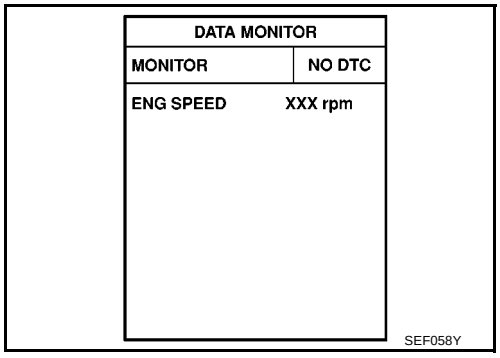
DTC Confirmation Procedure

EBS010DJ

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. If a 1st trip DTC is detected, go to EC-688, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

EBS010DK

1. CHECK “ABS ACTUATTOR AND ELECTRIC UNIT (CONTROL UNIT)” FUNCTION

Refer to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

>> **INSPECTION END**

DTC P1217 ENGINE OVER TEMPERATURE

PFP:00000

System Description

EBS00OOM

NOTE:
If DTC P1217 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-572, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

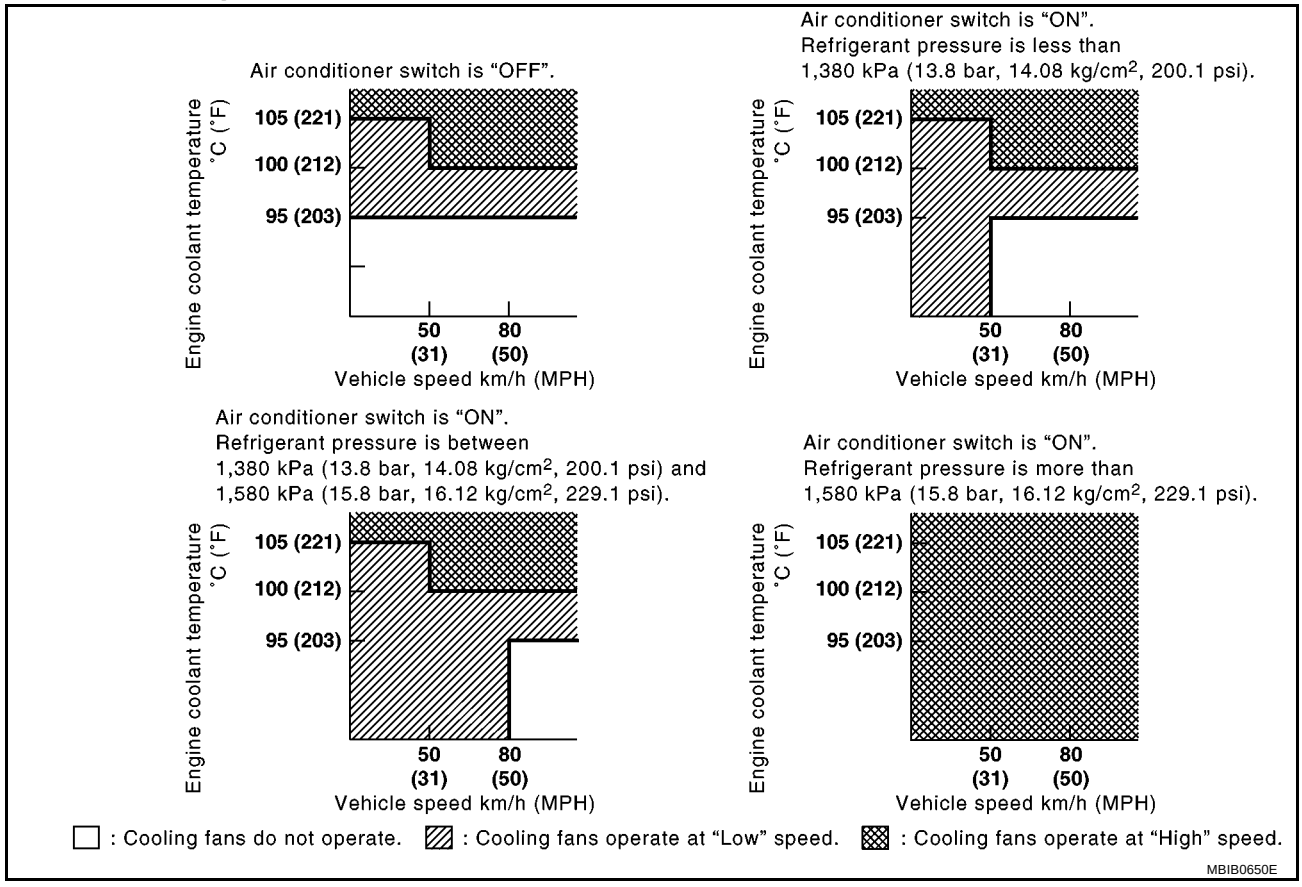
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	IPDM E/R (Cooling fan relay)
Battery	Battery voltage*1		
Vehicle speed signal	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch*3	Air conditioner ON signal*2		
Refrigerant pressure sensor*3	Refrigerant pressure		

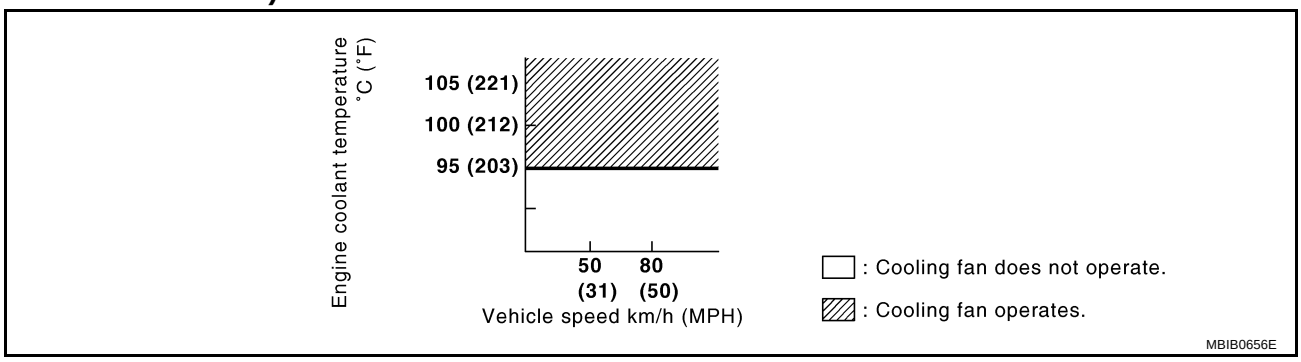
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.
*2: This signal is sent to ECM through CAN communication line.
*3: Models with air conditioner.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF] (models with A/C) or 2 step control [ON/OFF] (models without A/C).
The ECM controls cooling fan relays through CAN communication line.

OPERATION
(Models with A/C)



(Models without A/C)



CONSULT-II Reference Value in Data Monitor Mode

EBS00OON

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	(Models with A/C) ● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 104°C (210°F)	LOW*
		Engine coolant temperature is 105°C (212°F) or more	HI*

*:Models without air conditioner, cooling fan operates only ON and OFF operation, but CONSULT-II display will change OFF, LOW and HI depends on engine coolant temperature.

On Board Diagnosis Logic

EBS00OOO

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. ● Engine coolant is not within the specified range.	● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat For more information, refer to EC-702, "Main 12 Causes of Overheating" .

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-8, "Changing Engine coolant" . Also, replace the engine oil. Refer to LU-5, "Changing Engine Oil" .

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-20, "Engine Coolant Mixture Ratio" .**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

Overall Function Check

EBS00OOP

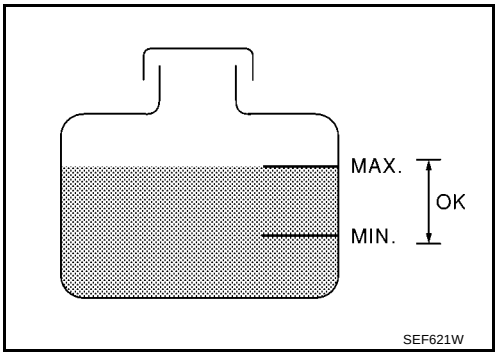
Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

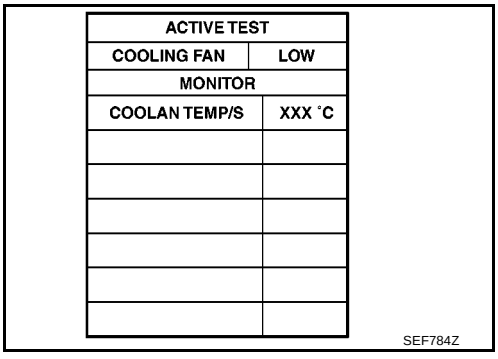
Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-695, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-695, "Diagnostic Procedure" .
3. Turn ignition switch ON.



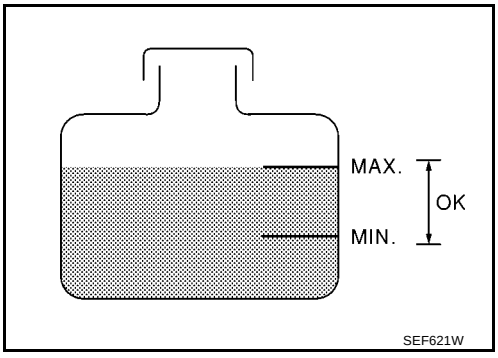
4. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II.
5. If the results are NG, go to EC-695, "Diagnostic Procedure" .



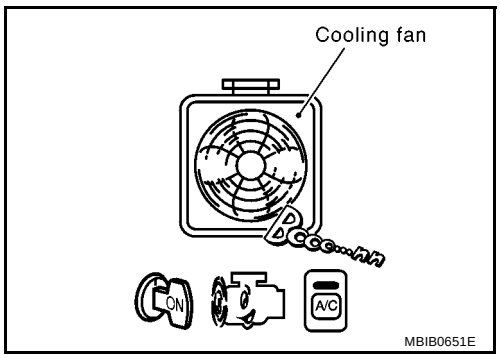
WITHOUT CONSULT-II

(Models with air conditioner)

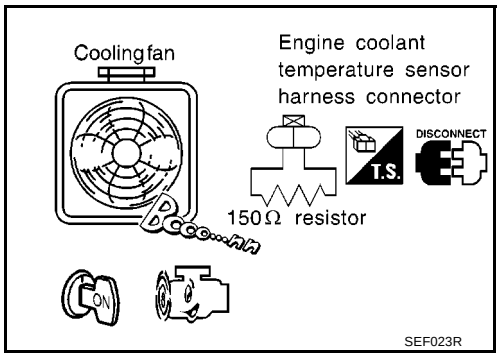
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-695, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-695, "Diagnostic Procedure" .
3. Start engine.
   Be careful not to overheat engine.
4. Set temperature control lever to full cold position.
5. Turn air conditioner switch ON.
6. Turn blower fan switch ON.
7. Run engine at idle for a few minutes with air conditioner operating.
   Be careful not to overheat engine.



8. Make sure that cooling fans operates at low speed.
   If NG, go to EC-695, "Diagnostic Procedure" .
   If OK, go to the following step.
9. Turn ignition switch OFF.
10. Turn air conditioner switch and blower fan switch OFF.
11. Disconnect engine coolant temperature sensor harness connector.
12. Connect 150Ω resistor to engine coolant temperature sensor harness connector.

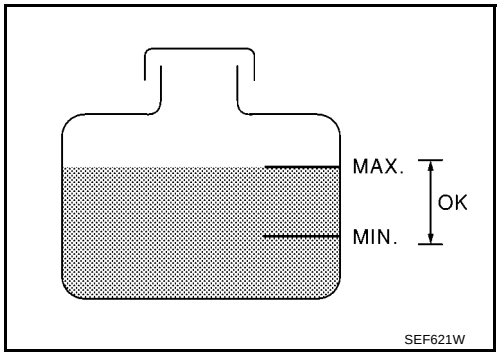


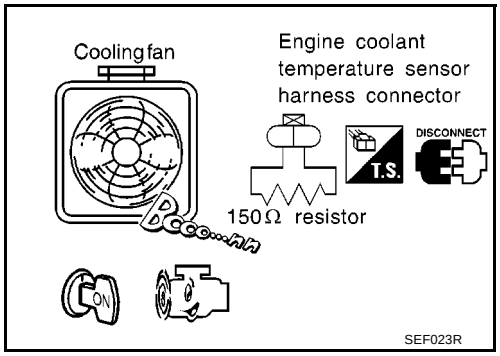
13. Restart engine and make sure that cooling fan operates at higher speed than low speed.
    Be careful not to overheat engine.
14. If NG, go to EC-695, "Diagnostic Procedure" .



(Models without air conditioner)

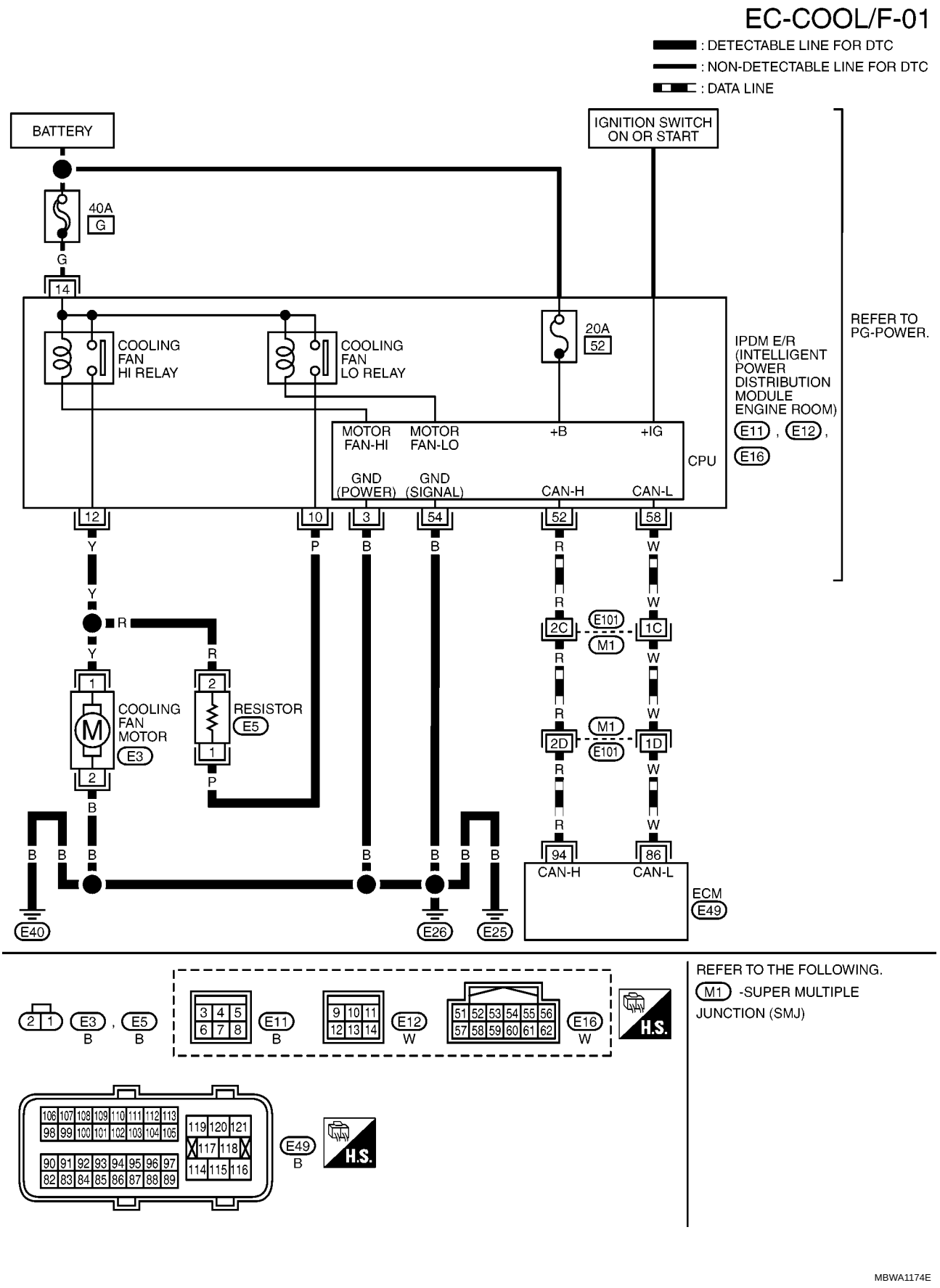
1. Check the coolant level in the reservoir tank and radiator.
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-695, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-695, "Diagnostic Procedure" .
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Start engine and make that cooling fan operates. Be careful not to overheat engine.
6. If NG, go to EC-695, "Diagnostic Procedure" .





Wiring Diagram
WITH AIR CONDITIONER

EBS00OOQ

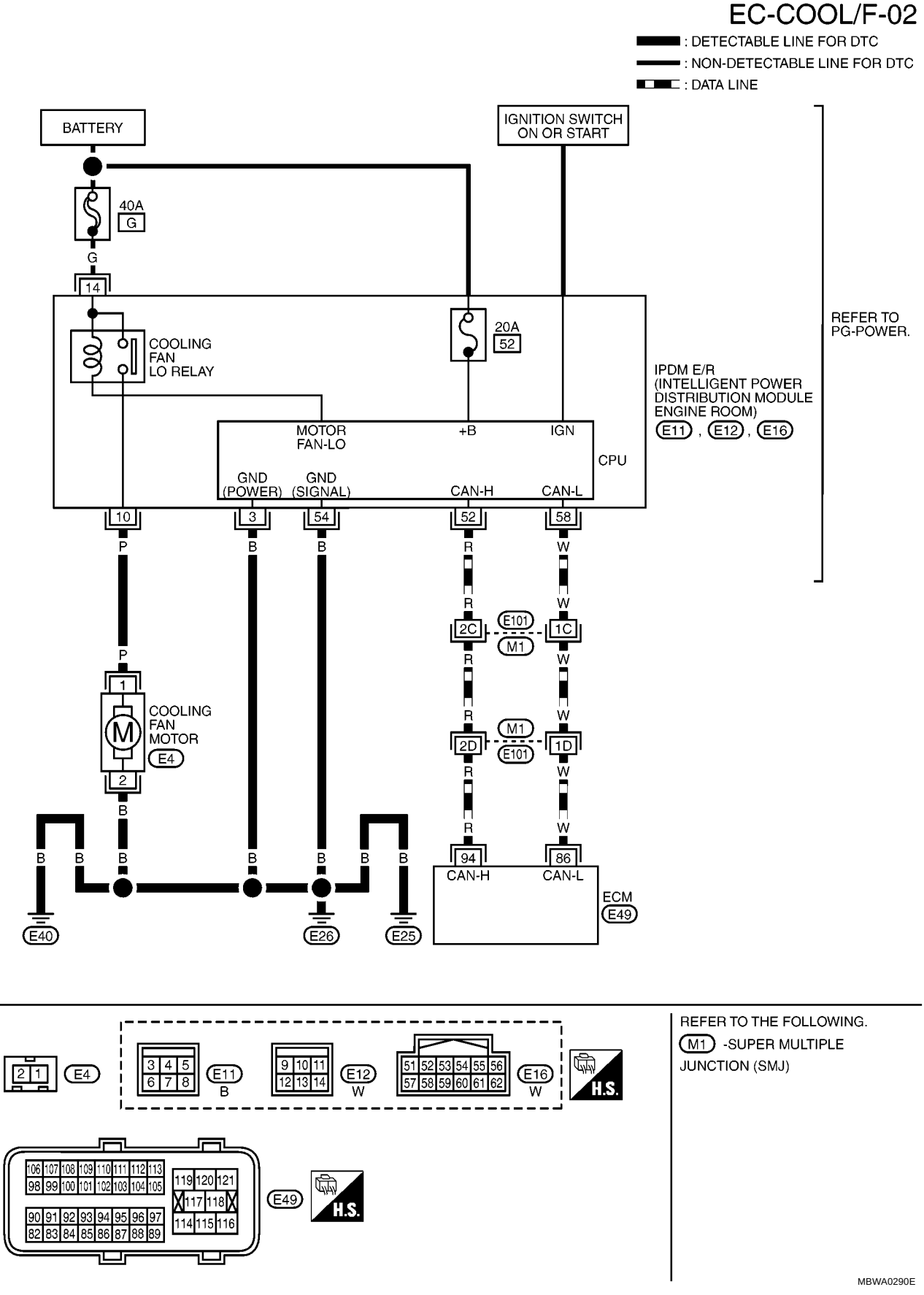


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA1174E

WITHOUT AIR CONDITIONER

EC-COOL/F-02



Diagnostic Procedure

EBS00OOR

PROCEDURE FOR MODELS WITH AIR CONDITIONER

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II and touch “LOW” on the CONSULT-II screen.
3. Make sure that cooling fan operates at low speed.

OK or NG

OK >> GO TO 3.
NG >> Check cooling fan low speed control circuit. (Go to EC-700, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

3. CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-II

1. Touch “HIGH”on the CONSULT-II screen.
2. Make sure that cooling fan operates at higher speed than low speed.

OK or NG

OK >> GO TO 6.
NG >> Check cooling fan high speed control circuit. (Go to EC-700, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	HIGH
MONITOR	
COOLAN TEMP/S	XXX °C

SEF785Z

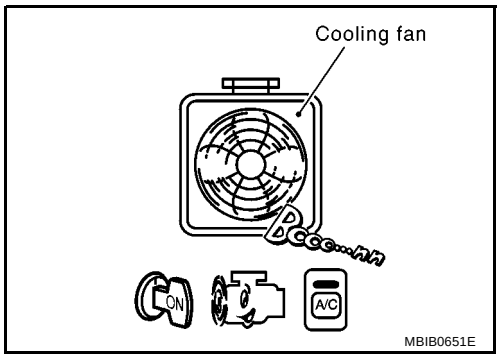
4. CHECK COOLING FAN LOW SPEED OPERATION

Without CONSULT-II

1. Start engine and let it idle.
2. Turn air conditioner switch ON.
3. Turn blower fan switch ON.
4. Make sure that cooling fan operates at low speed.

OK or NG

OK >> GO TO 5.
NG >> Check cooling fan low speed control circuit. (Go to EC-700, "PROCEDURE A" .)



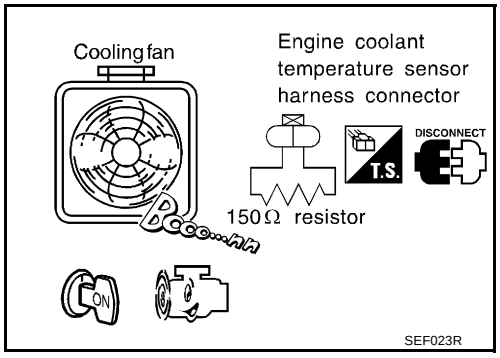
5. CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-II

1. Turn ignition switch OFF.
2. Turn air conditioner switch and blower fan switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
5. Restart engine and make sure that cooling fan operates at higher speed than low speed.

OK or NG

OK >> GO TO 6.
NG >> Check cooling fan high speed control circuit. (Go to EC-700, "PROCEDURE A" .)



6. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

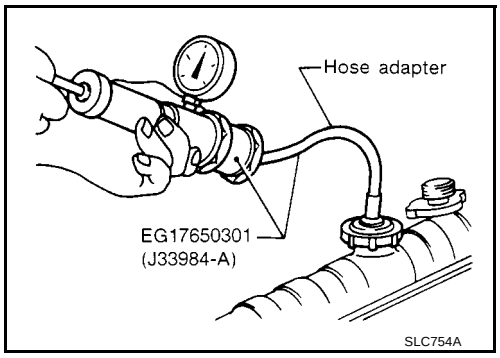
Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.



7. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-21, "WATER PUMP" .)

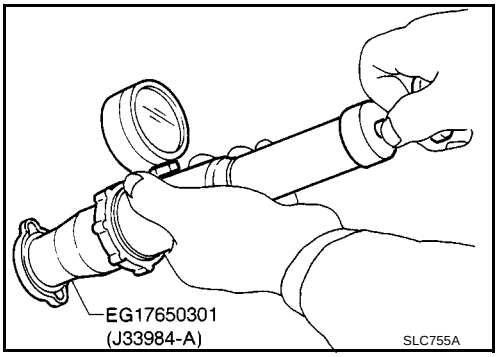
>> Repair or replace.

8. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 9.
NG >> Replace radiator cap.

9. CHECK THERMOSTAT

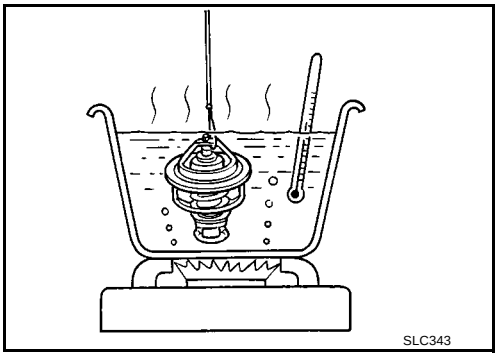
1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

Valve opening temperature:

80.5 - 83.5 °C (177 - 182 °F)

Valve lift:

More than 8 mm/95 °C (0.31 in/203 °F)



4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-23, "THERMOSTAT" .

OK or NG

OK >> GO TO 10.
NG >> Replace thermostat.

10. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-584, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace engine coolant temperature sensor.

11. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to EC-702, "Main 12 Causes of Overheating" .

>> **INSPECTION END**

PROCEDURE FOR MODELS WITHOUT AIR CONDITIONER

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK COOLING FAN OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II and touch “ON” on the CONSULT-II screen.
3. Make sure that cooling fan operates.

OK or NG

OK >> GO TO4.
NG >> Check cooling fan low speed control circuit. (Go to EC-700, "PROCEDURE A" .)

ACTIVE TEST	
COOLING FAN	LOW
MONITOR	
COOLAN TEMP/S	XXX °C

SEF784Z

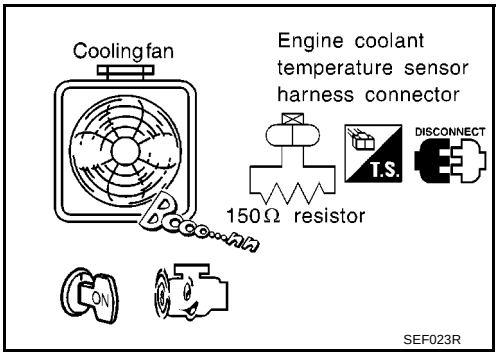
3. CHECK COOLING FAN OPERATION

Without CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
4. Restart engine and make sure that cooling fan operates.

OK or NG

OK >> GO TO 4.
NG >> Check cooling fan high speed control circuit-1. (Go to EC-700, "PROCEDURE A" .)



SEF023R

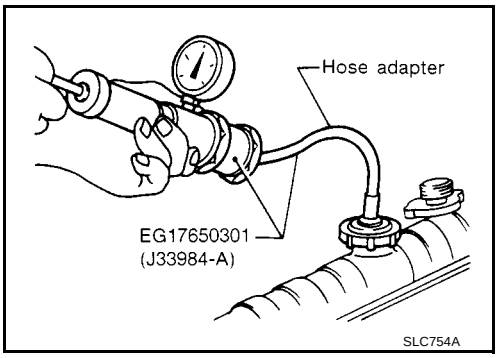
4. CHECK COOLING SYSTEM FOR LEAK

Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:
Higher than the specified pressure may cause radiator damage.

Pressure should not drop.



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following for leak.

- Hose
- Radiator
- Water pump (Refer to CO-21, "WATER PUMP" .)

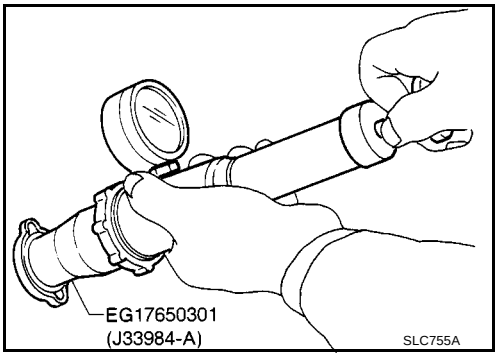
>> Repair or replace.

6. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure:

59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)



OK or NG

OK >> GO TO 7.
NG >> Replace radiator cap.

7. CHECK THERMOSTAT

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.

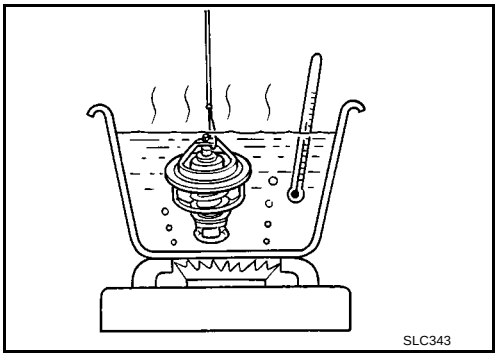
   Valve opening temperature:

   80.5 - 83.5 °C (177 - 182 °F)

   Valve lift:

   More than 8 mm/95 °C (0.31 in/203 °F)

4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to CO-23, "THERMOSTAT" .



OK or NG

OK >> GO TO 8.
NG >> Replace thermostat.

8. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-584, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace engine coolant temperature sensor.

9. CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to EC-702, "Main 12 Causes of Overheating" .

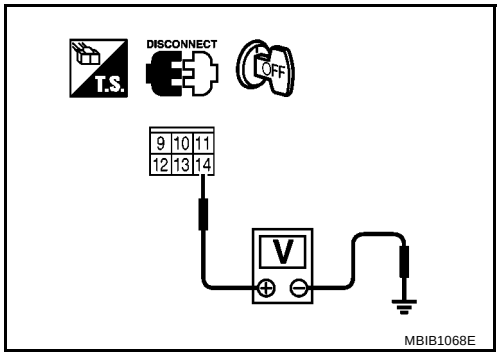
>> **INSPECTION END**

PROCEDURE A

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E12.
3. Check voltage between IPDM E/R terminal 14 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

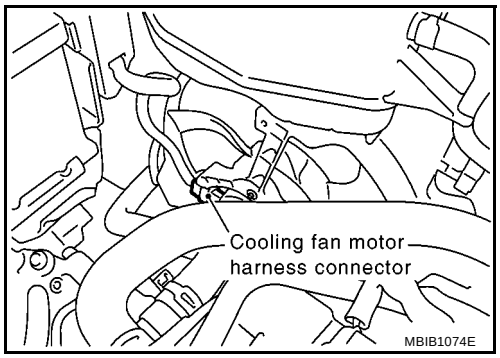
- 40A fusible links
- Harness for open or short between IPDM E/R and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN MOTORS CIRCUIT

1. Disconnect cooling fan motor harness connector.
2. Check harness continuity between cooling fan motor terminal 1 and IPDM E/R terminal 12 (models with A/C) or 10 (models without A/C), cooling fan motor terminal 2 and ground.
   Refer to wiring diagram.

Continuity should exist.



3. Also check harness for short to ground and short to power.
4. For models with air conditioner, check harness continuity between IPDM E/R terminal 10 and cooling fan motor terminal 1.
   Refer to wiring diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan motor and IPDM E/R
- Harness for open or short between cooling fan motor and ground
- Harness for open or short between resistor and IPDM E/R (models with A/C)
- Harness for open or short between resistor and cooling fan motor (models with A/C)
- Resistor E5 (models with A/C)

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK COOLING FAN MOTORS

Refer to EC-702, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace cooling fan motors.

6. CHECK INTERMITTENT INCIDENT

Perform EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R. Refer to PG-18, "IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)" .
NG >> Repair or replace harness or connector.

Main 12 Causes of Overheating

EBS00OOS

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See MA-20, "Engine Coolant Mixture Ratio" .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See CO-8, "LEVEL CHECK" .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi) (Limit)	See CO-15, "Checking Radiator Cap" .
ON*2	5	● Coolant leaks	● Visual	No leaks	See CO-8, "LEAK CHECK" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See CO-23, "THERMOSTAT" , and CO-11, "RADIATOR" .
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-695).
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See CO-8, "Changing Engine coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See CO-8, "LEVEL CHECK" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-59, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-73, "CYLINDER BLOCK" .

*1: Turn the ignition switch ON.
*2: Engine running at 3,000 rpm for 10 minutes.
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.
*4: After 60 minutes of cool down time.
For more information, refer to CO-5, "OVERHEATING CAUSE ANALYSIS" .

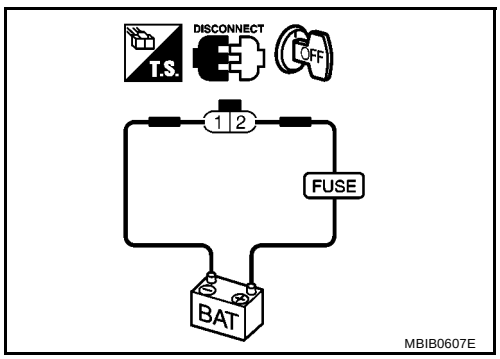
Component Inspection

EBS00OOT

COOLING FAN MOTOR

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Terminals	
	(+)	(-)
Cooling fan motor	1	2



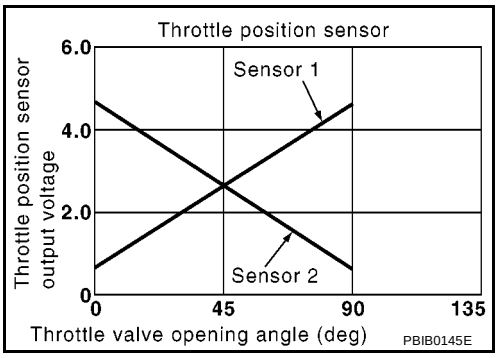
DTC P1223, P1224 TP SENSOR

PFP:16119

Component Description

EBS00OSG

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OSH

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T models) 1st (M/T models)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OSI

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1223 1223	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (The TP sensor 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 2)
P1224 1224	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

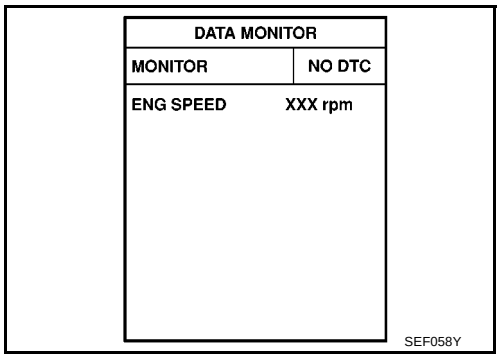
DTC Confirmation Procedure

EBS00OSJ

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-706, "Diagnostic Procedure" .



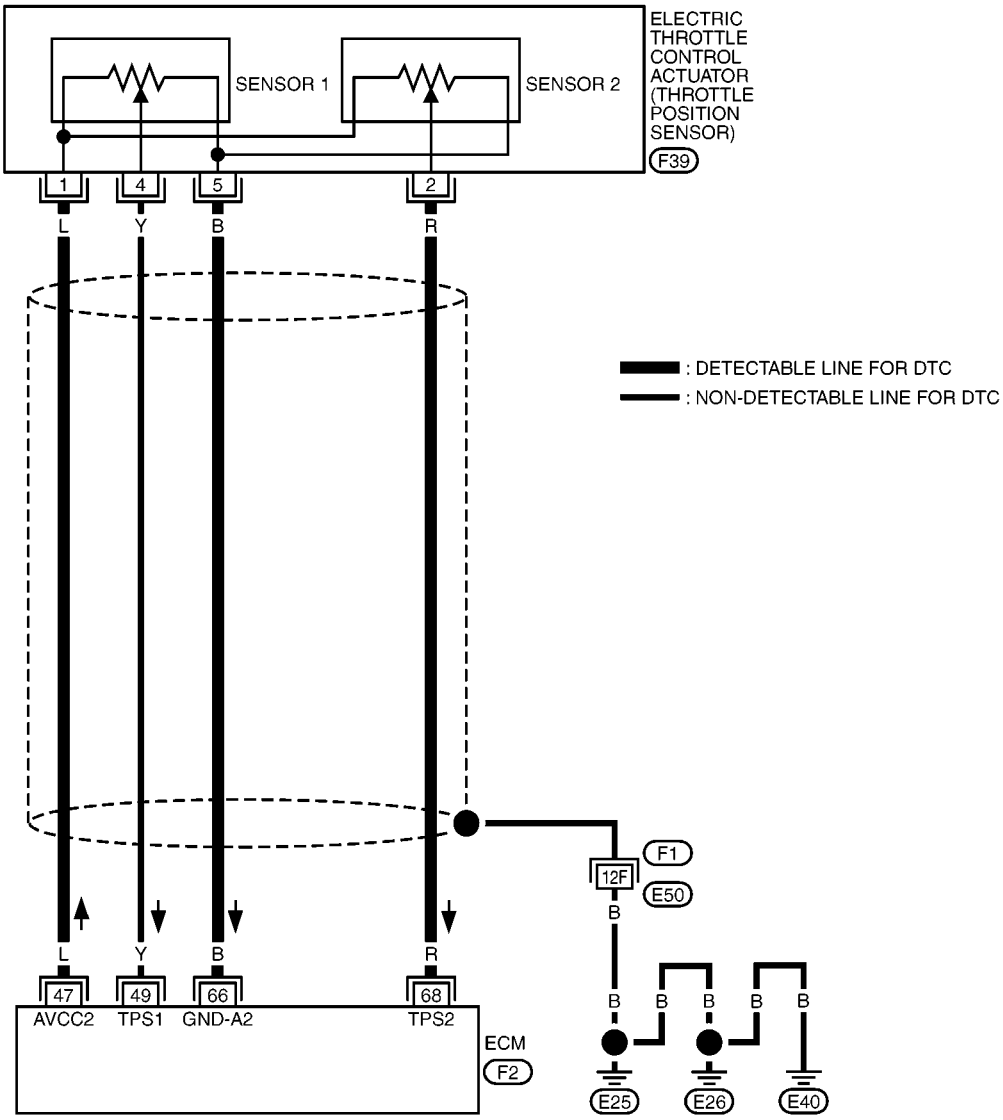
WITHOUT CONSULT-II

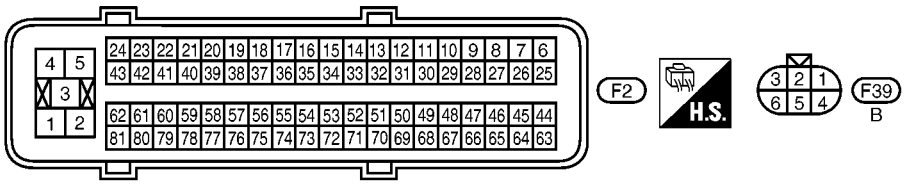
1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-706, "Diagnostic Procedure" .

Wiring Diagram

EBS00OSK

EC-TPS2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0291E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

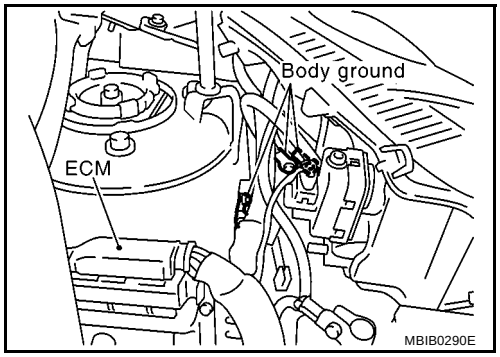
Diagnostic Procedure

EBS00OSL

1. RETIGHTEN GROUND SCREWS

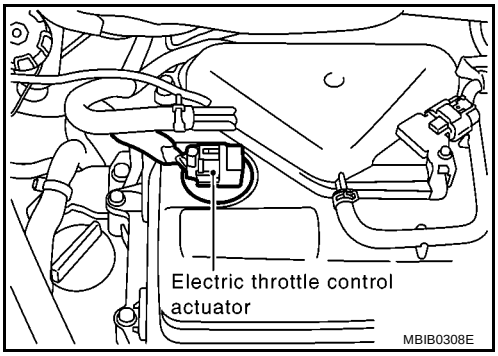
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



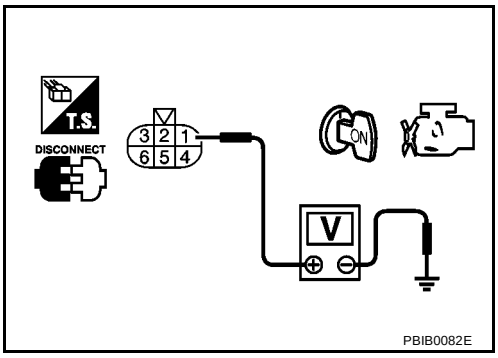
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-708, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

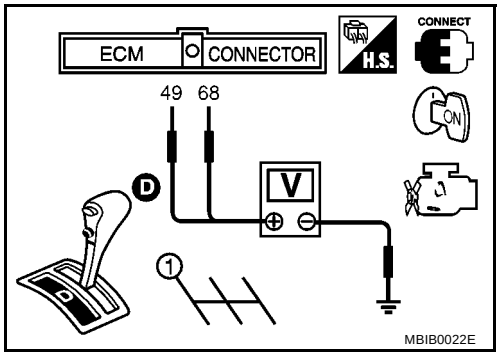
Component Inspection

EBS00OSM

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-503, "Throttle Valve Closed Position Learning" .
8. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OSN

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

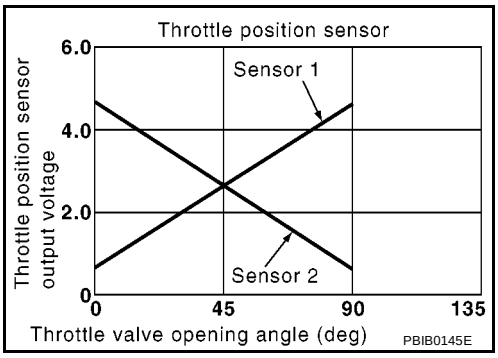
DTC P1225 TP SENSOR

PFP:16119

Component Description

EBS00OOU

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

EBS00OOV

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	● Electric throttle control actuator (TP sensor 1 and 2)

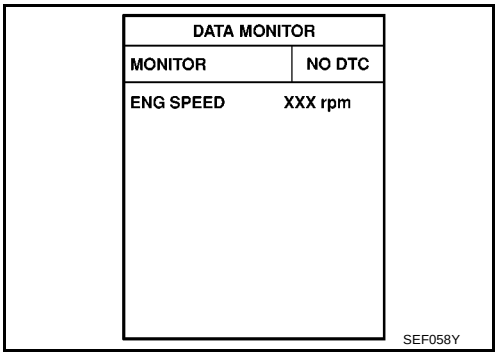
DTC Confirmation Procedure

EBS00OOW

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. If 1st trip DTC is detected, go to EC-710, "Diagnostic Procedure" .



WITHOUT CONSULT-II

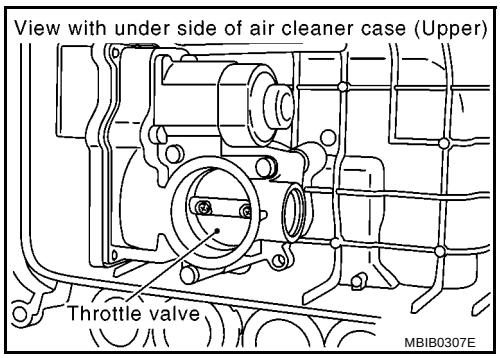
1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If 1st trip DTC is detected, go to EC-710, "Diagnostic Procedure" .

Diagnostic Procedure

EBS00OOX

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

EBS00OOY

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

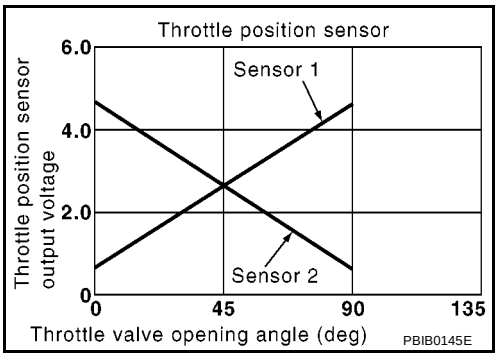
DTC P1226 TP SENSOR

PFP:16119

Component Description

EBS00OOZ

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

EBS00OP0

The MI will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	● Electric throttle control actuator (TP sensor 1 and 2)

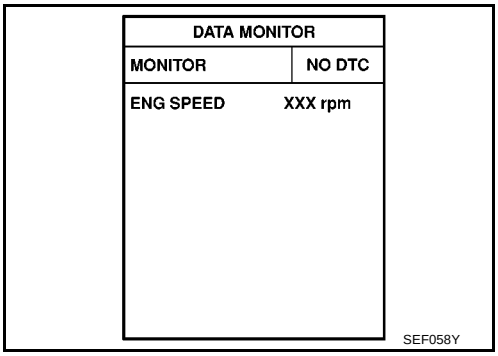
DTC Confirmation Procedure

EBS00OP1

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. Repeat steps 3 and 4 for 32 times.
6. If 1st trip DTC is detected, go to EC-712, "Diagnostic Procedure" .



WITHOUT CONSULT-II

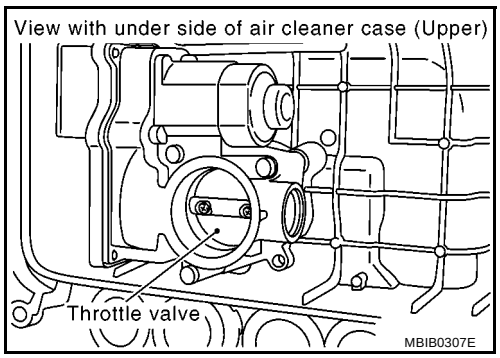
1. Turn ignition switch ON.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Repeat step 2 for 32 times.
4. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
5. If 1st trip DTC is detected, go to EC-712, "Diagnostic Procedure" .

Diagnostic Procedure

EBS00OP2

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 2.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

EBS00OP3

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

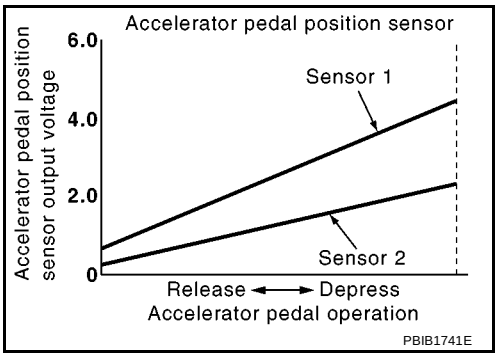
DTC P1227, P1228 APP SENSOR

PFP:18002

Component Description

EBS00OP4

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OP5

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differ from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS00OP6

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1227 1227	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P1228 1228	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of throttle valve to be slower than the normal condition. So, the acceleration will be poor.

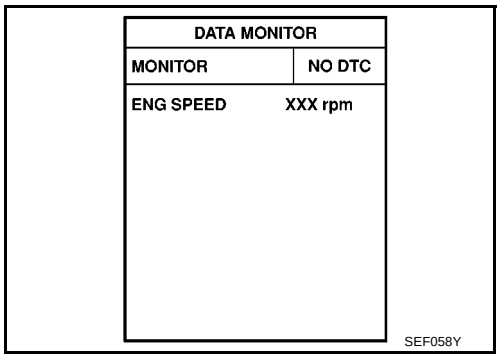
DTC Confirmation Procedure

EBS00OP7

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-718, "Diagnostic Procedure" .

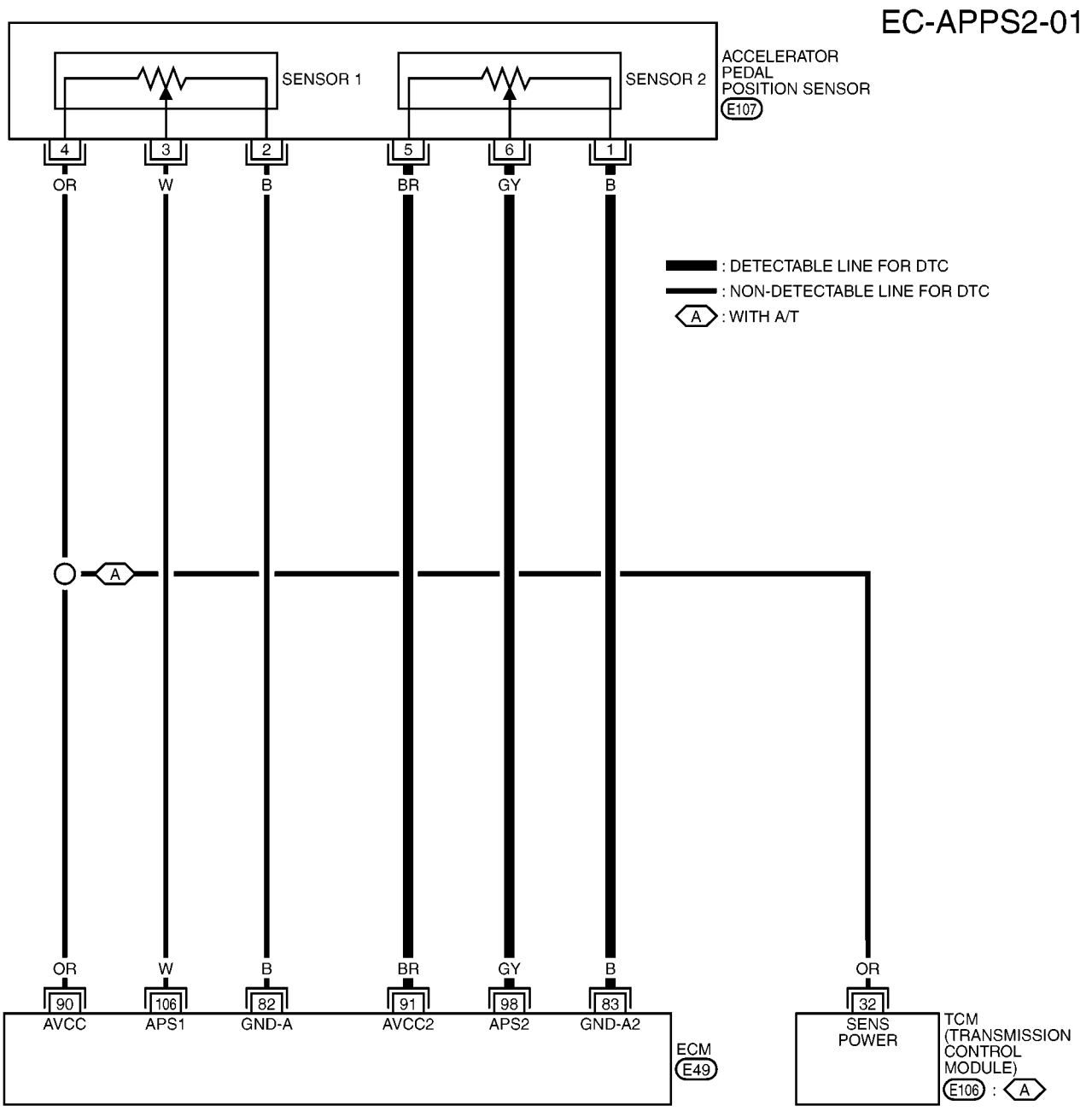


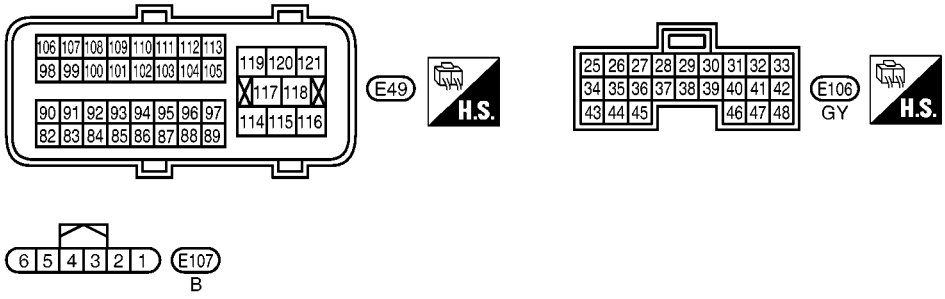
WITHOUT CONSULT-II

1. Start engine and let it idle for 1 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-718, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS00OP8





MBWA0292E

Specification data are reference values and are measured between each terminal and ground.

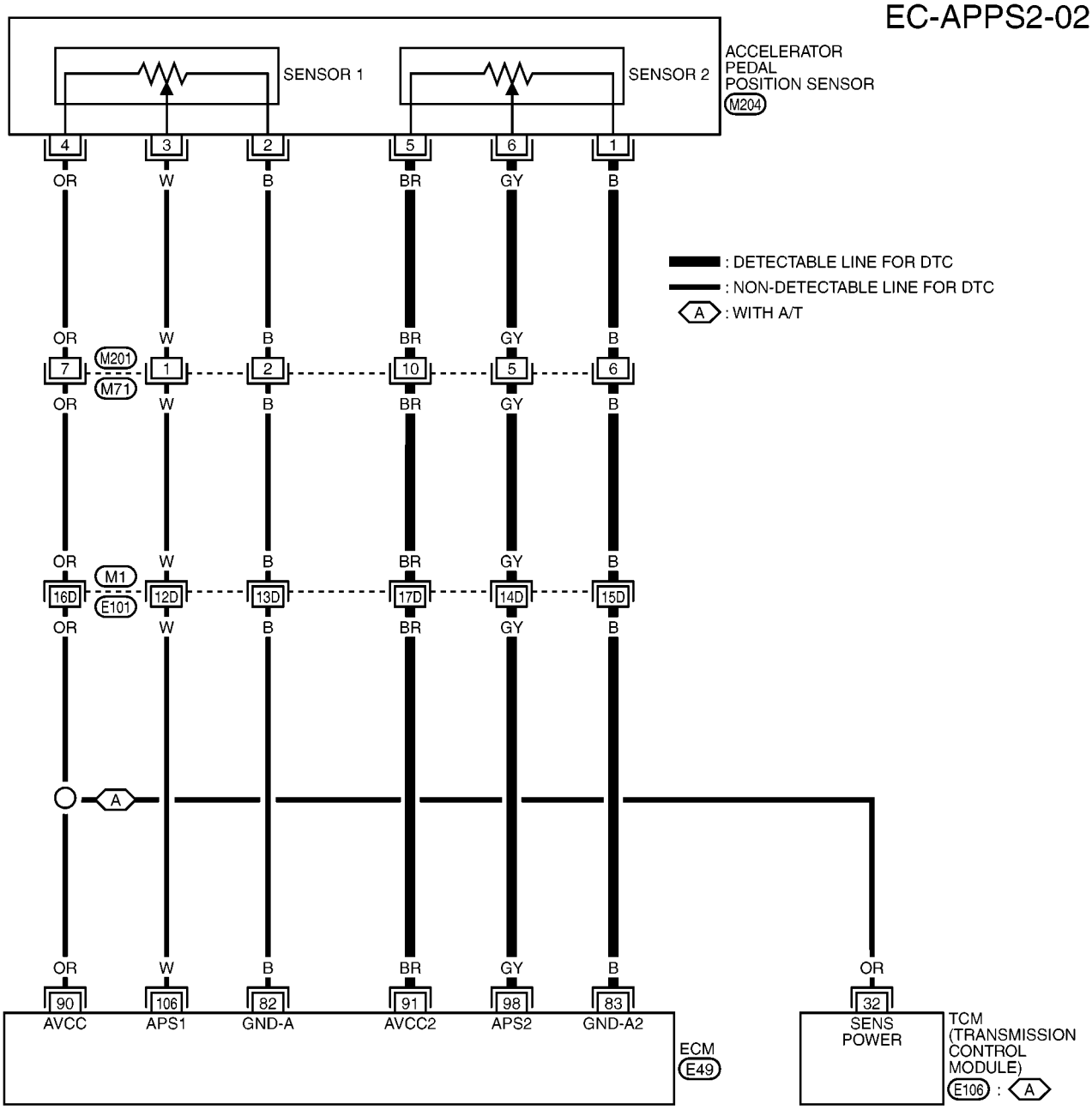
CAUTION:

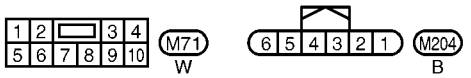
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

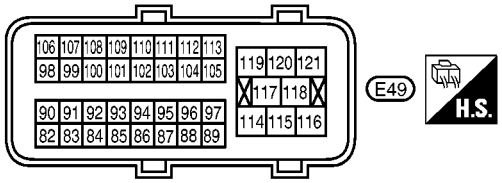
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

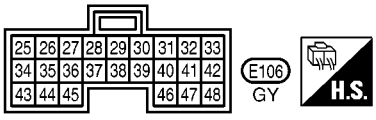
RHD MODELS

EC-APPS2-02









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0293E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

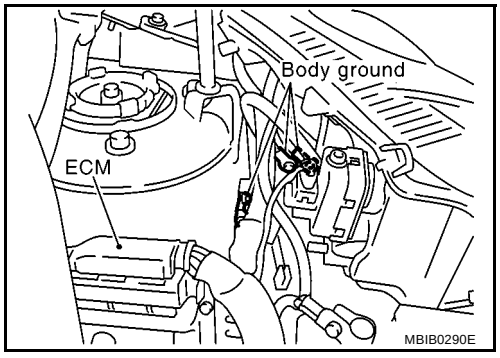
Diagnostic Procedure

EBS00OP9

1. RETIGHTEN GROUND SCREWS

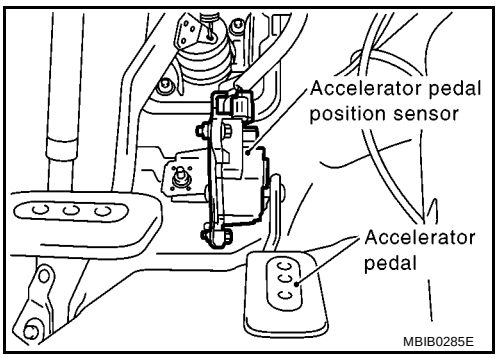
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



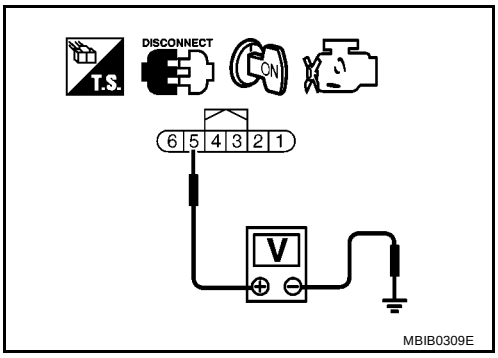
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 83 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-720, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

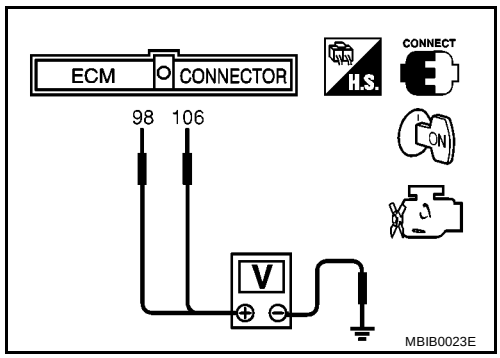
Component Inspection

EBS00OPA

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS00OPB

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

EBS00OPC

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	● Harness or connectors (The TP sensor 1 and 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 1 and 2) ● ECM pin terminal

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

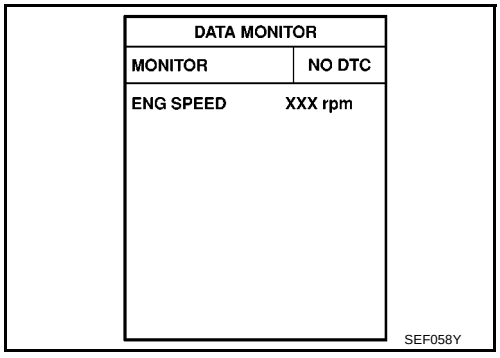
DTC Confirmation Procedure

EBS00OPD

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-724, "Diagnostic Procedure" .



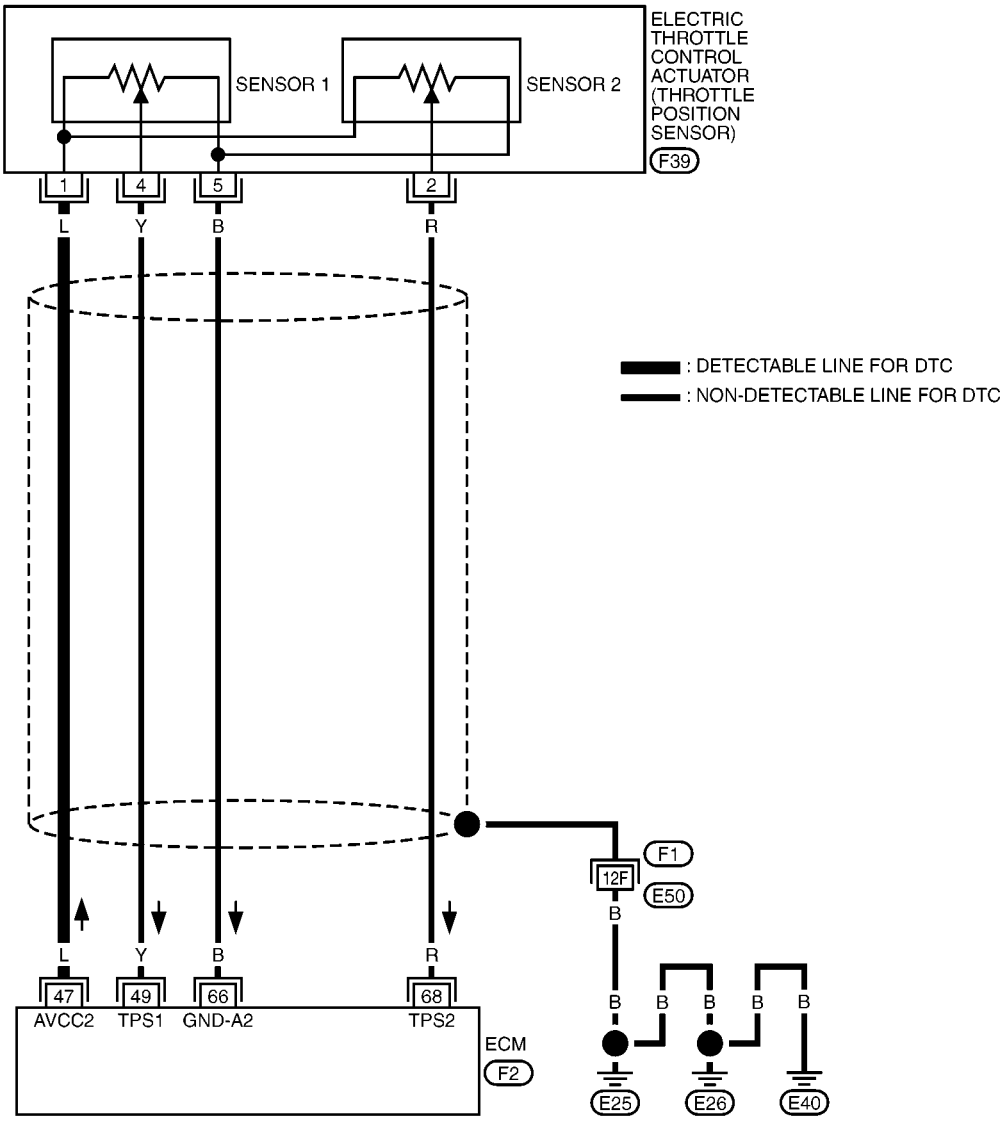
WITHOUT CONSULT-II

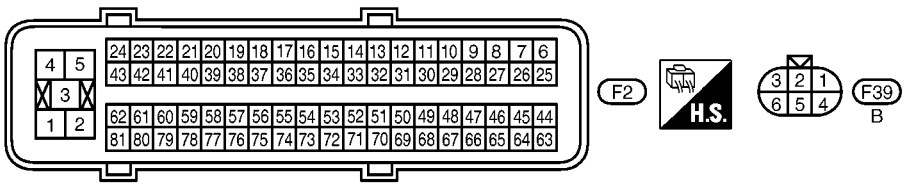
1. Start engine and let it idle for 1 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-724, "Diagnostic Procedure" .

Wiring Diagram

EBS00OPE

EC-SEN/PW-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0463E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V

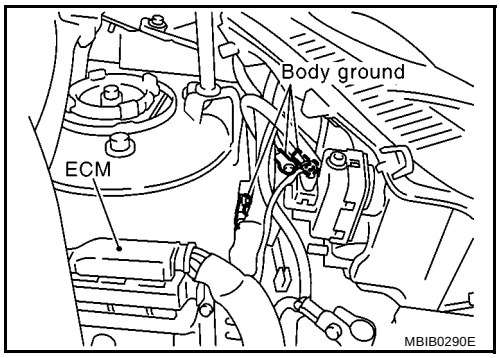
Diagnostic Procedure

EBS00OPF

1. RETIGHTEN GROUND SCREWS

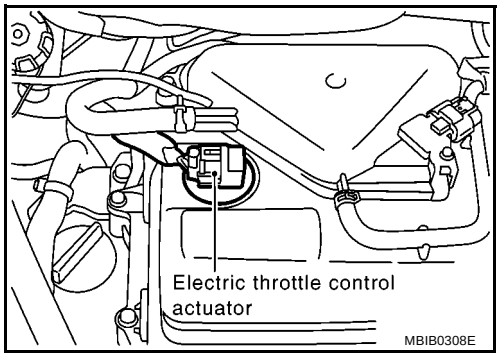
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.

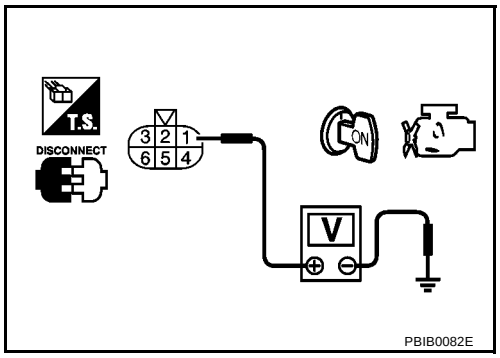


3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.



3. CHECK SENSOR POWER SUPPLY CIRCUITS FOR SHORT

Check the following.

- Harness for short to power and short to ground between ECM terminal 47 and electric throttle control actuator terminal 1
- ECM pin terminal

OK or NG

OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR

Refer to EC-620, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

6. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

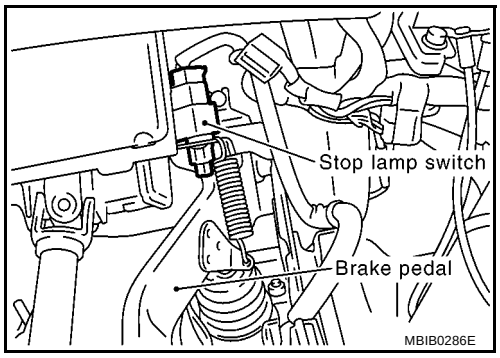
DTC P1805 BRAKE SWITCH

PFP:25320

Description

EBS00OPG

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OPH

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

EBS00OPI

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for an extremely long time while the vehicle is driving.	● Harness or connectors (Stop lamp switch circuit is open or shorted.) ● Stop lamp switch

FAIL-SAFE MODE

EBS00OPJ

When the malfunction is detected, the ECM enters fail-safe mode.

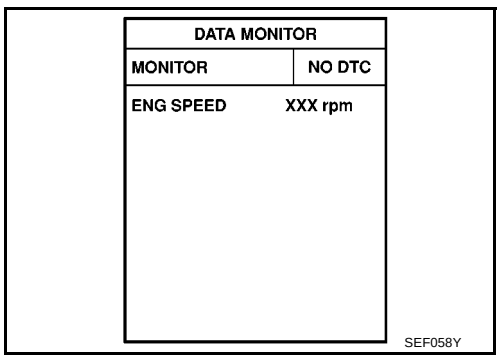
Engine operation condition in fail-fail safe mode	
ECM controls the electric throttle control actuator by regulating the throttle opening to a small range.Therefore,acceleration will be poor.	
Vehicle condition	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

DTC Confirmation Procedure

EBS00OPK

WITH CONSULT-II

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. If DTC is detected, go to EC-729, "Diagnostic Procedure" .



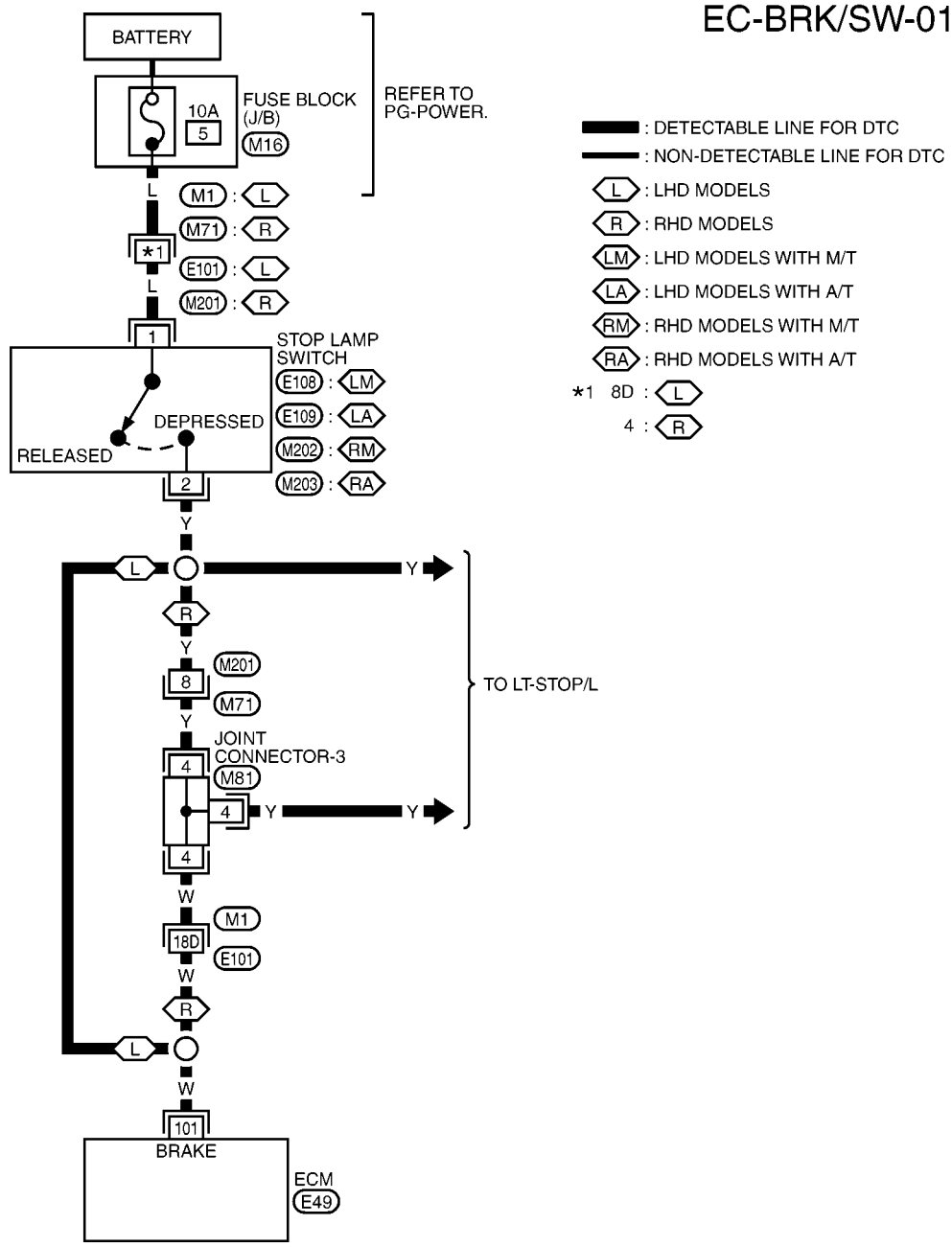
WITHOUT CONSULT-II

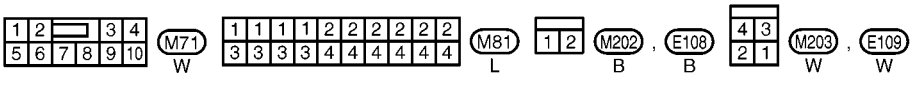
1. Turn ignition switch ON.
2. Fully depress the brake pedal at least 5 seconds.
3. Erase the Diagnostic Test Mode II (Self-diagnostic results) memory. Refer to EC-510 .
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
5. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
6. If DTC is detected, go to EC-729, "Diagnostic Procedure" .

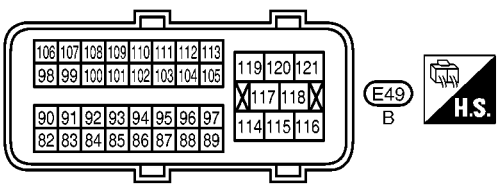
Wiring Diagram

EBS00OPL

EC-BRK/SW-01







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MBWA0574E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	W	Stop lamp switch	**[Engine is running]** ● Brake pedal: Fully released	Approximately 0V
			[Engine is running] ● Brake pedal: Depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

EBS00OPM

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

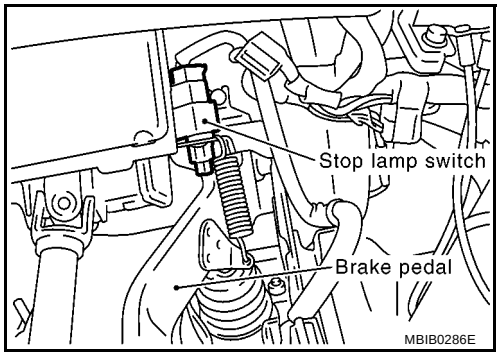
Brake pedal	Stop lamp
Fully released	Not illuminated
Depressed	Illuminated

OK or NG

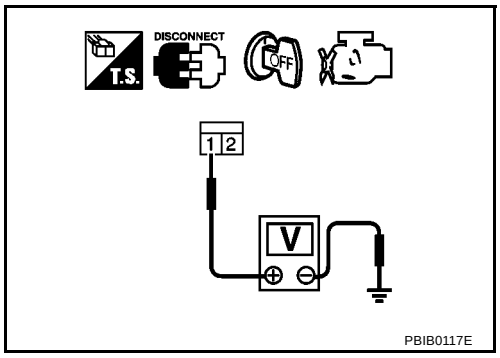
OK >> GO TO 4.
NG >> GO TO 2.

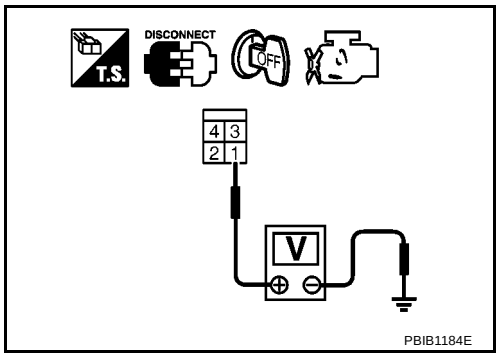
2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.





Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) connector M16
- Harness connectors M1, E101 (LHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open and short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Joint connector-3 (RHD models)
- Harness for open or short between ECM and stop lamp switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK STOP LAMP SWITCH

Refer to EC-732, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace stop lamp switch.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

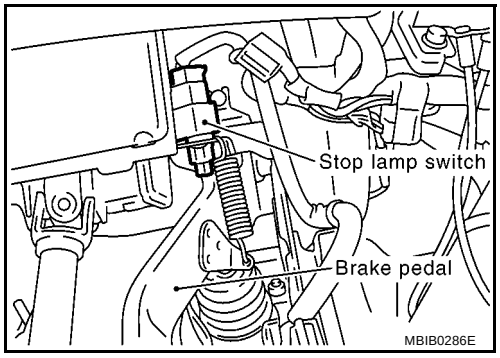
>> **INSPECTION END**

Component Inspection

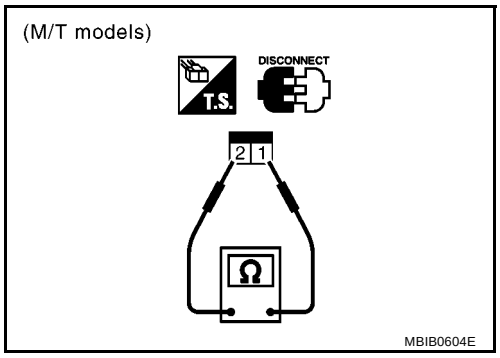
EBS00OPN

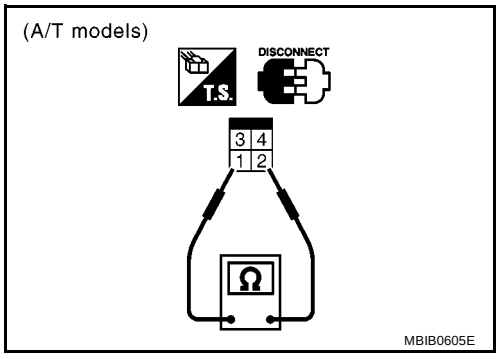
STOP LAMP SWITCH

1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.





Conditions	Continuity
Brake pedal fully released	Should not exist.
Brake pedal depressed	Should exist.

If NG, adjust brake pedal installation, refer to BR-6, "BRAKE PEDAL" , and perform step 2 again.

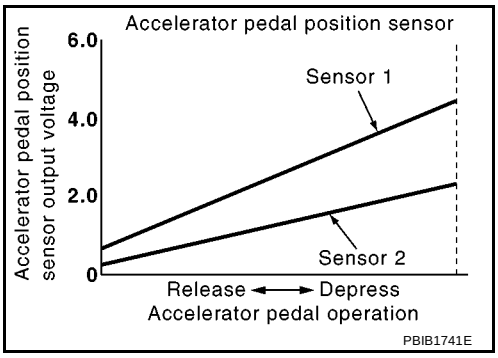
DTC P2122, P2123 APP SENSOR

PFP:18002

Component Description

EBS010DL

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS010DM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS010DN

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

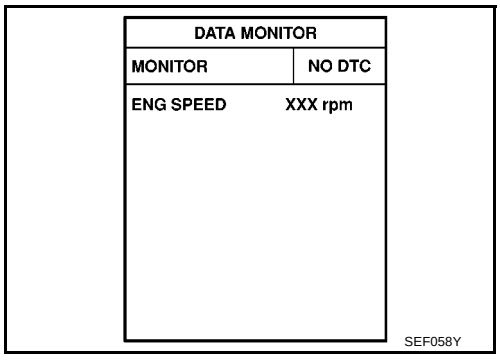
DTC Confirmation Procedure

EBS010DO

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-738, "Diagnostic Procedure" .

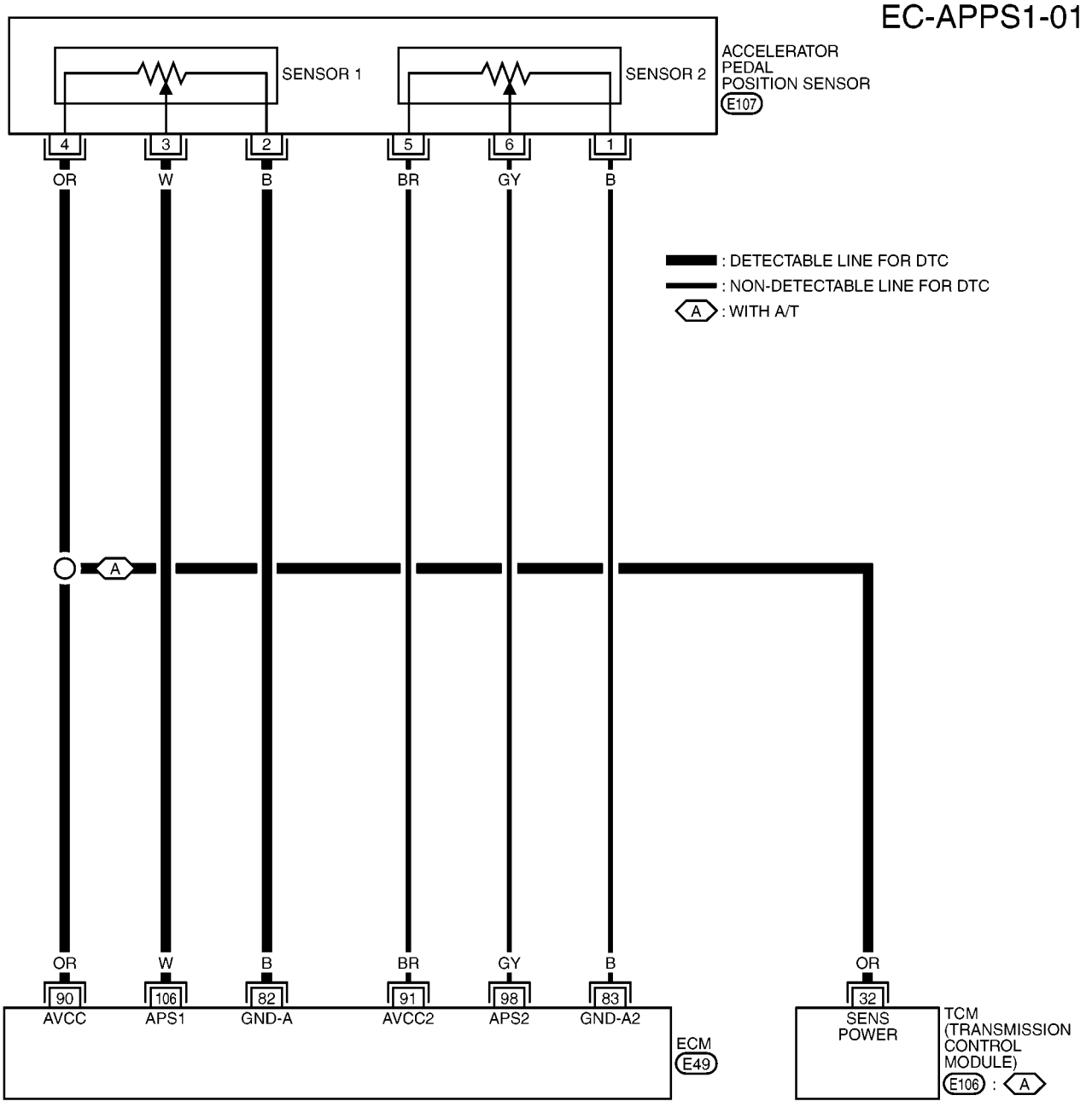


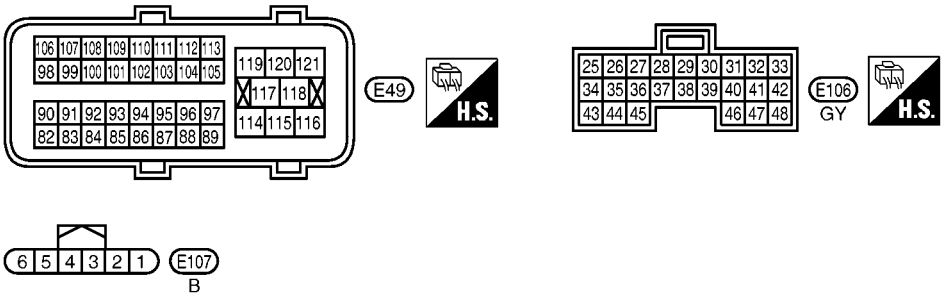
WITHOUT CONSULT-II

1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-738, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS010DP





MBWA0279E

Specification data are reference values and are measured between each terminal and ground.

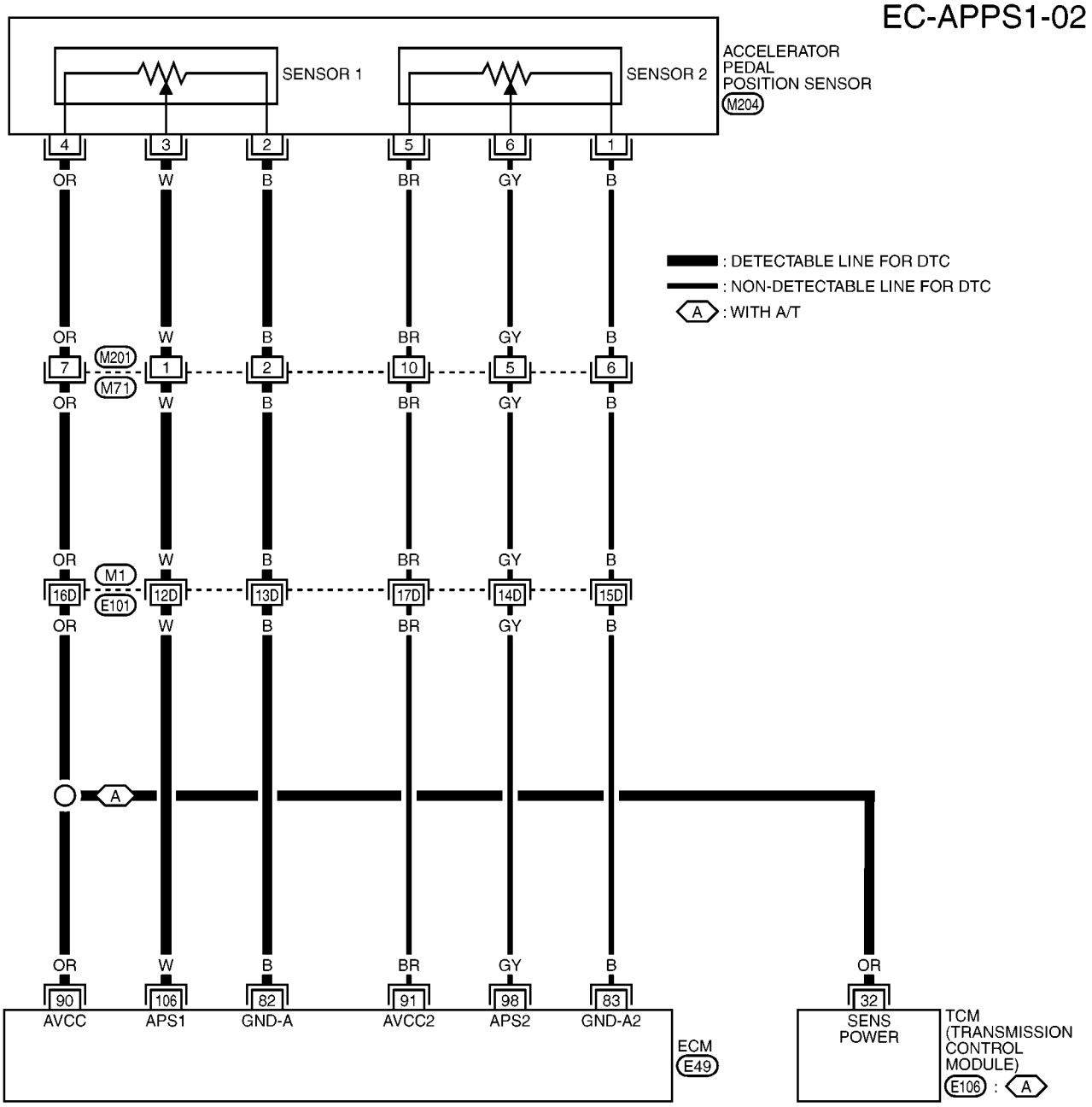
CAUTION:

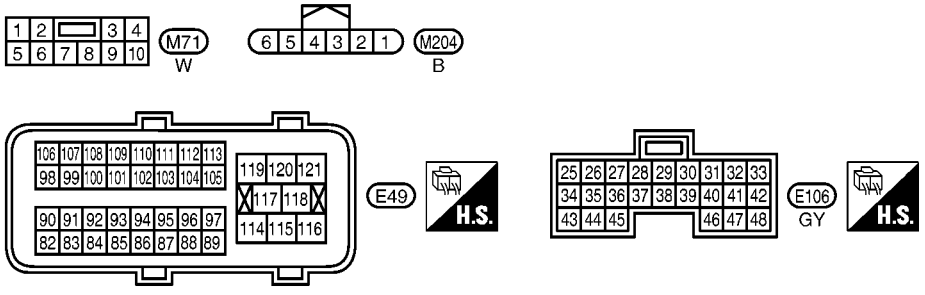
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS1-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0280E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

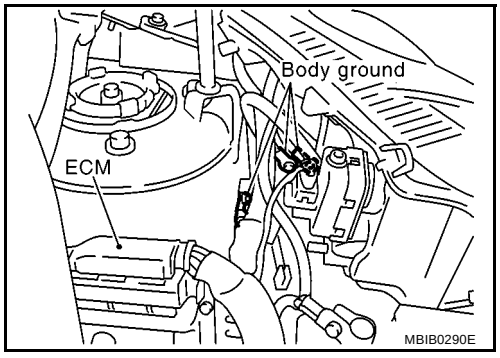
Diagnostic Procedure

EBS010DQ

1. RETIGHTEN GROUND SCREWS

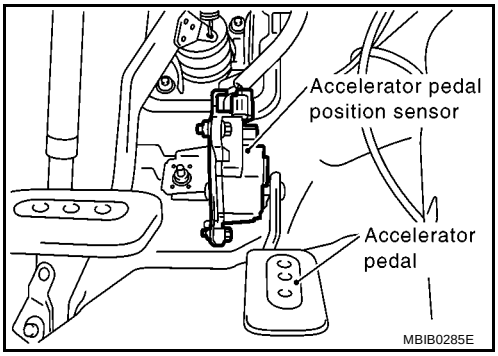
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



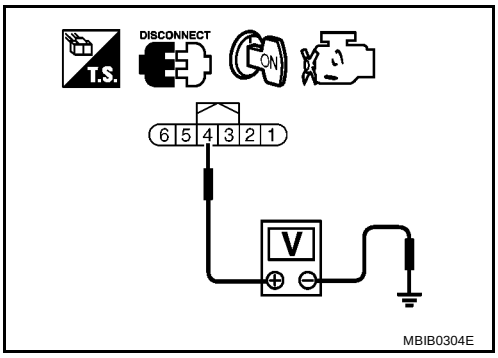
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-740, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

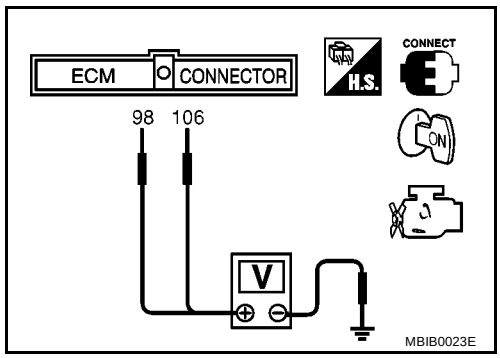
EBS010DR

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS010DS

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

DTC P2127, P2128 APP SENSOR

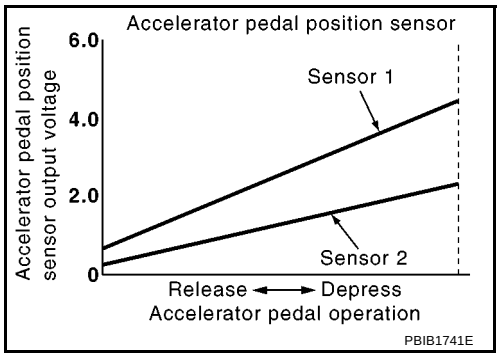
PFP:18002

Component Description

EBS010DT

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT-II Reference Value in Data Monitor Mode

EBS010DU

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differ from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010DV

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2)
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

EBS010DW

NOTE:

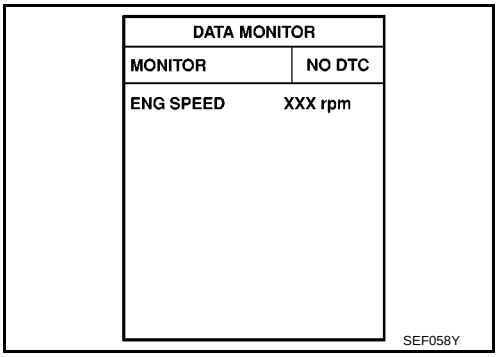
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-747, "Diagnostic Procedure" .

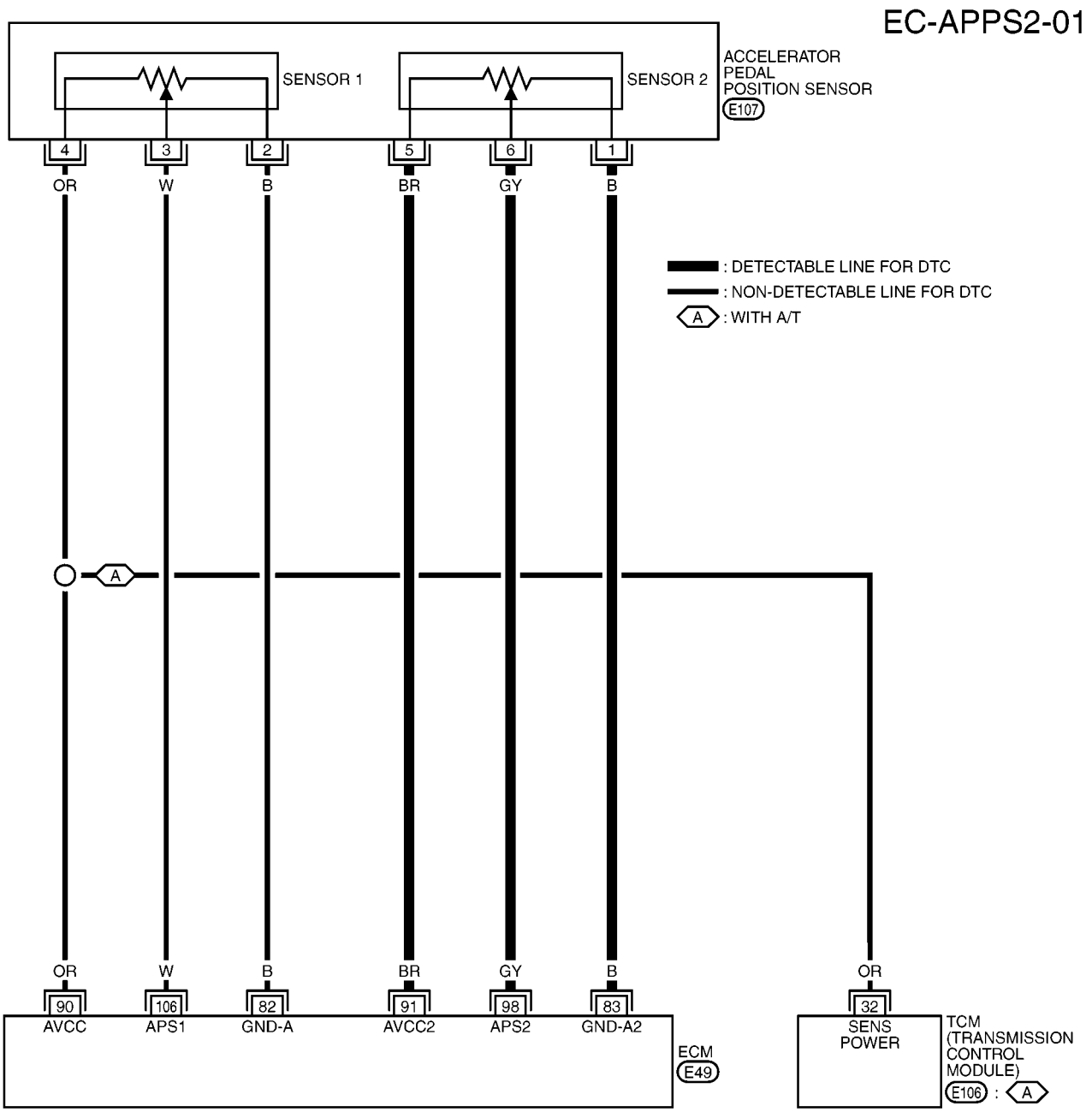


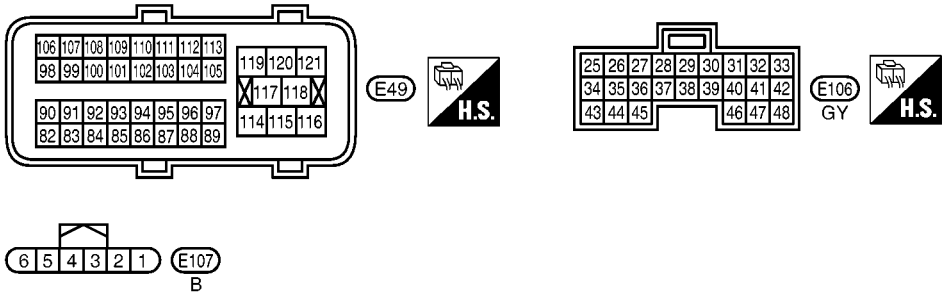
WITHOUT CONSULT-II

1. Start engine and let it idle for 1 seconds.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-747, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS010DX





MBWA0292E

Specification data are reference values and are measured between each terminal and ground.

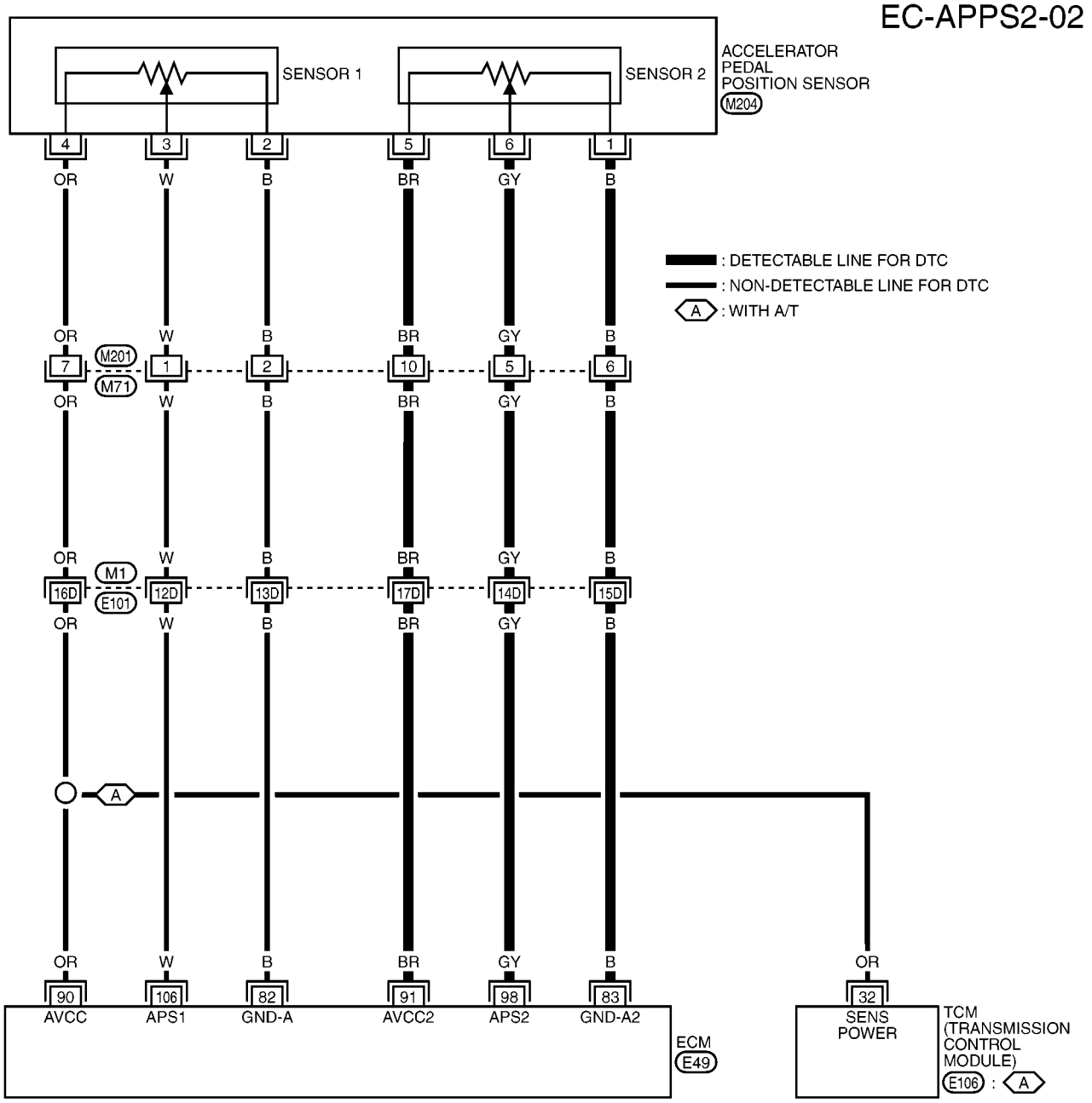
CAUTION:

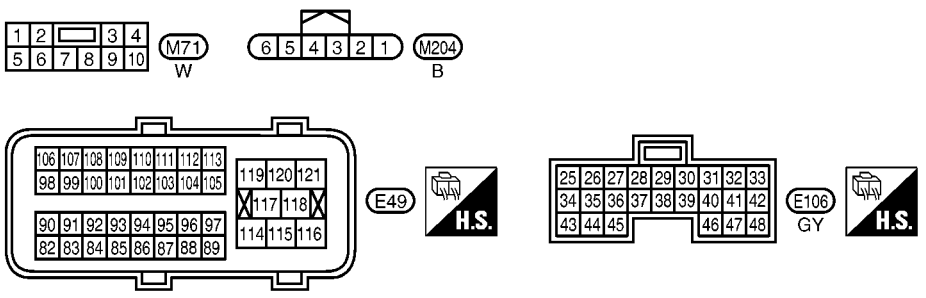
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS2-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0293E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

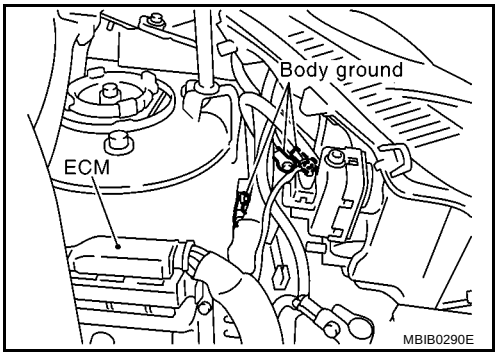
Diagnostic Procedure

EBS010DY

1. RETIGHTEN GROUND SCREWS

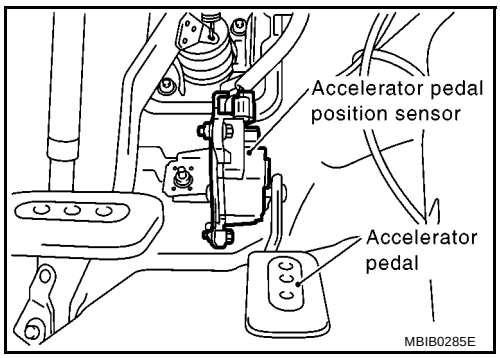
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



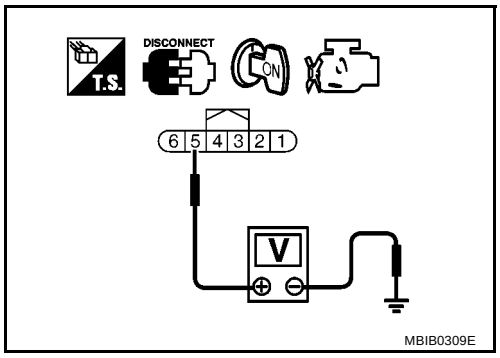
2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 83 and APP sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 98 and APP sensor terminal 6. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M71, M201 (RHD models)
- Harness connectors M1, E101 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-749, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

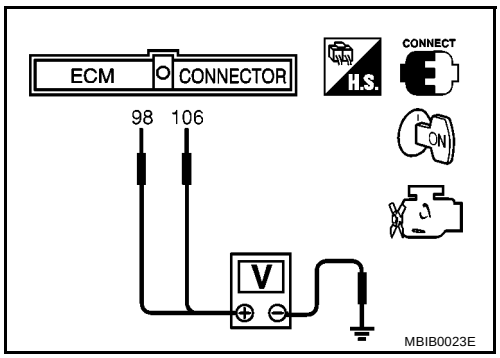
EBS010DZ

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.

3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS010E0

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

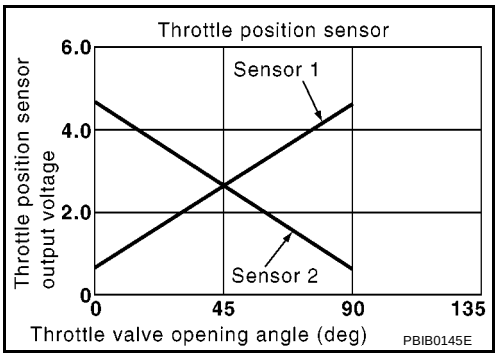
DTC P2135 TP SENSOR

PFP:16119

Component Description

EBS010E1

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has the two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

EBS010E2

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN1 THRTL SEN2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T model) 1st (M/T model)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

EBS010E3

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) ● Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

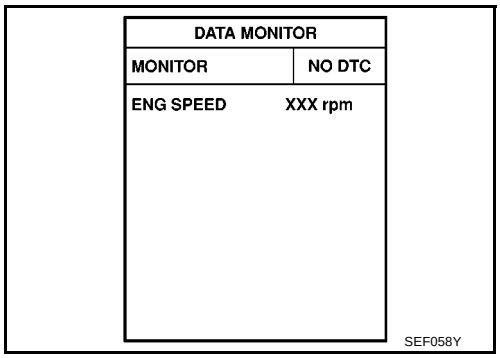
DTC Confirmation Procedure

EBS010E4

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-754, "Diagnostic Procedure" .



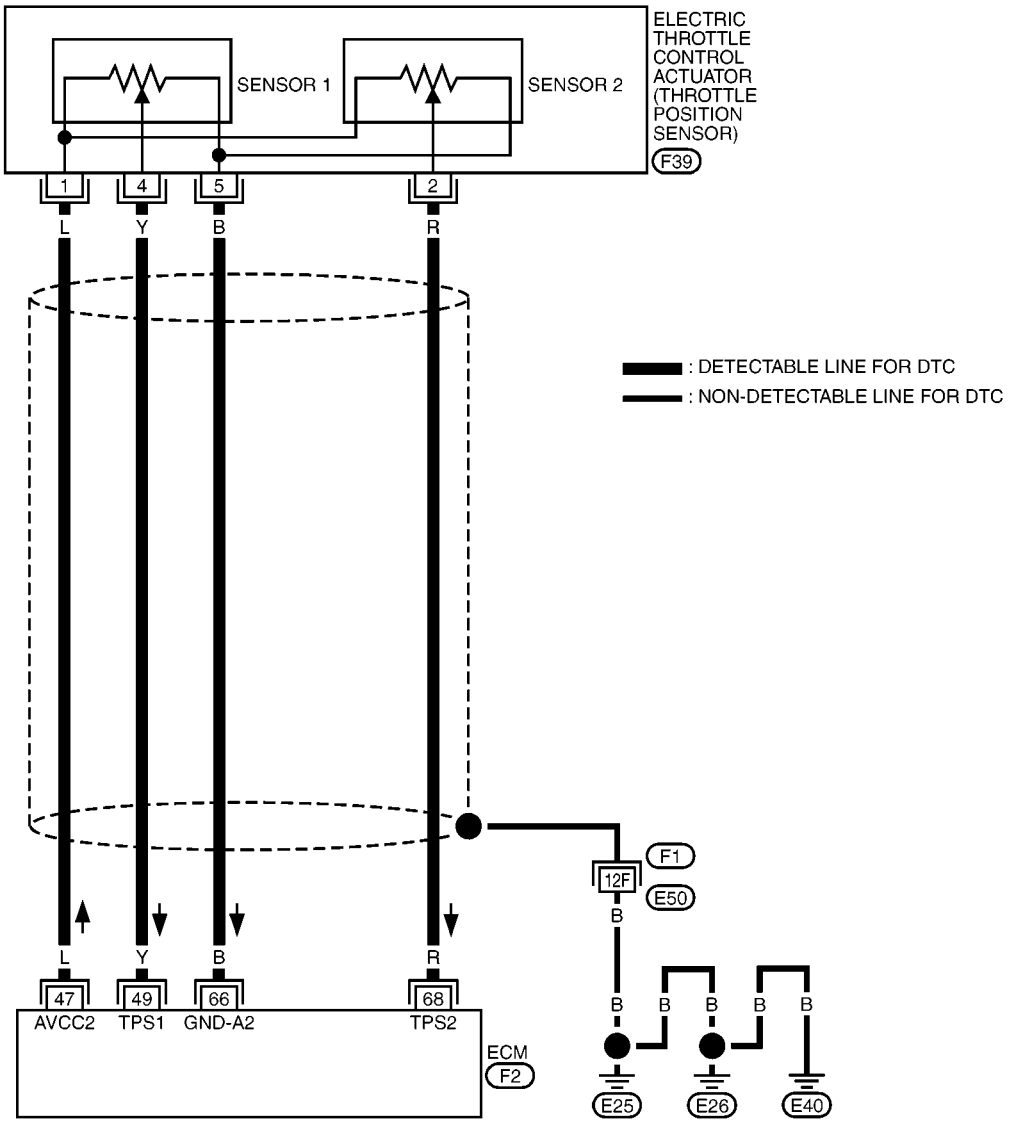
WITHOUT CONSULT-II

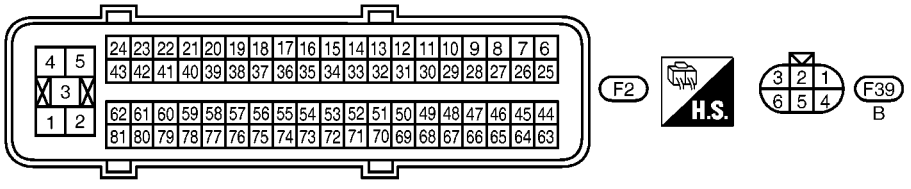
1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-754, "Diagnostic Procedure" .

Wiring Diagram

EBS010E5

EC-TPS3-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0275E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	L	Sensor power supply (Throttle position sensor)	**[Ignition switch ON]**	Approximately 5V
49	Y	Throttle position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Throttle position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch ON] ● **Engine stopped** ● Shift lever position: D (A/T models) ● Shift lever position: 1st (M/T models) ● Accelerator pedal: Fully depressed	More than 0.36V

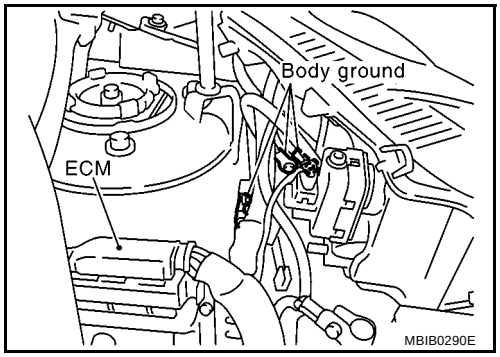
Diagnostic Procedure

EBS010E6

1. RETIGHTEN GROUND SCREWS

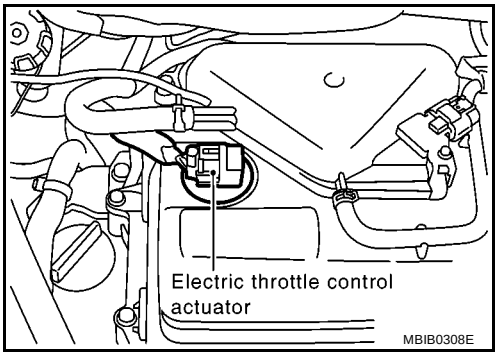
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



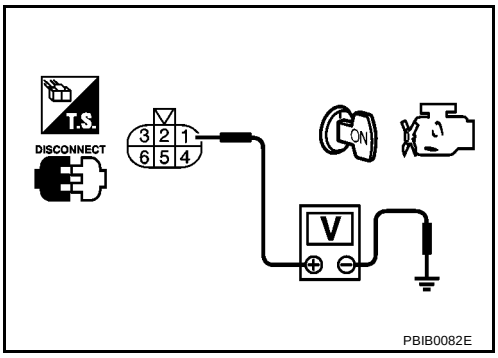
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 49 and electric throttle control actuator terminal 4, ECM terminal 68 and electric throttle control actuator terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-756, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

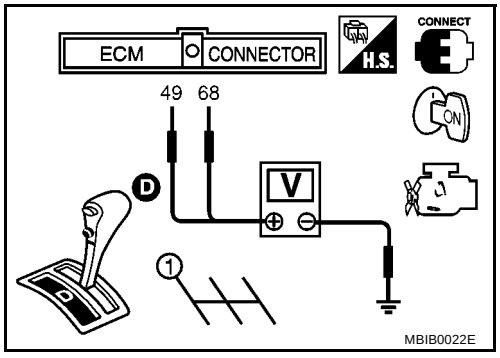
Component Inspection

EBS010E7

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-503, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set selector lever to D position (A/T models) or 1st position (M/T models).
5. Check voltage between ECM terminals 49 (TP sensor 1 signal), 68 (TP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
49 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
68 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V



6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-503, "Throttle Valve Closed Position Learning" .
8. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS010E8

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

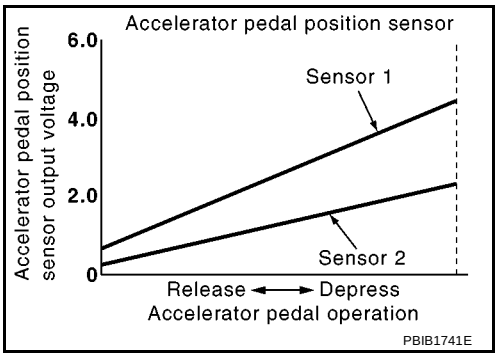
DTC P2138 APP SENSOR

PFP:18002

Component Description

EBS010E9

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.



CONSULT-II Reference Value in Data Monitor Mode

EBS010EA

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	4.0 - 4.8V
ACCEL SEN2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.6 - 0.9V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage.

On Board Diagnosis Logic

EBS010EB

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) ● Accelerator pedal position sensor 1 and 2

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MI lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

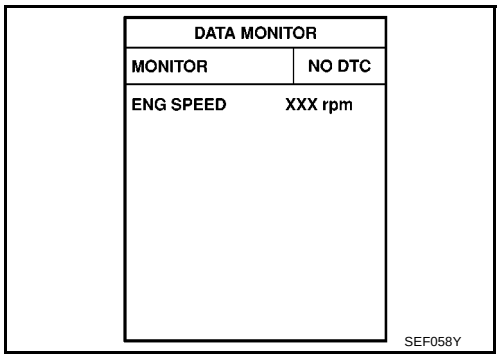
DTC Confirmation Procedure

EBS010EC

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-762, "Diagnostic Procedure" .

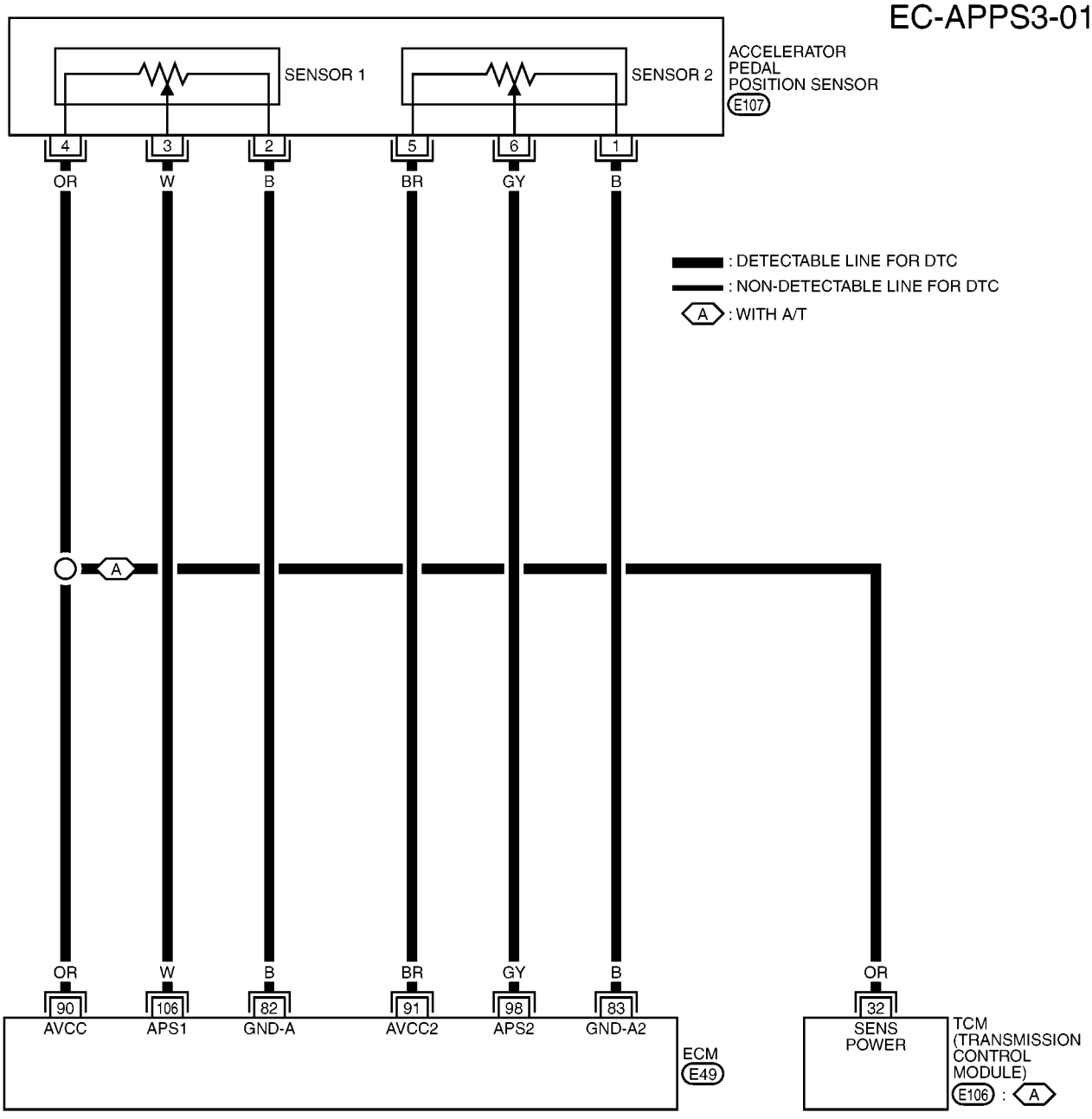


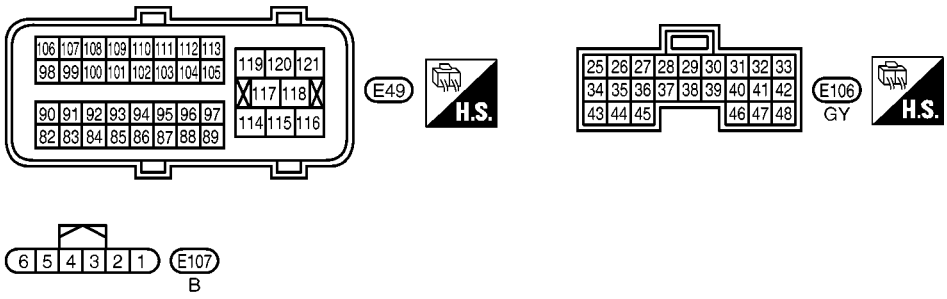
WITHOUT CONSULT-II

1. Start engine and let it idle for 1 second.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.
4. If DTC is detected, go to EC-762, "Diagnostic Procedure" .

Wiring Diagram
LHD MODELS

EBS010ED





MBWA0277E

Specification data are reference values and are measured between each terminal and ground.

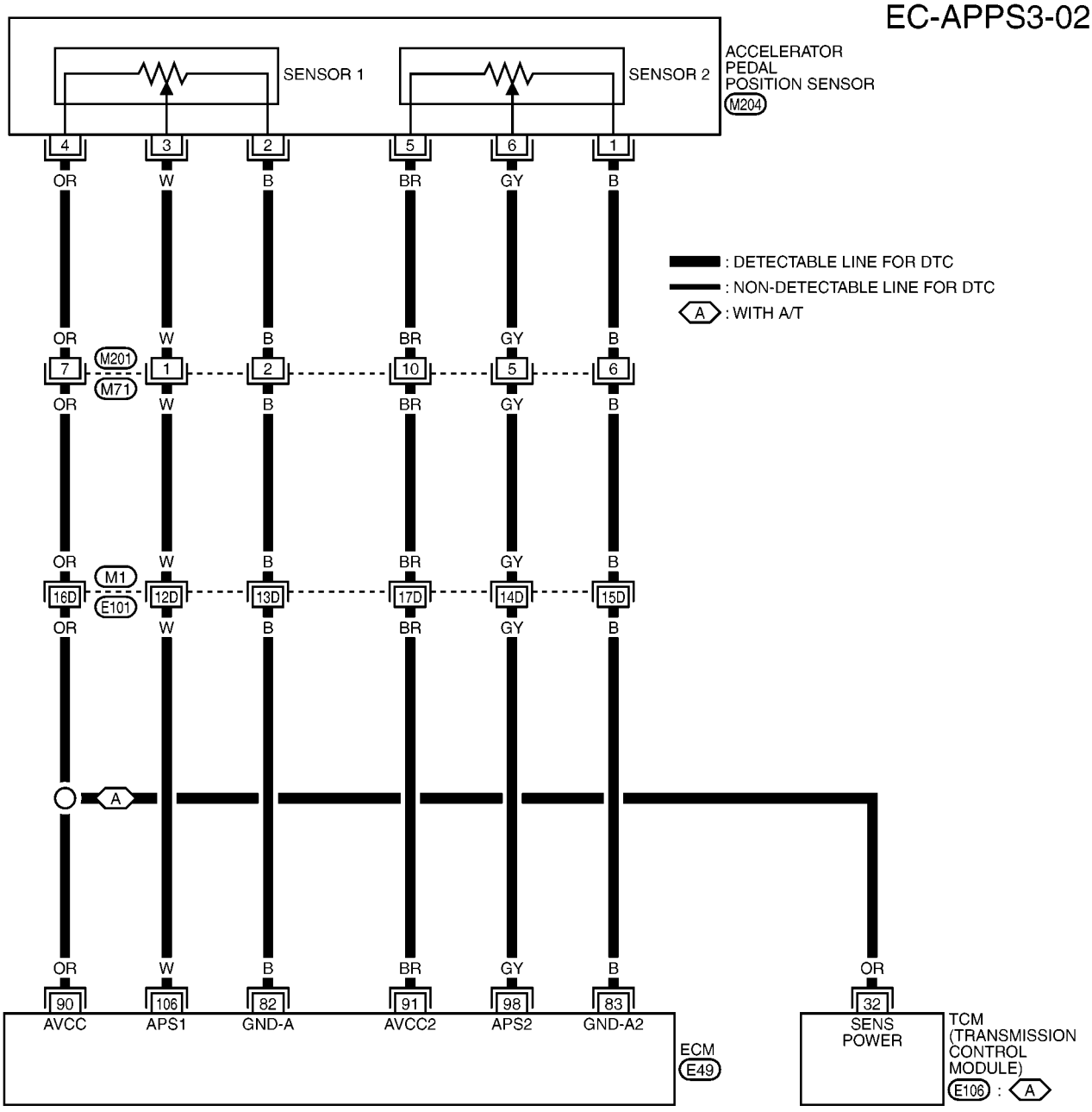
CAUTION:

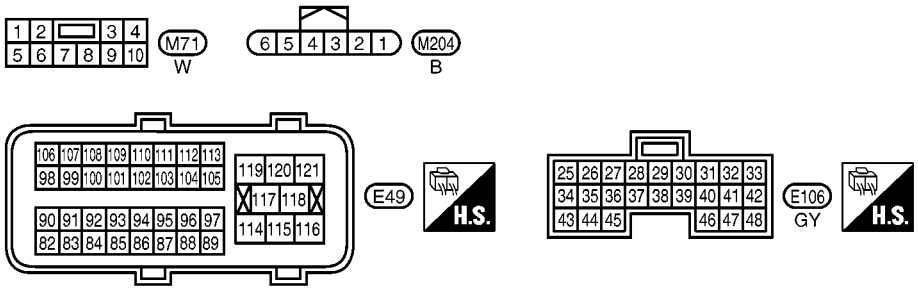
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

RHD MODELS

EC-APPS3-02





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0278E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	B	Sensor ground (APP sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	B	Sensor ground (APP sensor 2)	**[Ignition switch ON]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	OR	Sensor power supply (APP sensor 1)	**[Ignition switch ON]**	Approximately 5V
91	BR	Sensor power supply (APP sensor 2)	**[Ignition switch ON]**	Approximately 5V
98	GY	Accelerator pedal position sensor 2	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.3 - 0.6V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch ON]** ● **Engine stopped** ● Accelerator pedal: Fully released	0.6 - 0.9V
			[Ignition switch ON] ● **Engine stopped** ● Accelerator pedal: Fully depressed	3.9 - 4.7V

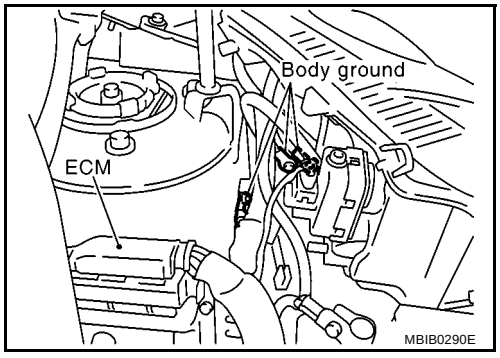
Diagnostic Procedure

EBS010EE

1. RETIGHTEN GROUND SCREWS

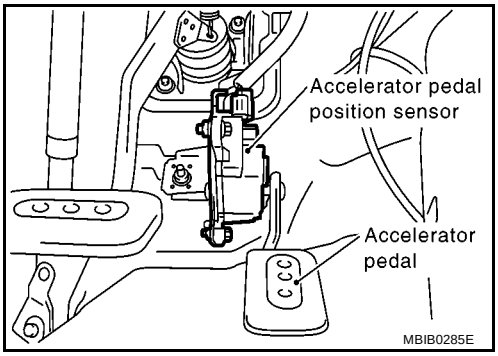
1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 2.



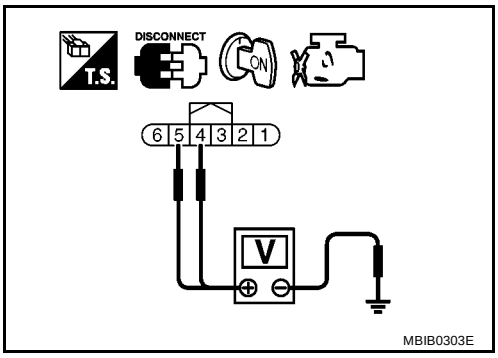
2. CHECK APP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminals 4, 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 82 and APP sensor terminal 2, ECM terminal 83 and APP sensor terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 106 and APP sensor terminal 3, ECM terminal 98 and APP sensor terminal 6.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M1, E101 (RHD models)
- Harness connectors M71, M201 (RHD models)
- Harness for open or short between ECM and accelerator pedal position sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR

Refer to EC-765, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. REPLACE APP SENSOR

1. Replace the accelerator pedal position sensor.
2. Perform EC-503, "Accelerator Pedal Released Position Learning" .
3. Perform EC-503, "Throttle Valve Closed Position Learning" .
4. Perform EC-503, "Idle Air Volume Learning" .

>> **INSPECTION END**

10. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

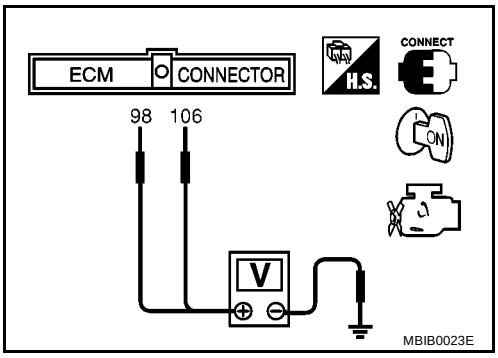
Component Inspection

EBS010EF

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and engine ground under the following conditions.

Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.6 - 0.9V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.3 - 0.6V
	Fully depressed	1.95 - 2.4V



4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-503, "Accelerator Pedal Released Position Learning" .
6. Perform EC-503, "Throttle Valve Closed Position Learning" .
7. Perform EC-503, "Idle Air Volume Learning" .

Remove and Installation

EBS010EG

ACCELERATOR PEDAL

Refer to ACC-2, "ACCELERATOR CONTROL SYSTEM" .

HO2S1 HEATER

PFP:22690

Description

EBS00OPO

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 after warming up	ON

CONSULT-II Reference Value in Data Monitor Mode

EBS00OPP

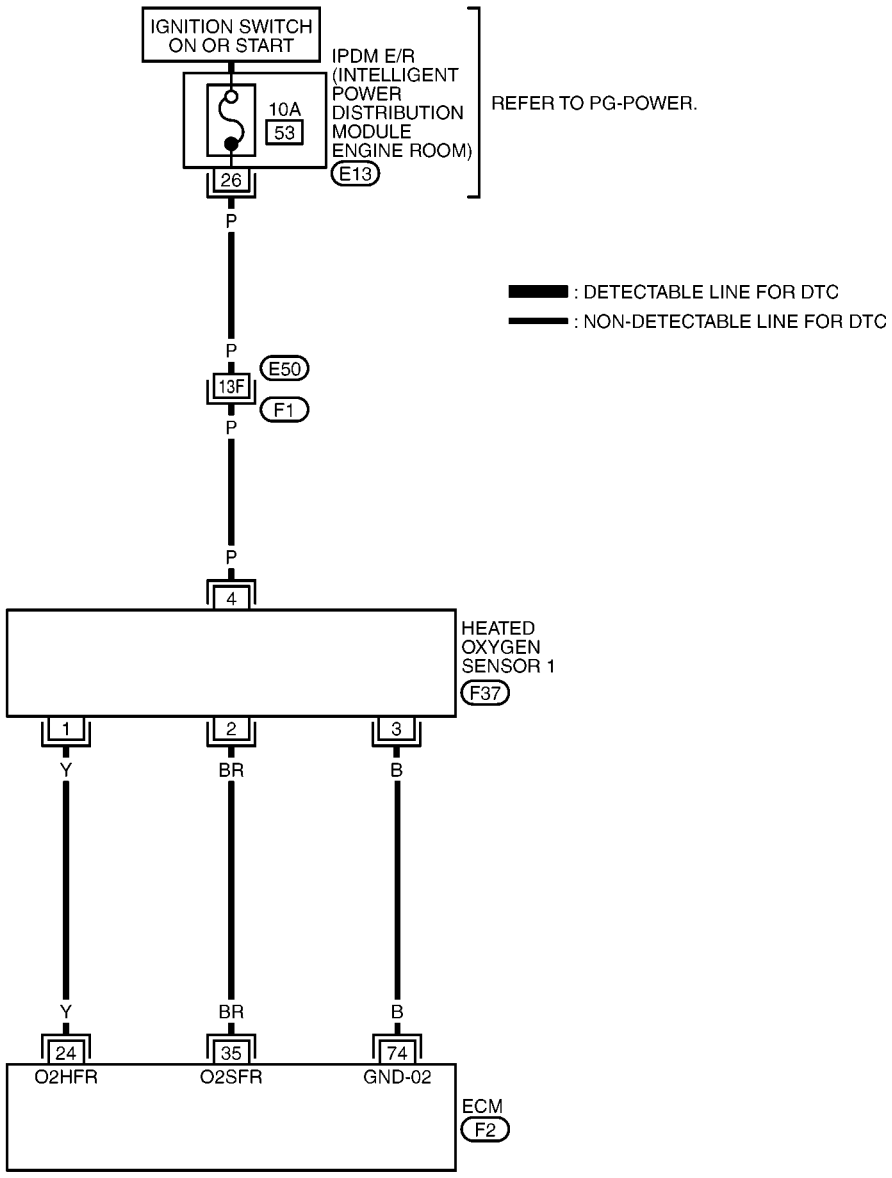
Specification data are reference values.

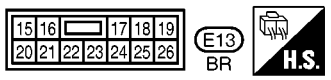
MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm	ON
	● Engine speed: Above 3,600 rpm	OFF

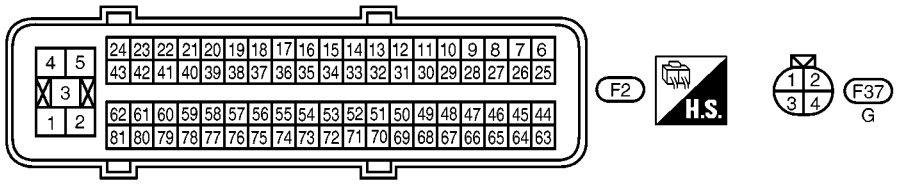
Wiring Diagram

EBS00OPQ

EC-FRO2-01





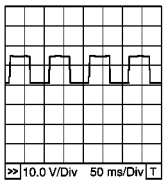


REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0464E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	Y	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition.** ● Engine speed is below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

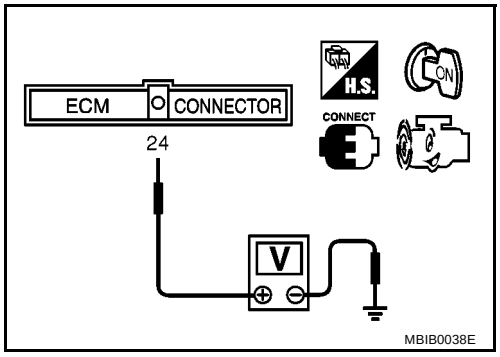
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

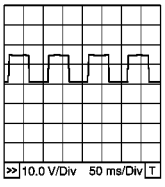
EBS00OPR

1. CHECK OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Set tester prove between ECM terminal 24 (HO2S1 heater signal) and ground.
5. Start engine and let it idle.
6. Check the voltage under the following conditions.
   Verify that the oscilloscope screen shows the signal waves as shown below.



MBIB0038E

Conditions	Voltage
At idle	Approximately 7.0V★  PBIB0519E
Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

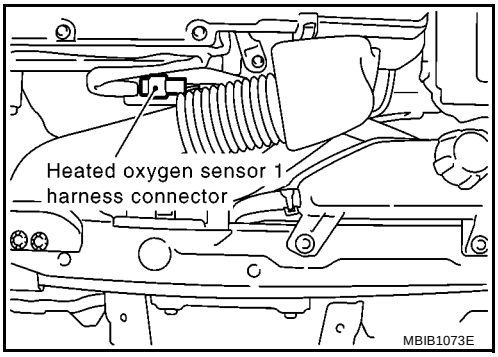
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

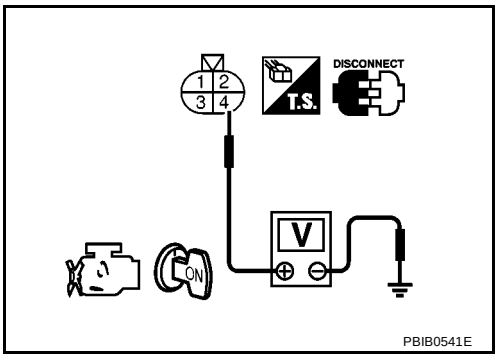
2. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Turn ignition switch ON.



4. Check voltage between HO2S1 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair harness or connectors.

4. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 24 and HO2S1 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-770, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

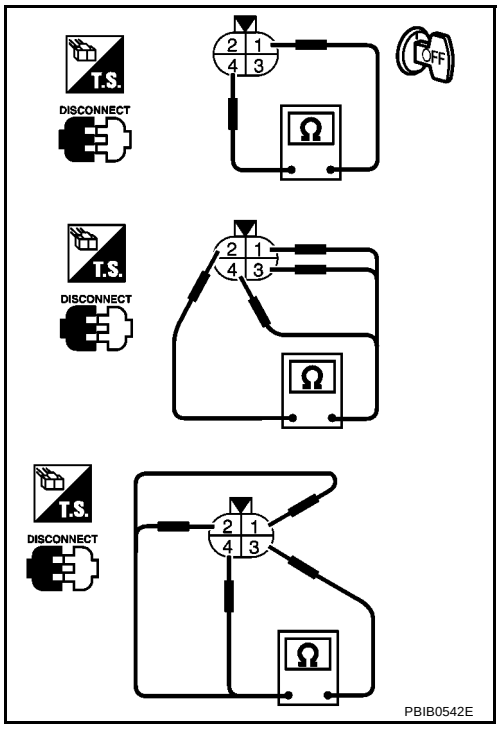
EBS00OPS

HEATED OXYGEN SENSOR 1 HEATER

1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
1 and 4	3.3 - 4.0 Ω at 25°C (77°F)
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 1.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OPT

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

HO2S2 HEATER

PFP:226A0

Description

EBS00OPU

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Manifold absolute pressure (MAP) sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600 (A/T models) Above 3,800 (M/T models)	OFF
● Below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. ● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

CONSULT-II Reference Value in Data Monitor Mode

EBS00OPV

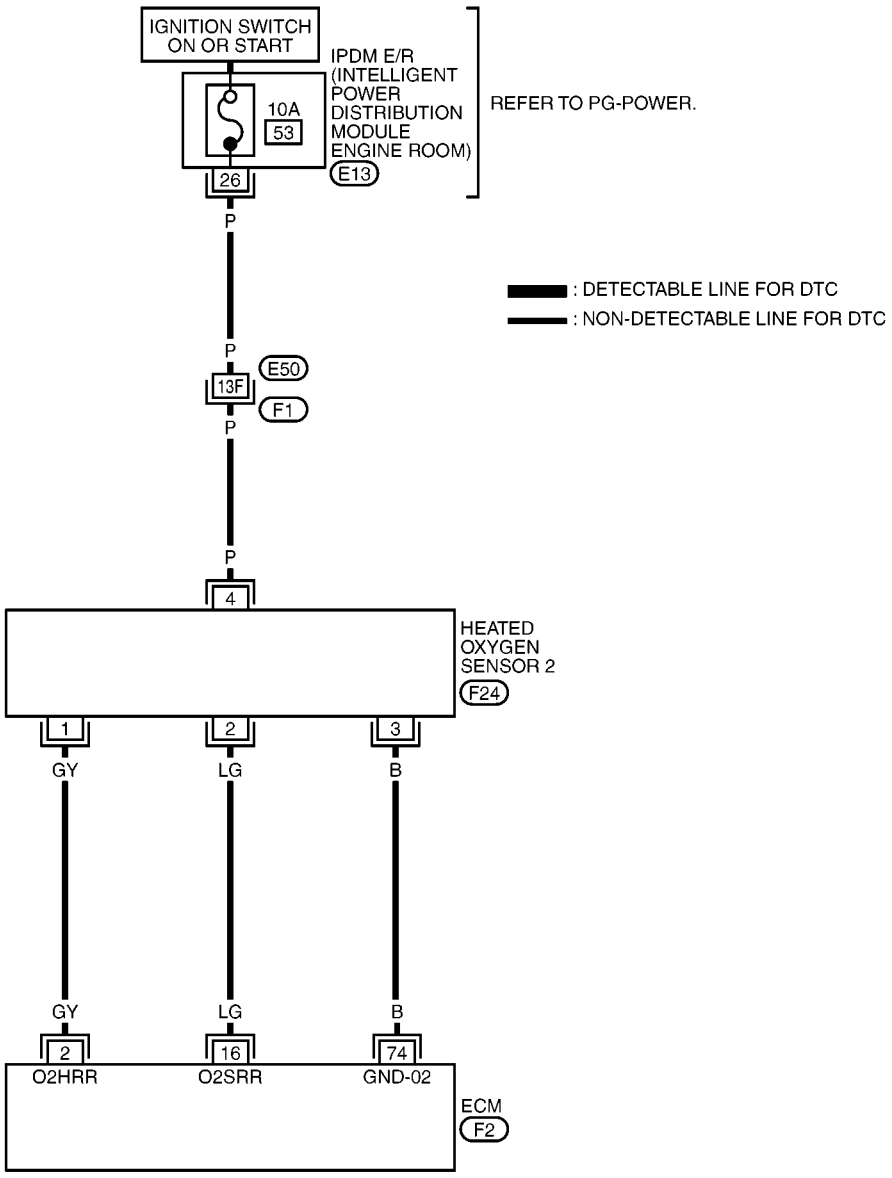
Specification data are reference values.

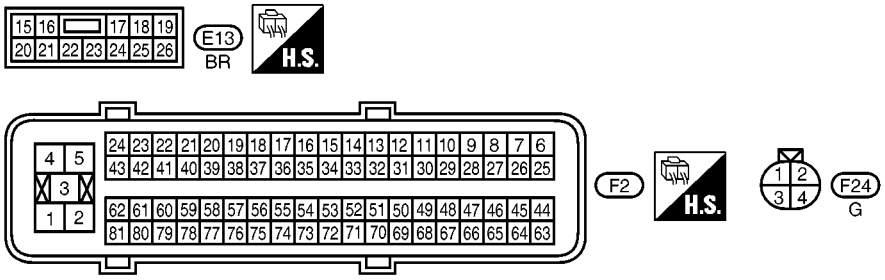
MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	● Engine speed is below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	ON
	● Engine speed: Above 3,600 rpm (A/T models), 3,800 rpm (M/T models)	OFF

Wiring Diagram

EBS00OPW

EC-RRO2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0465E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	GY	Heated oxygen sensor 2 heater	**[Engine is running]** ● Engine speed: Below 3,600 rpm (A/T models), 3,800 rpm (M/T models) after the following conditions are met. – Engine: After warming up – Keeping the engine speed at between 3,500 to 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - 1.0V
			[Ignition switch ON] ● Engine stopped **[Engine is running]** ● Engine speed is above 3,600 rpm (A/T models), 3,800 rpm (M/T models).	BATTERY VOLTAGE (11 - 14V)

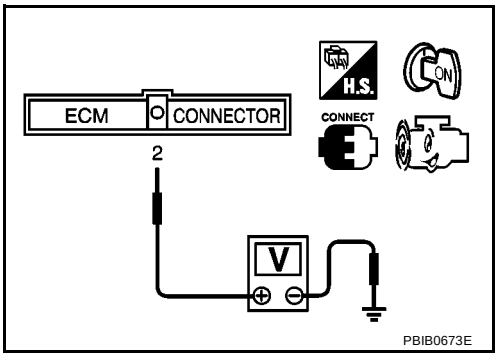
Diagnostic Procedure

EBS00OPX

1. CHECK OVERALL FUNCTION

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter proves between ECM terminal 2 (HO2S2 heater signal) and ground.
6. Check the voltage under the following conditions.

Conditions	Voltage
At idle	0 - 1V
Engine speed is above 3,600 rpm (A/T models), 3,800 rpm (M/T models).	Battery voltage



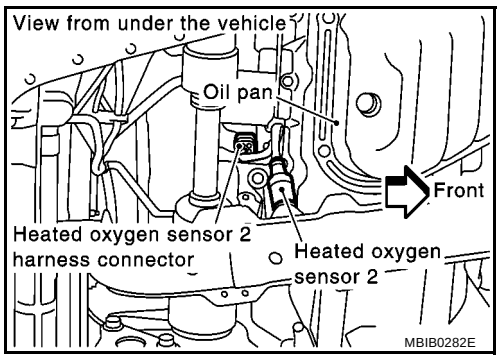
OK or NG

OK >> **INSPECTION END**

NG >> GO TO 2.

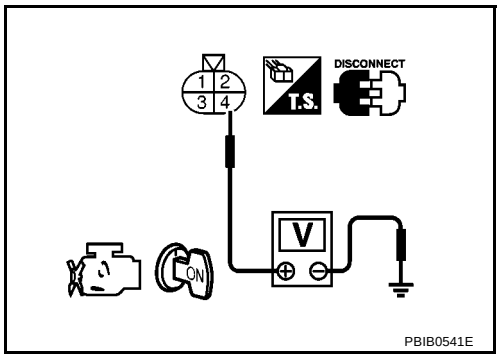
2. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Turn ignition switch ON.



4. Check voltage between HO2S2 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair harness or connectors.

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 2 and HO2S2 terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-775, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS00OPY

HEATED OXYGEN SENSOR 2 HEATER

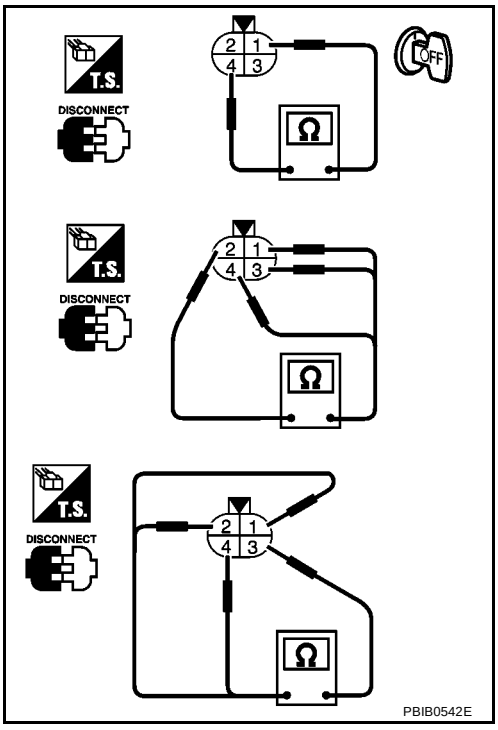
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
1 and 4	3.3 - 4.0 Ω at 25°C (77°F)
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**



Removal and Installation

EBS00OPZ

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

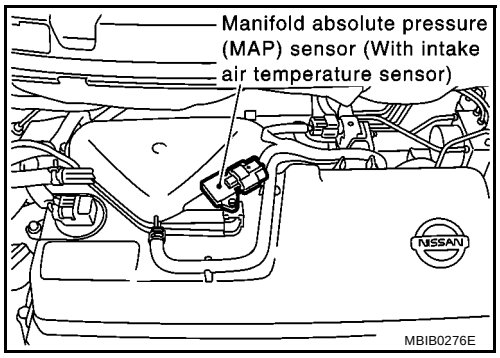
IAT SENSOR

PFP:22630

Component Description

EBS00OQ0

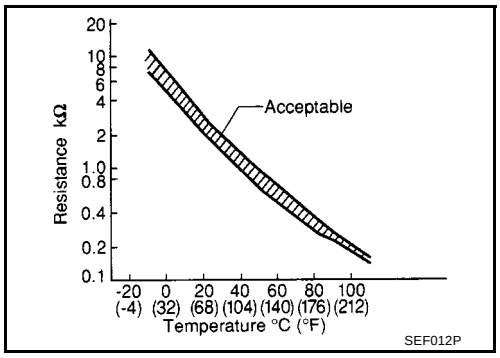
The intake air temperature sensor is built into manifold absolute pressure sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.43	7.9 - 9.3
25 (77)	3.32	1.9 - 2.1
80 (176)	1.23	0.31 - 0.37

*: These data are reference values and are measured between ECM terminal 34 (Intake air temperature sensor) and ground.

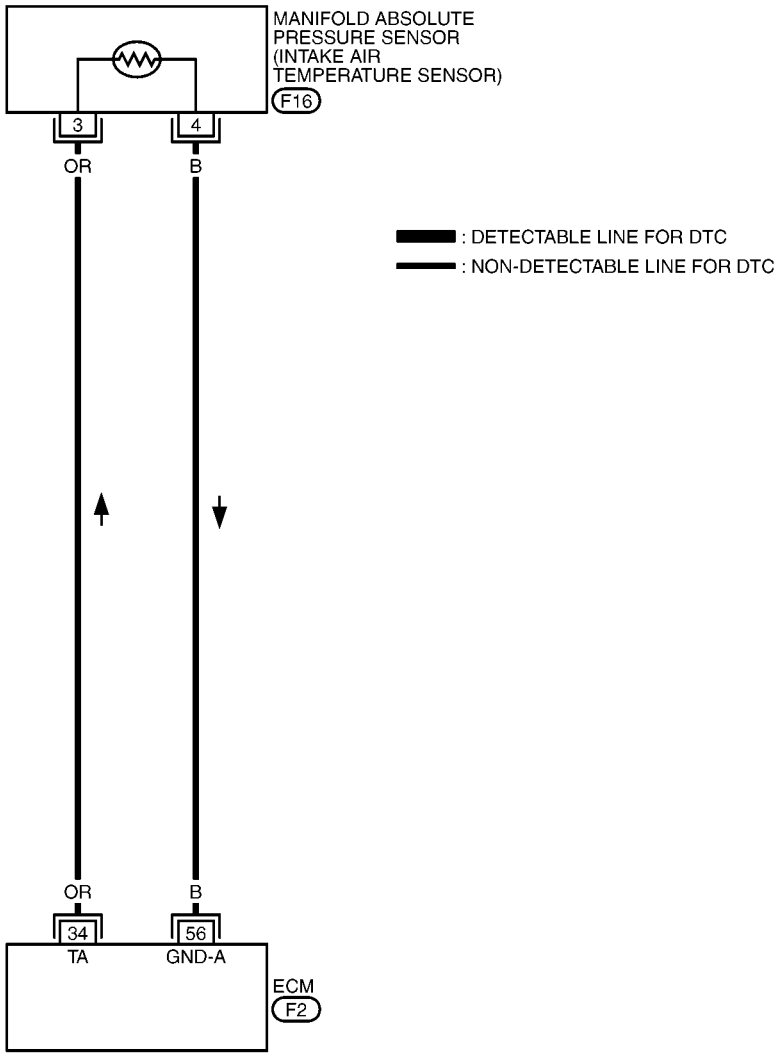


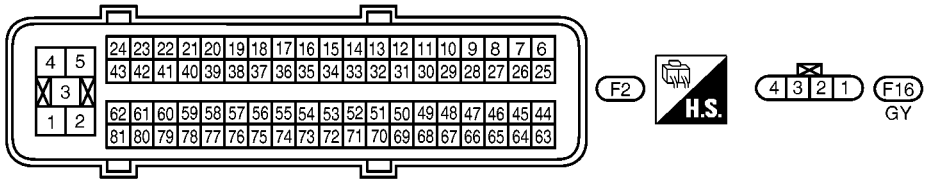
CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

Wiring Diagram

EBS00OQ1

EC-IATSEN-01





MBWA0466E

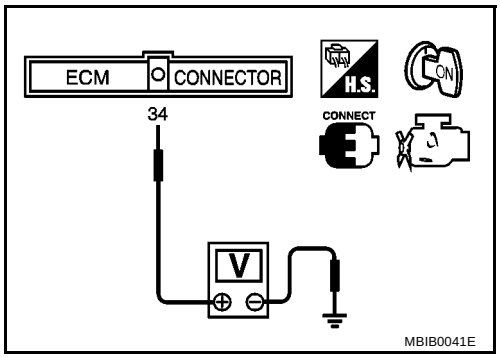
Diagnostic Procedure

EBS00OQ2

1. CHECK OVERALL FUNCTION

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 34 and ground with CONSULT-II or tester.

Voltage: 0.04 - 4.84V

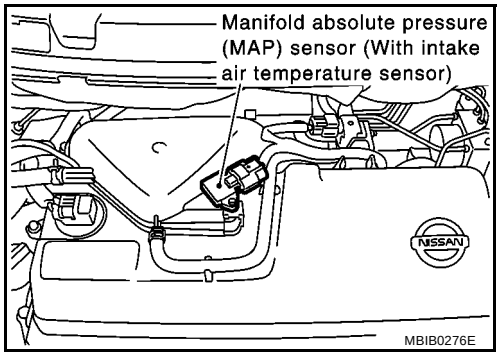


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

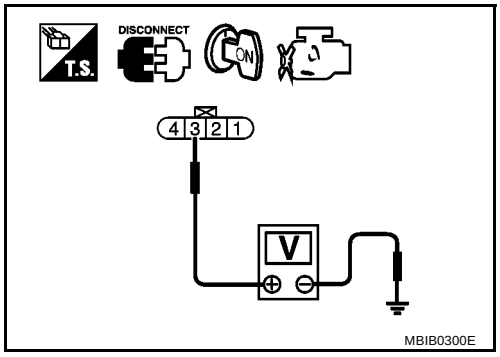
2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect manifold absolute pressure sensor (intake air temperature sensor is built-into) harness connector.
3. Turn ignition switch ON.



4. Check voltage between MAP sensor terminal 3 and ground.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between MAP sensor terminal 4 and ECM terminal 56.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-779, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace manifold absolute pressure sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

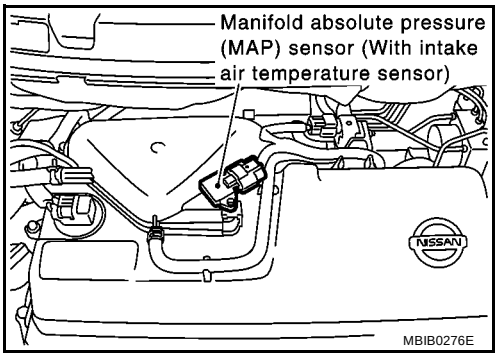
EBS00OQ3

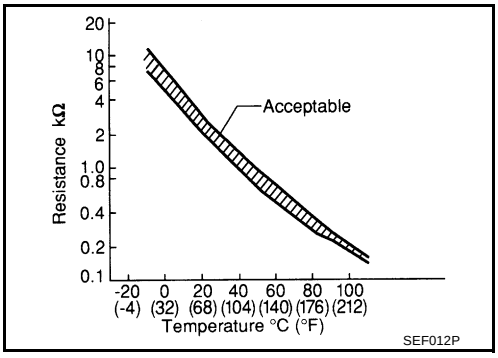
INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between manifold absolute pressure sensor terminals 3 and 5 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1

2. If NG, replace manifold absolute pressure sensor (with intake air temperature sensor).





Removal and Installation

EBS00OQ4

MANIFOLD ABSOLUTE PRESSURE SENSOR

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

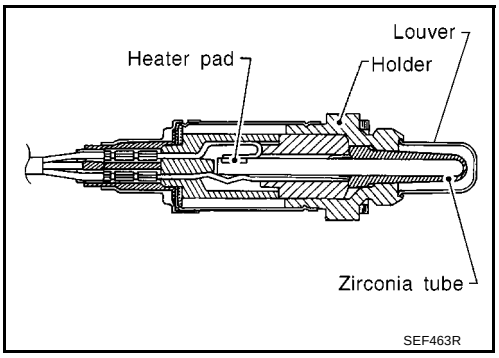
HO2S1

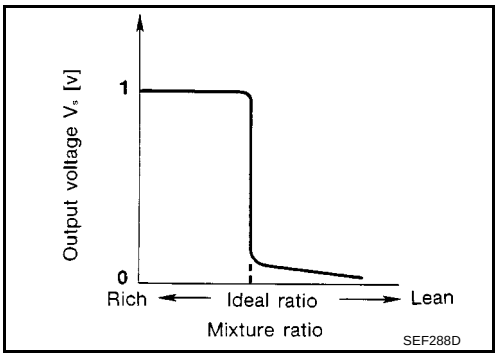
PFP:22690

Component Description

EBS00OQ5

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.





CONSULT-II Reference Value in Data Monitor Mode

EBS00OQ6

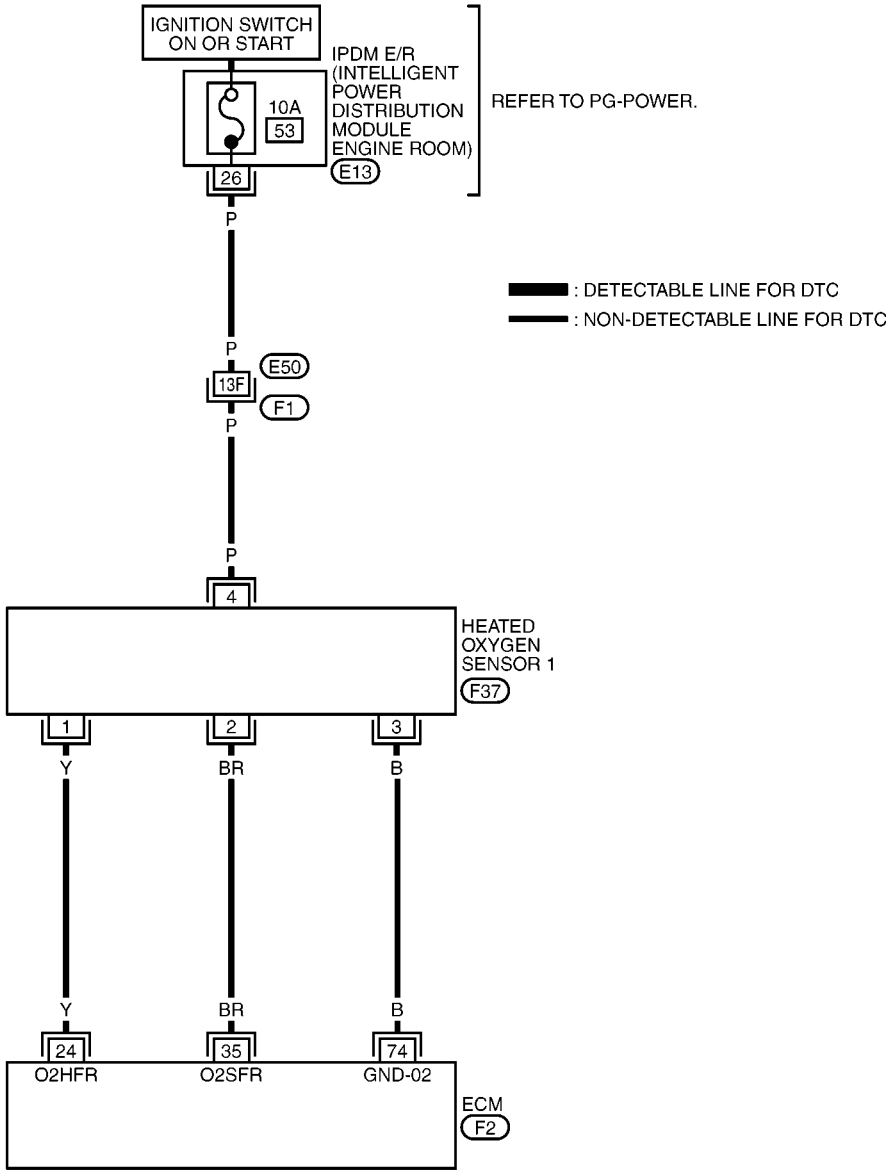
Specification data are reference values.

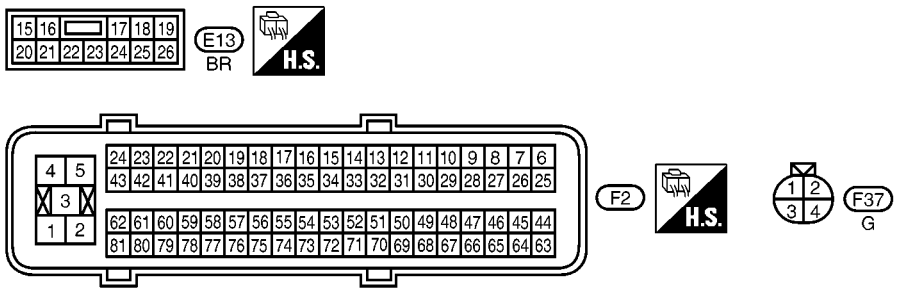
MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.

Wiring Diagram

EBS00OQ7

EC-FRO2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0464E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	BR	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - Approximately 1.0V (Periodically change)
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

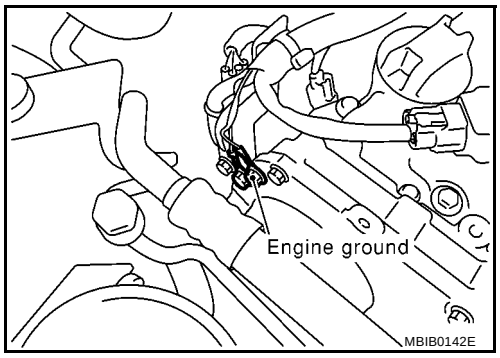
Diagnostic Procedure

EBS00OQ8

1. INSPECTION START

1. Turn ignition switch OFF.
2. Loosen and retighten engine ground screws.

>> GO TO 2.



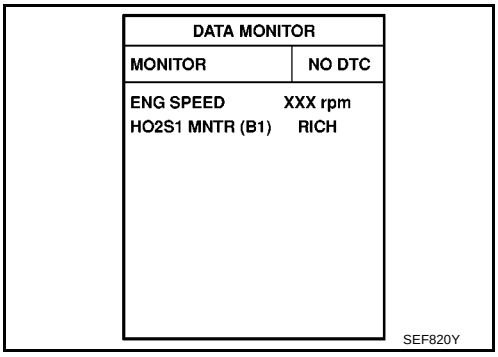
2. CHECK OVERALL FUNCTION

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 MNTR (B1)” in “DATA MONITOR” mode with CONSULT-II.
3. Keep the engine speed at 2,000 rpm under no load, and make sure that the monitors fluctuates between LEAN and RICH more than 5 times in 10 seconds.

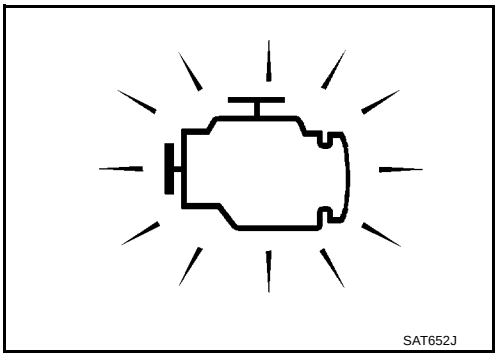
   1 time: RICH → LEAN → RICH

   2 times: RICH → LEAN → RICH → LEAN →RICH



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Set ECM in Diagnostic test mode - II (Heated oxygen sensor 1 monitor).
   Refer to EC-510, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
4. Keep the engine speed at 2,000 rpm under no load, and make sure that the MI comes ON more than 5 times in 10 seconds.



OK or NG

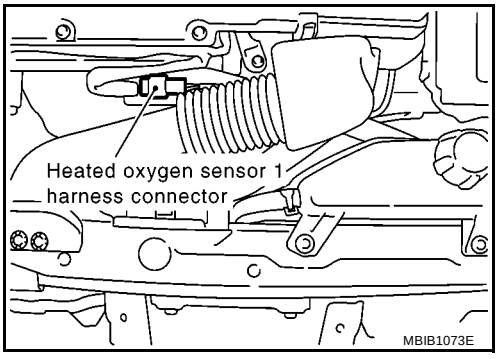
OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S1 terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 35 and HO2S1 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-784, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

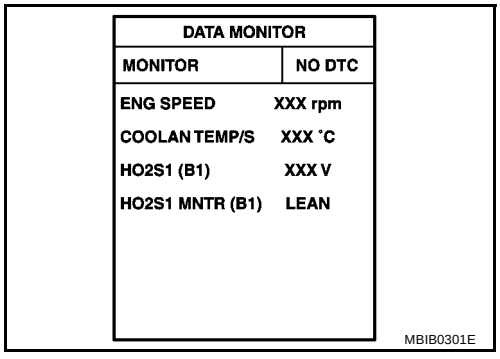
Component Inspection

EBS00OQ9

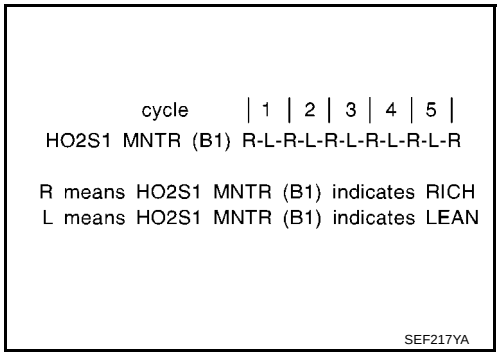
HEATED OXYGEN SENSOR 1

With CONSULT-II

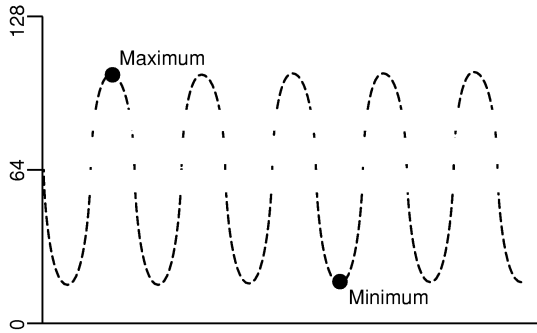
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.



6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



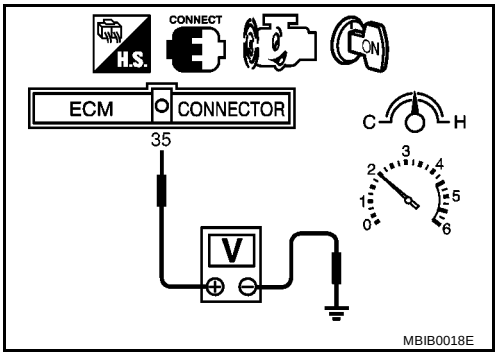
CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and engine ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least one time.
   - The minimum voltage is below 0.3V at least one time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OQA

HEATED OXYGEN SENSOR 1

Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

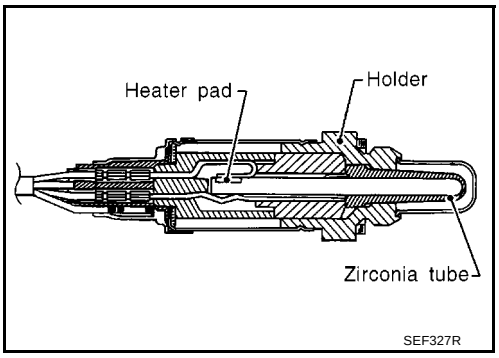
HO2S2

PFP:226A0

Component Description

EBS00OQB

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OQC

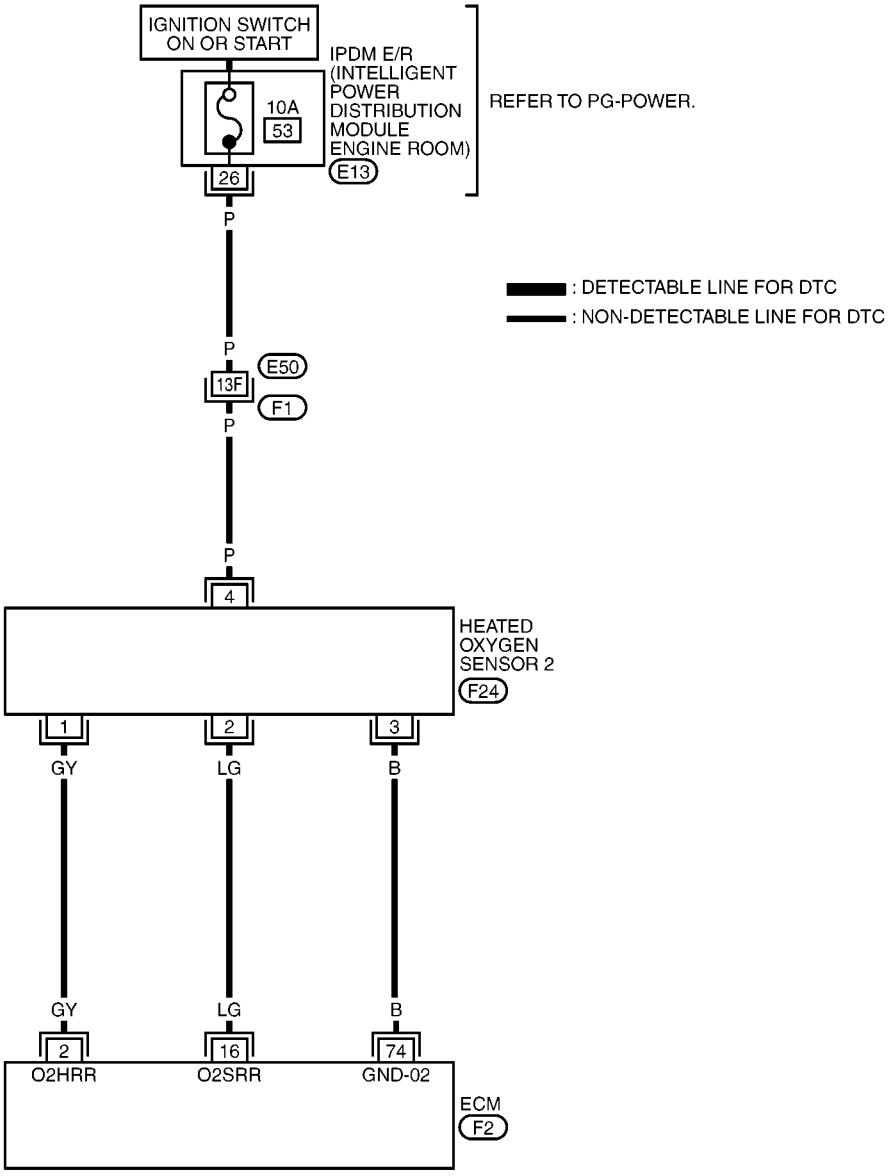
Specification data are reference values.

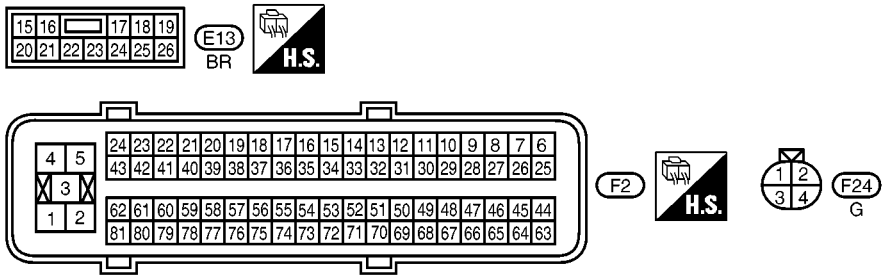
MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)	● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load		LEAN ←→ RICH

Wiring Diagram

EBS00OQD

EC-RRO2-01





REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0465E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
16	LG	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	0 - Approximately 1.0V
74	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

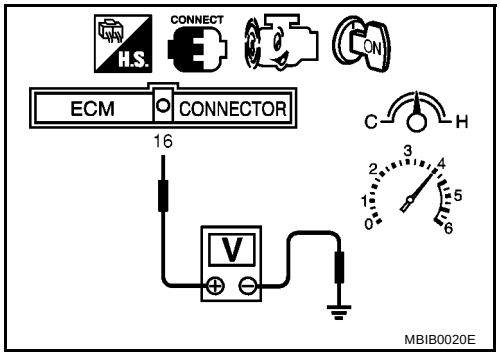
Diagnostic Procedure

EBS00OQE

1. CHECK OVERALL FUNCTION-I

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 (HO2S2 signal) and ground.
6. Check the voltage while revving up to 4,000 rpm under no load at least 10 times. (Depress and release the accelerator pedal as quickly as possible.)

The voltage does not remain in the range of 0.2 - 0.4V



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK OVERALL FUNCTION-II

Keep engine at idle for 10 minutes, then check the voltage between ECM terminal 16 and ground, or check voltage when coasting 80 km/h (50 MPH) in 3rd gear (M/T) or D position (A/T).

The voltage does not remain in the range of 0.2 - 0.4V

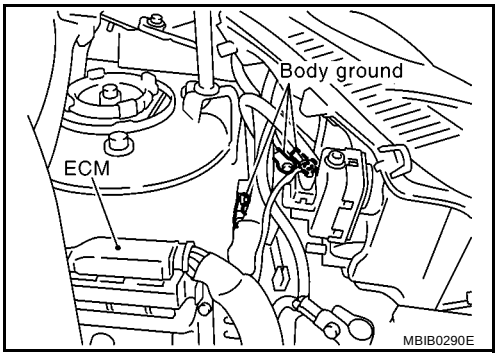
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. RETIGHTEN GROUND SCREWS

1. Turn ignition switch OFF.
2. Loosen and retighten body ground screws.

>> GO TO 4.



4. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

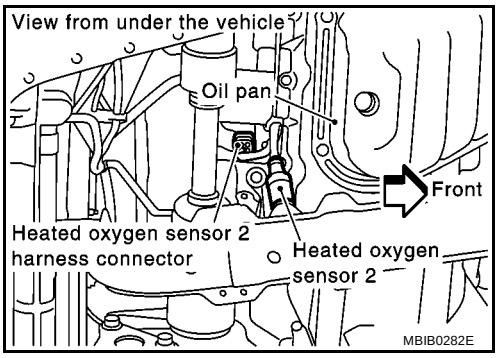
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 74 and HO2S2 terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



5. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 16 and HO2S2 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 16 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-790, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace heated oxygen sensor 2.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

EBS00OQF

HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

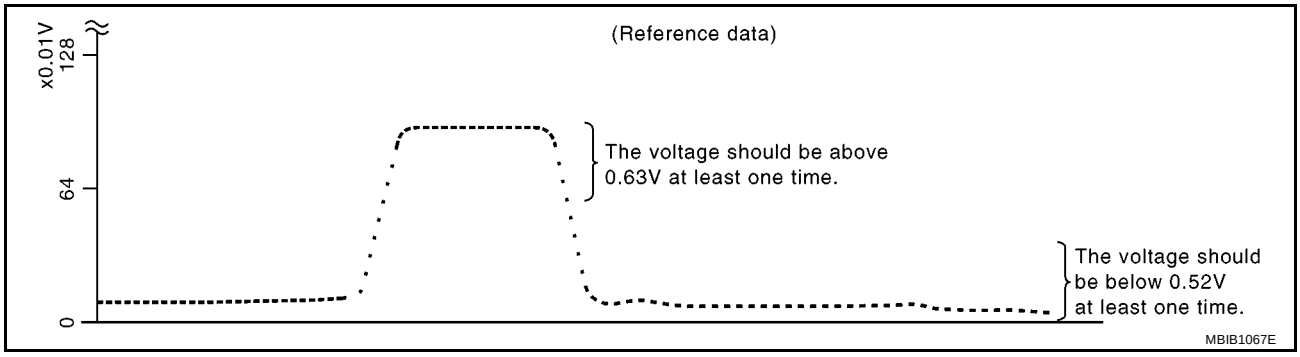
SEF174Y

6. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

7. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



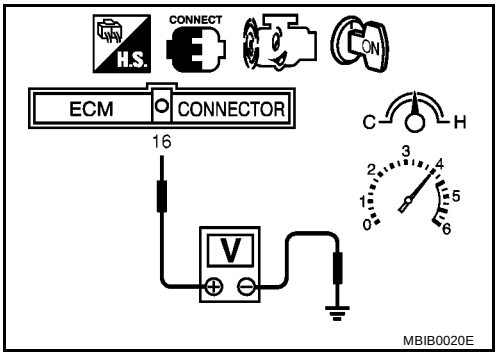
“HO2S2 (B1)” should be above 0.63V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.52V at least once when the “FUEL INJECTION” is −25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 16 [HO2S2 (B1) signal] and engine ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.63V at least once during this procedure.
   If the voltage is above 0.63V at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position (A/T), 3rd gear position (M/T).
   The voltage should be below 0.52V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

EBS00OQG

HEATED OXYGEN SENSOR 2

Refer to EX-3, "EXHAUST SYSTEM" .

IGNITION SIGNAL

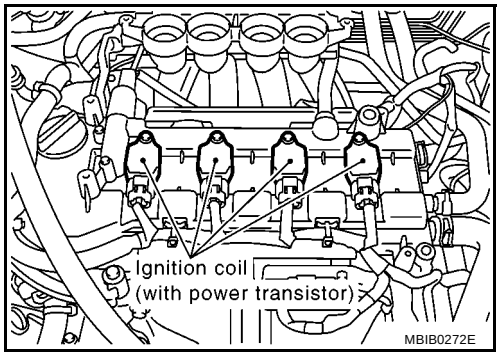
PFP:22448

Component Description

EBS00OQH

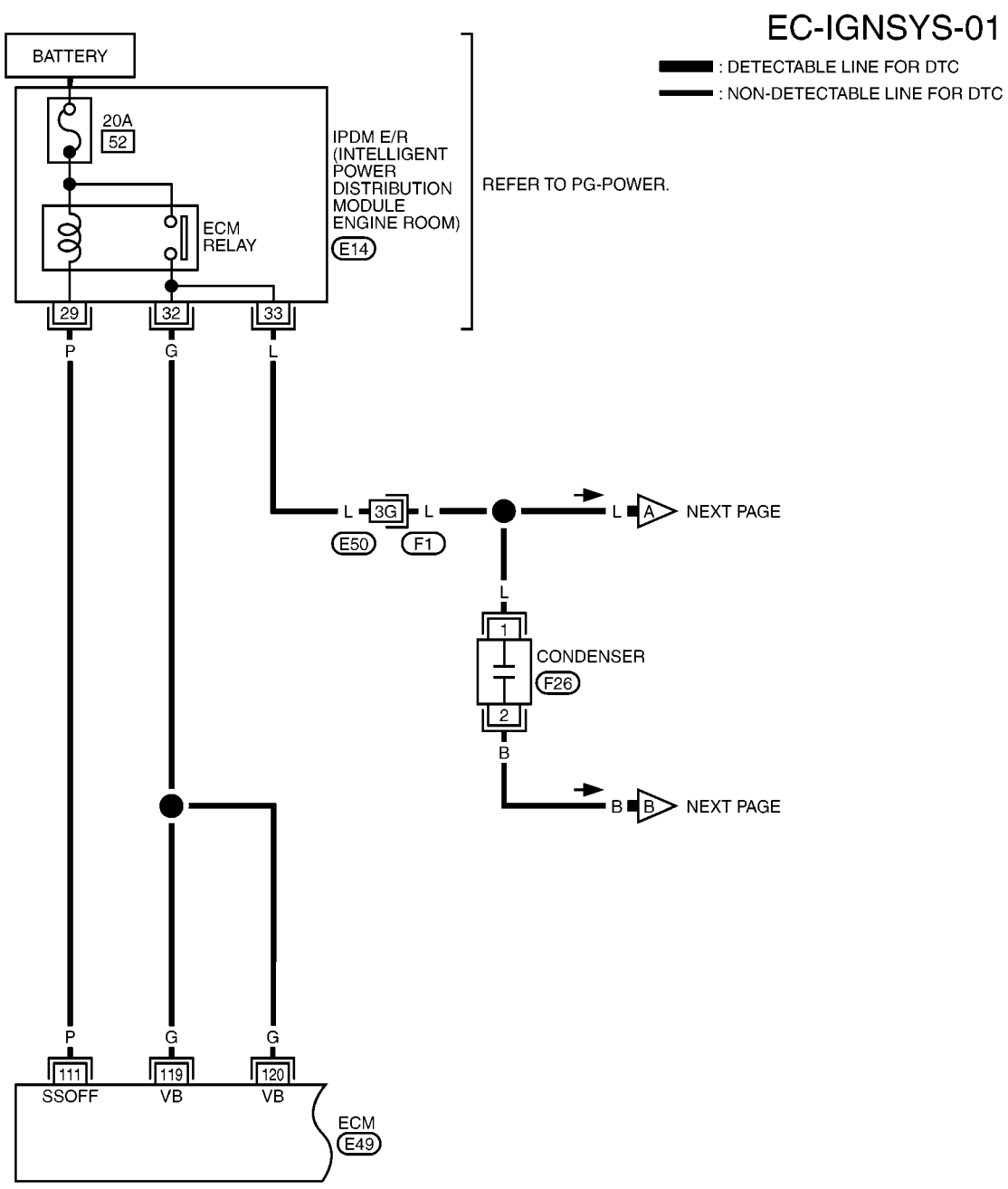
IGNITION COIL & POWER TRANSISTOR

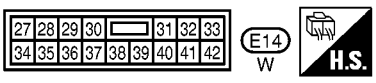
The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.

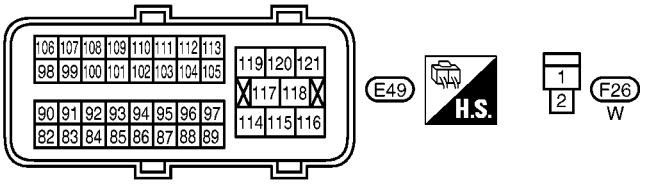


Wiring Diagram

EBS00OQI







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0296E

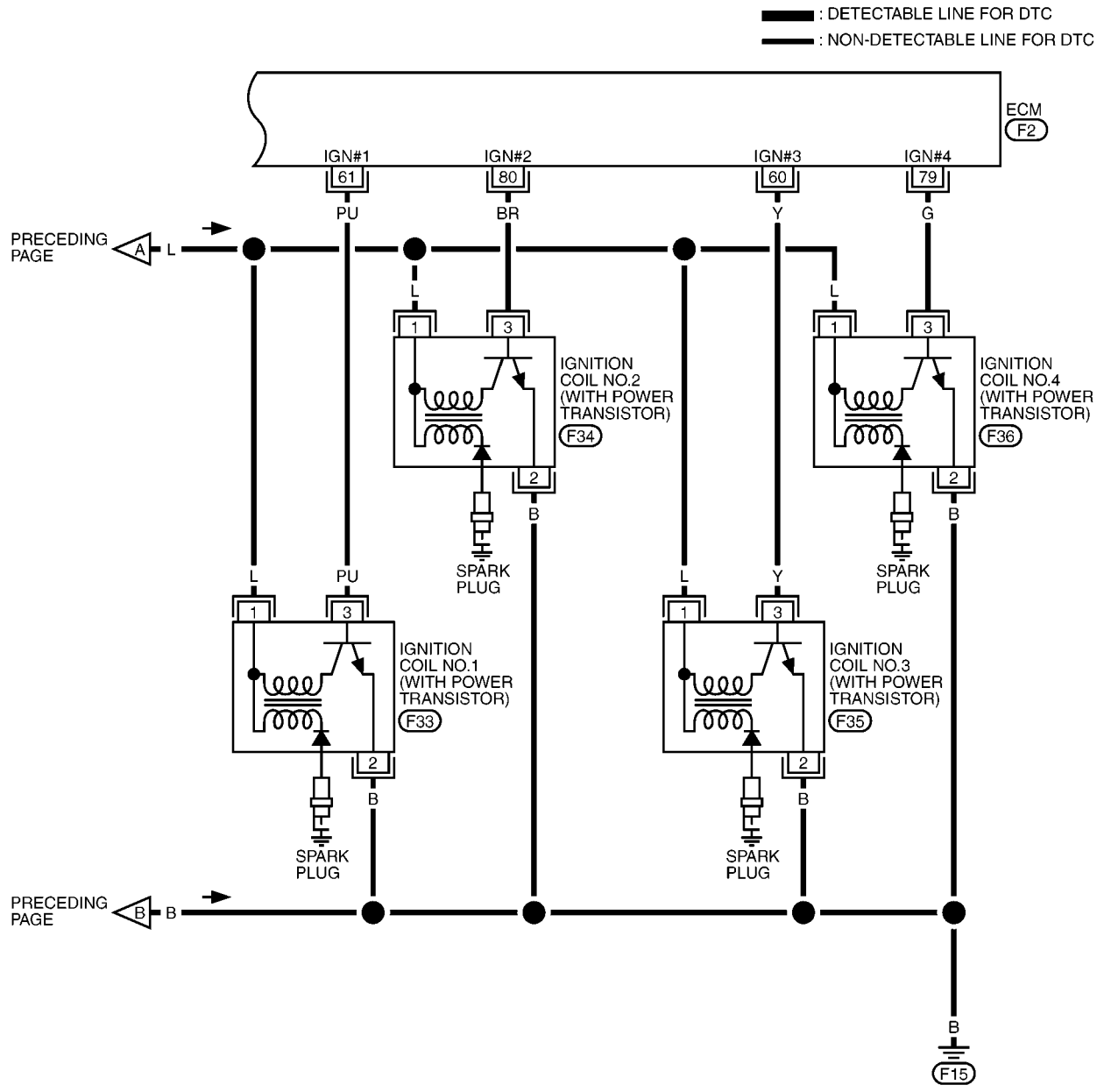
Specification data are reference values and are measured between each terminal and ground.

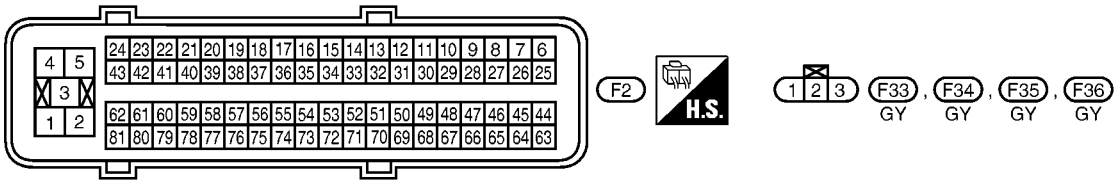
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	P	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch OFF] ● More than a few seconds passed after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	G	Power supply for ECM	**[Ignition switch ON]**	BATTERY VOLTAGE (11 - 14V)

EC-IGNSYS-02

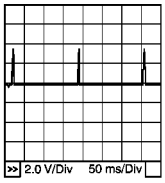
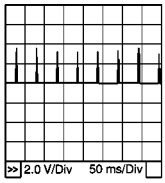




MBWA0297E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
60 61 79 80	Y PU G BR	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm.	0 - 0.2V★  PBIB0522E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00OQJ

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.
Is engine running?

Yes or No

Yes (With CONSULT-II)>>GO TO 2.
Yes (Without CONSULT-II)>>GO TO 3.
No >> GO TO 4.

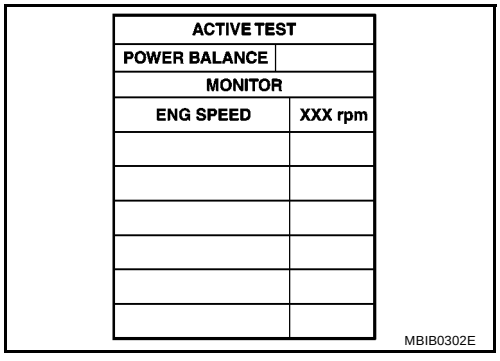
2. CHECK OVERALL FUNCTION

With CONSULT-II

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
2. Make sure that each circuit produces a momentary engine speed drop.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.



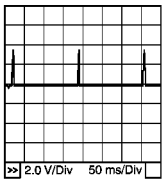
MBIB0302E

3. CHECK OVERALL FUNCTION

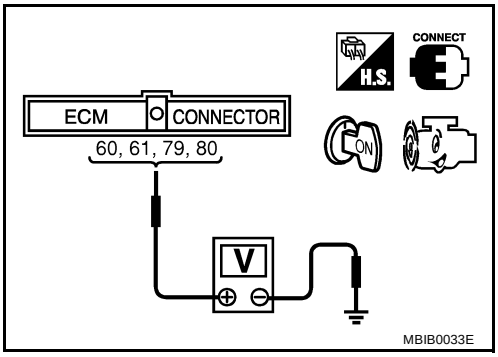
Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 60, 61, 79, 80 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:
The pulse cycle changes depending on rpm at idle.



PBIB0521E



MBIB0033E

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

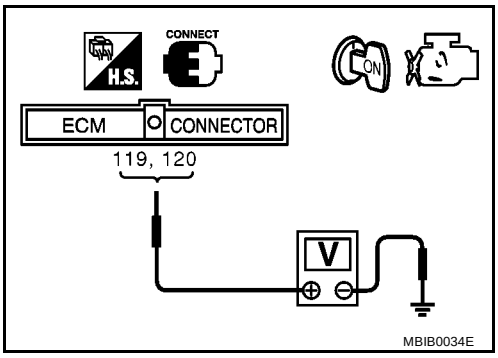
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Go to EC-567, "POWER SUPPLY CIRCUIT FOR ECM"
.



MBIB0034E

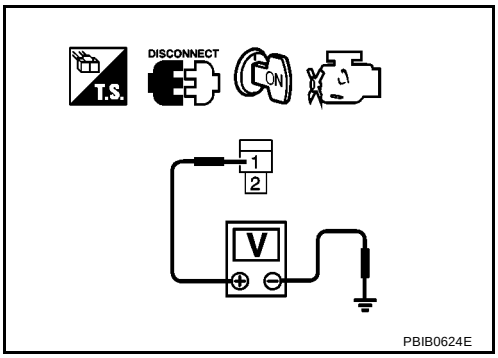
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.
4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.



PBIB0624E

6. DETECT MALFUNCTION PART

Check the following.

- IPDM E/R harness connector E14
- Harness connectors E50, F1
- Harness for open or short between condenser and IPDM E/R

>> Repair or replace

7. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser terminal 2 and ground.
   Refer to Wiring diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to power in harness or connector.

8. CHECK CONDENSER

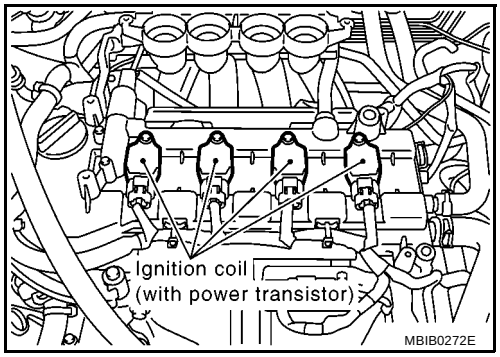
Refer to EC-799, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace condenser.

9. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.

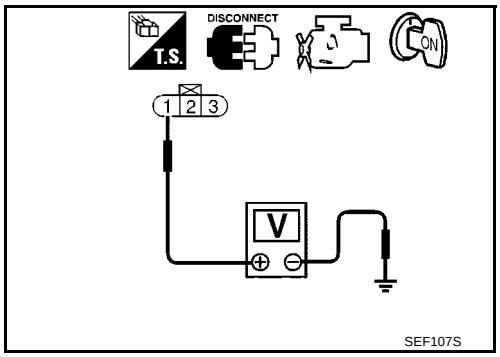


5. Check voltage between ignition coil terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.



10. DETECT MALFUNCTIONING PART

Check harness for open or short between ignition coil and IPDM E/R.

>> Repair or replace harness or connectors.

11. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to power in harness or connectors.

12. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 60, 61, 79, 80 and ignition coil terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-799, "Component Inspection" .

OK or NG

OK >> GO TO 14.
NG >> Replace ignition coil with power transistor.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

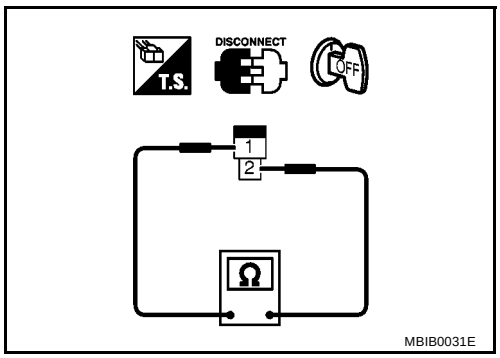
EBS00OQK

CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

3. Check resistance between condenser terminals 1 and 2.

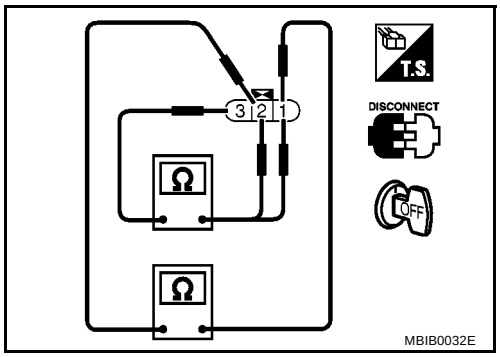
Resistance: Above 1 MΩ at 25°C (77°F)



IGNITION COIL WITH POWER TRANSISTOR

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No.	Resistance Ω [at 25°C (77°F)]
2 and 3	Except 0 or ∞
1 and 2	Except 0
1 and 3	



Removal and Installation

EBS00OQL

IGNITION COIL WITH POWER TRANSISTOR

Refer to EM-27, "IGNITION COIL" .

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description

EBS00OQM

SYSTEM DESCRIPTION

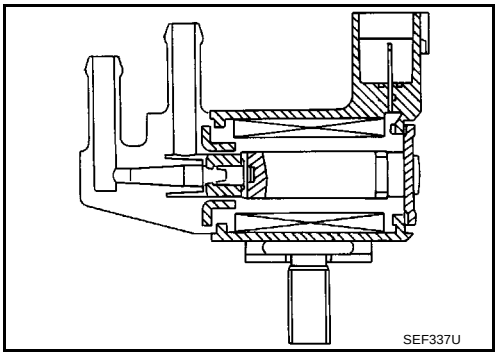
Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Manifold absolute pressure sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Vehicle speed signal*2	Vehicle speed		

*1: ECM determines the start signal status by the signals of engine speed and battery voltage.
*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



CONSULT-II Reference Value in Data Monitor Mode

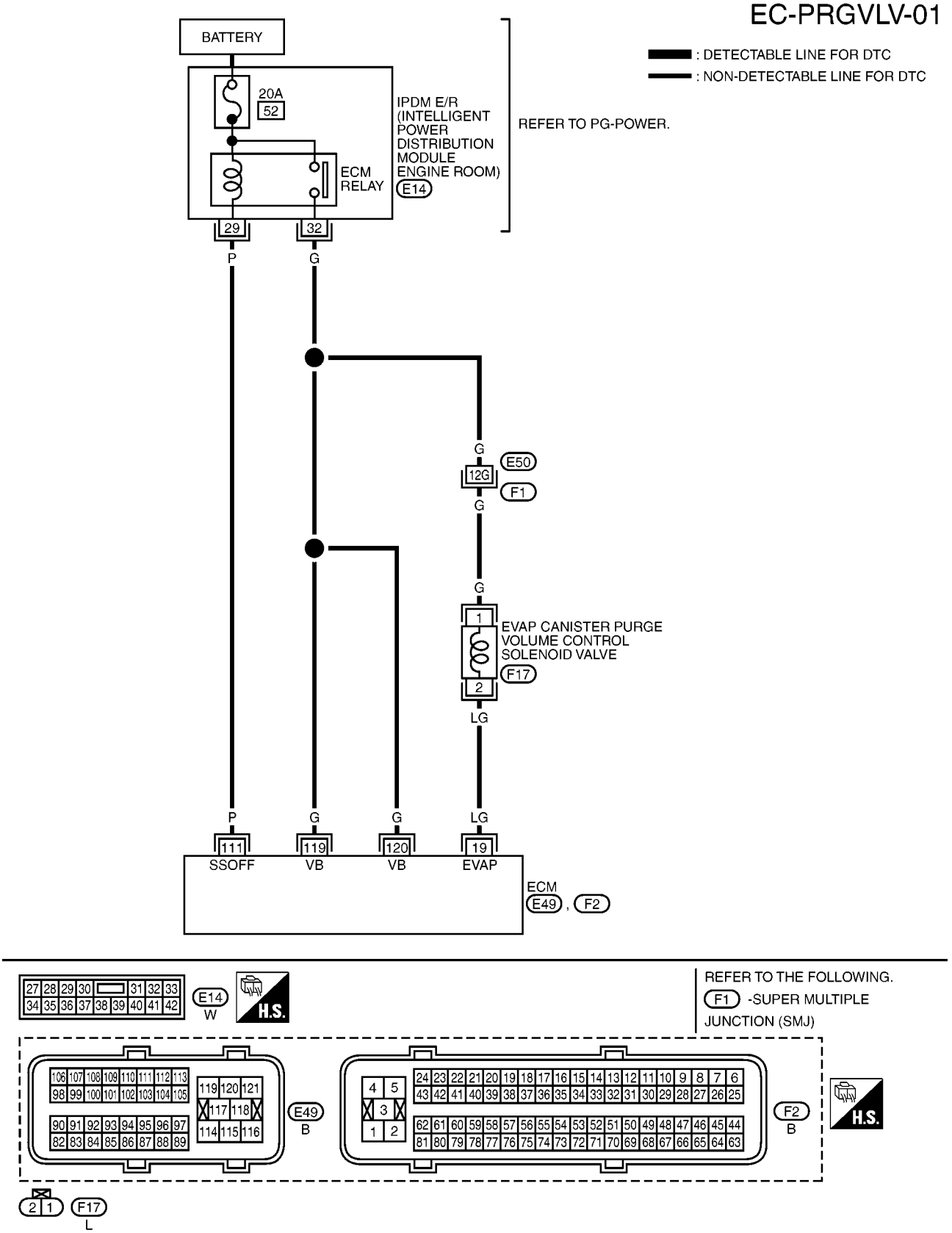
EBS00OQN

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%

Wiring Diagram

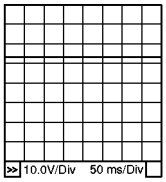
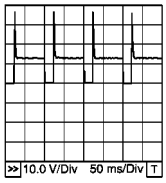
EBS00OQO



MBWA0578E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
19	LG	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

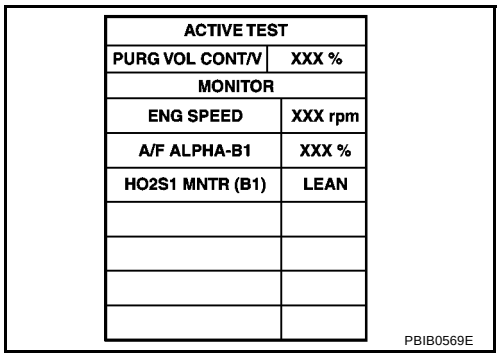
Diagnostic Procedure

EBS00OQP

1. CHECK OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose connected to the EVAP canister.
3. Turn ignition switch ON, and select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II.
4. Start engine and let it idle.



5. Change the valve opening percentage with touching “Qu” or “Qd” on CONSULT-II screen, and check for vacuum existence at the EVAP purge hose under the following conditions.

Conditions (PURG VOL CONT/V value)	Vacuum
0%	Should not exist.
100%	Should exist.

Without CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect the EVAP purge hose connected to the EVAP canister.
3. Start engine and let it idle for at least 80 seconds.
4. Check for vacuum existence at the EVAP purge hose under the following conditions.

Conditions	Vacuum
At idle	Should not exist.
Engine speed is about 2,000 rpm.	Should exist.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK EVAP CANISTER

Refer to EC-843, "Component Inspection" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace EVAP canister.

3. CHECK EVAP PURGE LINE

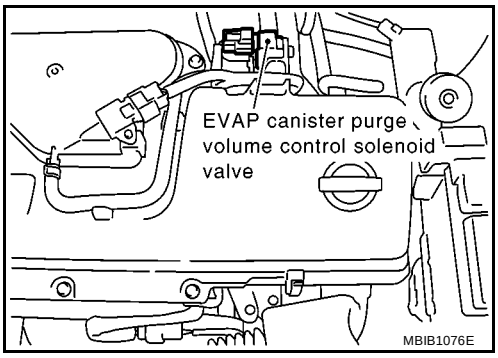
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to EC-840, "EVAPORATIVE EMISSION SYSTEM" .

OK or NG

OK >> GO TO 4.
NG >> Repair or reconnect the hose.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.

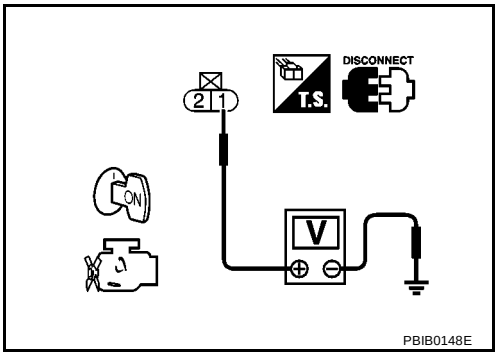


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.



5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between EVAP canister purge volume control solenoid valve and IPDM E/R
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair harness or connectors.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 19 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK (With CONSULT-II)>>GO TO 7.
OK (Without CONSULT-II)>>GO TO 8.
NG >> Repair open circuit or short to ground and short to power in harness or connectors.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN

PBIB0569E

8. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-806, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP canister purge volume control solenoid valve.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

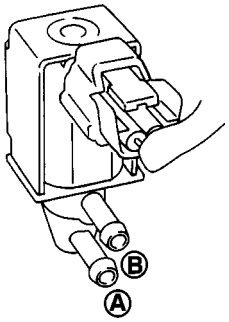
EBS00OQQ

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No

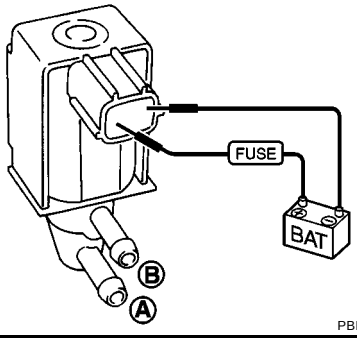


PBIB0149E

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation

EBS00OQR

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EM-16, "AIR CLEANER AND AIR DUCT" .

VSS

PFP:32702

Description

EBS00OSW

The vehicle speed signal is sent to the combination meter from the “ABS actuator and electric unit (control unit)” through CAN communication line. The combination meter then sends a signal to the ECM through CAN communication line.

Diagnostic Procedure

EBS00OSX

1. INSPECTION START

Do you have CONSULT-II?

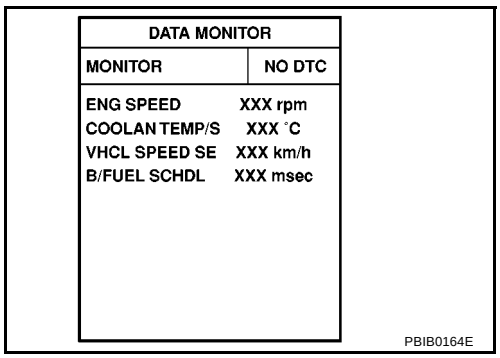
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK OVERRALL FUNCTION

1. Turn ignition switch OFF.
2. Lift up the vehicle.
3. Start engine and let it idle
4. Select “VHCL SPEED SE” in“DATA MONITOR” mode with CONSULT-II.
5. Select “VHCL SPEED SE” indication when rotating wheels with suitable gear position.

“VHCL SPEED SE” indication should exceed 10km/h (6MPH).



OK or NG

OK >> **INSPECTION END**.
NG >> GO TO 3.

3. CHECK DTC

Refer to BRC-8, "TROUBLE DIAGNOSIS" (models without ESP) or BRC-61, "TROUBLE DIAGNOSIS" (models with ESP).

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK COMBINATION METER

Check combination meter function.
Refer to DI-5, "COMBINATION METERS" .

>> **INSPECTION END**

IVT CONTROL SOLENOID VALVE

PFP:23796

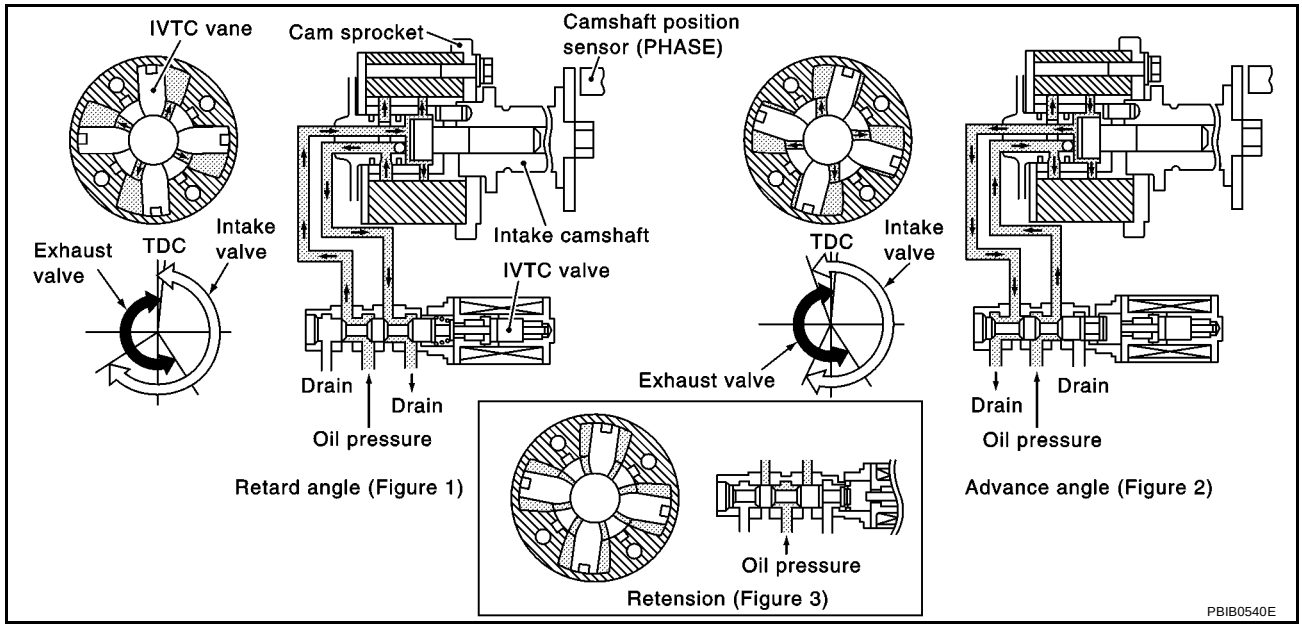
Description

EBS00OQS

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed signal*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

COMPONENT DESCRIPTION

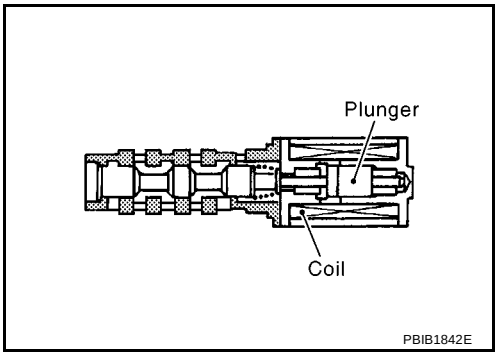
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OQT

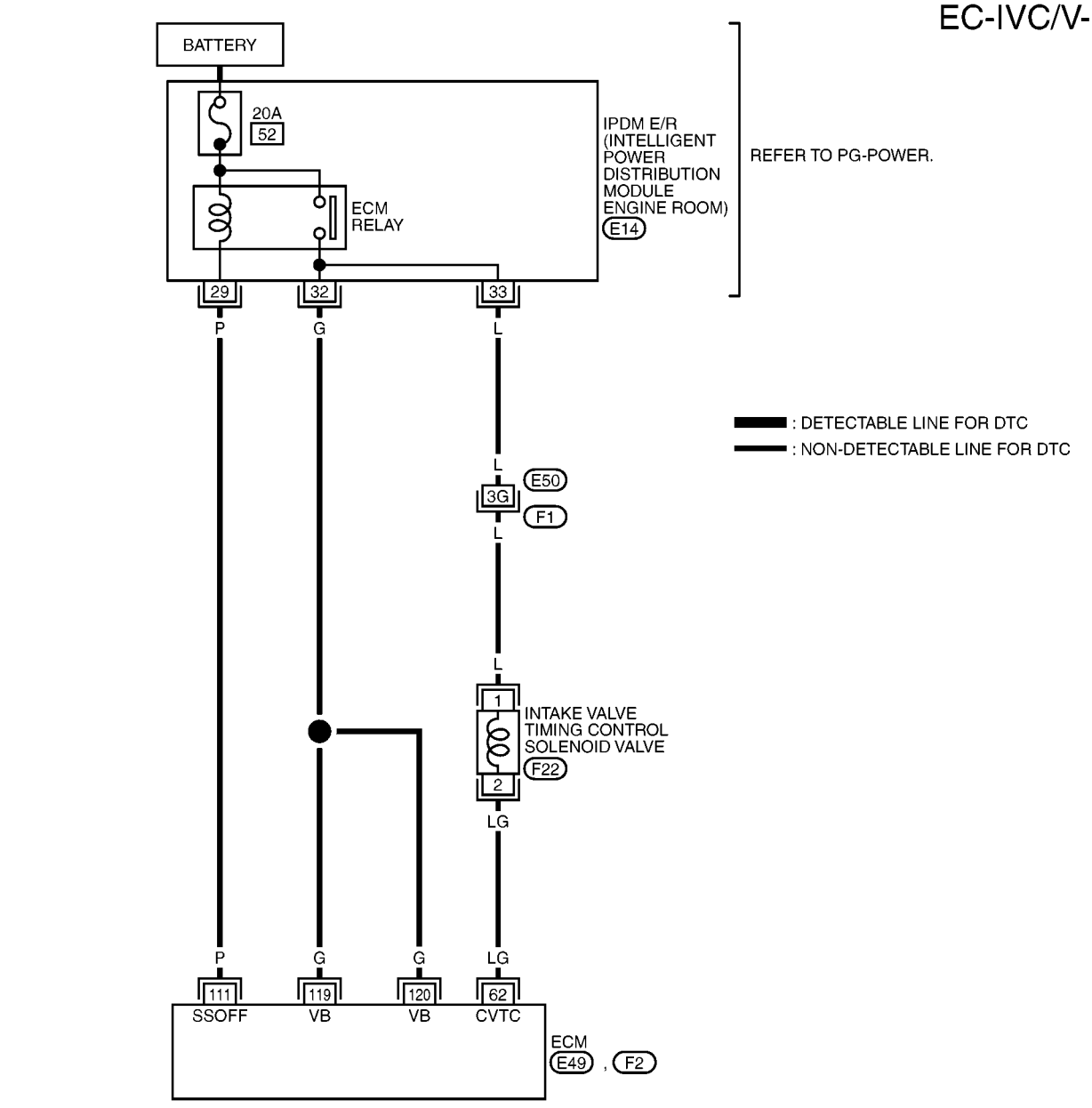
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	–5° - 5°CA
		When revving up to 2,000 rpm quickly	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving up to 2,000 rpm quickly	Approx. 0% - 50%

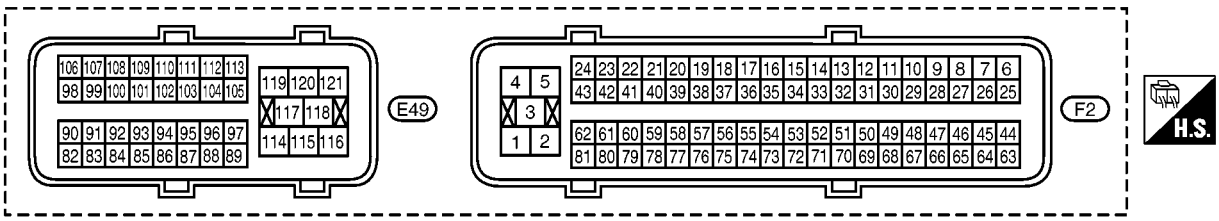
Wiring Diagram

EBS00OQU

EC-IVC/V-01



REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

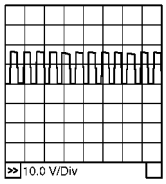


MBWA0468E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	LG	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● **Warm-up condition** ● When revving engine up to 2,000 rpm quickly	Approximately 4V - BATTERY VOLTAGE (11 - 14V)★  PBIB1790E

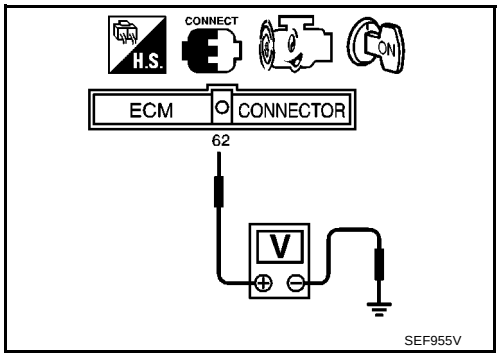
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

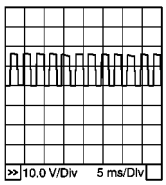
EBS00OQV

1. CHECK OVERALL FUNCTION CHECK

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Set the tester probe between ECM terminals 62 (IVT control solenoid valve signal) and ground.
5. Start engine and let it idle.
6. Check the voltage under the following conditions.
   Verify that the oscilloscope screen shows the signal wave as shown below.



SEF955V

Conditions	Voltage
At idle	BATTERY VOLTAGE (11 - 14V)
When revving engine up to 2,000 rpm quickly	Approximately 4V - BATTERY VOLTAGE (11 - 14V)★  PBIB0532E

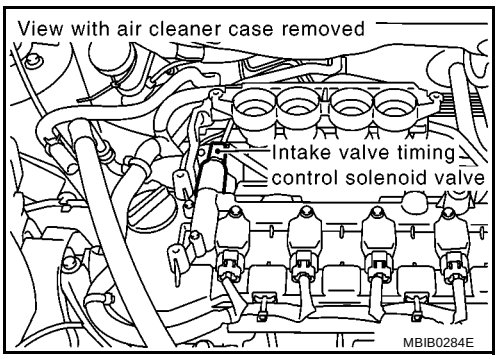
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.

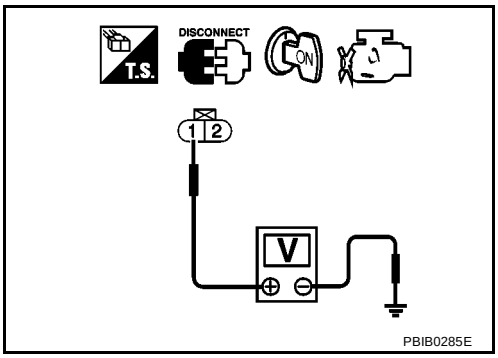


4. Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.



3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- IPDM E/R harness connector E14
- Harness for open or short between intake valve timing control solenoid valve and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 62 and intake valve timing control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-814, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace intake valve timing control solenoid valve.

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-648, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace crankshaft position sensor (POS).

7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-655, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace camshaft position sensor (PHASE).

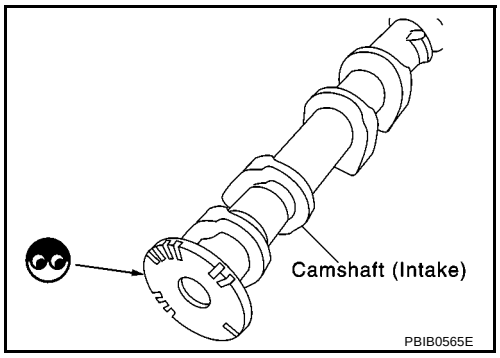
8. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

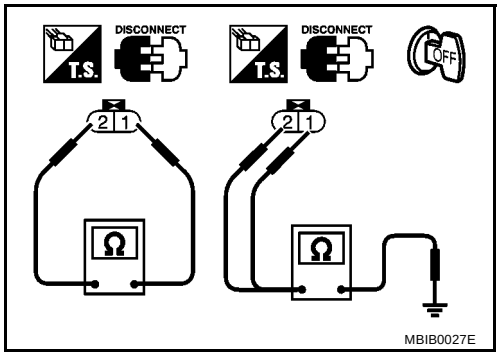
Component Inspection

EBS00OQW

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve terminals 1 and 2 under the following conditions.

Terminals	Resistance
1 and 2	Approximately 7.2Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



Removal and Installation

EBS00OQX

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EM-33, "ROCKER COVER" .

PNP SWITCH

PFP:32006

Component Description

EBS00OQY

When the shift lever position is P or N (A/T models) or Neutral (M/T models), park/neutral position (PNP) switch is ON.
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

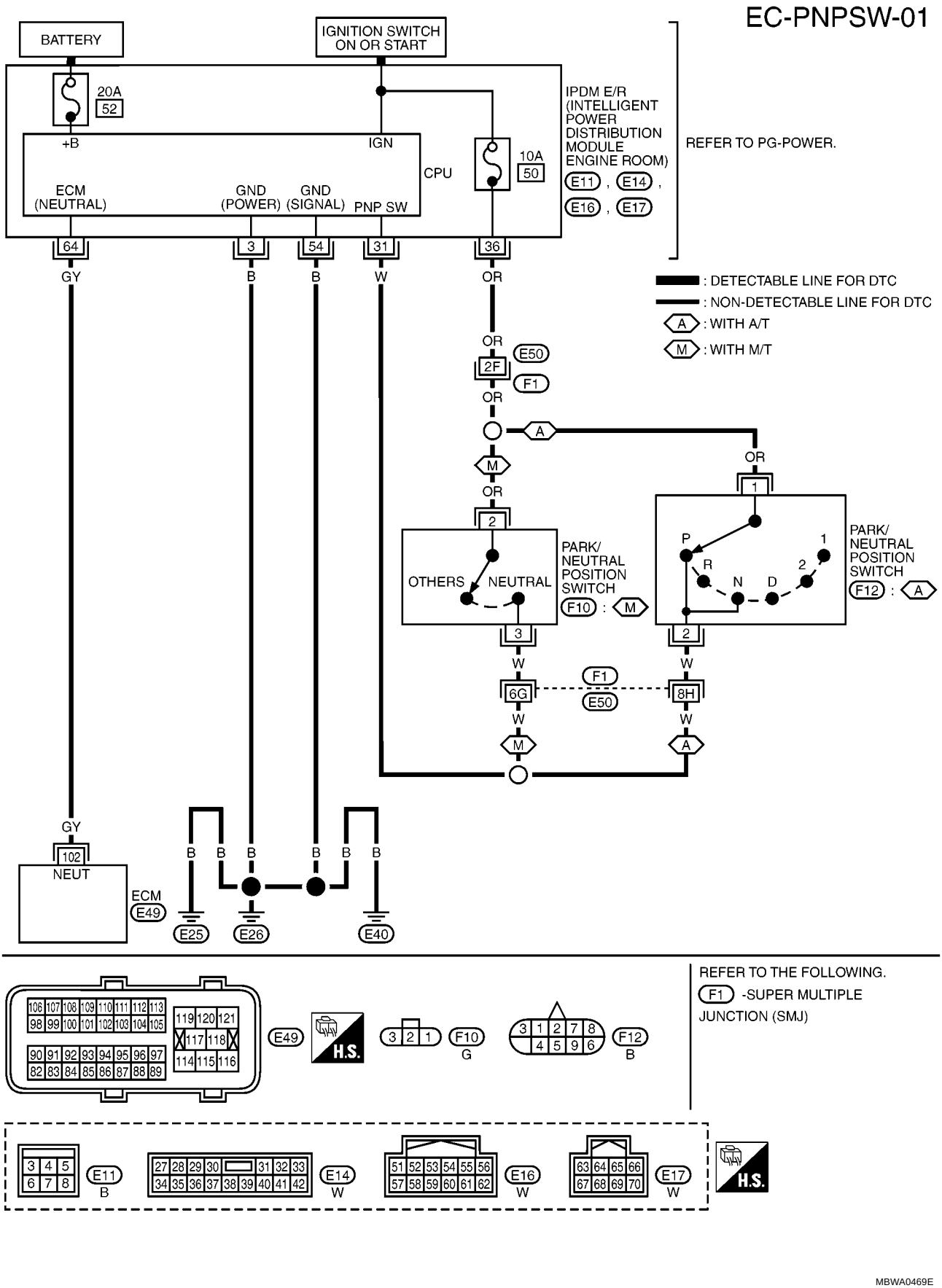
EBS00OQZ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T models) Neutral (M/T models)	ON
		Shift lever: Except above	OFF

Wiring Diagram

EBS00OR0



MBWA0469E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	GY	PNP switch	**[Ignition switch ON]** ● Shift lever position: P or N (A/T models) Neutral (M/T models).	Approximately 0V
			[Ignition switch ON] ● Except the above gear position	BATTERY VOLTAGE

Diagnostic Procedure

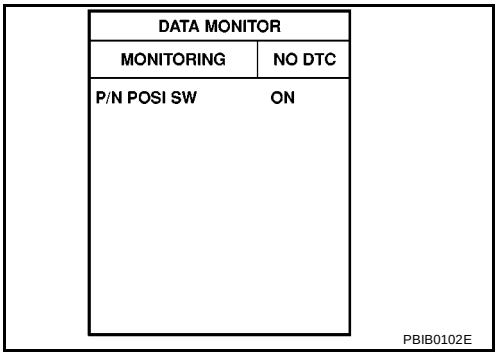
EBS00OR1

1. CHECK OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check the “P/N POSI SW” signal under the following conditions.

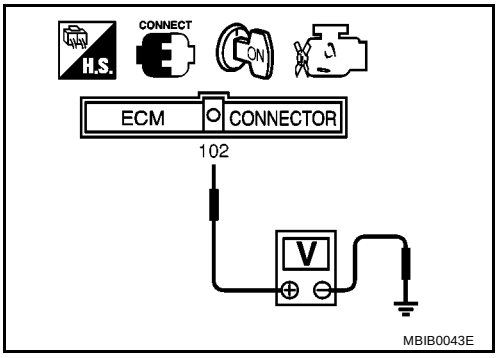
Selector lever position	P/N POSI SW signal
P and N (A/T models), Neutral (M/T models) position	ON
Except the above position	OFF



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 and ground under the following conditions.

Selector lever position	Voltage
P and N (A/T models), Neutral (M/T models) position	Approximately 0V
Except the above position	Battery voltage



OK or NG

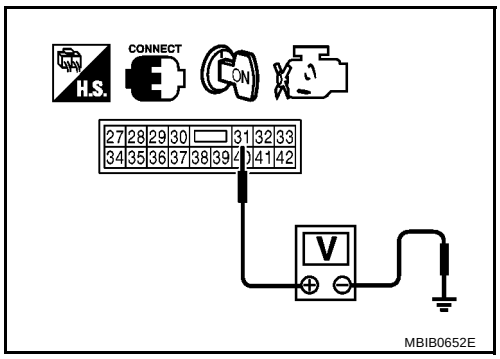
OK >> **INSPECTION END**

NG >> GO TO 2.

2. CHECK PNP SWITCH CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between IPDM E/R terminal 31 and ground under following condition.

Shift lever position	Voltage
P or N (A/T models) Neutral (M/T models)	Battery voltage (11- 14V)
Except above position	Approximately 0V

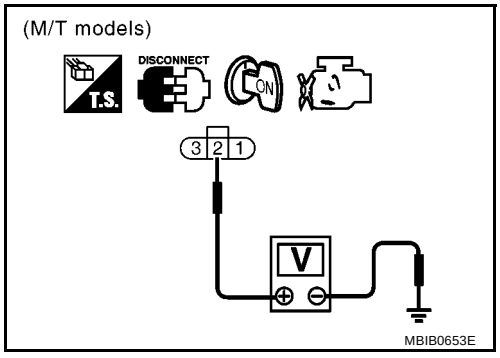


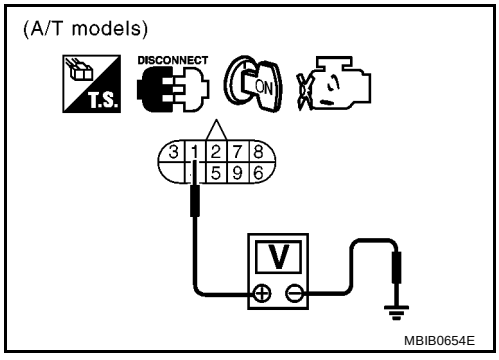
OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK PNP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Connect IPDM E/R harness connector.
3. Disconnect PNP switch harness connector.
4. Turn ignition switch ON.
5. Check voltage between PNP switch terminal 1 (A/T models) or 2 (M/T models) and ground with CONSULT-II or tester.





Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PARTS

Check the following.

- 10A fuse
- Harness connectors E50, F1
- IPDM E/R connector E14
- Harness for short or open between PNP switch and fuse

>> Repair or replace harness or connectors.

5. CHECK HARNESS CONTINUTY BETWEEN PNP SWITCH AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E14.
3. Check harness continuity between IPDM E/R terminal 31 and PNP switch terminal 2 (A/T models), 3 (M/T models).

Continuity should exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PARTS

Check the following.

- Harness connectors E50, F1
- Harness for short or open between PNP switch and IPDM E/R

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK PNP SWITCH

Refer to AT-361, "COMPONENT INSPECTION" (A/T models).

OK or NG

OK >> GO TO 9.
NG >> Replace PNP switch.

8. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E17
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminal 102 and IPDM E/R terminal 64.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO OT 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

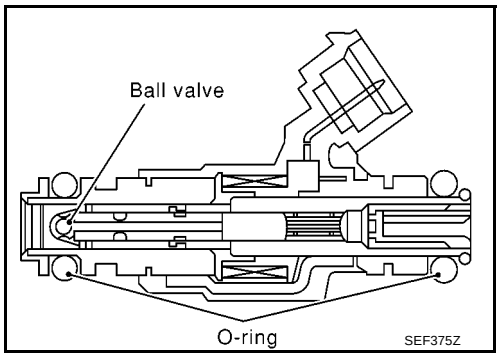
INJECTOR CIRCUIT

PFP:16600

Component Description

EBS00OR2

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OR3

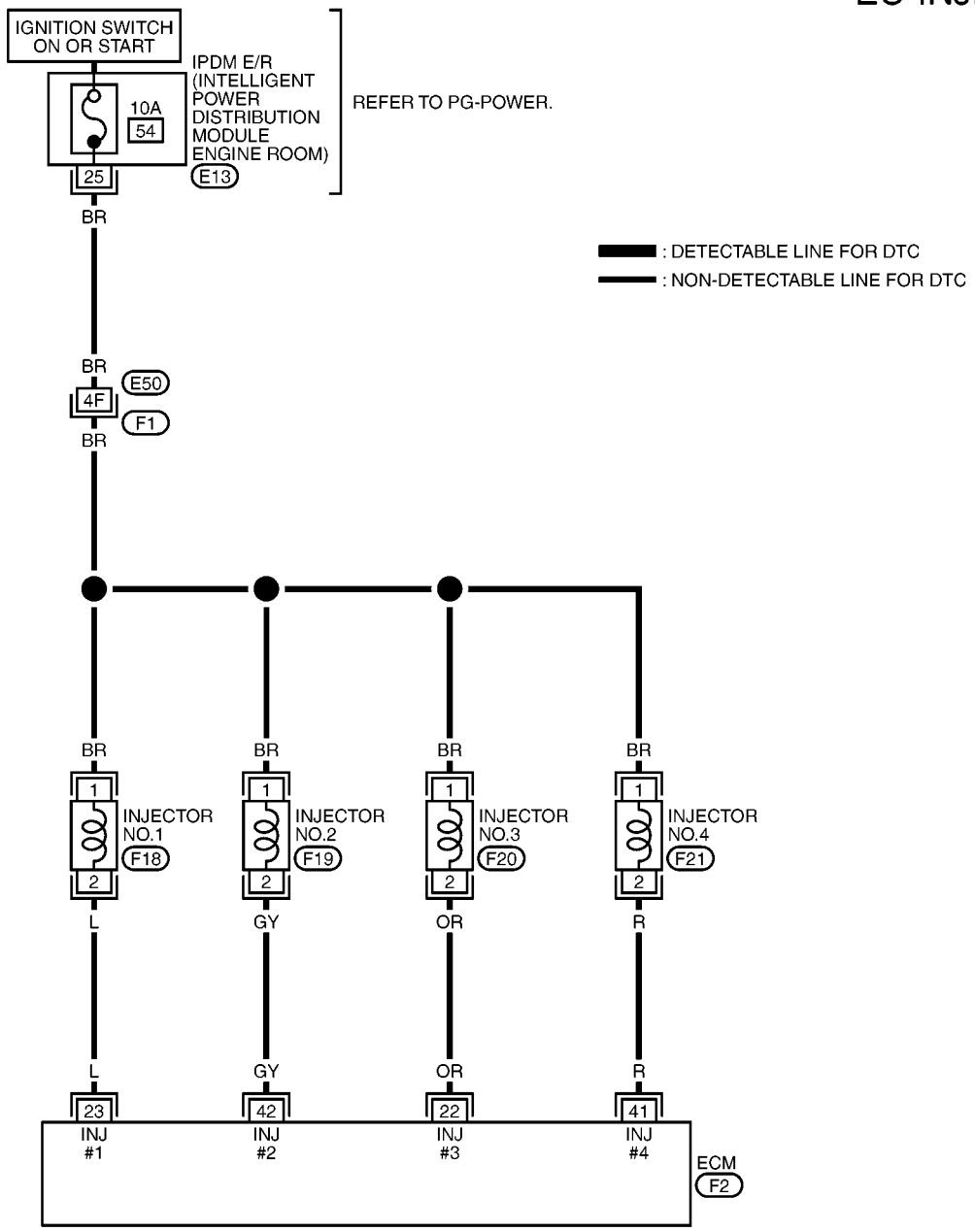
Specification data are reference values.

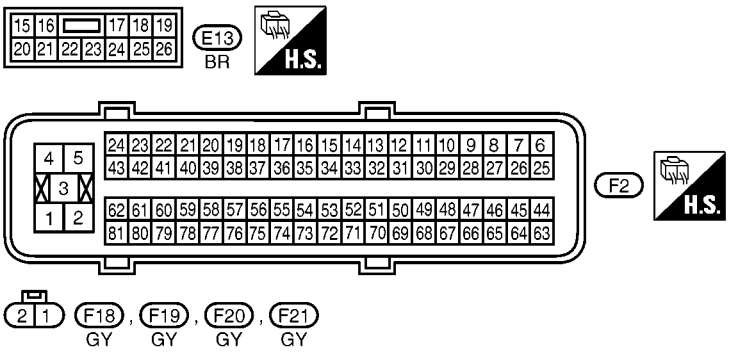
MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	2.5 - 3.5 msec
		2,000 rpm	2.5 - 3.5 msec
INJ PULSE-B1	● Engine: After warming up ● Shift lever: N (A/T models) Neutral (M/T models) ● Air conditioner switch: OFF ● No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

Wiring Diagram

EBS00OR4

EC-INJECT-01



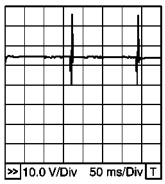
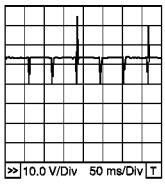


REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0298E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	OR L R GY	Injector No. 3 Injector No. 1 Injector No. 4 Injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

EBS00OR5

1. INSPECTION START

Turn ignition switch to START.
Is any cylinder ignited?

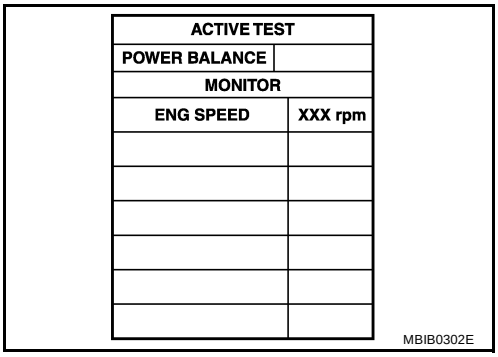
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK OVERALL FUNCTION

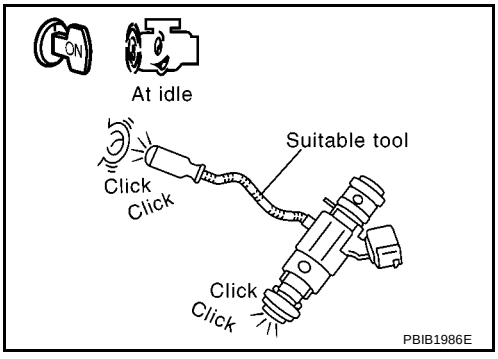
With CONSULT-II

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.
   Clicking noise should be heard.

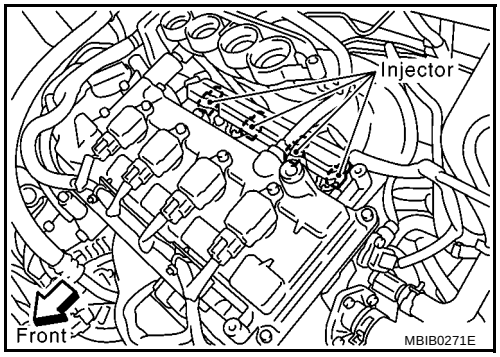


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect injector harness connector.
3. Turn ignition switch ON.

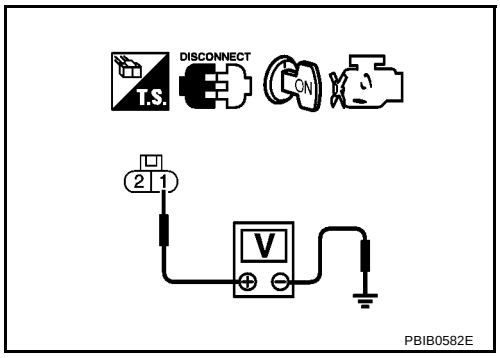


4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F1, E50
- IPDM E/R connector E13
- 10A fuse
- Harness for open or short between injector and fuse

>> Repair harness or connectors.

5. CHECK INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between injector terminal 2 and ECM terminals 22, 23, 41, 42. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK INJECTOR

Refer to EC-825, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace injector.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

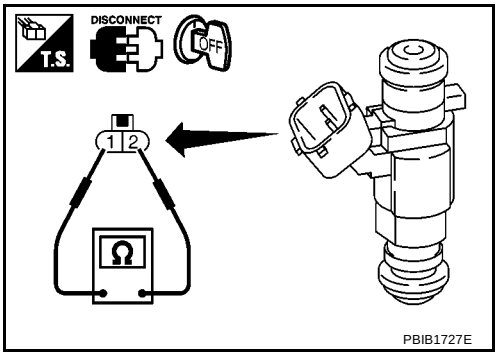
Component Inspection

EBS00OR6

INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 12.1 - 12.9Ω [at 20°C (68°F)]



Removal and Installation

EBS00OR7

INJECTOR

Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .

FUEL PUMP CIRCUIT

PFP:17042

Description

EBS00OR8

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

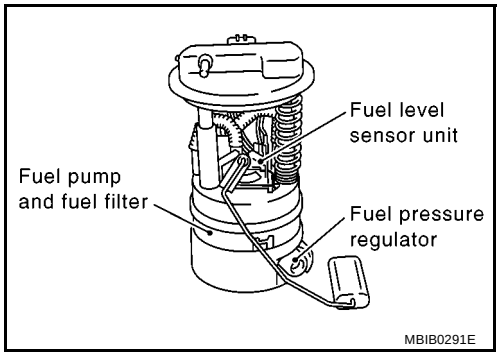
*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a engine speed signal from the crankshaft position sensor (POS) and camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running and cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the fuel tank.



CONSULT-II Reference Value in Data Monitor Mode

EBS00OR9

Specification data are reference values.

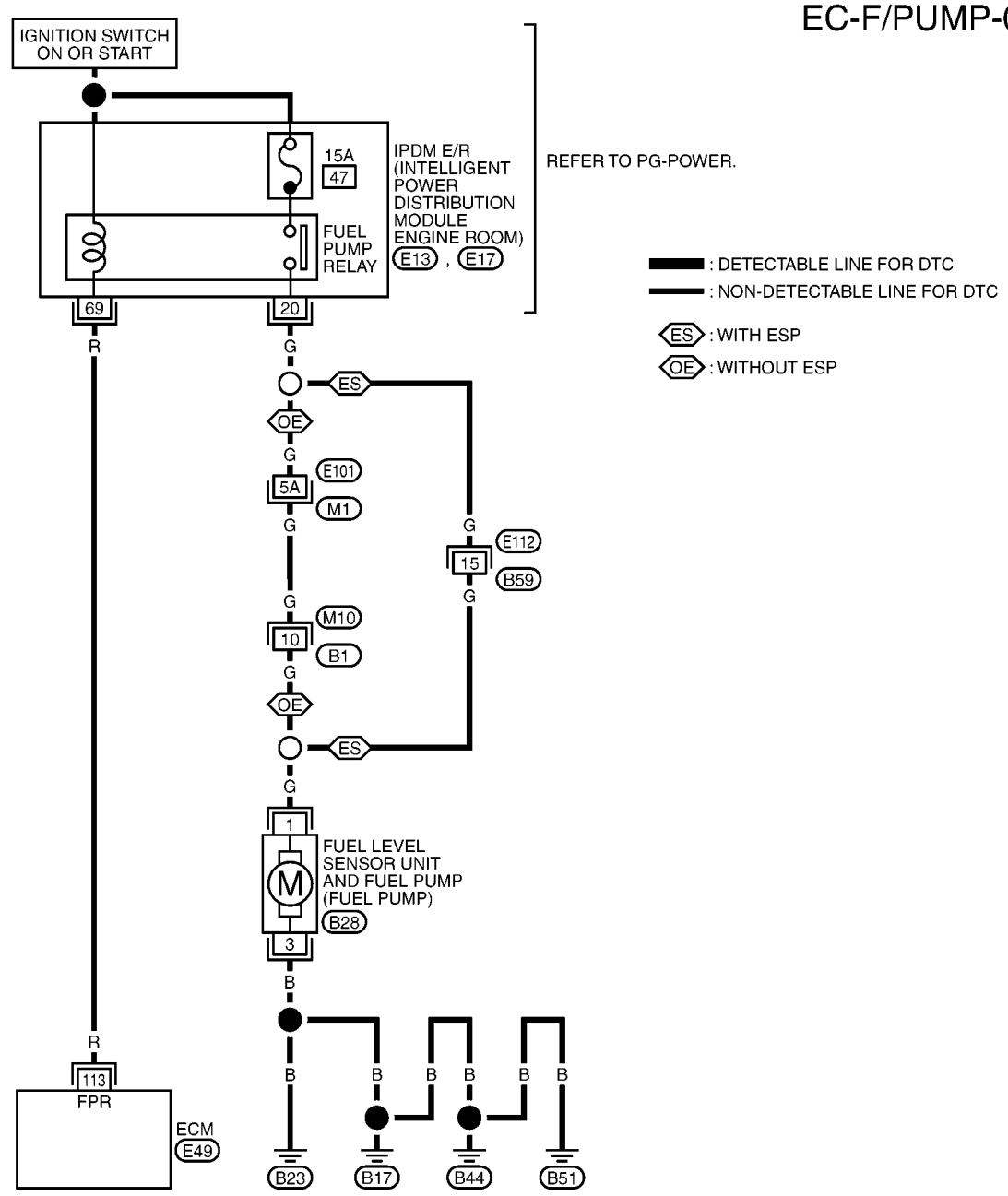
MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking	ON
	● Except above conditions	OFF

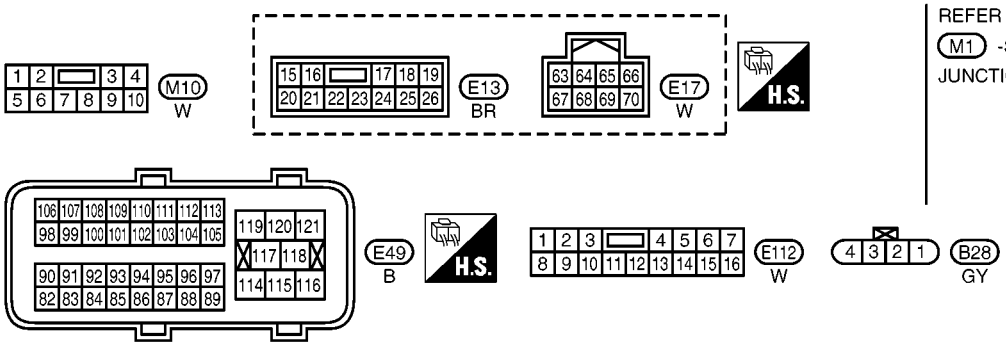
Wiring Diagram

SMA for VIN >SJN**AK12U1309269

EBS00ORA

EC-F/PUMP-01





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0575E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
113	R	Fuel pump relay	**[Ignition switch ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)

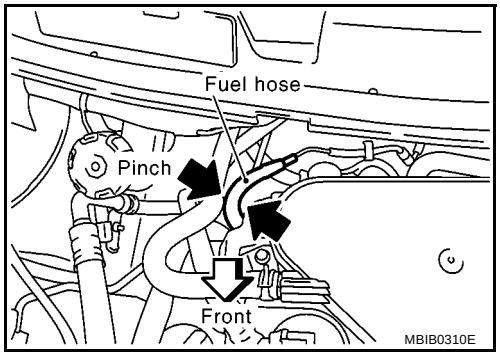
Diagnostic Procedure

SMA for VIN >SJN**AK12U1309296

EBS00ORB

1. CHECK OVERALL FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.
   Fuel pressure pulsation should be felt on the fuel hose for 1 second after ignition switch is turned ON.



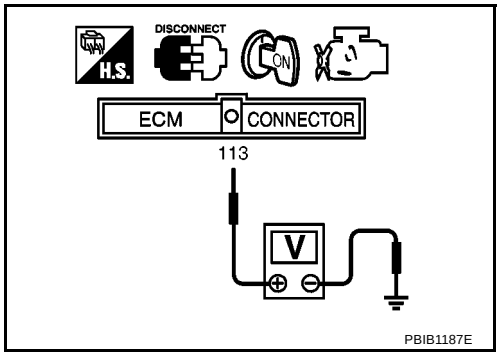
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Turn ignition switch ON.
4. Check voltage between ECM terminals 113 and ground with CONSULT-II or tester.

Voltage: Battery voltage



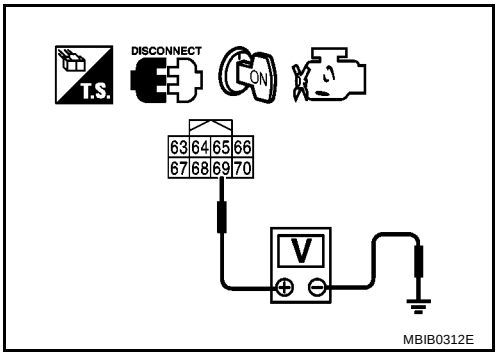
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK FUEL PUMP POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R harness connector E17.
3. Turn ignition switch ON.
4. Check voltage between IPDM E/R terminal 69 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 9.

4. DETECT MALFUNCTIONING PART

Check the following.

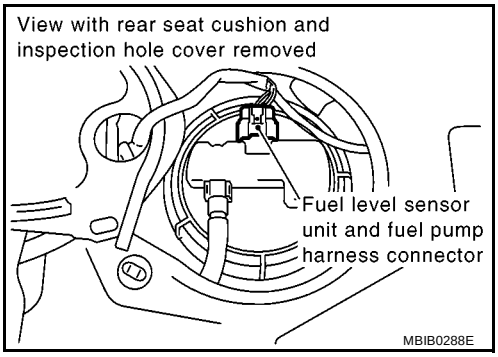
- IPDM E/R connector E17
- Harness for open or short between IPDM E/R and ECM

>> Repair harness or connectors.

5. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Check harness continuity between IPDM E/R connector E13 terminal 20 and “fuel level sensor unit and fuel pump” terminal 1, “fuel level sensor unit and fuel pump” terminal 3 and body ground.
   Refer to Wiring Diagram.

Continuity should exist.



4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E112, B59 (Models with ESP)
- Harness connectors M1, E101 (Models without ESP)
- Harness connectors B1, M10 (Models without ESP)
- Harness for open or short between “fuel level sensor unit and fuel pump” and IPDM E/R
- Harness for open or short between “fuel level sensor unit and fuel pump” and body ground

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 113 and IPDM E/R connector E17 terminal 69. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open or short between ECM and IPDM E/R.

8. CHECK FUEL PUMP

Refer to EC-830, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace fuel pump.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace IPDM E/R
NG >> Repair or replace harness or connector
>> **INSPECTION END**

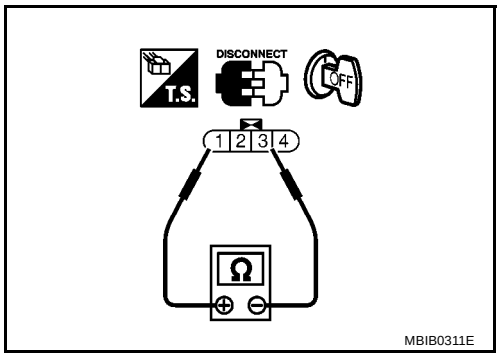
Component Inspection

EBS00ORC

FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check resistance between “fuel level sensor unit and fuel pump” terminals 1 and 3.

Resistance: Approximately 1.0Ω [at 25°C (77°F)]



MBIB0311E

Removal and Installation

EBS00ORD

FUEL PUMP

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

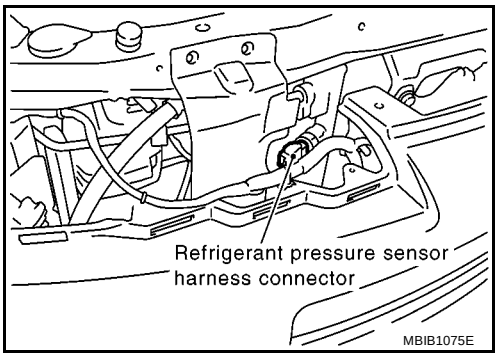
REFRIGERANT PRESSURE SENSOR

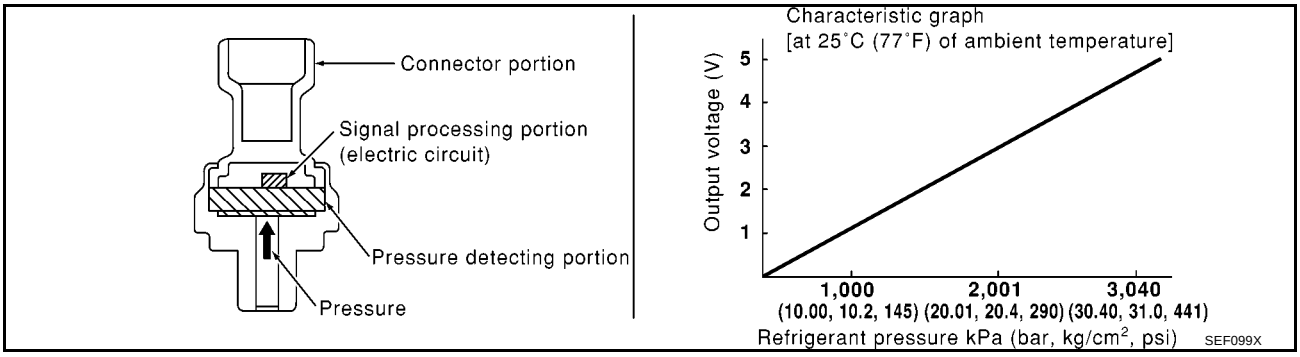
PFP:92136

Component Description

EBS00ORE

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

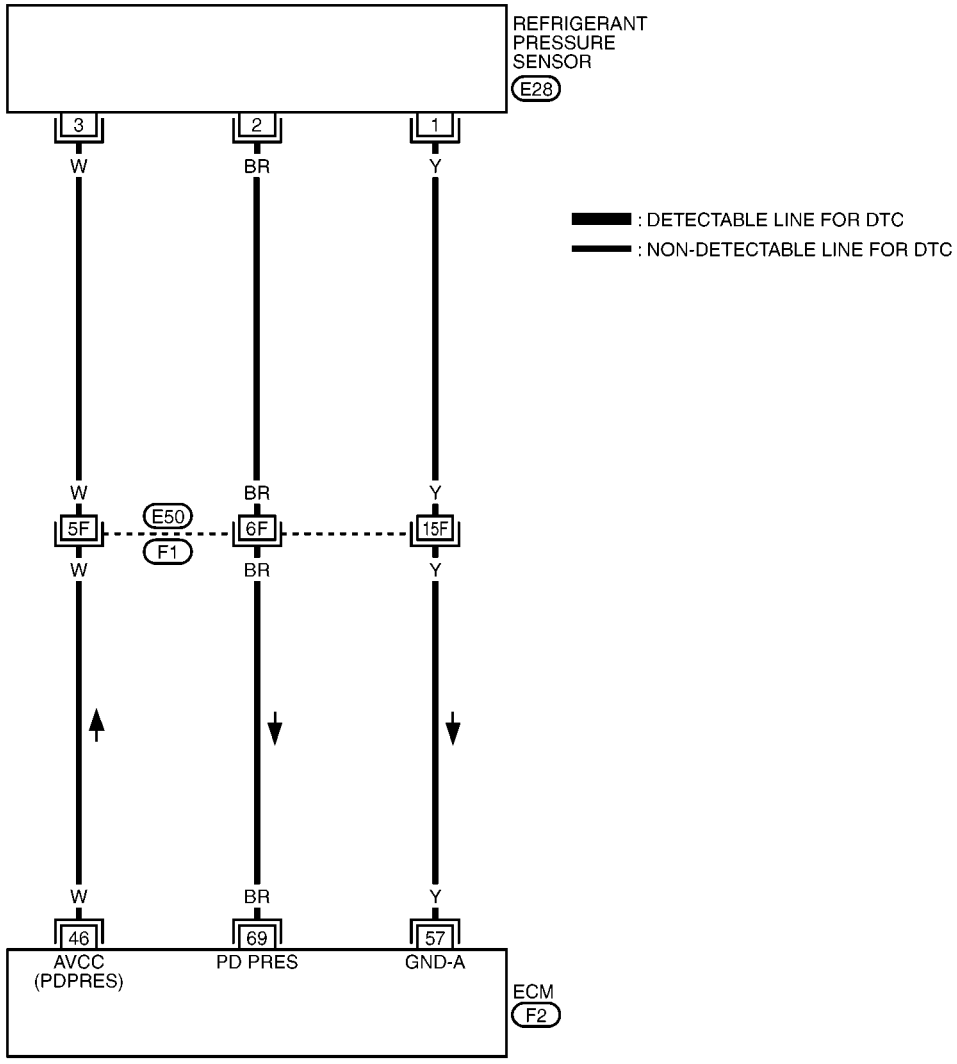


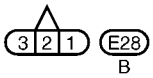


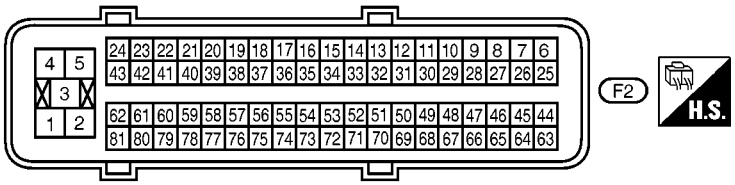
Wiring Diagram

EBS00ORF

EC-RP/SEN-01







REFER TO THE FOLLOWING.
F1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0300E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
57	Y	Sensor ground (Refrigerant pressure sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
46	W	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch ON]**	Approximately 5V
69	BR	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are ON. (Compressor operates.)	1.0 - 4.0V

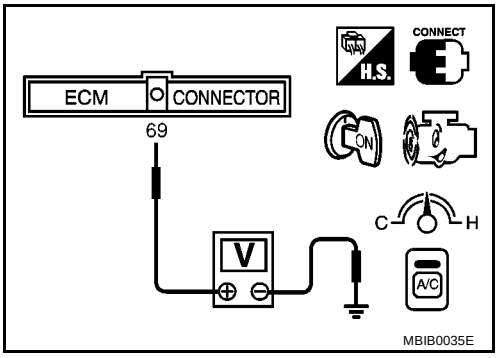
Diagnostic Procedure

EBS00ORG

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch ON.
3. Check voltage between ECM terminal 69 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

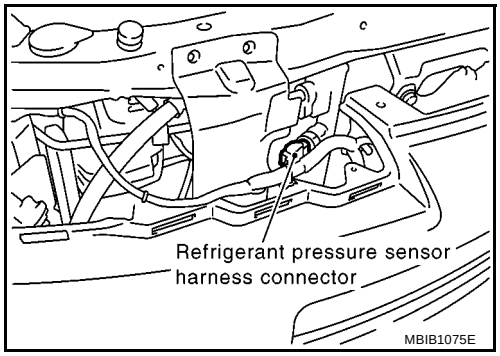


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

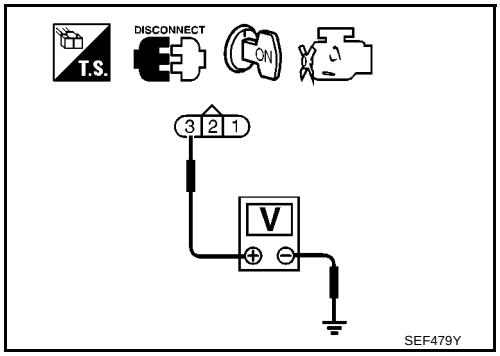
2. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn A/C switch and blower switch OFF.
2. Stop engine.
3. Disconnect refrigerant pressure sensor harness connector.
4. Turn ignition switch ON.



5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair harness or connectors.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 57 and refrigerant pressure sensor terminal 1. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 69 and refrigerant pressure sensor terminal 2. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E50, F1
- Harness for open or short between ECM and refrigerant pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-566, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace refrigerant pressure sensor.
NG >> Repair or replace.

Removal and Installation

EBS00ORH

REFRIGERANT PRESSURE SENSOR

Refer to ATC-84, "REFRIGERANT LINES" (Automatic air conditioner models) or MTC-61, "REFRIGERANT LINES" (Manual air conditioner models).

ELECTRICAL LOAD SIGNAL

PFP:25350

Description

EBS00ORI

The electrical load signal (Headlamp switch signal, rear window defogger switch signal, etc.) is transferred through the CAN communication line from IPDM E/R to ECM.

CONSULT-II Reference Value in Data Monitor Mode

EBS00ORJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is 2nd.	ON
		Rear window defogger switch is OFF and lighting switch is OFF.	OFF

Diagnostic Procedure

EBS00ORK

1. INSECTION START

Do you have CONSULT-II?

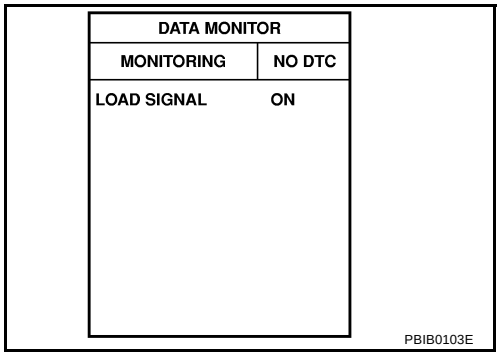
Yes or No

Yes >> GO TO 2.
No >> GO TO 6.

2. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I

1. Turn ignition switch ON.
2. Connect CONSULT-II and select “DATA MONITOR” mode.
3. Select “LOAD SIGNAL” and check indication under the following conditions.

Condition	Indication
Rear window defogger switch ON	ON
Rear window defogger switch OFF	OFF



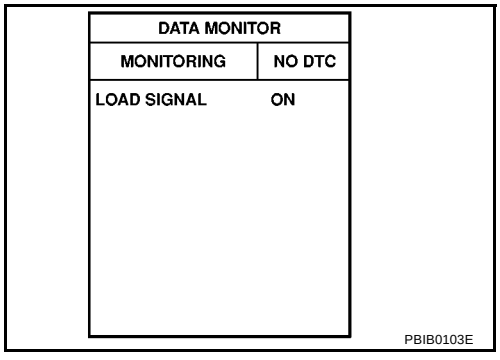
OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3. CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II

Check “LOAD SIGNAL” indication under the following conditions.

Condition	Indication
Lighting switch ON at 2nd position	ON
Lighting switch OFF	OFF



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

4. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to GW-14, "REAR WINDOW DEFOGGER" .

>> **INSPECTION END**

5. CHECK HEADLAMP SYSTEM

Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" or LT-42, "HEADLAMP - DAYTIME LIGHT SYSTEM - " .

>> **INSPECTION END**

6. CHECK REAR WINDOW DEFOGGER SYSTEM

Refer to GW-14, "REAR WINDOW DEFOGGER" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace

7. CHECK HEADLAMP SYSTEM

Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" or LT-42, "HEADLAMP - DAYTIME LIGHT SYSTEM - " .

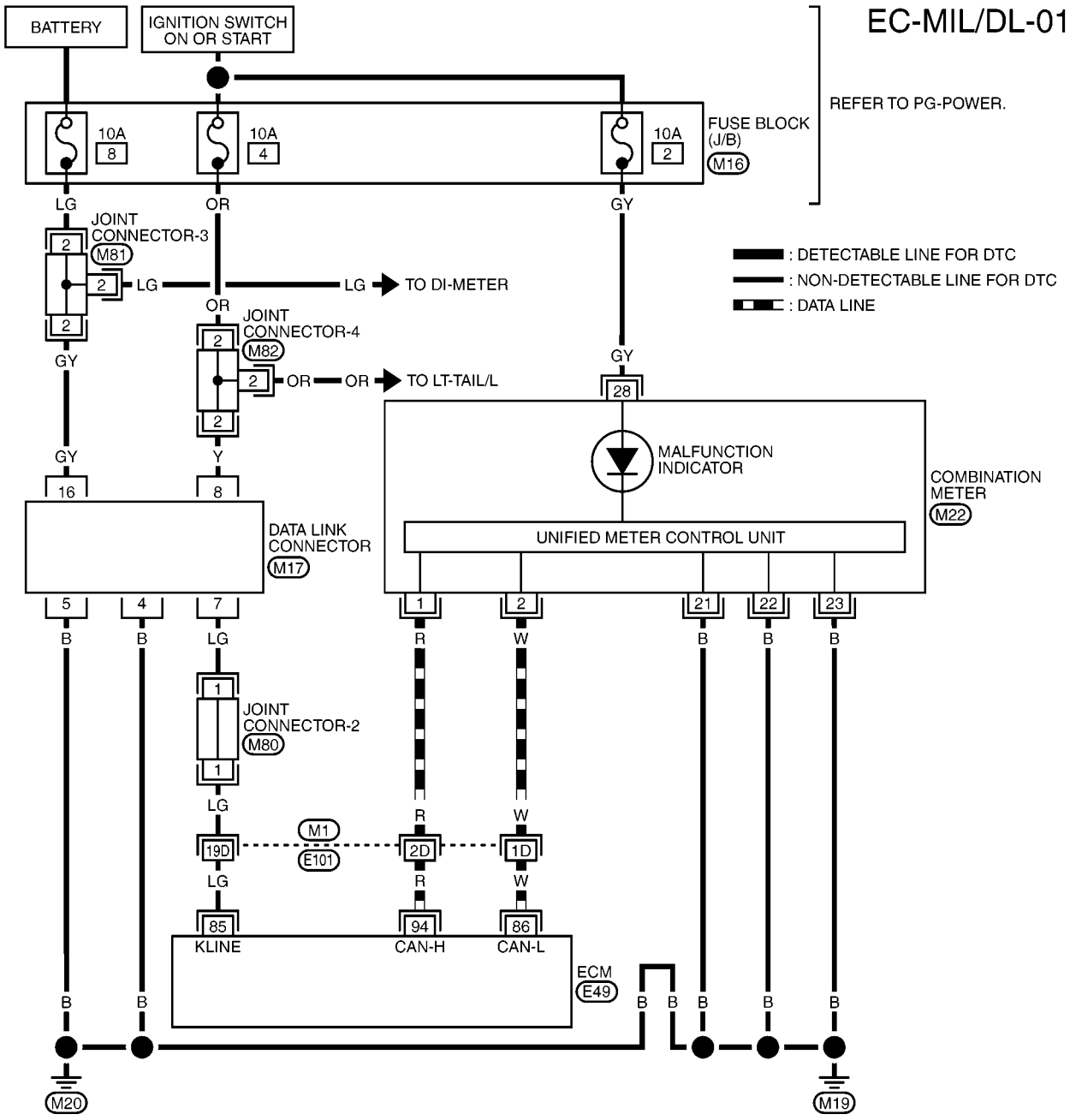
>> **INSPECTION END**

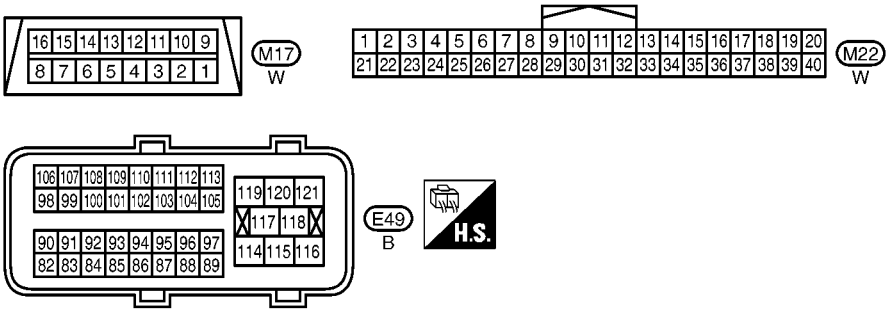
MI & DATA LINK CONNECTORS

PFP:24814

Wiring Diagram (LHD Models)

EBS00ORL



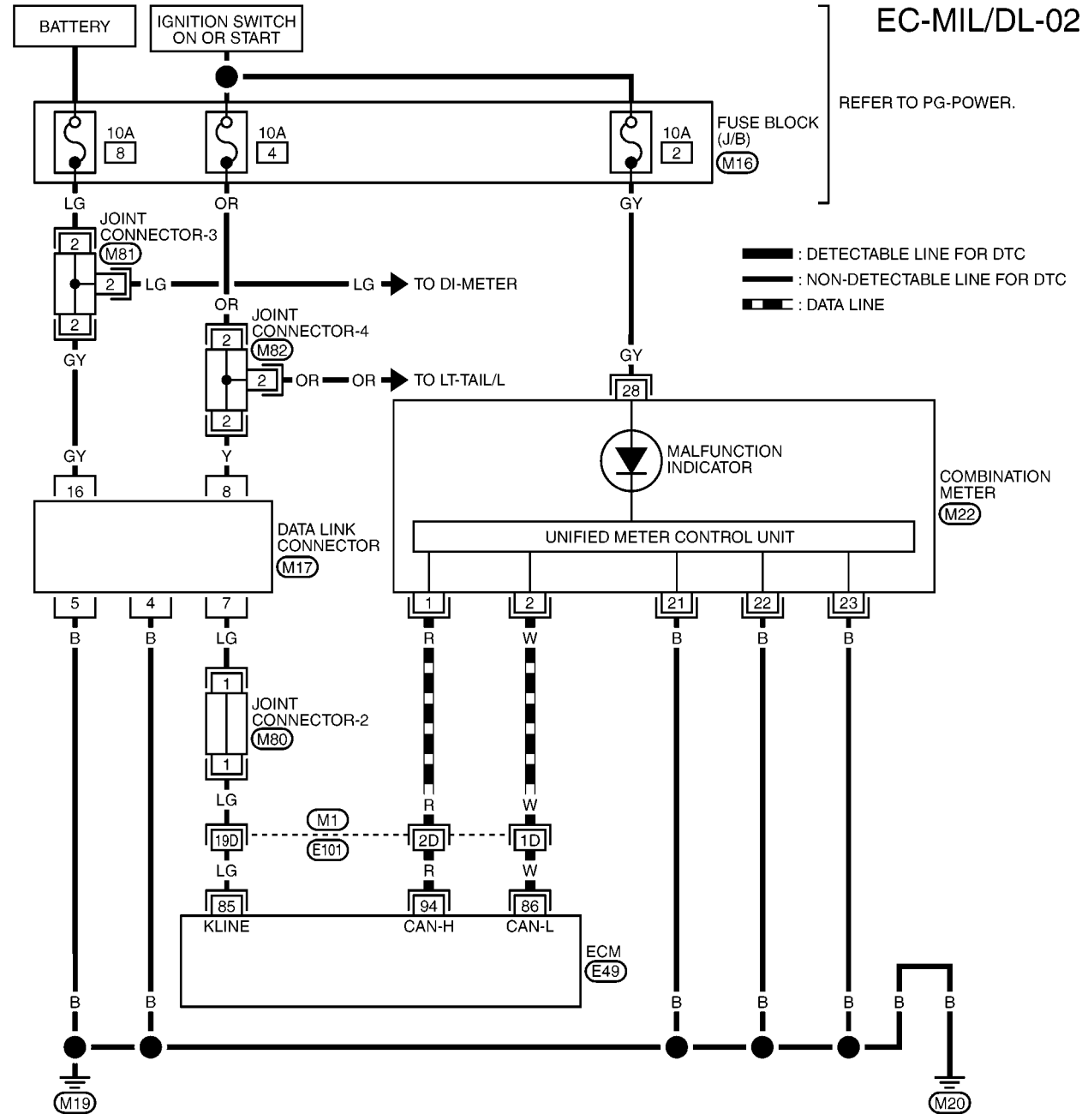


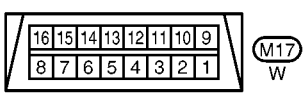
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M80 , M81 , M82 -JOINT CONNECTOR (J/C)

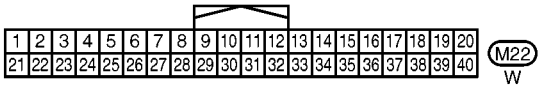
MBWA0576E

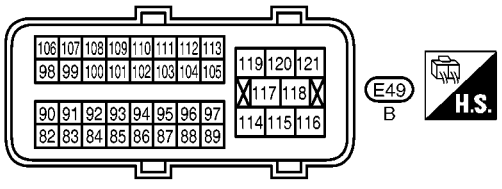
Wiring Diagram (RHD Models)

EBS00ORM









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M80, M81, M82 -JOINT CONNECTOR (J/C)

MBWA0577E

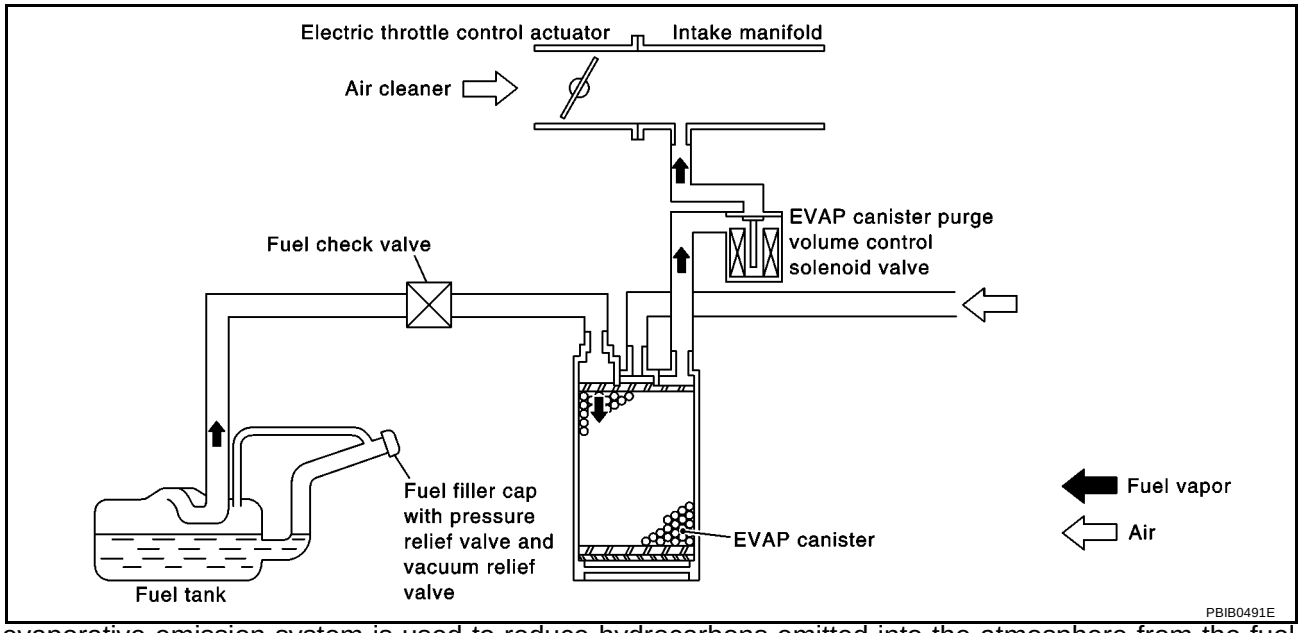
EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description

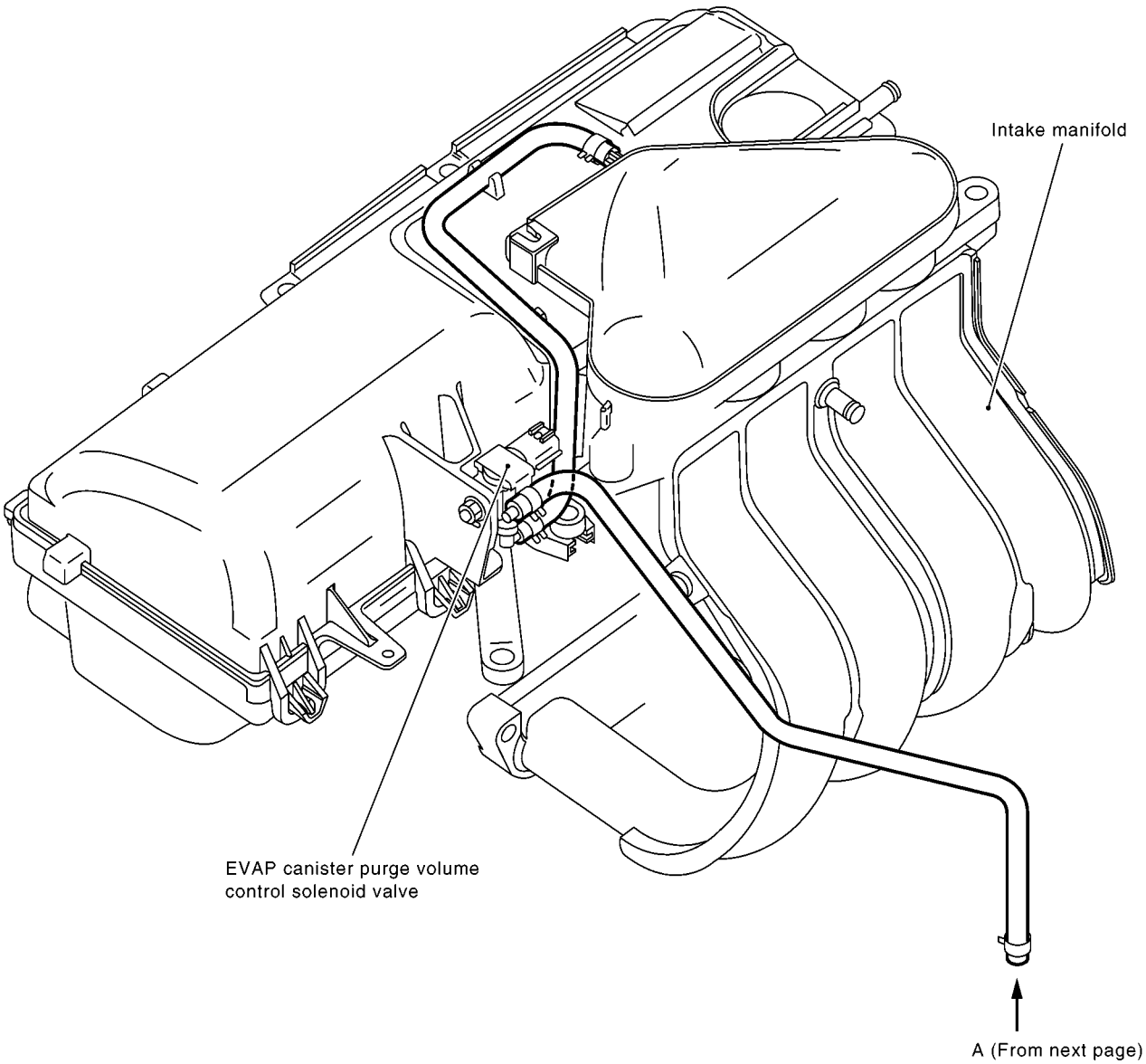
EBS00ORN

SYSTEM DESCRIPTION



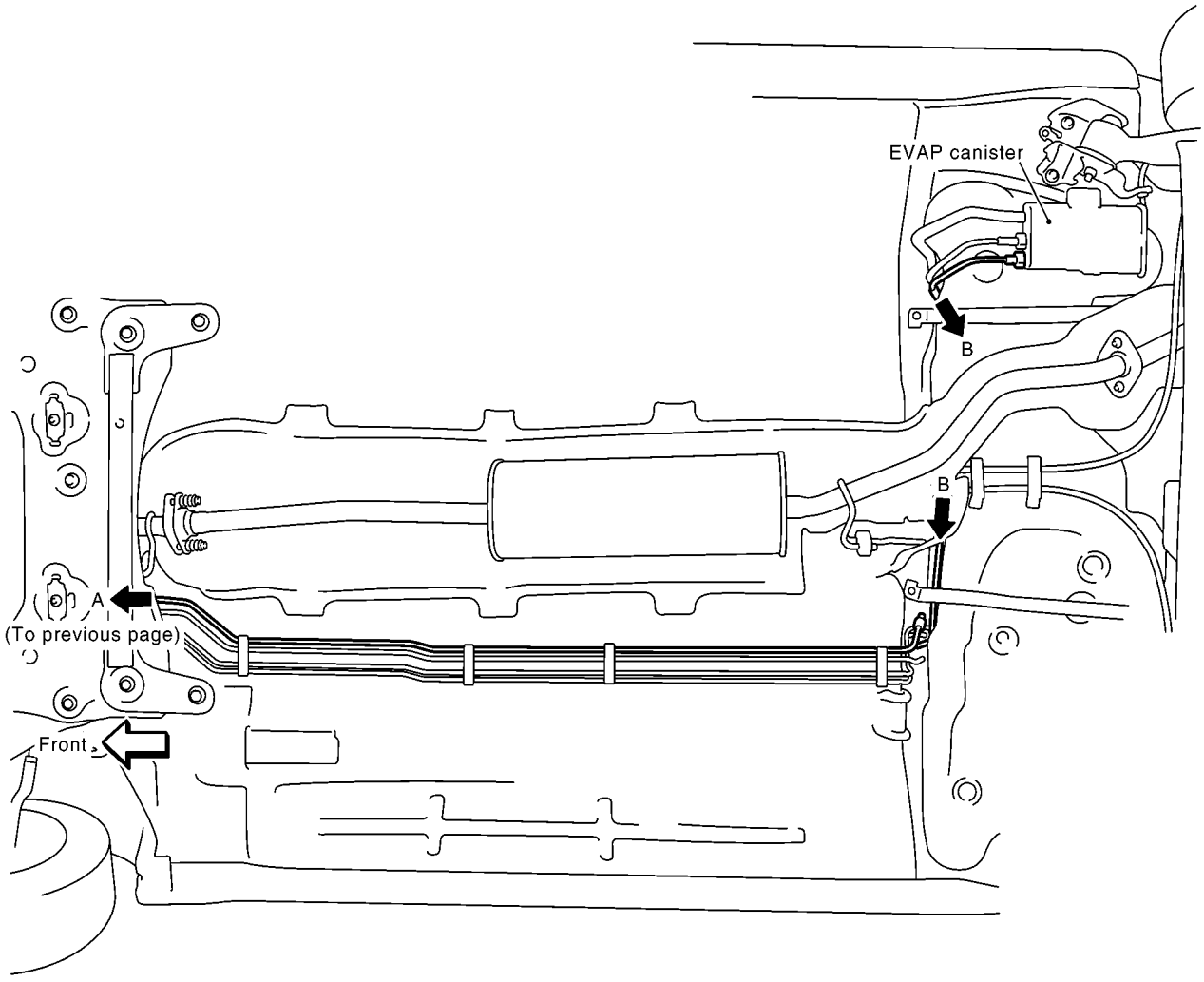
The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.
EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION LINE DRAWING



NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

MBIB0544E



MBIB0541E

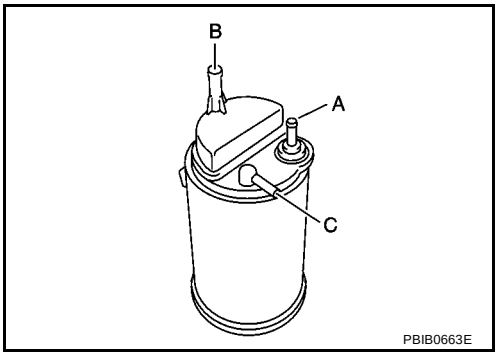
Component Inspection

EBS00ORO

EVAP CANISTER

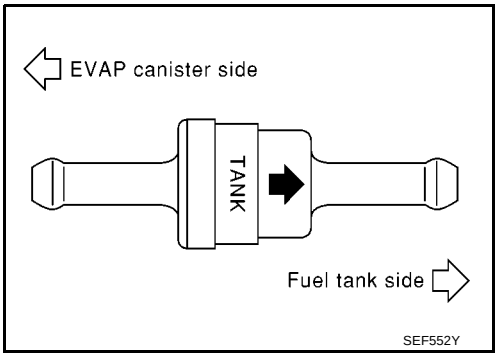
Check EVAP canister as follows:

1. Block port **B** . Orally blow air through port **A** . Check that air flows freely through port **C** .
2. Block port **A** . Orally blow air through port **B** . Check that air flows freely through port **C** .



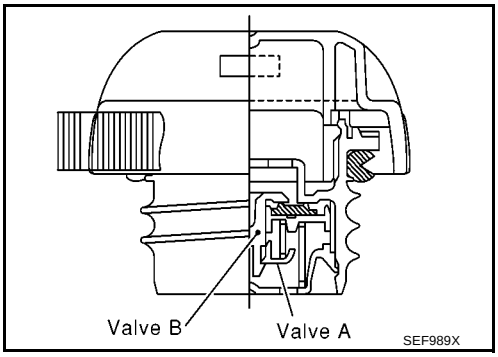
FUEL CHECK VALVE

1. Blow air through connector on fuel tank side.
   A considerable resistance should be felt and a portion of air flow should be directed toward the EVAP canister side.
2. Blow air through connector on EVAP canister side.
   Air flow should be smoothly directed toward fuel tank side.
3. If fuel check valve is suspected of not properly functioning in steps 1 and 2 above, replace it.



FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FILLER CAP)

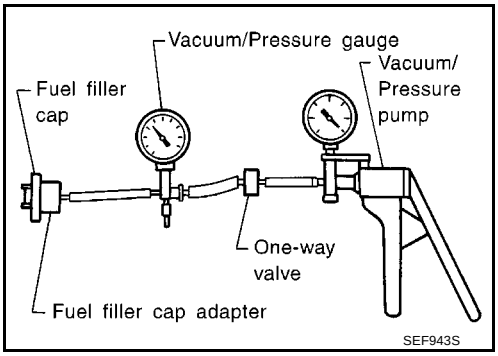
1. Wipe clean valve housing.



2. Check valve opening pressure and vacuum.

Pressure:	**15.3 - 20.0 kPa (0.153 - 0.200 bar, 0.156 - 0.204 kg/cm^2 , 2.22 - 2.90 psi)**
Vacuum:	**–6.0 to –3.4 kPa (–0.060 to –0.034 bar, –0.061 to –0.035 kg/cm^2 , –0.87 to –0.49 psi)**

3. If out of specification, replace fuel filler cap as an assembly.



EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-806, "Component Inspection" .

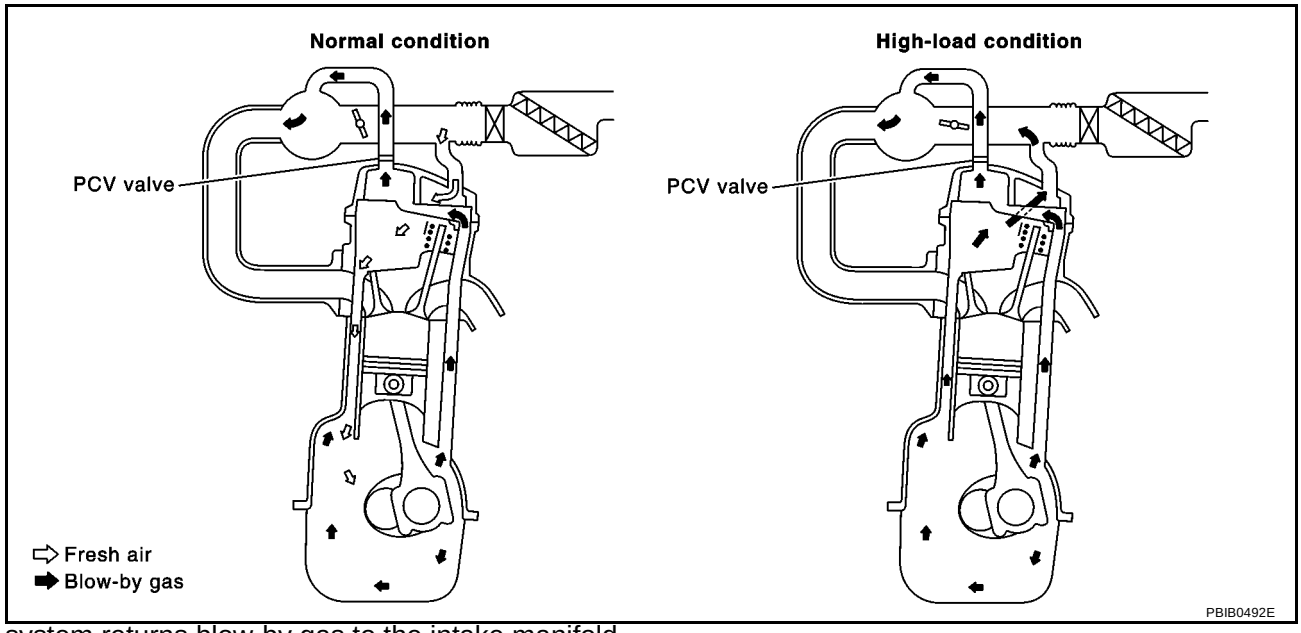
POSITIVE CRANKCASE VENTILATION

PFP:11810

Description

EBS00ORP

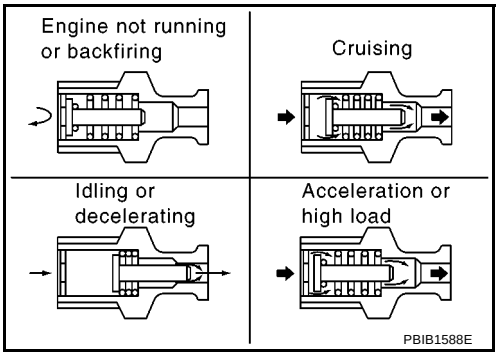
SYSTEM DESCRIPTION



This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

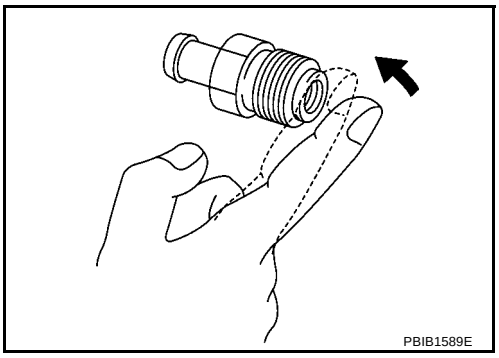


Component Inspection

EBS00ORQ

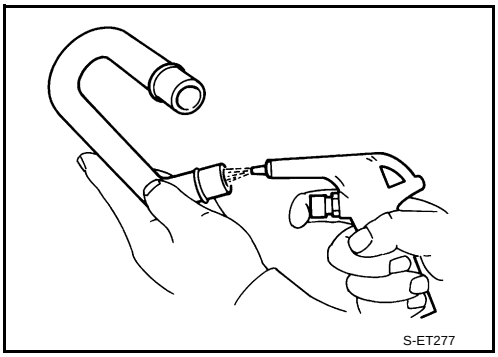
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PCV VALVE VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

EBS00ORR

Fuel pressure at idle	Approximately 350 kPa (3.5bar, 3.57kg/cm^2 , 51psi)

Idle Speed and Ignition Timing

EBS00ORS

Target idle speed	No load*1 (in P or N position)	M/T: 650±50 rpm A/T: 700±50 rpm
Ignition timing	In P or N position	5°±2° BTDC

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Calculated Load Value

EBS00ORT

Condition	Calculated load value% (Using CONSULT-II)
At idle	10 - 35
At 2,500 rpm	10 - 35

Manifold absolute pressure sensor

EBS00ORU

Supply voltage	Approximately 5.0V
Output voltage at idle	1.4 - 1.5V*

*: Engine is warmed up to normal operating temperature and running under no-load.

Intake Air Temperature Sensor

EBS00ORV

Temperature °C (°F)	Resistance kΩ
25 (77)	1.9 - 2.1
80 (176)	0.31 - 0.37

Engine Coolant Temperature Sensor

EBS00ORW

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Heated Oxygen Sensor 1 Heater

EBS00ORX

Resistance [at 25°C (77°F)]	3.3 - 4.0Ω

Heated Oxygen sensor 2 Heater

EBS00ORY

Resistance [at 25°C (77°F)]	3.3 - 4.0Ω

Crankshaft Position Sensor (POS)

EBS00ORZ

Refer to EC-648, "Component Inspection" .

Camshaft Position Sensor (PHASE)

EBS00OS0

Refer to EC-655, "Component Inspection" .

Throttle Control Motor

EBS00OS1

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω

Injector

EBS00OS2

Resistance [at 20°C (68°F)]	12.1 - 12.9Ω

Fuel Pump

EBS00OS3

Resistance [at 25°C (77°F)]	Approximately 1.0Ω

ENGINE CONTROL SYSTEM

SECTION **EC**

CONTENTS

K9K

DIESEL EQUIPMENT 1
Cleanliness 1
Special features 4
Location of components 11

DIESEL EQUIPMENT 15
Specifications 15
Diesel filter 18
High pressure pump 20
Flow actuator 24
Fuel temperature sensor 27
Venturi 29
Injector rail 31
Pressure sensor 36
Injectors 37
High pressure pipes 41
ECM 45

DIESEL INJECTION 47
Immobilizer function 47
Idle speed adjustment 48
Air conditioning control 50
Pre/postheating (glow plug) control 52

DIESEL EQUIPMENT 53
Glow plugs 53
Engine coolant temperature 54

ANTI-POLLUTION 55
Oil vapour rebreathing 55
Exhaust gas recirculation (EGR) 56

DIESEL INJECTION 57
Trouble diagnosis - Introduction 57
Trouble diagnosis - ECM terminal 68
Trouble diagnosis - Summary table of DTC 70
Trouble diagnosis - Introduction 72
DTC P0089 Common rail fuel pressure regulation function 73
DTC P0087 Fuel flow capacity function 75
DTC P0110 IAT sensor 76
DTC P0115 ECT sensor 77
DTC P0180 Fuel temperature sensor circuit 78
DTC P0190 FRP sensor 79
DTC P0200 Injector control circuit 80
DTC P0201 Injector circuit cylinder 1 82
DTC P0202 Injector circuit cylinder 2 84
DTC P0203 Injector circuit cylinder 3 86
DTC P0204 Injector circuit cylinder 4 88
DTC P0225 APP senser 1 90
DTC P0231 Low pressure control circuit 92
DTC P0235 TC boost pressure sensor 93
DTC P0301 Cylinder 1 misfire 94
DTC P0302 Cylinder 2 misfire 95
DTC P0303 Cylinder 3 misfire 96
DTC P0304 Cylinder 4 misfire 97
DTC P0325 Knock sensor circuit 98
DTC P0335 CKP sensor (POS) 99
DTC P0340 CMP sensor 100
DTC P0380 Glow plug diagnostic connection .. 101

DTC P0382 Glow plug relay control circuit 102
DTC P0400 EGR volume control solenoid valve circuit 103
DTC P0403 EGR control circuit 104
DTC P0409 EGR position sensor 105
DTC P0500 VSS 106
DTC P0513 Immobiliser 107
DTC P0530 Refrigerant pressure sensor 108
DTC P0560 ECM supply voltage 109
DTC P0571 Brake switch circuit 110
DTC P0604 ECM memory 111
DTC P0606 ECM 112
DTC P0608 Sensor supply voltage 114
DTC P0609 Supply voltage APP sensor 2 115
DTC P0685 ECM relay control 117
DTC P2120 APP sensor 2 118
DTC P2226 Atmospheric pressure sensor circuit 120
DTC C001 CAN communication line 121

DIESEL INJECTION 122

Trouble diagnosis - States and parameter summary table 122

DIESEL INJECTION 123

Trouble diagnosis - States and data monitor summary table 123
Trouble diagnosis - Conformity check 124
Trouble diagnosis - Interpretation of parameters 156
Trouble diagnosis - Interpretation of states 157
Trouble diagnosis - Tests 158
Trouble diagnosis - Customer complaints 171
Trouble diagnosis - Symptoms 173
Circuit diagram 218
Wiring diagram - Intake air temperature sensor 220
Wiring diagram - Engine coolant temperature sensor 221
Wiring diagram - Fuel temperature sensor 222
Wiring diagram - Common rail fuel pressure sensor 223
Wiring diagram - Injector 224
Wiring diagram - Accelerator pedal position sensor 226
Wiring diagram - Fuel flow actuator 228
Wiring diagram - TC boost pressure sensor 229
Wiring diagram - Knock sensor (accelometer) 231
Wiring diagram - Crankshaft position sensor 232
Wiring diagram - Camshaft position sensor 233
Wiring diagram - Glow control system 234
Wiring diagram - EGR control system 235
Wiring diagram - Refrigerant pressure sensor 236
Wiring diagram - Main power supply and ground circuit 237
Wiring diagram - Brake switch 238
Wiring diagram - Temperature sensor 239
Wiring diagram - Cooling system 241
Wiring diagram - CAN communication line 244
Wiring diagram - MI & data link connectors 245

DIESEL EQUIPMENT
Cleanliness

CLEANLINESS INSTRUCTIONS WHICH MUST BE FOLLOWED WHEN WORKING ON THE HIGH PRESSURE DIRECT INJECTION SYSTEM

Risks relating to contamination

The system is very sensitive to contamination. The risks caused by the introduction of contamination are:
– damage or destruction of the high pressure injection system and the engine,
– seizing or leaking of a component.

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) get into the system during dismantling or into the circuits via the fuel unions.

The cleanliness principle must be applied from the filter to the injectors.

WHAT ARE THE SOURCES OF CONTAMINATION?

Contamination is caused by:
– metal or plastic chips,
– paint,
– fibres:
  - boxes,
  - brushes,
  - paper,
  - clothing,
  - cloths,
– foreign bodies such as hair,
– ambient air,
– etc.

IMPORTANT: It is not possible to clean the engine using a high pressure washer because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection problems.

INSTRUCTIONS TO BE FOLLOWED BEFORE ANY WORK IS CARRIED OUT ON THE INJECTION SYSTEM

- Ensure that you have the plugs for the unions to be opened (bag of plugs sold at the Parts Stores - Nissan part No.: 16830 BN700, Renault part No.: 77 01 206 804). Plugs are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be thrown away.

- Ensure that you have hermetically resealable plastic bags for storing removed parts. Stored parts will therefore be less subject to the risk of impurities. The bags must be used only once, and after use they must be thrown away.

- Lint-free towelettes to be used for injection pump related service purpose. The use of a normal cloth or paper for cleaning purposes is forbidden. These are not lint-free and may contaminate the fuel circuit of the system. Each lint-free cloth should only be used once.

INSTRUCTIONS TO BE FOLLOWED BEFORE OPENING THE FUEL CIRCUIT

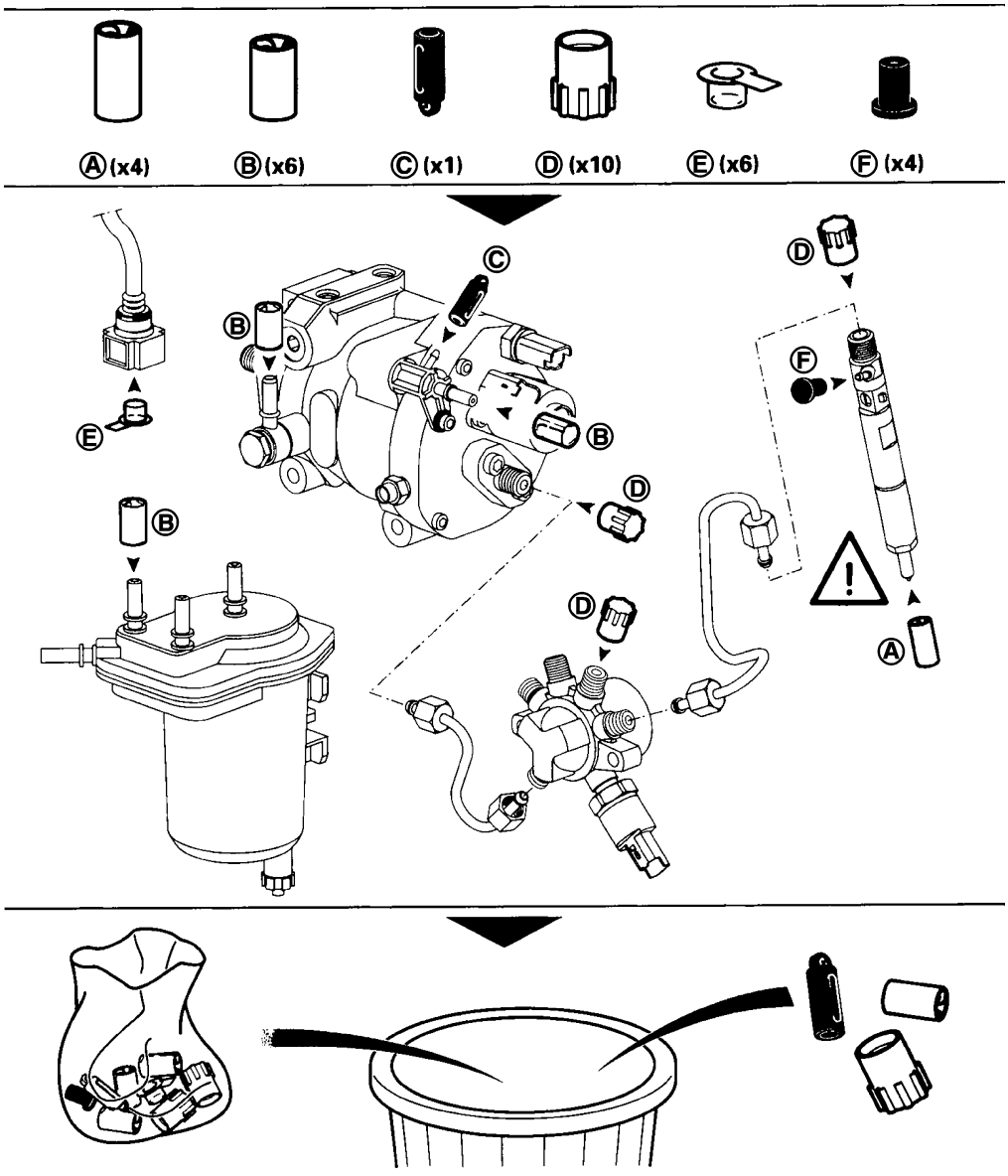
- For each operation, use new thinner (used thinner contains impurities). Pour it into a clean receptacle.
- For each operation, use a clean brush which is in good condition (the brush must not shed its bristles).
- Use a brush and thinners to clean the connections to be opened.
- Blow compressed air over the cleaned parts (tools, cleaned the same way as the parts, connections and injection system zone). Check that no bristles remain adhered.
- Wash your hands before and during the operation if necessary.
- When wearing leather protective gloves, cover these with latex gloves.

INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION

- As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Stores - Nissan part No.: 16830 BN700, Renault part No.: 77 01 206 804. They must not, under any circumstances, be reused.
- Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries contamination.
- All components of the injection system that are removed must be stored in a hermetically sealed plastic bag once the plugs have been inserted.
- The use of a brush, thinner, bellows, sponge or normal cloth is strictly forbidden once the circuit has been opened. These items are likely to allow impurities to enter the system.
- A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

Instructions For Fitting The Plugs

Nissan part number: 16830 BN700
(Renault part number: 77 01 206 804)



MBIB0321E

CAUTION:

- **The engine must not run with:**
  - **Diesel containing more than 10% diester**
  - **Petrol, even in very small amounts.**
- **The system can inject the diesel into the engine at a pressure of up to 140,000 kPa (1,400 bar, 1,428 kg/cm^2, 20,300 psi). Before carrying out any work, check that the injector rail is no longer pressurized and that the fuel temperature is not too high.**
- **You must respect the cleaning and safety advice specified in this document for any work on the high pressure injection system.**

The high pressure injection system is intended to deliver a specific quantity of diesel to the engine at a specific time.

DESCRIPTION

- **DELPHI and type "DDCR"** injection controlling **112 terminals** ECM.

- The system consists of:
– a priming pump on the low pressure circuit,
– a diesel fuel filter,
– a high pressure pump incorporating a low pressure pump (transfer pump),
– a flow actuator attached to the pump,
– an injector rail,
– a pressure sensor located in the rail,
– four solenoid injectors,
– a fuel temperature sensor,
– an engine coolant temperature sensor,
– an intake (upstream) air temperature sensor,
– a camshaft position sensor (cylinder reference sensor),
– a turbocharger air pressure sensor,
– a knock sensor (accelerometer),
– an EGR solenoid valve,
– an accelerator pedal potentiometer,
– and an ECM.

- The "common rail" direct high pressure injection system works sequentially (based on the operation of multipoint injection for petrol engines).

- This new injection system reduces operating noise, reduces the volume of pollutant gases and particles and produces high engine torque at low engine speeds thanks to a pre-injection procedure.

- The high pressure pump generates the high pressure sent to the injector rail. The flow actuator on the pump controls the quantity of diesel engine fuel supplied according to the demand determined by the ECM. The rail supplies each injector through a steel pipe.

- The ECM:
  - determines the value of injection pressure necessary for the engine to operate well and then controls the pressure regulator. It checks that the pressure value is correct by analysing the value transmitted by the pressure sensor located on the rail,
  - determines the injection time necessary to deliver the right quantity of diesel and the moment when injection should be started,
  - controls each injector electrically and individually after determining these two values.

- The injected flow to the engine is determined by:
  - the duration of injector control,
  - the injector opening and closing speed,
  - the needle travel (determined by a constant for the type of injector),
  - the nominal hydraulic flow of the injector (unique to each injector),
  - the high pressure rail pressure controlled by the ECM.

- The ECM controls:
  - the idle speed adjustment,
  - the exhaust gas flow reinjected into the inlet,
  - the fuel supply control (advance, flow and rail pressure),
  - the cooling fan control,
  - the heat adjustment of the coolant circuit (thermoplungers),
  - the glow plug (pre/post heating) control.

- The high pressure pump is supplied at low pressure by an integrated low pressure pump (transfer pump). It supplies the rail whose pressure is controlled for charge by the flow actuator and for discharging by the injector valves. Falls in pressure can be compensated for in this way. The flow actuator allows the high pressure pump to provide just the amount of diesel fuel necessary to maintain the pressure in the rail. Thanks to this element, heat generation is minimised and engine output improved.
  In order to discharge the rail using the injector valves, the valves are controlled by short electrical impulses:
  - short enough not to open the injector, (through the return circuit from the injectors),
  - long enough to open the valves and discharge the rail.

- The ECM controls the cooling fans and the coolant temperature warning light on the instrument panel.

IMPORTANT

- **The engine must not operate with:**
  – **diesel engine fuel containing more than 10% diester,**
  – **petrol, even in tiny quantities.**

- **The system can inject the diesel into the engine at a pressure up to 1400 bars. Before carrying out any work, check that the injector rail is not under pressure and that the fuel temperature is not too high.**

- **You must respect the cleaning and safety advice specified in this document for any work on the high pressure injection system.**

- **Removal of the interior of the pump and injectors is prohibited. Only the flow actuator, the fuel temperature sensor and the venturi can be replaced.**

- **For safety reasons, it is strictly forbidden to slacken a high pressure pipe union when the engine is running.**

- **It is not possible to remove the pressure sensor from the fuel rail because this may cause circuit contamination problems. If the pressure sensor fails, the pressure sensor, the rail and the five high pressure pipes must be replaced.**

- **It is strictly forbidden to remove any injection pump pulley marked number 070 575. If the pump is being replaced, the pulley must be replaced.**

- **It is forbidden to repair the wiring connecting the knock sensor (accelerometer) and the CKP sensor (engine speed sensor). If the wiring should fail, it has to be replaced with new wiring.**

- **Applying 12 volts directly to any component in the system is prohibited.**

- **Ultrasonic carbon removal and cleaning are prohibited.**

- **Never start the engine without the battery being connected correctly.**

- **Disconnect the injection system ECM when carrying out any welding work on the vehicle.**

- **It is essential to replace all the disconnected air inlet plastic pipes.**

There is a 16 digit code on the injectors called individual injector correction. This code is specific to each injector, and takes into account differences in manufacture and specifies the flow injected by each of them.

When an injector is replaced, it is necessary to program the code of the new injector into the ECM.

When an ECM is replaced, it is necessary to program the codes of the four injectors.

<u>There are two possibilities:</u>

- **If it is possible to communicate with the ECM:**
  - **read out the data from the ECM using the "SAVE DATA FOR REPLACE" in "WORK SUPPORT" mode with CONSULT-II**
  - **turn ignition switch OFF.**
  - **remove battery negative cable.**
  - **change the ECM**
  - **reprogram the data from the "WRITE DATA AFTER REPLACE" in "WORK SUPPORT" mode with CONSULT-II to the replaced ECM**
  - **after replacement, ensure that the ECM has not detected malfunctions relating to the injector codes and check that the instrument panel warning light is off.**

- **If it is not possible to communicate with the ECM:**
  - **turn ignition switch OFF.**
  - **remove battery negative cable.**
  - **change the ECM**
  - **read the data on the injectors**
    Refer to EC-K9K-39 for individual injector correction value location.
  - **enter the data in the ECM using the "ENTER INJCTR CALIB DATA" in "WORK SUPPORT" mode with CONSULT-II manually**
  - **reconfigure the different elements such as the power-assisted steering pump assembly and the thermoplungers etc.**
  - **using CONSULT-II, ensure that the ECM has not detected malfunctions relating to the injector codes and check that the instrument panel warning light is off.**

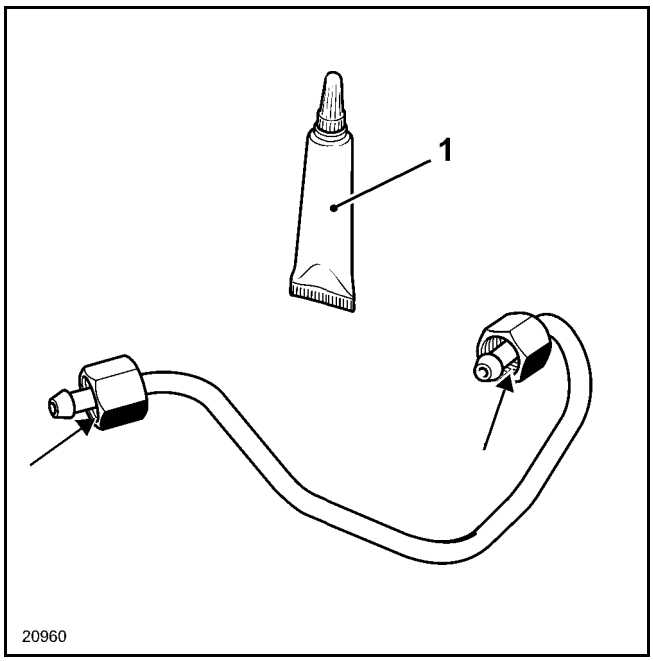
All the high pressure pipe removed must be systematically replaced along with the clips.

TIGHTENING THE HIGH PRESSURE PIPES

NOTE: fit the pump/rail pipe before the rail/injector pipes.

Rail-pump pipe

– Undo the rail,
– Grease the threads of the high pressure pipe nuts,
– Insert the high pressure pipe olive into the taper of the high pressure pump outlet,
– Insert the high pressure pipe olive into the taper of the high pressure rail inlet.
– Move the nut into position by hand, on the rail side then the pump side,
– Tighten the rail,
– Tighten the high pressure pipe nuts on the rail side then on the pump side.



Rail/injector pipes

– Undo the rail,
– Grease the threads of the high pressure pipe nuts,
– Insert the high pressure pipe olive into the taper of the high pressure injector inlet,
– Insert the high pressure pipe olive into the taper of the high pressure rail outlet,
– Move the nuts into position by hand, on the injector side then the rail side,
– Tighten the rail,
– Ensure that the new clip, supplied with the new high pressure pipe, is fitted,
– Tighten the nuts of the high pressure pipes on the injector side first and then on the fuel rail side.

NOTE: Before fitting a new high pressure pipe, move back the nuts on the pipe then lightly lubricate the nut threads with the oil from the sachet (1) provided in the parts kit.

CHECKING SEALING AFTER REPAIR

After any operation, check that there are no diesel leaks.

Reprime the circuit using the priming pump.

Start the engine and allow to warm up at idle speed, visually inspecting for any fuel leaks.

Apply tracing fluid around the high pressure connections of the pipe that has been replaced.

Once the engine coolant temperature is above **50°C** and provided there are no malfunctions present, carry out a road test, taking the engine speed up to **4000 rpm** at least once to check that there are no leaks.

Perform a visual inspection after the road test to make sure that there are no high pressure leaks.

Clean off the tracing fluid.

REPLACING THE ECM

The system can be reprogrammed using CONSULT-II.

Before an ECM is replaced in after-sales, the following must be done.

- Check the individual correction value from "WORK SUPPORT" mode using print out function of CONSULT-II.
- After replacing ECM, enter each injector's individual correction value using "WORK SUPPORT" mode with CONSULT-II.
- Also set the system configuration using "CONFIGURATION" mode with CONSULT-II.

REPLACING THE INJECTORS

NOTE: Individual injector correction is a factory calibration carried out on each injector to adjust the flow of each one precisely, taking into account differences in manufacture.

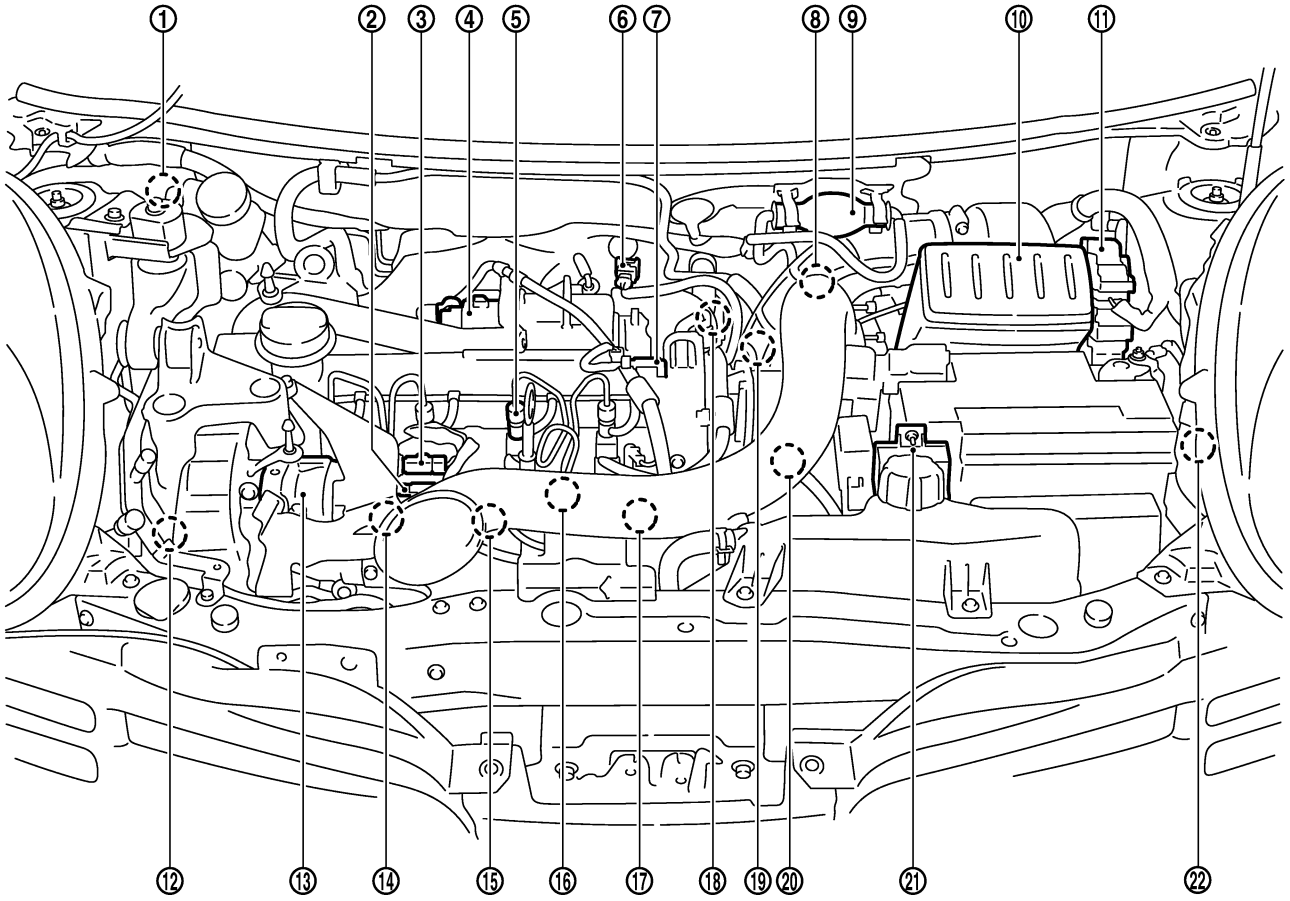
The correction values are written on a label affixed to each injector then entered in the ECM which can then control each injector by taking account of their differences in manufacture.

The system can be programmed "WORK SUPPORT" mode with CONSULT-II.

The correction values (16 digit code) must be replaced after replacing an injector. (Refer to special features)

- **Entering each injector's individual correction value**, when replacing the ECM.

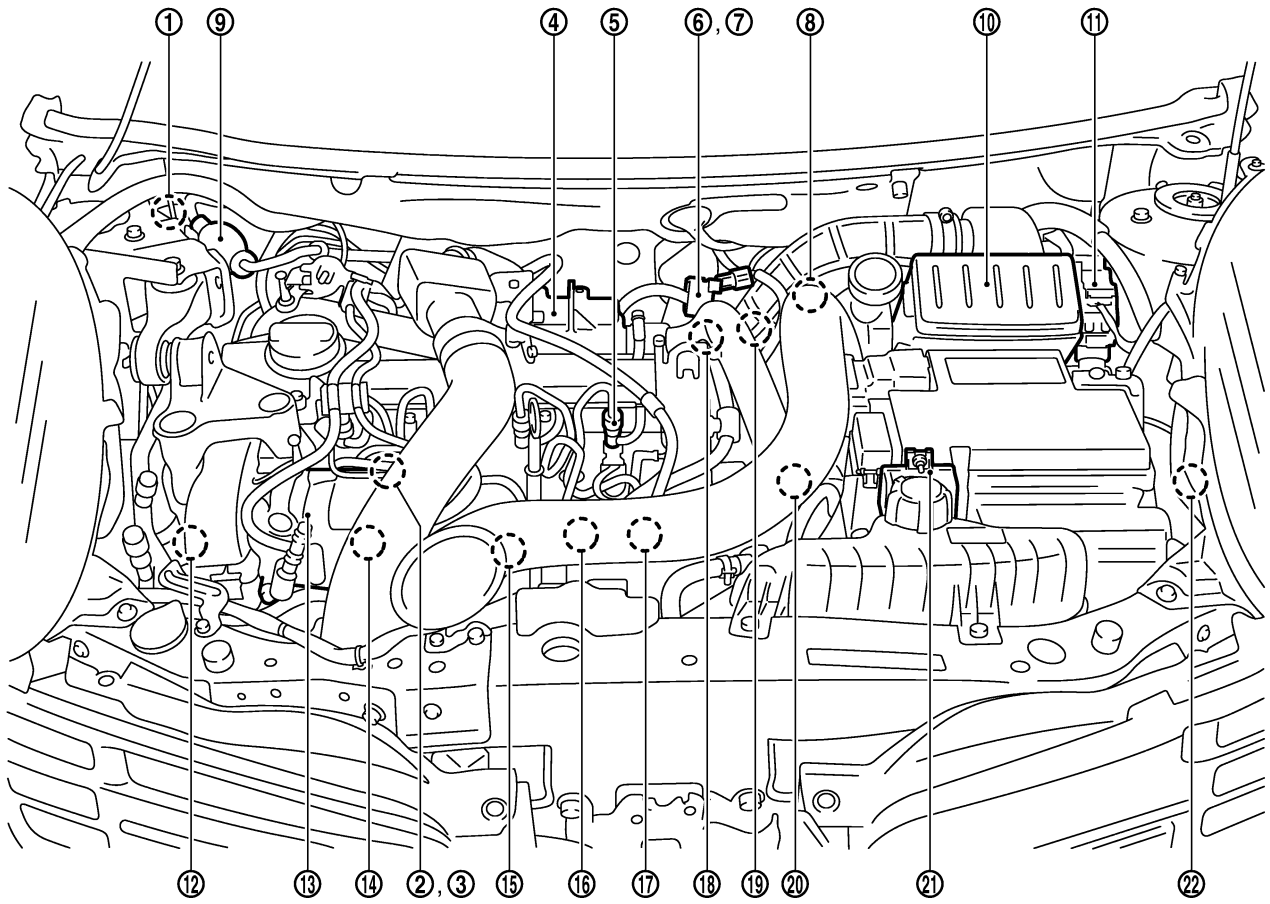
Models without intercooler
Engine cover removed



YEC670E

1. Fuel filter (LHD models)
2. Venturi
3. Fuel temperature sensor
4. EGR control solenoid valve
5. Injector
6. Turbocharger air temperature sensor
7. Turbocharger air pressure sensor
8. Fuel filter (RHD models)
9. Priming pump (RHD models)
10. Air cleaner
11. ECM
12. Camshaft position sensor
13. High pressure pump
14. Fuel flow actuator
15. Knock sensor (Accelerometer)
16. Spherical injector rail
17. Common rail fuel pressure sensor
18. Engine coolant temperature sensor
19. Intake air temperature sensor
20. Crankshaft position sensor
21. Glow relay (control) unit
22. IPDM E/R

Models with intercooler
Engine cover removed



YEC671E

1. Fuel filter (LHD models)
2. Venturi
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12. Camshaft position sensor
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15. Knock sensor (Accelerometer)
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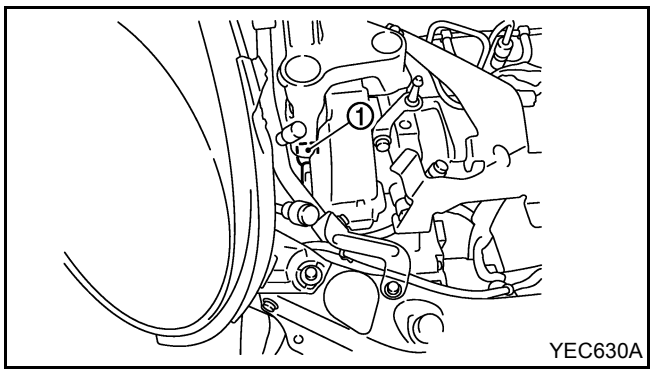
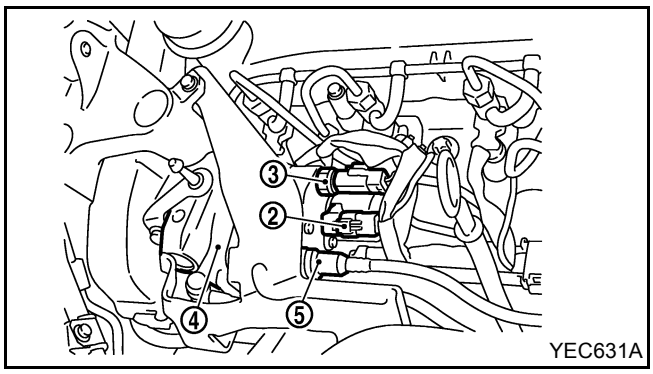
18. Engine coolant temperature sensor
19. Intake air temperature sensor
20. Crankshaft position sensor
21. Glow relay (control) unit
22. IPDM E/R

1 Camshaft position sensor

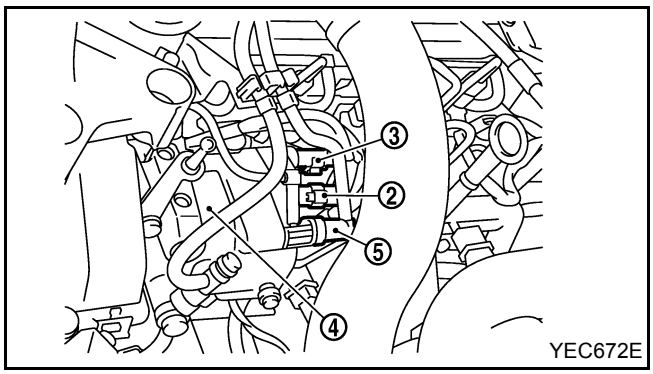


2 Fuel flow actuator
3 Fuel temperature sensor
4 High pressure pump
5 Venturi

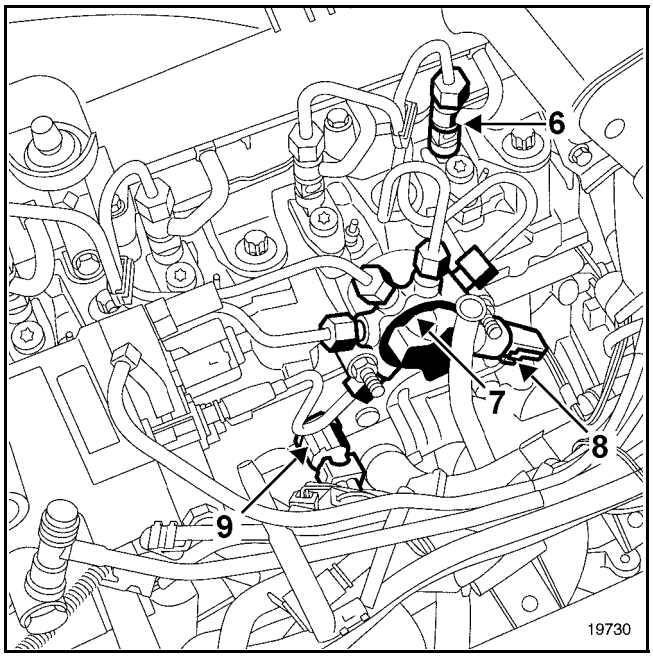
Models without intercooler



Models with intercooler

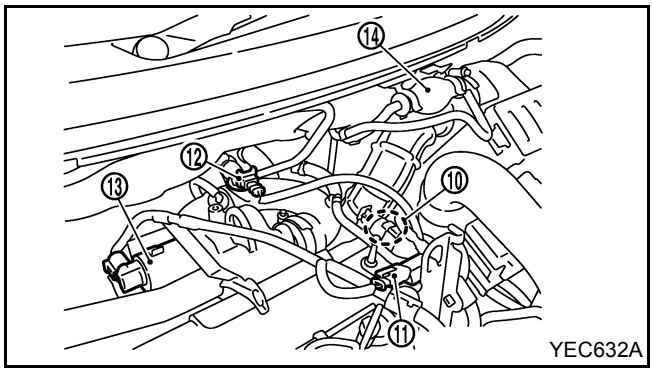


6 Injector
7 Injector rail
8 Rail pressure sensor
9 Knock sensor (Accelerometer)

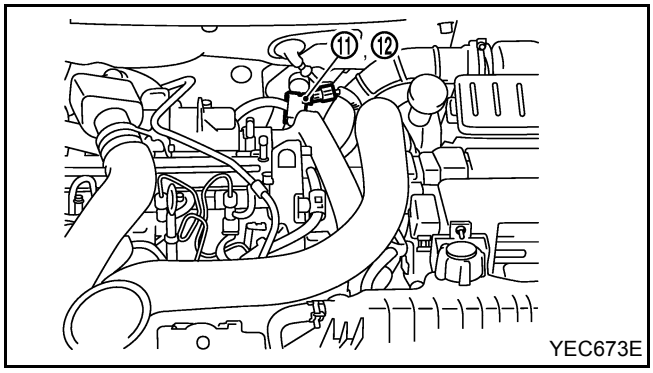


10 Intake air temperature sensor
11 Turbocharger air pressure sensor
12 Turbocharger air temperature sensor
13 EGR control solenoid valve
14 Priming bulb (RHD models)

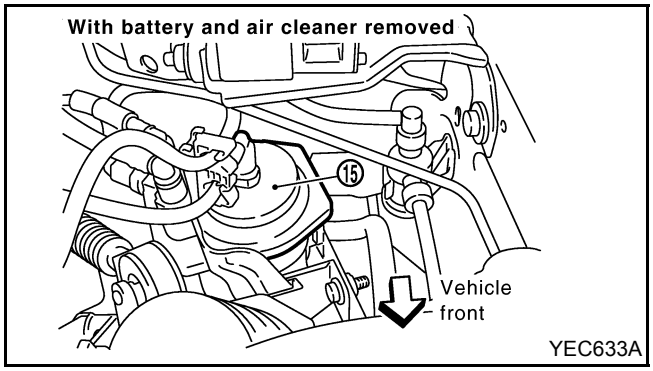
Models without intercooler

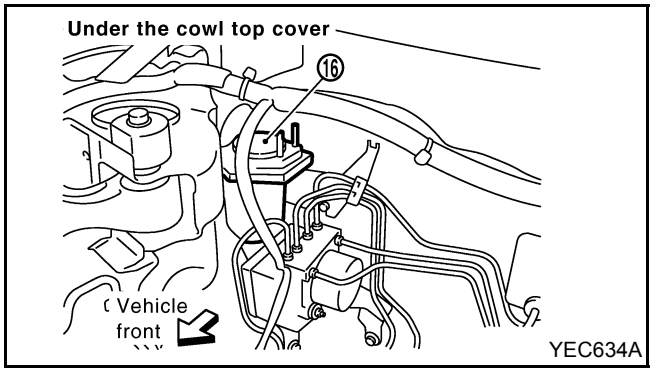


Models with intercooler

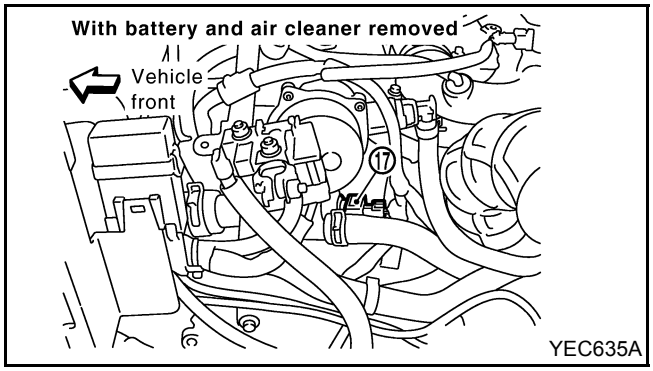


15 Fuel filter (RHD models)
16 Fuel filter (LHD models)

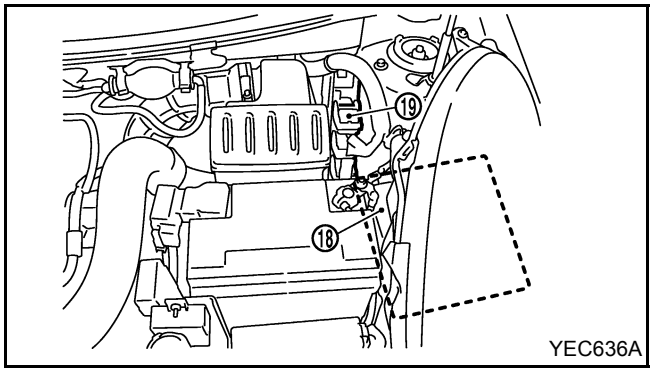




17 Engine coolant temperature sensor



18 IPDM E/R
19 ECM

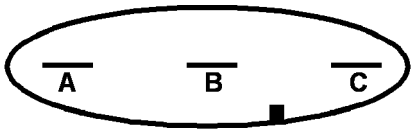


Vehicles	Engines							
	Type	Suffix	Bore (mm, in)	Stroke (mm, in)	Displacement cm^3 (cu in)	Compression ratio	Catalytic converter	Emission control standard
K12	K9K	700	76 (2.99)	80.5 (3.17)	1,461 (89.15)	18.25/1	228	EU 00

ENGINE SPEED (rpm)			SMOKE OPACITY	
IDLE SPEED	Max. - no load	Max. - under load	Homologation value	Max. - legal
800 ± 50 900 or more* : without intercooler 875 or more* : with intercooler	4500 ± 150	5000 ± 150	2.26 m^{-1} (60%)	3 m^{-1} (73%)

*: A/C ON

DESCRIPTION	MARQUE/TYPE	SPECIAL NOTES
High pressure pump	DELPHI	0 to 1400 bars continuous pressure
Fuel pump	DELPHI	Incorporated into the high pressure pump
Common rail fuel pressure sensor	DELPHI	Incorporated into the rail Non measurable resistance
Injectors	DELPHI	Solenoid injector Maximum pressure **1400 bar** Non measurable resistance
Diesel flow actuator	DELPHI	Located on the high pressure pump Resistance: **5.3 ± 0.5 Ω at 20ºC**
ECM	DELPHI	ECM (computer) (112 terminals)
Pre/postheating unit (glow)	NAGARES BED 7-12	With pre-postheating function controlled by the ECM (computer)
Pre-heater plugs (glow)	BERU	Resistance: **Less than 1 Ω** connector disconnected
Accelerator pedal potentiometer (APP sensor)	CTS	Double track potentiometer Resistance: – terminals 1: 4 (earth) and 6 (+5 V): **1.7 ± 0.9 kΩ** – terminals 2: 5 (earth) and 3 (+5 V): **2.85 ± 2.0 kΩ**
Intake air temperature sensors	JAEGER	CTN thermistor Resistance: **5000 ± 6800 Ω at - 40°C** **9500 ± 900 Ω at - 10°C** **2051 ± 120 Ω at 25°C** **810 ± 47 Ω at 50°C** **310 ± 17 Ω at 80°C**

DESCRIPTION	MARQUE/TYPE	SPECIAL NOTES
Fuel temperature sensor	DELPHI	Located on the high pressure pump CTN thermistor Resistance: **2.2 kΩ at 25°C**
Engine coolant temperature sensor	ELTH	CTN thermistor Resistance: **76000 ± 7000 Ω at - 40°C** **12500 ± 1130 Ω at - 10°C** **2252 ± 112 Ω at 25°C** **810 ± 40 Ω at 50°C** **280 ± 8 Ω at 80°C** **115 ± 3 Ω at 110°C** **88 ± 2 Ω at 120°C**
Crankshaft position (Engine speed) sensor	MGI	Variable reluctance sensor Resistance: **760 Ω**
Atmospheric pressure sensor	DELPHI	Built into the computer
Charge air (Turbocharger) pressure sensor	DELCO ELECTRONICS	Resistance: – terminals A and B: **9 kΩ** – terminals A and C: **4 kΩ** – terminals B and C: **5 kΩ**  *DI1330*
Camshaft position sensor	SAGEM	Hall effect sensor
Knock sensor (accelerometer)	SAGEM	Non measurable resistance
Turbocharging air temperature and pressure sensor	BOSCH / LDF6T 20-250	Pressure sensor with a negative temperature coefficient thermistor Supply voltage **+5V** Resistance between terminals 1 and 2: – **20,376 Ω ± 1110.5 at −25°C** – **15,614 Ω ± 829 at −20°C** – **9426 Ω ± 475 at −10°C** – **5887 Ω ± 281.5 at 0°C** – **3791 Ω ± 172.5 at 10°C** – **2511 Ω ± 109 at 20°C** – **1715.5 Ω ± 71 at 30°C** – **1200 Ω ± 47 at 40°C** – **851 Ω ± 32 at 50°C** – **612 Ω ± 22 at 60°C** – **446 Ω ± 15 at 70°C** – **330 Ω ± 11 at 80°C** 4-track connector: – 1: earth – 2: air temperature sensor signal – 3: **+5V** supply – 4: pressure sensor signal

DESCRIPTION	MARQUE/TYPE	SPECIAL NOTES
EGR solenoid valve EGR valve position potentiometer	PIERBURG	Resistance: – terminals 4 and 6: **8 ± 0.5 Ω at 25°C** Incorporated into the EGR solenoid valve Resistance: – terminals 2 and 3: **1 ± 0.5 kΩ at 20°C** – terminals 1 and 2: **4 ± 1.6 kΩ at 20°C**

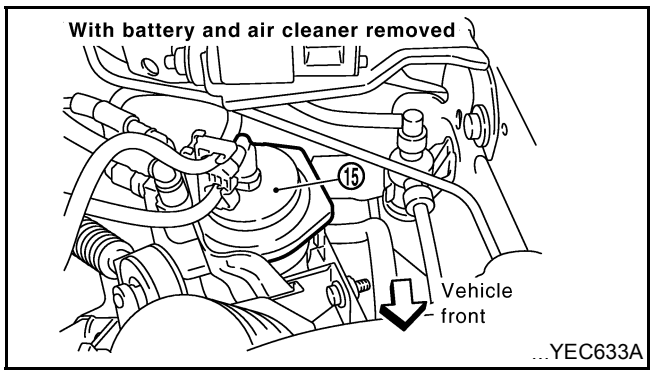
IMPORTANT: Before carrying out any work, wait for the fuel temperature to drop.

REMOVAL - REFITTING

Disconnect the battery.

Remove fuel filter:

RHD models
After removing battery and air cleaner
15Fuel filter (RHD models)



LHD models
After removing front wipers, cowl top cover, front wiper motor assembly and cowl top panel/tray.

Release the diesel fuel filter from its support.

Fit the new diesel fuel filter (do not remove the plugs until the last moment).

Disconnect all the snap fasteners beginning with the three vertical snap fasteners. Prevent the snap fasteners from coming into contact with the environment.

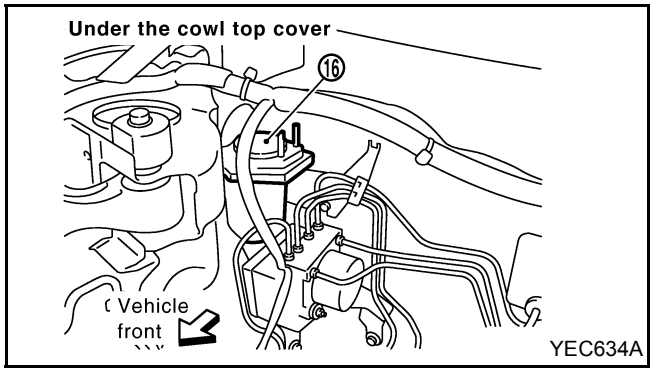
Disconnect the pump outlet snap fastener last of all; reconnect it immediately when the new filter is installed.

Reconnect the other snap fasteners.

Prime the system using the priming bulb (automatic degassing).

Reconnect the battery.

16Fuel filter (LHD models)



IMPORTANT: It is strictly forbidden to remove any injection pump pulley marked number 070 575. If the pump is being replaced, the pulley must be replaced.

SPECIAL TOOLING REQUIRED	
Nissan No. KV113E0010 (Mot. 1566)	Tool for removing and refitting high pressure pipes

EQUIPMENT REQUIRED

Low torque wrench

High pressure pipe wrench (for example, Facom "DM19" wrench).

Pipe socket for tightening the injector-rail high pressure pipes (for example, Facom Crowfoot 18-17 wrench).

Pipe socket for tightening the pump-rail high pressure pipe (for example, Facom Crowfoot 19-17 wrench).

TIGHTENING TORQUES (in daNm)	
High pressure pipe nuts	3.8
Rail nuts	2.8 ± 0.3
Filler neck nut on the rail	2.1
High pressure pump mounting bolts	2.1 ± 2

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

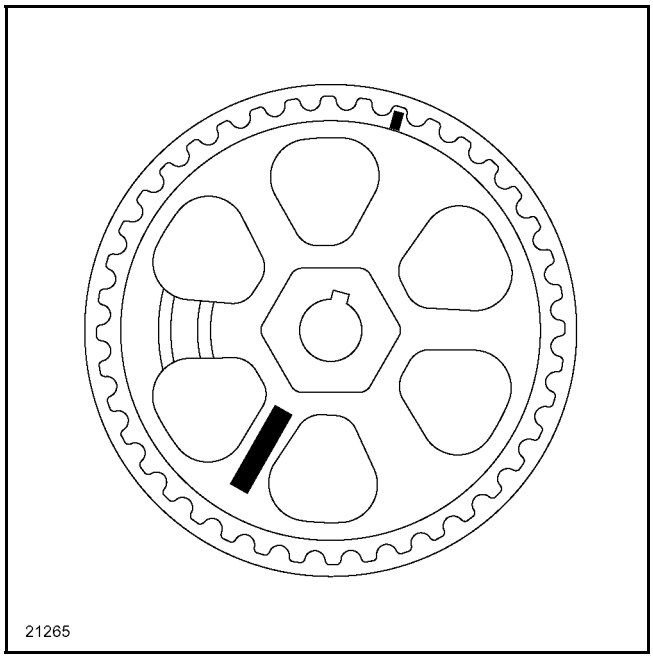
Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

REMOVAL

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

It is strictly forbidden to remove any injection pump pulley marked **number 070 575** (see diagram). If the pump is being replaced, the pulley must be replaced.



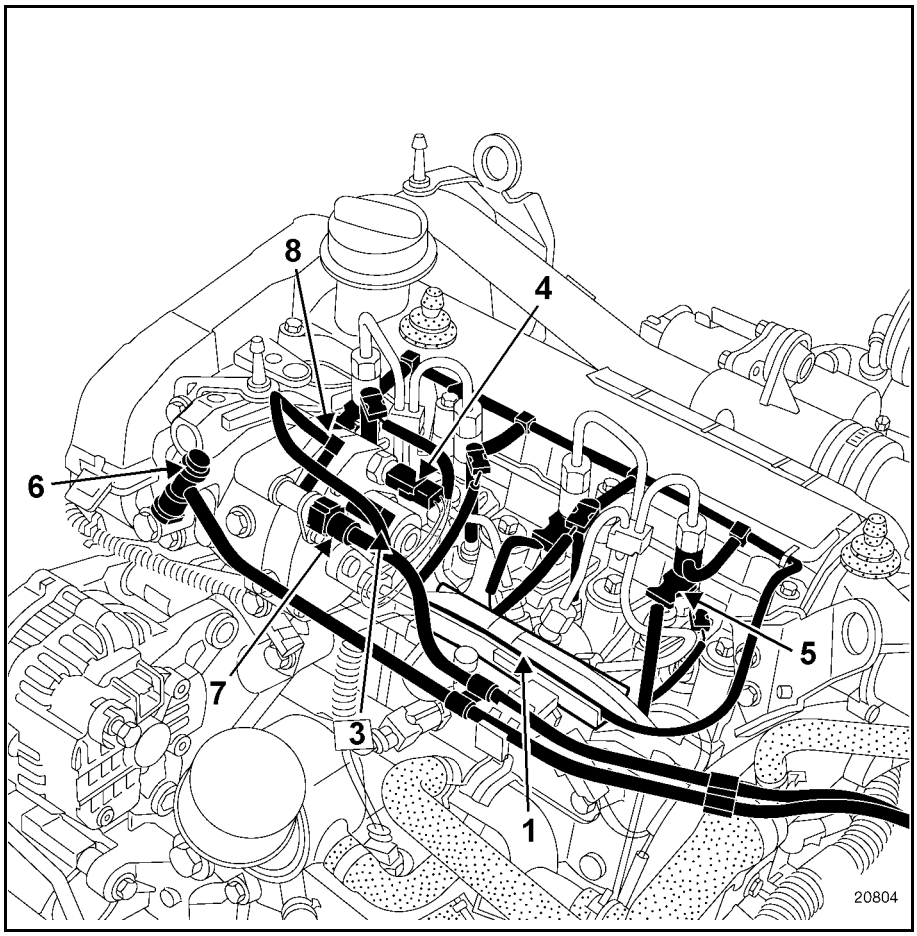
The high pressure pump may be removed after having first removed the timing belt

Disconnect the battery.

Remove:
– the neck (1) located on the fuel rail,
– the dipstick guide and plug the hole.

Undo the mounting nuts of the rail (2) a few turns.

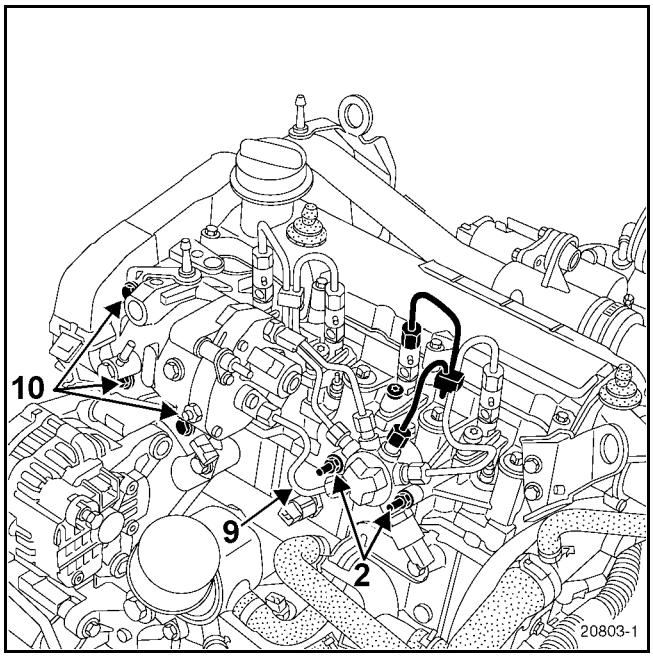
Carefully disconnect:
– the connectors from the flow actuator (3) and fuel temperature sensor (4),
– the pre-heater (glow) plugs and the injectors (5),
– the return pipe (8) connecting the injector with the pump.



Remove the high pressure pipe (9) connecting the pump to the rail. To do this:
– undo the nut on the pump side then the nut on the rail side,
– Move the nut along the tube keeping the olive in contact with the taper.

Plug all the holes of the injection circuit.

Remove the three mounting bolts (10) from the injection pump then remove it.



REFITTING

Fit the pump then position the mounting bolts without tightening them.

IMPORTANT: All the high pressure pipes removed must be systematically replaced.

Before fitting the new high pressure pipe, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.

Refit the high pressure pipe, to do this:
– remove the protective plugs,
– insert the high pressure pipe olive into the taper of the high pressure pump outlet,
– insert the high pressure pipe olive into the taper of the high pressure rail inlet.

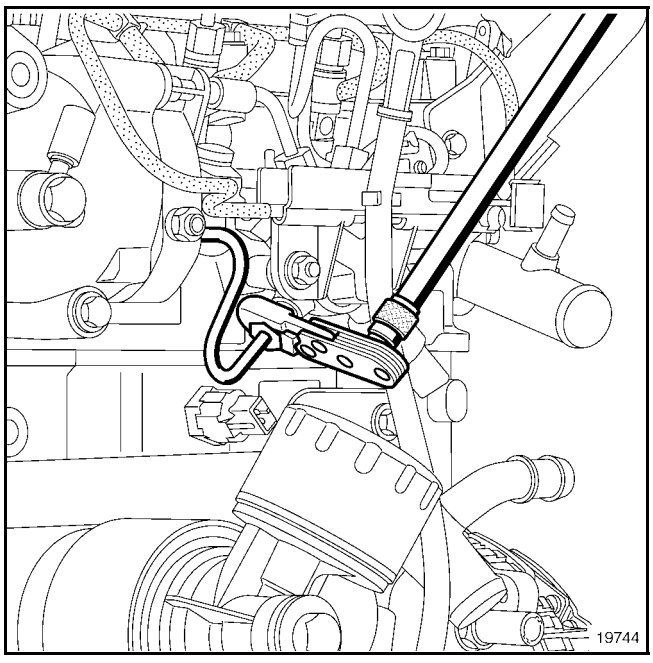
Finger tighten the nuts of the high pressure pipe starting with the one located on the rail side.

Tighten the mounting bolts (10) on the high pressure pump to a torque of **2.1 daN.m**.

IMPORTANT: Do not touch the pipes with the wrench when torque tightening.

Using the recommended tools, tighten the following in the order and to the torques shown:
– the nut on the rail side to **3.8 daN.m**,
– the nut on the pump side to **3.8 daN.m**,

Tighten the rail mounting nuts to a torque setting of **2.8 daNm**.



Refit in the reverse order to removal for the other refitting operations.

Test the sealing of the high pressure after it has been repaired (refer to **"Special features"**).

EQUIPMENT REQUIRED
Low torque wrench
Pipe socket for tightening the high pressure pipe (for example, Facom Crowfoot 18-17 wrench).

TIGHTENING TORQUES (in daNm)	
Flow actuator mounting bolt	**0.55 ± 0.06**

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

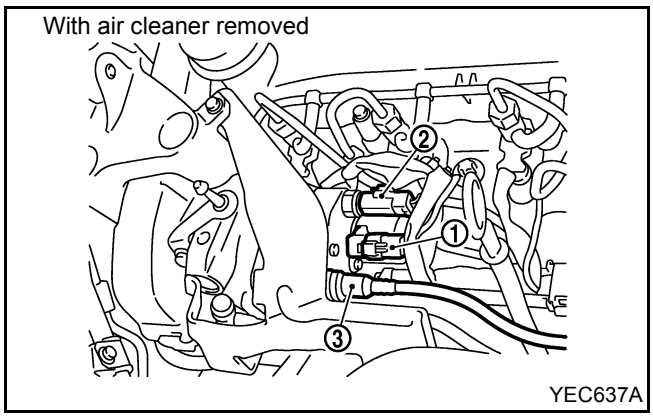
REMOVAL

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

Remove the engine cover.

Disconnect the connector from the flow actuator (1) and from the fuel temperature sensor carefully (2).

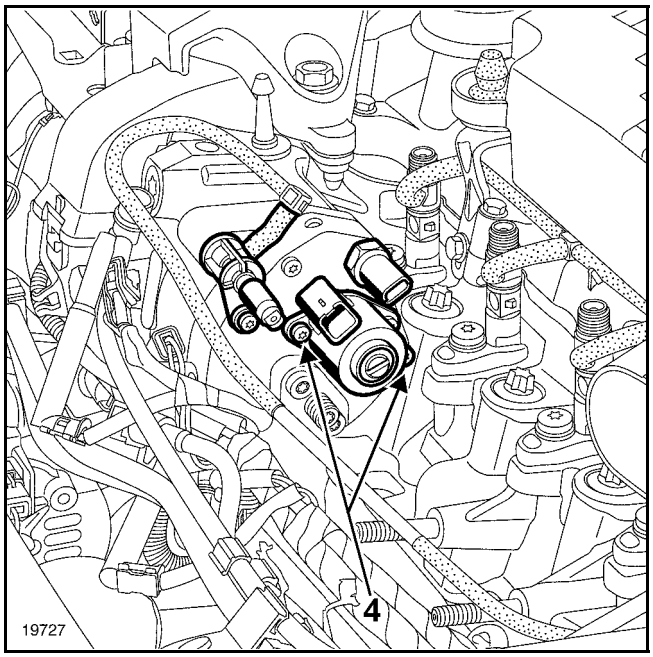


Disconnect the fuel return pipe (3).

Remove the high pressure pipe from injector no. 4 (refer to high pressure pipes).

Plug the holes in the injection circuit.

Disconnect the pre-heater plug and the injectors from cylinders 3 and 4.



Unscrew the two retaining bolts from the bracket (4).

Withdraw the flow actuator (by hand using small successive turns. Do not use the electrical connector as a lever arm).

REFITTING

Remove the new component from its packaging just before fitting it.

NOTE: Do not lubricate the seals with grease or used diesel oil. Use the applicator provided in the kit for the new part.

Position the actuator. (Important: when fitting the regulator, do not mark the seal.)

Position the two mounting bolts then tighten them.

Fit a new high pressure pipe to injector no. 4 plus a new clip (refer to high pressure pipes).

Reconnect:
– the diesel return pipe,
– the electrical connectors.

Refit in the reverse order to removal for the other refitting operations.

Test the sealing of the high pressure circuit after it has been repaired (refer to **"Special features"**).

EQUIPMENT REQUIRED
Low torque wrench

TIGHTENING TORQUES (in daNm)	
Fuel temperature sensor	1.5 ± 0.15

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

REMOVAL

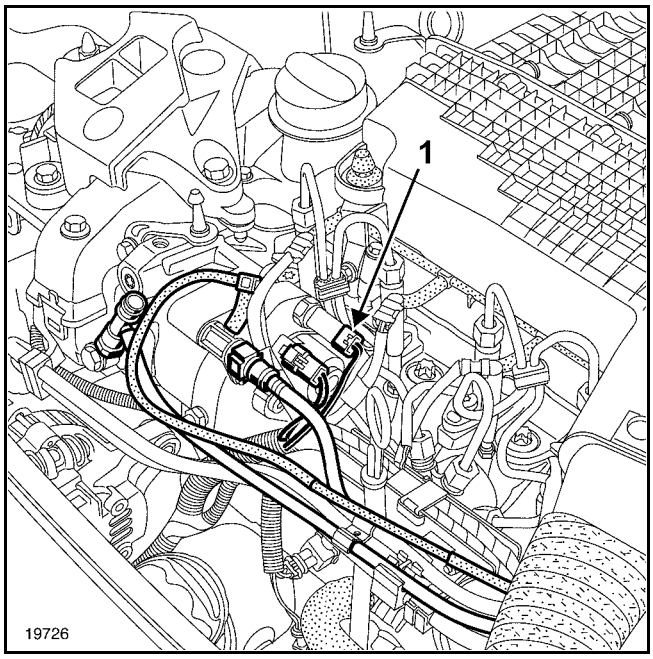
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

Remove the engine cover.

Disconnect the connector from the fuel temperature sensor carefully (1).

Undo then remove the fuel temperature sensor.



REFITTING

Grease the O-ring with the lubricant from the sachet provided with the new part.

Take care not to damage the O-ring when installing the sensor.

Position the fuel temperature sensor then tighten to torque.

Reconnect:
– the electrical connector.
– the battery.

Test the sealing of the high pressure after it has been repaired (refer to **"Special features"**).

EQUIPMENT REQUIRED
Low torque wrench

TIGHTENING TORQUES (in daNm)	
Venturi mounting bolts	0.55 ± 0.06

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

REMOVAL

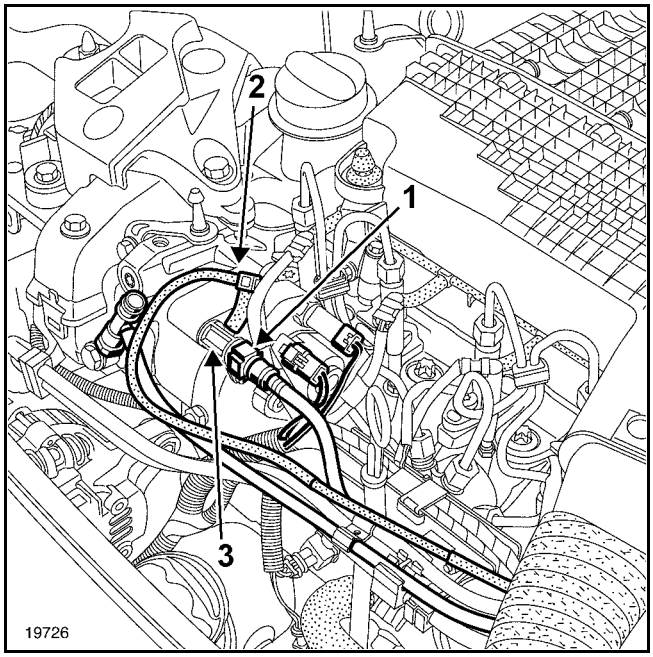
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

Remove the engine cover.

Disconnect:
– the fuel return pipe on the pump (1).
– the return pipe (2) connecting the injector with the pump.

Remove the venturi mounting bolts (3) then take it out.



REFITTING

Grease the O-ring with the lubricant from the sachet provided with the new part.

Take care not to damage the O-ring when installing the venturi.

Position the venturi then tighten it to torque.

Reconnect the different pipes.

Test the sealing of the high pressure circuit after it has been repaired (refer to **"Special features"**).

SPECIAL TOOLING REQUIRED	
Nissan No. KV113E0010 (Mot. 1566)	**Tool for removing and refitting high pressure pipes**

EQUIPMENT REQUIRED
Low torque wrench
High pressure pipe wrench (for example, Facom "DM19" wrench).
Pipe socket for tightening the injector-rail high pressure pipes (for example, Facom Crowfoot 18-17 wrench).
Pipe socket for tightening the pump-rail high pressure pipe (for example, Facom Crowfoot 19-17 wrench).

TIGHTENING TORQUES (in daNm)	
High pressure pipe nuts	**3.8**
Rail nuts	**2.8 ± 0.3**
Filler neck nut on the rail	**2.1**

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

IMPORTANT: The pressure sensor cannot be separated from the rail.

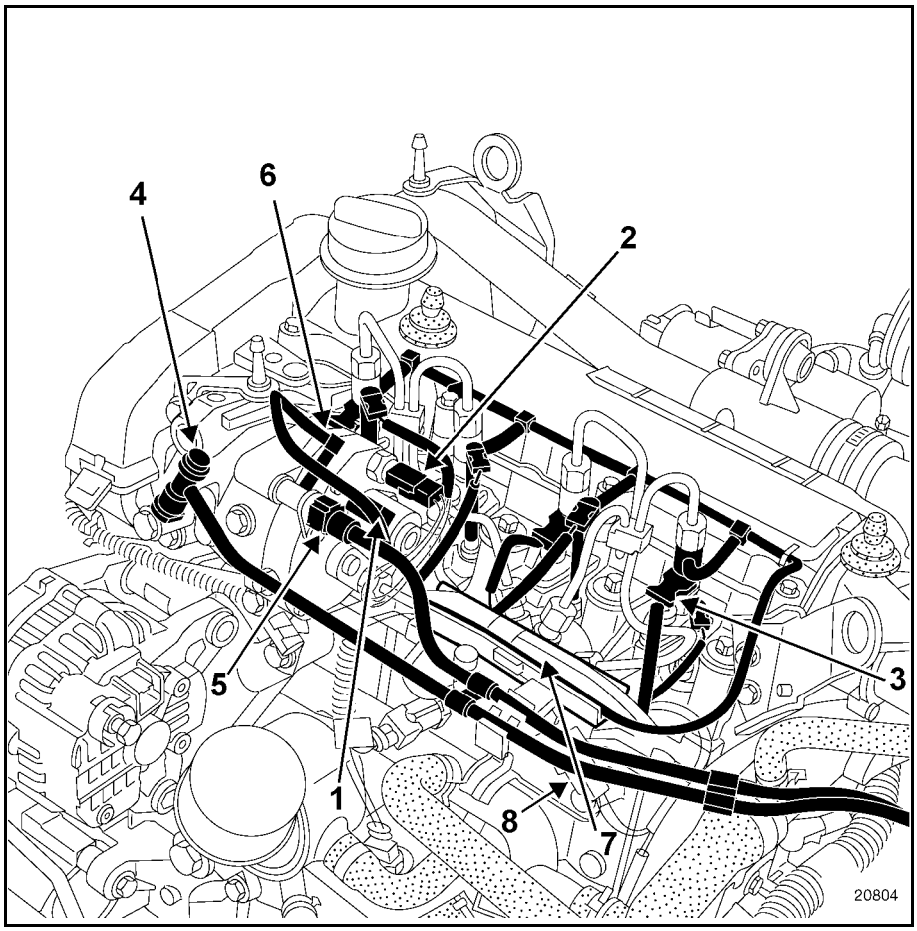
REMOVAL

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

Remove the engine cover.

Carefully disconnect:
– the connectors from the flow actuator (1),
– the connectors from the fuel temperature sensor (2),
– the injector connectors (3),
– the glow (heater) plugs,
– on the pump, the fuel supply (4) and return (5) pipes.
– the return pipe (6) connecting the injectors with the pump.



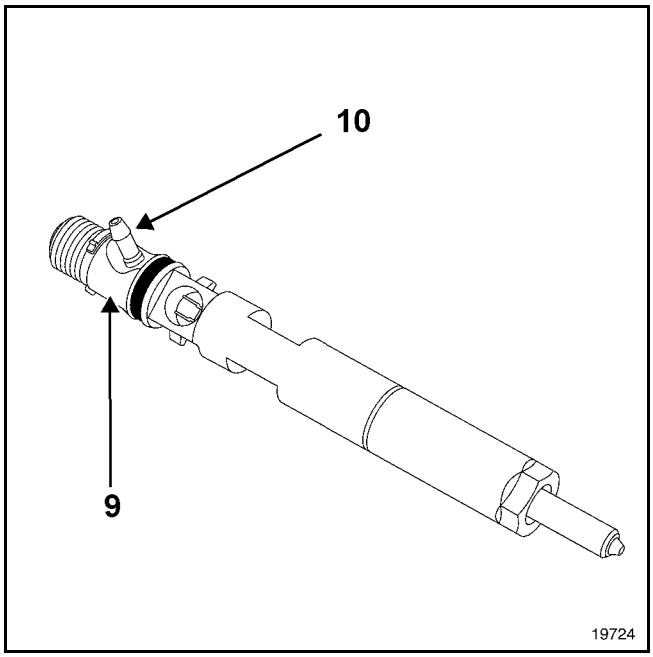
Remove:
– the neck (7) located on the fuel rail,
– the dipstick guide and plug the hole.

Disconnect the pressure sensor connector from the rail (8).

Remove the clips connecting the high pressure pipes.

IMPORTANT: When undoing the high pressure pipes, it is essential to maintain the central union of the injector (9).

IMPORTANT: Do not damage the injector's leak return duct (10).



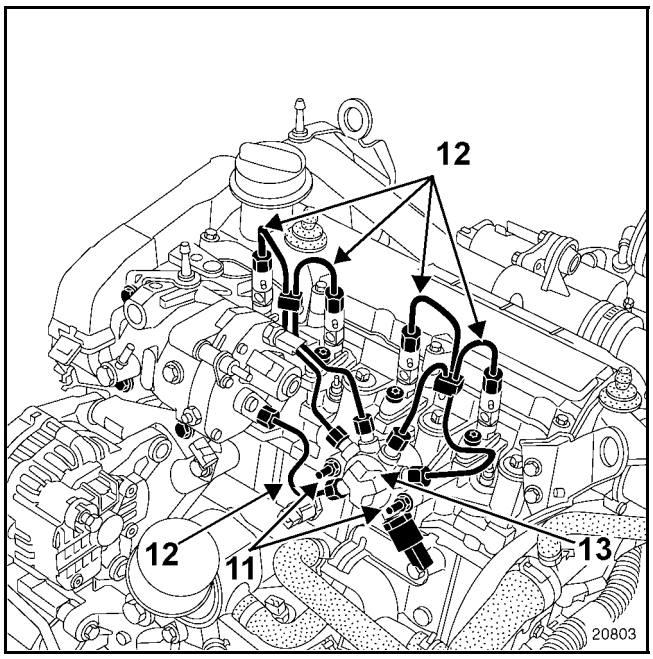
Undo the mounting nuts of the rail (11) a few turns.

**NOTE: Undo the nut on the pump side or the injector side, then the nut located on the rail side.
Undo the nuts for each pipe in turn.
Move the nut along the pipe keeping the olive in contact with the taper.**

Remove all the high pressure pipes (12).

Plug all the holes in the injection circuit.

Remove the rail (13).



REFITTING

IMPORTANT: All the high pressure pipes removed must be replaced as a matter of course.

Fit a new high pressure rail on the studs.

Finger tighten the nuts.

Before fitting the new high pressure pipes, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.

NOTE: Fit the pump/rail pipe before the rail/injector pipes.

Fit the pump-rail high pressure pipe:

– remove the protective plugs from the high pressure pump outlet, the high pressure rail inlet and the pipe.
– insert the high pressure pipe olive into the taper of the high pressure pump outlet,
– insert the high pressure pipe olive into the taper of the high pressure rail inlet.
– finger tighten the nuts of the high pressure pipe starting with the one located on the rail side.

Fit the rail-injector high pressure pipe:

IMPORTANT: When tightening the high pressure pipes, it is essential to maintain the central union of the injector (10).

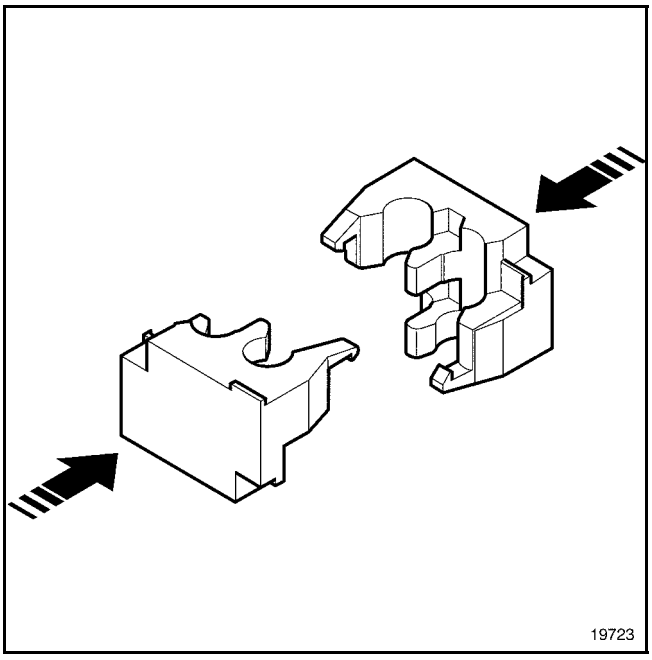
– remove the protective plugs from the high pressure rail outlet, the injector high pressure inlet and the pipe.
– insert the high pressure pipe olive into the taper of the high pressure injector inlet,
– insert the high pressure pipe olive into the taper of the high pressure rail outlet.
– finger tighten the nuts of the high pressure pipe starting with the one located on the injector side.

Fit the remaining high pressure pipes as you did previously.

NOTE: The order in which the pipes are installed is not important.

Fit the clips supplied with the new pipes onto the high pressure pipes:
– Insert the first half of the clip using adjustable pliers,
– Insert the second half of the clip using adjustable pliers.

IMPORTANT: Pay attention to the direction of installation of the second clip. The tabs located in the centre of the clip will only fit together in one position.



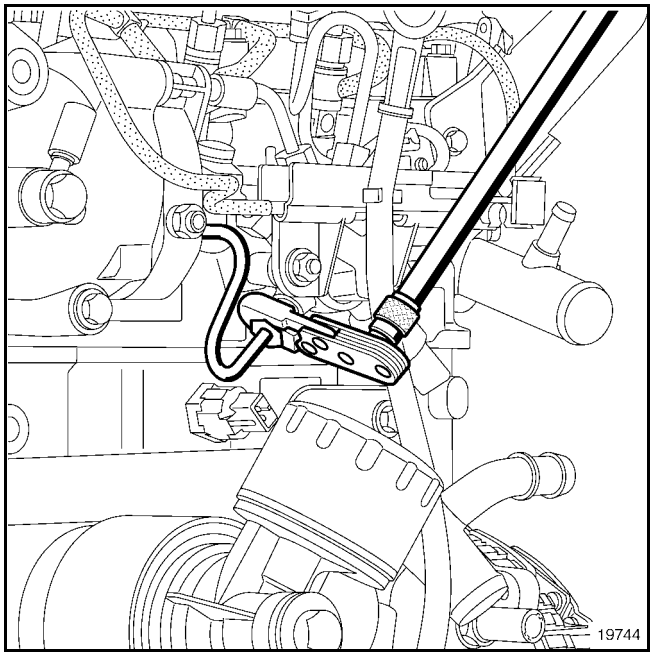
Tighten the rail nuts to a torque of **2.8 daNm.**

IMPORTANT: Do not touch the pipes with the wrench when torque tightening.

IMPORTANT: Follow the order and tightening torque of the high pressure pipes.

Using the recommended tools, tighten the nuts on the rail - pump high pressure pipe:

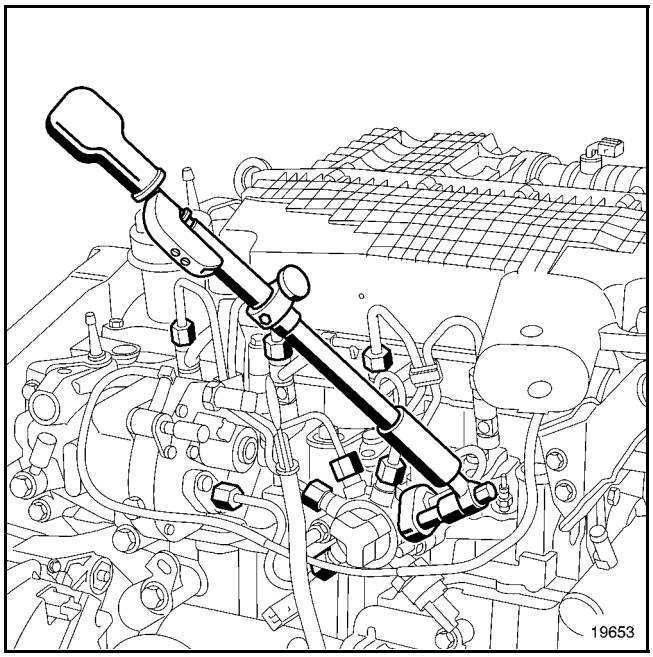
– tighten the nut on the rail side to a torque of **3.8 daN.m**.
– tighten the nut on the pump side to a torque of **3.8 daN.m**.



Using the recommended tools, tighten the nuts on the rail - injector high pressure pipes:

– tighten the nut on the injector side to a torque of **3.8 daN.m**.
– tighten the nut on the rail side to a torque of **3.8 daN.m**.

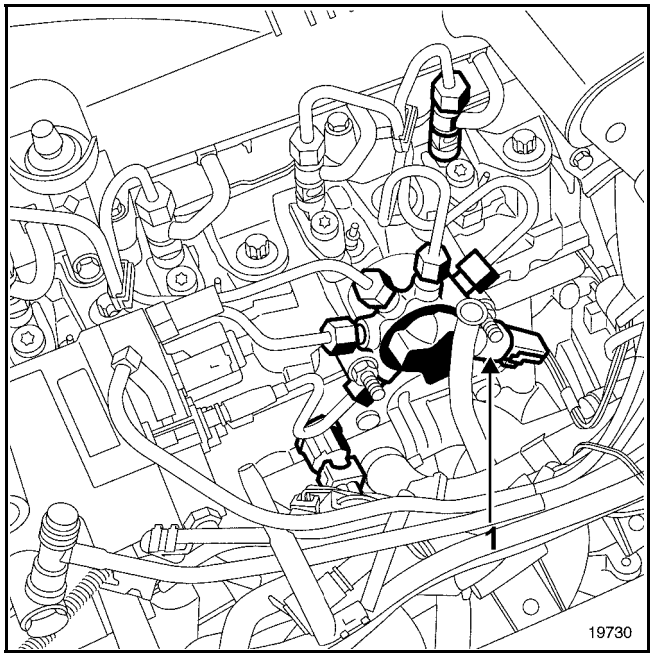
NOTE: Tighten one pipe fully before moving on to the next pipe.



Refit in the reverse order to removal for the other refitting operations.

Test the sealing of the high pressure after it has been repaired (refer to **"Special features"**).

The pressure sensor (1) cannot be separated from the fuel rail. If the pressure sensor malfunctions, the pressure sensor assembly - rail and high pressure pipes - must be replaced (refer to **fuel rail** section).



SPECIAL TOOLING REQUIRED	
Nissan No. KV113E0010 (Mot. 1566)	Tool for removing and refitting high pressure pipes

EQUIPMENT REQUIRED
Low torque wrench
High pressure pipe wrench (for example, Facom DM19 wrench).
Pipe socket for tightening the injector-rail high pressure pipes (for example, Facom Crowfoot 18-17 wrench).
Pipe socket for tightening the pump-rail high pressure pipe (for example, Facom Crowfoot 19-17 wrench).

TIGHTENING TORQUES (in daNm)	
High pressure pipe nuts	3.8
Rail nuts	2.8 ± 0.3
Injector mounting	2.8 ± 0.3
Filler neck nut on the rail	2.1

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

IMPORTANT: It is forbidden to open an injector. If you open an injector by mistake, you will have to change it. This is because of the manufacturing and installation tolerances and because there is a risk of contaminating the inside of the injector.
The rod filter of the injector must not be removed.

REMOVAL

NOTE: It is possible to replace a single high pressure pipe.

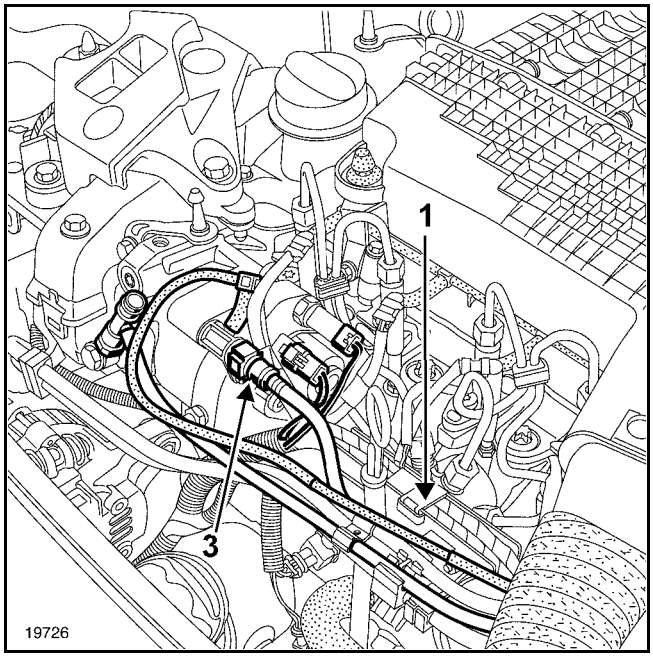
YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

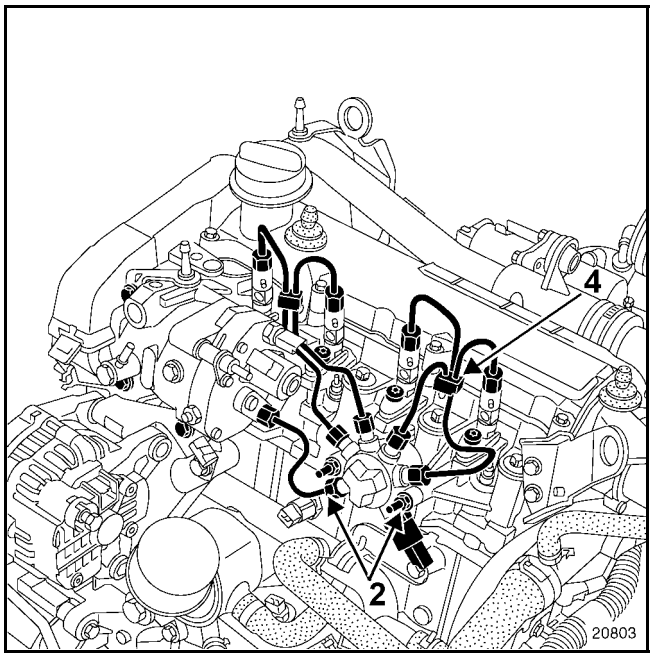
Disconnect the battery.

Remove:
– the engine cover,
– the neck (1) located on the high pressure rail,
– the dipstick guide then plug the hole.

Undo the mounting nuts of the rail (2) a few turns.

Disconnect:
– the fuel return pipe (3),
– the injector electrical connector.





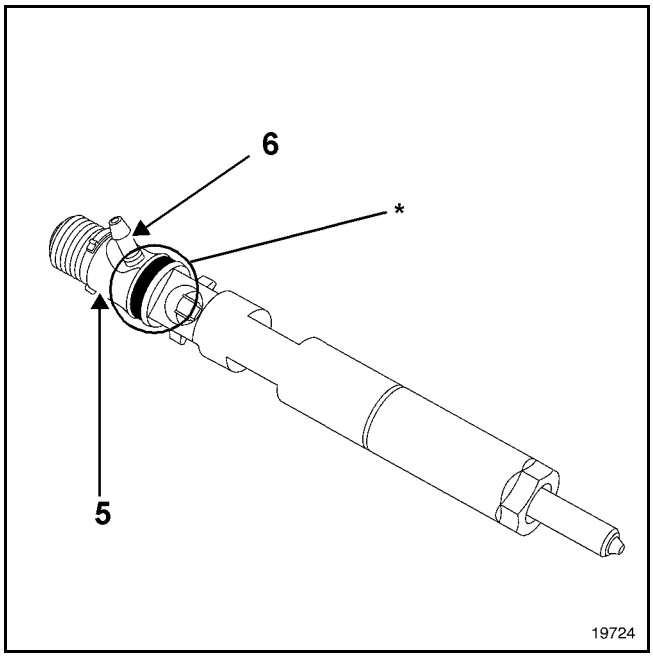
Remove the clip (4) connecting the high pressure pipes.

IMPORTANT: When undoing the high pressure pipes, it is essential to maintain the central union of the injector (5).

Undo the nut on the injector side, then the nut located on the rail side of the high pressure pipe.

Move the nut along the tube keeping the olive in contact with the taper.

IMPORTANT: Do not damage the injector's leak return duct (6).



* 16 digit code

Remove the high pressure pipe (7).

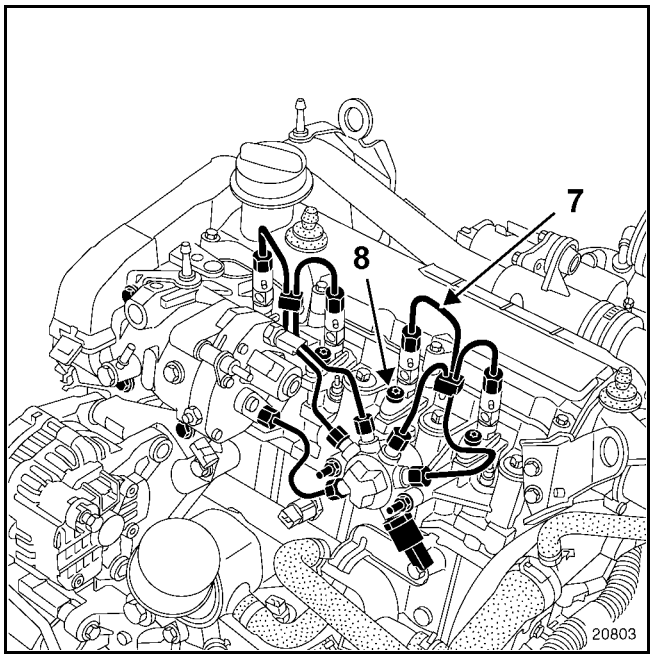
Disconnect the diesel return pipe on the injector.

Plug all the holes of the injection circuit.

Unscrew the injector bracket (8).

Remove the injector.

Pull off the flameshield washer.



REFITTING

NOTE: Read the 16 digit code on the new injector before refitting it and programming the code into the ECM using the CONSULT-II (see section "Special features, Replacing injectors"). The code is unique to each injector, it specifies the flow.

Clean the injector sockets and the injector bodies, as well as their brackets using a lint-free cloth (use the wipes recommended for this purpose, dipped in clean solvent.

Dry off using a different new wipe.

Replace the flameshield washer with a new one.

Position the injector.

Tighten its mounting clamp to a torque of **2.8 daN.m**.

IMPORTANT: All the high pressure pipes removed must be systematically replaced.

Before fitting the new high pressure pipe, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.

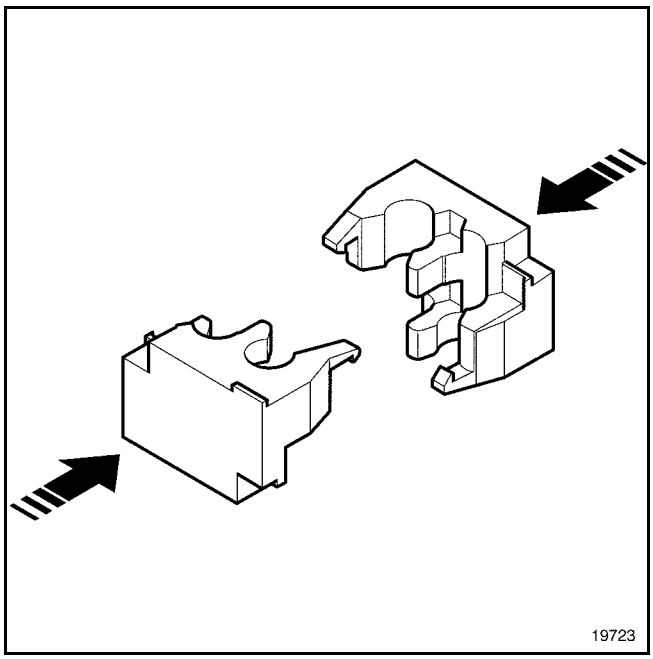
Fit the high pressure pipe:

– remove the protective plugs from the rail, the injector inlet and the pipe.
– insert the high pressure pipe olive into the taper of the injector inlet,
– insert the high pressure pipe olive into the taper of the rail outlet.

Move the nut into position by hand, injector side first then the rail side.

Fit a new clip supplied with the new pipes onto the high pressure pipes:
– Insert the first half of the clip using adjustable pliers,
– Insert the second half of the clip using adjustable pliers.

IMPORTANT: Pay attention to the direction of installation of the second clip. The tabs located in the centre of the clip will only fit together in one position.

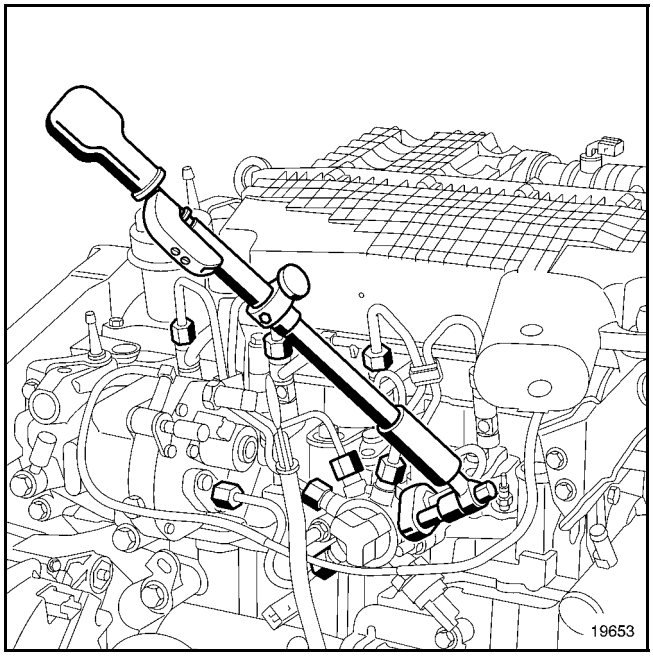


Tighten the rail nuts to a torque of **2.8 daNm.**

IMPORTANT: Do not touch the pipes with the wrench when torque tightening.

IMPORTANT: When tightening the high pressure pipes, it is essential to maintain the central union of the injector.

Using the recommended tools, tighten the following in the order and to the torques shown:
– the nut on the injector side to a torque of **3.8 daN.m**.
– the nut on the rail side to a torque of **3.8 daN.m**.



Refit in the reverse order to removal for the other refitting operations.

Test the sealing of the high pressure after it has been repaired (refer to **"Special features"**).

SPECIAL TOOLING REQUIRED	
Nissan No. KV113E0010 (Mot. 1566)	**Tool for removing and refitting high pressure pipes**

EQUIPMENT REQUIRED

Low torque wrench

High pressure pipe wrench (for example, Facom DM19 wrench).

Pipe socket for tightening the injector-rail high pressure pipes (for example, Facom Crowfoot 18-17 wrench).

Pipe socket for tightening the pump-rail high pressure pipe (for example, Facom Crowfoot 19-17 wrench).

TIGHTENING TORQUES (in daNm)	
High pressure pipe nuts	**3.8**
Rail nuts	**2.8 ± 0.3**
Filler neck nut on the rail	**2.1**

IMPORTANT: Before carrying out any work, connect the CONSULT-II, set up communication with the ECM and check that the injection rail is not under pressure.

Wait until the fuel temperature drops.

Order the special high pressure injection circuit plug kit.

REMOVAL

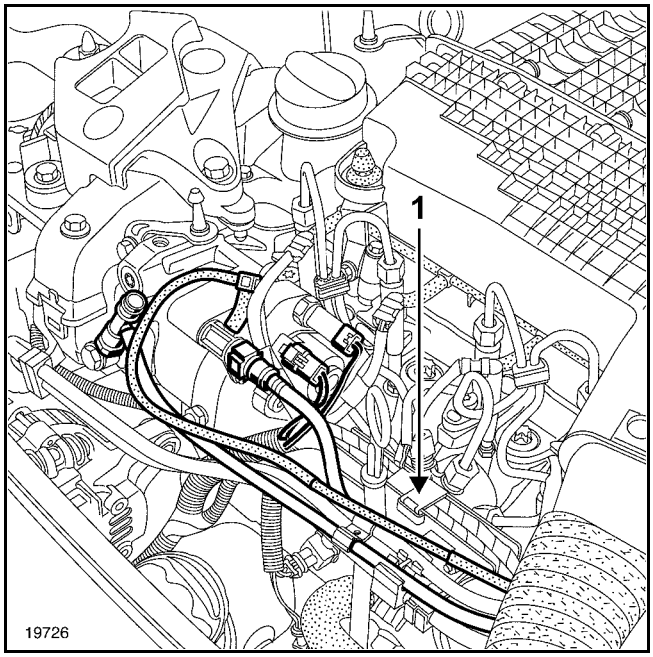
NOTE: It is possible to replace a single high pressure pipe.

YOU SHOULD FOLLOW THE CLEANNESS INSTRUCTIONS CLOSELY

Disconnect the battery.

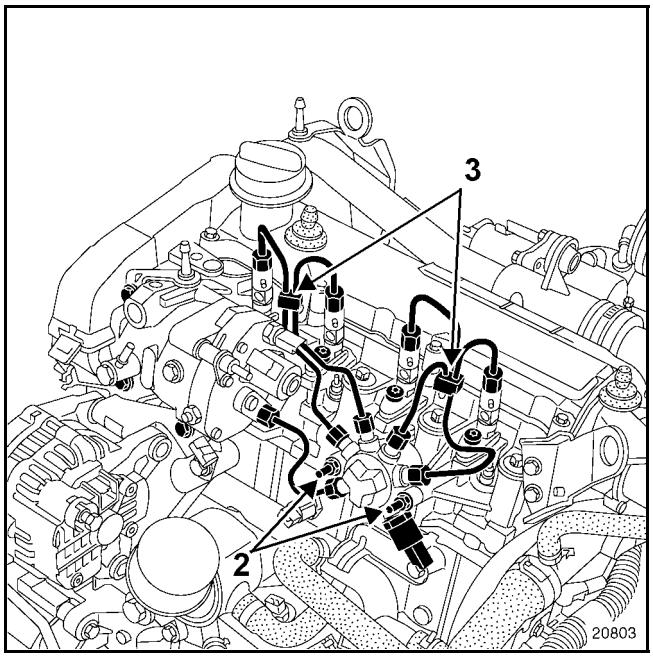
Remove:
– the engine cover,
– the neck (1) located on the high pressure rail,
– the dipstick guide then plug the hole.

Undo the mounting nuts of the rail (2) a few turns.



Remove the clip (3) connecting the high pressure pipes.

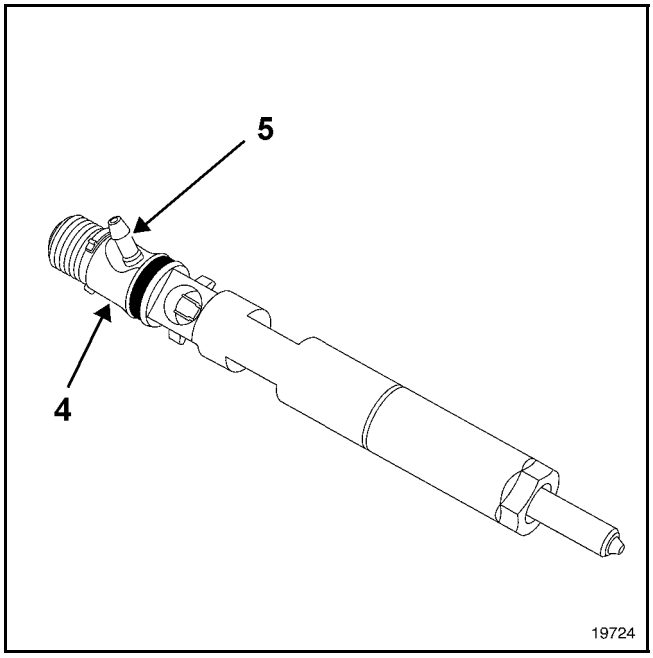
IMPORTANT: When undoing the high pressure pipes, it is essential to maintain the central union of the injector (4).



Undo the nut on the pump side or the injector side, then the nut located on the rail side.

Move the nut along the tube keeping the olive in contact with the taper.

IMPORTANT: Do not damage the injector's leak return duct (5).



Remove the high pressure pipe(s).

Plug all the holes of the injection circuit.

REFITTING

NOTE: Fit the pump/rail pipe before the rail/injector pipes.

Before fitting the new high pressure pipes, lightly lubricate the nut threads with the oil from the sachet provided in the new parts kit.

Fit the pump-rail high pressure pipe:

– remove the protective plugs from the high pressure pump outlet, the high pressure rail inlet and the pipe.
– insert the high pressure pipe olive into the taper of the high pressure pump outlet,
– insert the high pressure pipe olive into the taper of the high pressure rail inlet.
– finger tighten the nuts of the high pressure pipe starting with the one located on the rail side.

Fit the rail-injector high pressure pipe:

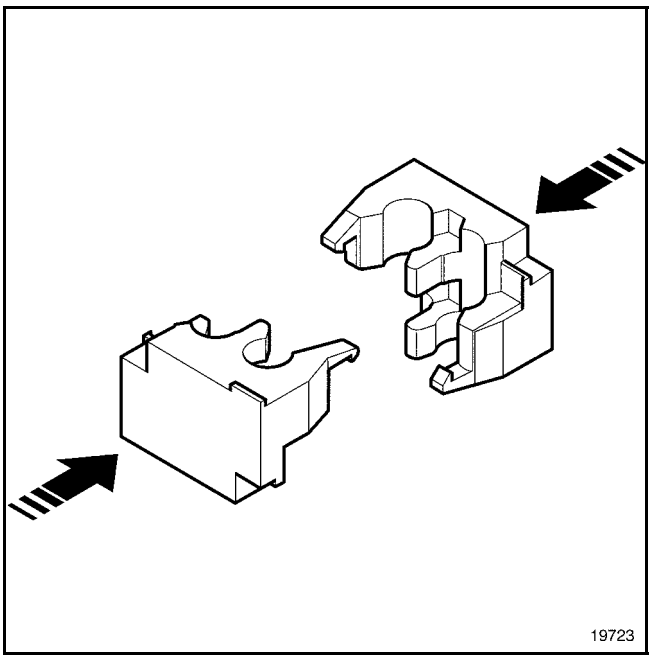
– remove the protective plugs from the high pressure rail outlet, the injector high pressure inlet and the pipe.
– insert the high pressure pipe olive into the taper of the high pressure injector inlet,
– insert the high pressure pipe olive into the taper of the high pressure rail outlet,
– finger tighten the nuts of the high pressure pipe starting with the one located on the injector side.

Fit the remaining high pressure pipes as you did previously.

IMPORTANT: All the high pressure pipes removed must be systematically replaced.

Fit a new clip supplied with the new pipes onto the high pressure pipes:
– insert the first half of the clip using adjustable pliers,
– insert the second half of the clip using adjustable pliers.

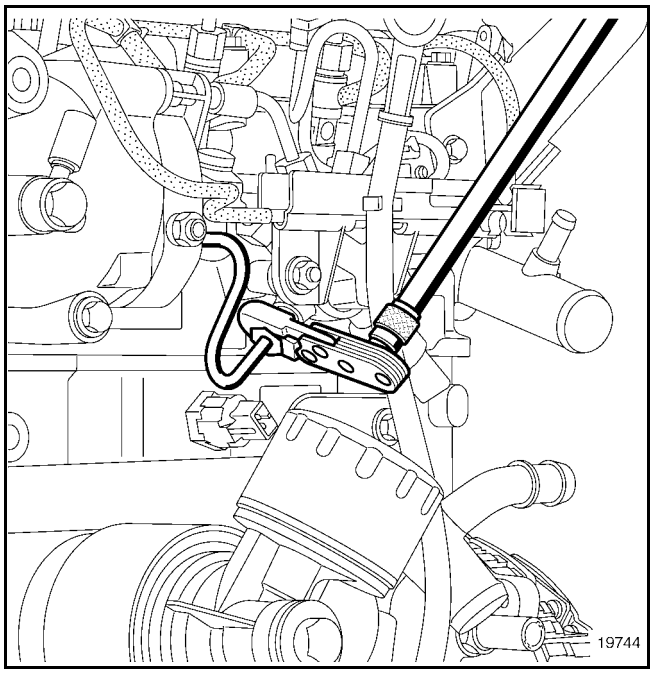
IMPORTANT: Pay attention to the direction of installation of the second clip. The tabs located in the centre of the clip will only fit together in one position.



Tighten the rail nuts to a torque of **2.8 daN.m.**

IMPORTANT: Do not touch the pipes with the wrench when torque tightening.

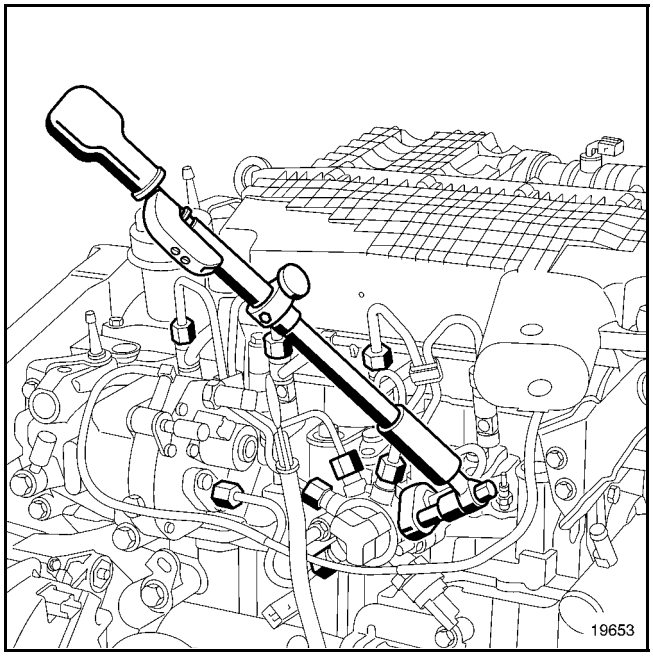
Using the recommended tools, tighten the following in the order and to the torques shown:
– the nut on the pump - rail high pressure pipe starting with the one located on the rail side to a torque of **3.8 daN.m**.
– the nut on the pump side to a torque of **3.8 daN.m**.



IMPORTANT: When tightening the high pressure pipes, it is essential to maintain the central union of the injector (4).

Using the recommended tools, tighten the following in the order and to the torques shown:
– the nut on the injector side to a torque of **3.8 daN.m**.
– the nut on the rail side to a torque of **3.8 daN.m**.

NOTE: Tighten one pipe fully before moving on to the next pipe.



Refit in the reverse order to removal for the other refitting operations.

Test the sealing of the high pressure after it has been repaired (refer to **"Special features"**).

NOTE: When replacing an ECM, it is necessary to program the individual injector correction and the other vehicle configurations using CONSULT-II.

REPLACING THE ECM

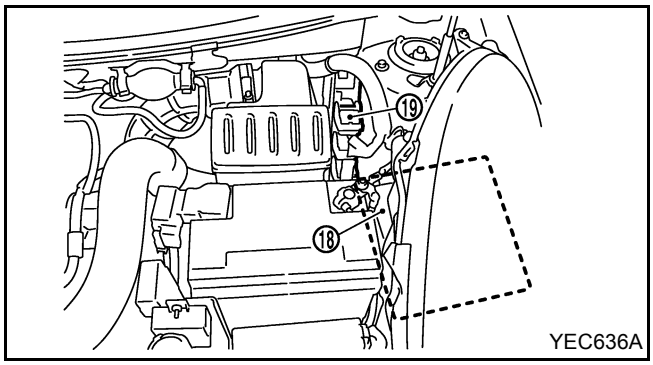
Before an ECM is replaced in after-sales, the following must be checked using CONSULT-II:

- Injectors individual correction value (16 digit code)
- System configulation

REMOVAL

Disconnect:
– the battery,
– the ECM harness connectors.

Remove the mounting nuts from the ECM (19).



REFITTING

Fit the new ECM, taking care to engage the positioning tab, then fit the ECM on its mounting studs.

Tighten the ECM mounting nuts.

Reconnect the ECM.

Connect the battery.

Turn the engine on and read the DTC using the CONSULT-II.

If necessary repair the DTC that appear then clear them.

Check that the vehicle is operating correctly.

This vehicle is fitted with an engine immobilizer system which is controlled by a key recognition system.

REPLACING THE ECM

The ECM are supplied without a code but they must all be programmed with one.

If an ECM is replaced, it must be programmed with the code of the vehicle and the correct operation of the engine immobilizer function must be checked. (Refer to BL section.)

WARNING:

These vehicles have a special ECM which does not function unless it is coded.

Consequently, it is strongly recommended that you do not carry out tests using ECMs borrowed from the warehouse or on another vehicle to prevent coding and uncoding problems which may leave the ECM useless.

UNCODING PROCEDURE

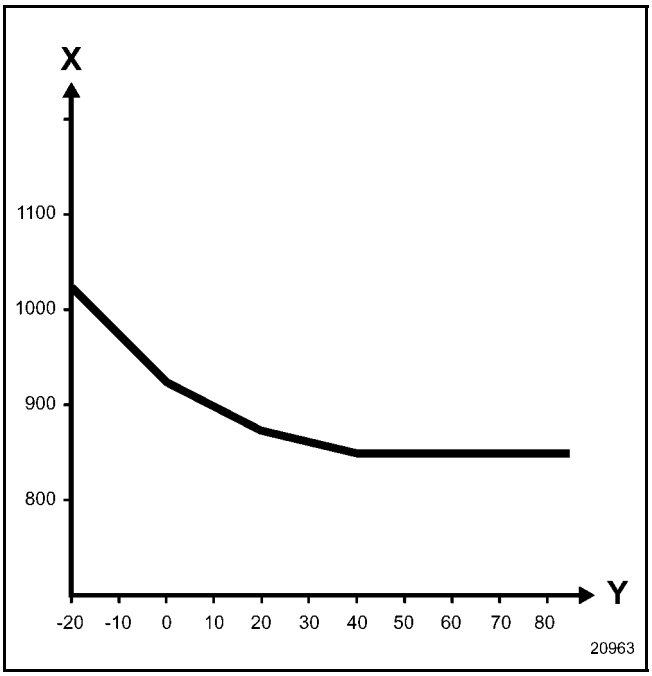
If the ECM has learnt a code and must be returned to the workshop it is imperative that you uncode it before removing it. (See the repair manual or the engine immobilizer TSB).

The ECM takes over calculation of the idle speed to maintain the idle speed at the recommended level and to compensate for any variation in the mechanical or electrical couple as regards:
– the engine coolant temperature,
– battery voltage,
– the gear selected on the transmission,
– the electrical consumers (climate control system, cooling fan assembly etc.),
– any malfunctions found.

At the engine operating temperature, without high electrical consumer, the idle speed is **850 rpm**.

IDLE SPEED CORRECTION ACCORDING TO ENGINE COOLANT TEMPERATURE

X. Engine speed in **rpm**
Y. Temperature in °**C**



SPEED ADJUSTMENT WHEN THERE IS AN ACCELERATOR PEDAL POSITION SENSOR (POTENTIOMETER) MALFUNCTION

- **If one or both terminals** of the accelerator pedal position sensor (potentiometer) are suspected, the ECM overrides the idle speed to maintain it at **1100 rpm**. This defect mode limits performance. The orange injection warning light lights up and flashes.

- **If the accelerator pedal position sensor (potentiometer) is blocked**, **is no longer being supplied, or is not transmitting an output signal,** the ECM overrides the idle speed to maintain it at **1300 rpm**. This mode limits performance. The orange injection warning light lights up and flashes.

- In both cases, when the brake pedal is depressed, the idle speed is stabilised at the **recommended speed**.

- **If the information from the accelerator pedal position sensor (potentiometer) and the brake switch information does not correspond, the speed is changed to 1100 rpm.**

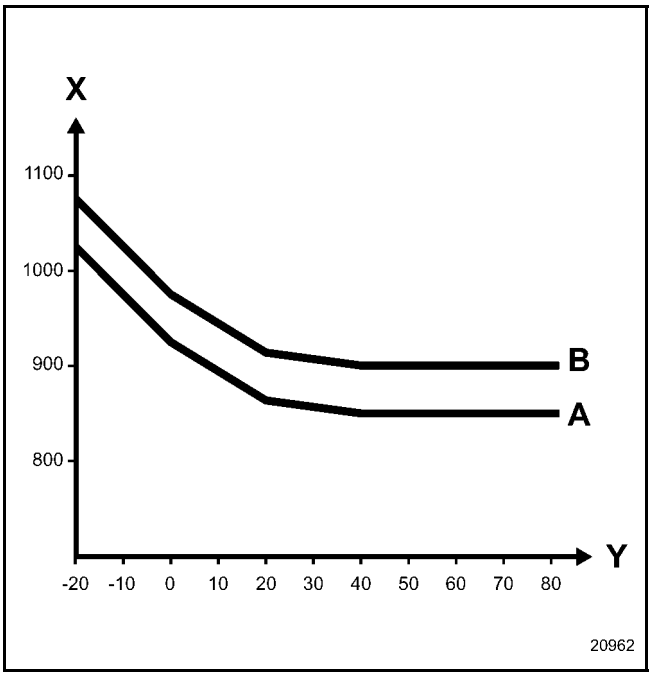
IDLE SPEED ADJUSTMENT WHEN THERE IS AN INJECTOR CODE MALFUNCTION

When there is an injector code malfunction, the ECM overrides the idle speed to maintain it at **1300 rpm**. This mode limits performance. The orange injection warning light lights up and flashes.

CORRECTION OF THE IDLING SPEED ACCORDING TO THE GEAR RATIOS

The idling speed is modified according to the gear selected in the transmission:
– **in neutral, 1st and 2nd gear**, the speed is (at the engine operating temperature) **850 rpm** (graph **A**),
– **for the other gears**, the speed is (at the engine operating temperature) **900 rpm** (graph **B**).

X. Engine speed in **rpm**
Y. Temperature in °**C**



AIR CONDITIONING CONTROL

The compressor is a variable displacement type.

The air conditioning relays are controlled by wires:

COMPRESSOR OPERATION PROGRAMMING

During certain stages of operation, the ECM stops the compressor from functioning.

Engine starting program

The compressor is prevented from operating for **4 seconds** after the engien has started.

Thermal protection program

The compressor is not engaged when the engine temperature is higher than **115** °**C** or from **110** °**C** at high speed, **4500 rpm** for more than **3 seconds.**

Fan assembly control programming

At idling speed and also when driving, with the air conditioning activated, the speed of the fan assembly is determined according to the refrigerant fluid pressure and the vehicle speed.

Recovery of performance

When pressure is applied to the accelerator pedal above **70%**, the compressor is disengaged for **5 seconds**.

Recovery of output when the vehicle starts moving

In order to help the vehicle move off, the air conditioning compressor is disengaged if the position of the accelerator pedal is above **35 %** and the idling speed less than **1250 rpm**.

Anti-stall protection

The compressor is disengaged if the engine speed is lower than **750 rpm.**

Engine overspeed timed protection program

The compressor is disengaged when the speed reaches **4500 rpm** for more than **3 seconds**.

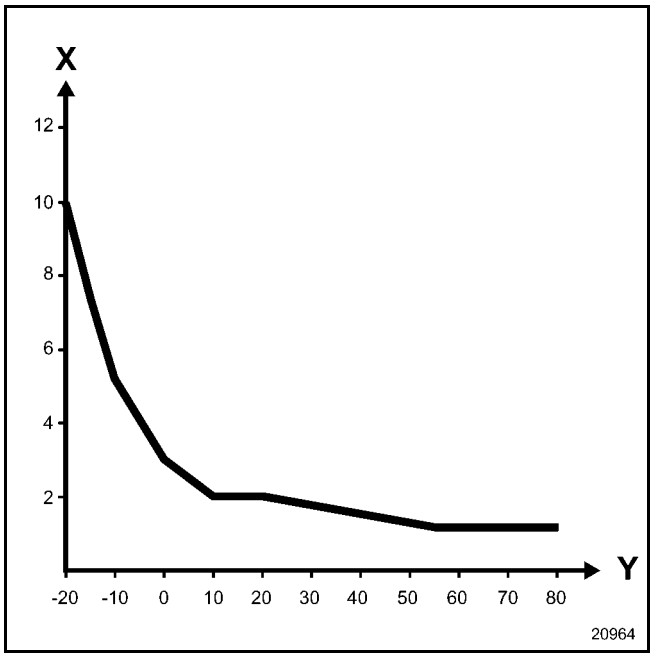
NOTE: The time between the compressor being disengaged twice is always greater than **10 seconds**.

The pre/postheating function is controlled by the preheating unit.

PRE/POSTHEATING (glow plug) OPERATING PRINCIPLE

1) Ignition on "preheating"

a) Variable preheating
The time period for the warning light to light up and the feed to heater plugs depends on the coolant temperature and the battery voltage.



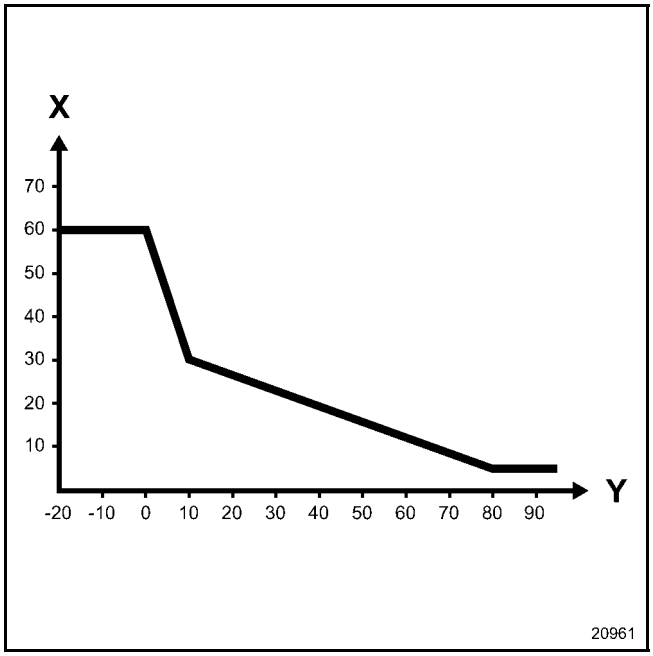
X. Time in seconds
Y. Temperature in °C

Whatever the situation, the preheating warning light cannot be lit for more than **15 seconds** (except in the event of an engine coolant temperature sensor malfunction).

b) Fixed preheating
After the warning light goes out the plugs remain supplied for a fixed period of **5 seconds**.

2) "Post heating" with the engine running

During this phase the plugs are supplied continuously according to engine coolant temperature.



X. Time in seconds
Y. Temperature in °C

For idle speed without pressing the accelerator pedal.

The resistance of a glow plug is **0.6** Ω.

TIGHTENING TORQUE (in daNm)	
Glow plug	**1.5**

Plugs may be removed without having to open the high pressure circuit.

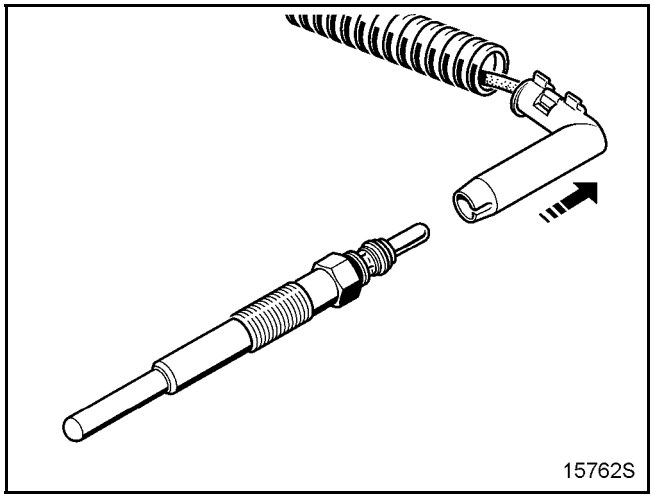
REMOVAL

Disconnect the battery.

Unclip the plug connector.

Clean the outside of the plug to avoid any dirt entering the cylinder.

Loosen and remove the plugs.



To undo the plug on cylinder 4 use a **10 mm** long radio socket attached to a universal joint. Once the plug is loosened use a hose to unscrew it completely.

REFITTING

Proceed in the reverse order to removal.

The cooling fan unit is controlled by the ECM.

COOLING FAN ASSEMBLY OPERATION WITH THE ENGINE RUNNING

The cooling fan assembly is controlled:

- at slow speed if the engine coolant temperature exceeds **99**°**C** or if there is an engine coolant temperature sensor malfunction, and is switched off when the temperature falls below **96**°**C**.
- at high speed if the engine coolant temperature exceeds **102**°**C** or if there is a low speed malfunction, and is switched off when the temperature falls below **99**°**C.**

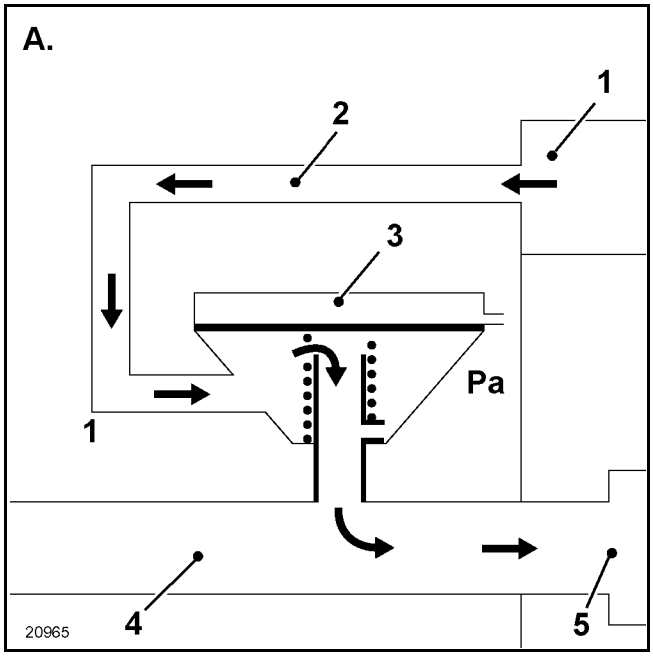
The cooling fan assembly low and high speeds are controlled when the air conditioning function is selected on the instrument panel.

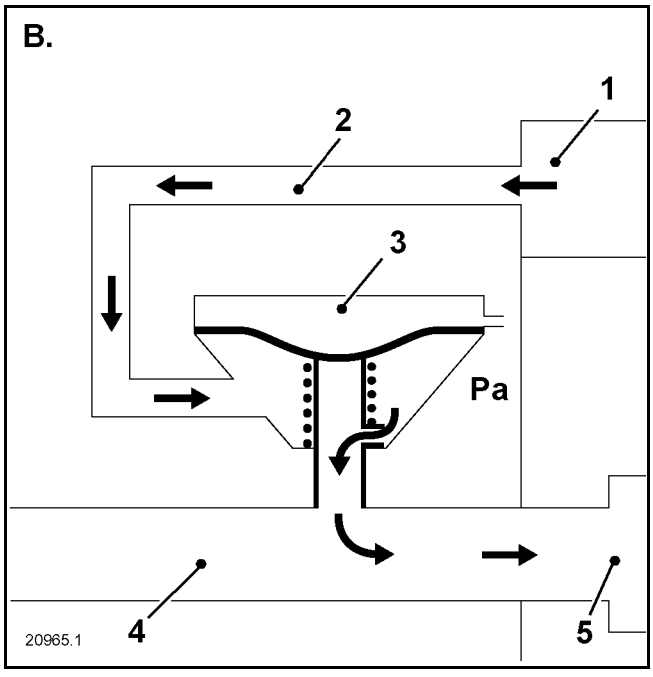
If the low speed setting is suspected, the high speed setting operates under the low speed conditions.

OPERATION OF THE ENGINE COOLANT TEMPERATURE WARNING LIGHT

The engine coolant temperature warning light remains lit if the engine coolant temperature exceeds **114**°**C**. It goes out when the temperature falls below **111**°**C**.

CIRCUIT DIAGRAM





1 Cylinder head cover
2 Oil vapour rebreathing duct
3 Oil vapour recirculation valve
4 Air inlet duct
5 Turbocharger
Pa Atmospheric pressure

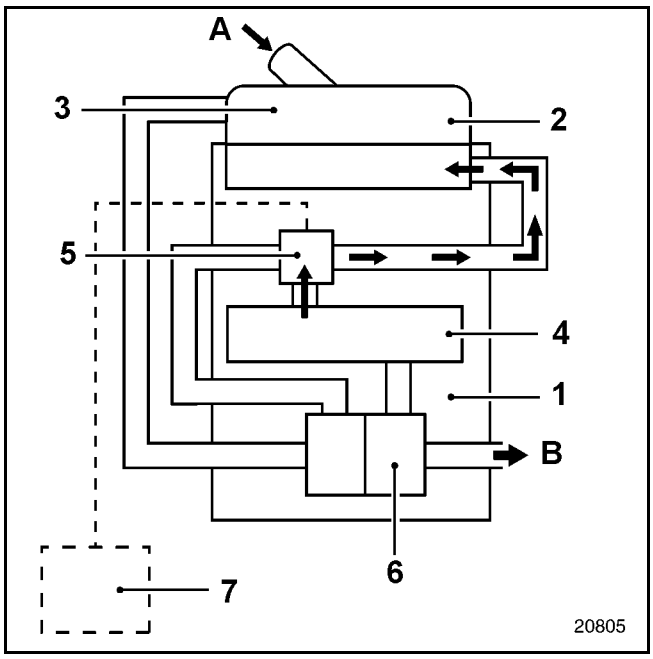
A. When there is a low charge, the vacuum in the air intake duct is below the spring set point. The oil vapours are extensively rebreathed by the vacuum in the air intake duct.

B. When there is a medium or high charge, the pressure in the air intake duct exhausts the valve diaphragm, the oil vapours are breathed in small quantities via a calibrated hole.

CHECKING

To ensure the correct operation of the anti-pollution system, the oil vapour rebreathing circuit must be kept clean and in good condition.

CIRCUIT DIAGRAM



1 Engine
2 Air filter unit
3 Air distributor
4 Exhaust manifold
5 EGR unit with solenoid valve
6 Turbocharger
7 ECM
A Air inlet
B Exhaust gas outlet

PURPOSE OF THE EGR SYSTEM

Exhaust gas recirculation is used to reduce the nitrogen oxide (NOx) content of the exhaust gases.

The ECM authorises gas to pass by controlling a solenoid valve.

1. SCOPE OF THIS DOCUMENT

This document presents the trouble diagnosis method applicable to all ECMs with the following specifications:

Vehicle(s): **K12** with **K9K** *Function concerned:* **DELPHI K9 DIESEL DIRECT COMMON RAIL INJECTION** (DDCR)	Name of ECM: **DDCR INJECTION** Program No.: **BE 88** VDIAG No.: 44

2. PREREQUISITES FOR TROUBLE DIAGNOSIS

To begin trouble diagnosis, it is essential to have the following items available:

Documentation type

Diagnostic procedures:
– Assisted with CONSULT-II, Service Manual.
– Wiring diagrams.

Specia tool required PLUGGED RAIL tools

3. REMINDERS

Trouble diagnosis:

There are **present** DTCs and **stored** DTCs (which appeared in a certain context and have since disappeared or which are still present but have not had trouble diagnosis performed on them in the current context).

The "present" or "stored" status of DTCs must be considered when activating the diagnostic tool after power is supplied to the ECM (without activating the system components).

Deal with **present DTCs** according to the procedure specified in the corresponding DTC trouble diagnosis.

For stored DTCs, note the DTCs displayed and follow the instructions in the **Notes** section.

If the DTC is **confirmed** when the instructions in the **Notes** section are applied, the malfunction is present. Deal with the DTC.

If the DTC is not confirmed, check:
– the electrical lines which correspond to the malfunction,
– the connectors for these lines (for oxidation, bent pins, etc.),
– the resistance of the malfunction component,
– the condition of the wires (melted or cut insulation, wear).

Conformity check

The conformity check is designed to check the states and data monitor items which do not display any DTCs on the diagnostic tool when inconsistent. This phase therefore allows:
– diagnoses malfunctions that do not have a DTC display, and which may correspond to a customer complaint.
– Checks that the system is operating correctly and that there is no risk of a DTC reappearing after repairs.

This section gives the trouble diagnosis procedures for states and parameters and the conditions for checking them.

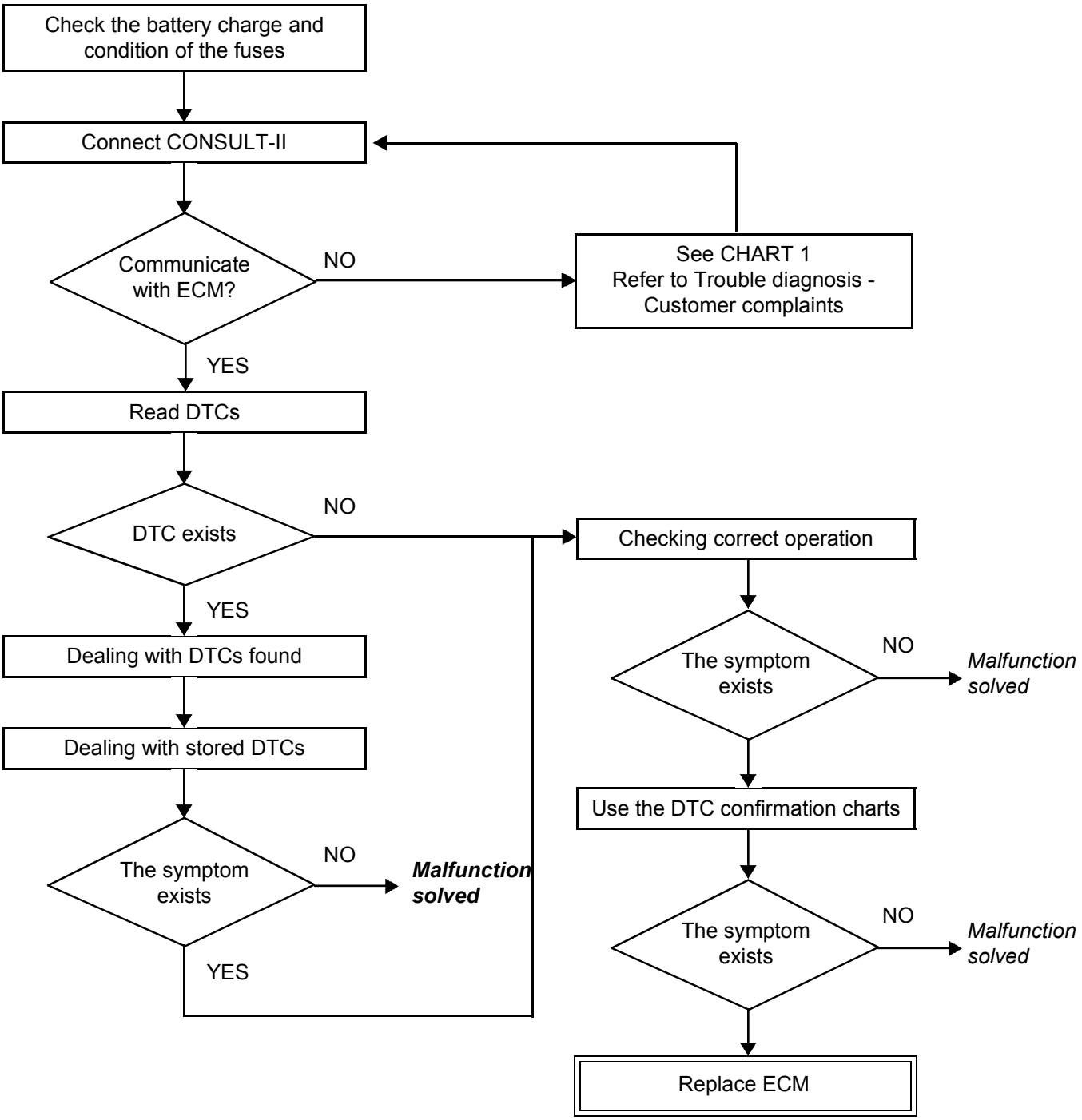
If a state is not operating normally or a data monitor value is outside permitted tolerance values, you should consult the corresponding trouble diagnosis page.

Customer complaints - trouble diagnosis

If the test with the CONSULT-II is OK, but the customer complaint still present, the malfunction should be treated by **customer complaints**.

A synopsis of the general procedure to follow is provided on the next page in the form of a flow chart.

4. DIAGNOSTIC PROCEDURE



5. SAFETY INSTRUCTIONS

All work on components requires that the safety rules be obeyed to prevent damage or injury:
– Make sure the battery is properly charged to avoid damaging the ECMs with a low charge.
– Use the proper tools.

Cleanliness instructions which must be followed when working on the high-pressure direct injection system:

Risks relating to contamination:

The system is very sensitive to contamination. The risks caused by the introduction of contamination are: damage to or destruction of the high-pressure injection system and the engine, seizing or incorrect sealing of a component.

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) get into the system during dismantling or into the circuits via the fuel unions.

The cleanliness guidelines must be applied from the filter through to the injectors.

- What are the sources of contamination?

Contamination is caused by:
– metal or plastic chips,
– paint,
– fibres from: cardboard,
brushes,
paper,
clothing,
cloths.
– foreign bodies such as hair,
– ambient atmosphere,
– etc.

WARNING:
Before working on the injection system, ensure that the system pressure is nearing 0 bar.

CAUTION: it is not possible to clean the engine using a high-pressure washer because of the risk of damaging the connections. In addition, moisture may collect in the connectors and cause electrical connection malfunctions.

5. SAFETY INSTRUCTIONS (CONTINUED):

Instructions to be followed before any work is carried out on the injection system:

- Ensure that you have the plugs for the unions to be opened (bag of plugs available from the Parts Stores, NISSAN part No:**16830 BN700**, Renault part No: **77 01 206 804**). Plugs are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be thrown away.
- Ensure that you have hermetically resealable plastic bags for storing removed parts. There is less risk of parts stored in this way being exposed to contamination. The bags must be used only once, and after use they must be thrown away.
- Ensure that lint-free towelettes are used for injection pump related service purposes. The use of a normal cloth or paper for cleaning purposes is prohibited. They are not lint-free and may contaminate the fuel circuit of the system. A lint-free cloth should only be used once.

5. SAFETY INSTRUCTIONS (CONTINUED):

Instructions to be followed before opening the fuel circuit:

Use new thinner for each operation (used thinner contains impurities). Pour it into a clean receptacle.

For each operation, use a clean brush in good condition (the brush must not shed its bristles).

Use a brush and thinners to clean the connections to be opened.

Blow compressed air over the cleaned parts (tools, cleaned the same way as the parts, connections and injection system zone). Check that no bristles remain adhering.

Wash your hands before and during the operation if necessary.

When wearing leather protective gloves, cover them with latex gloves.

Instructions to be followed during the operation:

As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Stores. They must not, under any circumstances, be reused .

Close the resealable bag, even if it has to be reopened shortly afterwards. The ambient atmosphere carries impurities.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once the plugs have been inserted.

The use of a brush, thinner, bellows, sponge or normal cloth is strictly forbidden once the circuit has been opened. These items are likely to allow contaminants to enter the system.

A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

SYSTEM OPERATION

The high-pressure injection system is designed to deliver a precise quantity of diesel to the engine at a specific time.

It is fitted with a "DDCR" type **112-terminals DELPHI** made ECM.

The system consists of:

- a priming bulb on the low-pressure circuit,
- a diesel filter,
- a high-pressure pump combined with a low-pressure pump (transfer pump),
- a high-pressure regulator mounted on the pump,
- an injector rail,
- a pressure sensor located in the rail,
- four solenoid injectors,
- a fuel temperature sensor,
- an engine coolant temperature sensor,
- an intake air temperature sensor,
- a camshaft position sensor,
- a crankshaft position sensor,
- a turbocharger air pressure sensor,
- a knock sensor (accelerometer),
- an EGR control valve,
- an accelerator pedal position sensor,
- an ECM,
- a mass air flow sensor,

The **common rail** high-pressure direct injection system works sequentially (based on the operation of multipoint injection for petrol engines).

This injection system reduces operating noise, reduces the volume of pollutant gases and particles and produces high engine torque at low engine speeds thanks to a pre-injection procedure.

The high-pressure pump generates the high-pressure sent to the injector rail. The actuator located on the pump controls the quantity of diesel supplied, according to the demand determined by the ECM. The rail supplies each injector through a steel pipe.

The ECM:
It determines the value of injection pressure necessary for the engine to operate correctly and then controls the pressure regulator. It checks that the pressure value is correct by analyzing the value transmitted by the common rail pressure sensor located on the rail.
It determines the injection time necessary to deliver the right quantity of diesel and the moment when injection should start,
It controls each injector electrically and individually after determining these two values.

The injected flow to the engine is determined by:
- the duration of injector control,
- the common rail pressure (regulated by the ECM),
- the injector opening and closing speed,
- the needle travel (determined by a constant for the type of injector),
- the nominal hydraulic flow of the injector (specific to each injector).

The ECM controls:
- the idle speed regulation,
- the EGR control into the intake manifold,
- the fuel supply monitoring (advance, flow and common rail pressure),
- the cooling fan,
- the air conditioning,
- the glow plug control (pre/post heating),

The high-pressure pump is supplied at low-pressure by an integrated low-pressure pump (transfer pump).
It supplies the rail the pressure in which is controlled for charging by the fuel flow actuator and for discharging by the injector valves. Drops in pressure may also be compensated for. The flow actuator allows the high-pressure pump to supply the exact quantity of diesel fuel required to maintain the pressure in the rail. This feature allows heat generation to be minimised and engine output to be improved.
Before discharging the rail using the injector valves, the valves are controlled by short electrical impulses:
short enough not to open the injector, (passing through the return circuit from the injectors),
and long enough to open the valves and discharge the rail.

The fan assembly and coolant temperature warning light on the instrument panel are controlled by the ECM (centralised coolant temperature management function).

The connections between the vehicle's various control units are multiplexed. Therefore, the malfunction warning lights on the instrument panel are lit via the CAN communication line.

There is no vehicle speed sensor in the transmission (transaxle). The vehicle speed signal on the instrument panel is transmitted by the ABS control unit or the wheel speed sensor via a wire connection and is then transmitted on the CAN by the instrument panel.

Some vehicles have a sensor located in the filter for detecting water in the diesel. If there is water present in the diesel, the orange injection and pre/postheating (glow) warning light comes on.

IMPORTANT

The engine must not operate with:
- diesel containing more than **10 %** diester,
- petrol, even in tiny quantities.

The system injects the diesel fuel into the engine at a pressure of up to 1400 bar. Before carrying out any work, check that the injector rail is not pressurised and that the fuel temperature is not too high.

You must respect the cleaning and safety advice specified in this document for any work on the high-pressure injection system.

Removal of the internal parts of the pump and injectors is prohibited. Only the fuel flow actuator, the fuel temperature sensor and the venturi can be replaced.

For safety reasons, it is strictly forbidden to undo a high-pressure pipe union when the engine is running.

It is not possible to remove the common rail fuel pressure sensor from the fuel rail because this may cause circuit contamination malfunction. If the pressure sensor fails, the pressure sensor, the rail and the five high-pressure pipes must be replaced.

It is strictly forbidden to remove any injection pump pulley bearing the number 070 575. If the pump is being replaced, the pulley must be replaced.

Applying 12 V directly to any component in the system is prohibited.

Ultrasonic decoking and cleaning are prohibited.

Never start the engine unless the battery is connected correctly.

Disconnect the injection system computer when carrying out any welding work on the vehicle.

It is essential to replace all the disconnected air inlet plastic pipes.

Functions included

Air conditioning control assistance:

For vehicles with air conditioning, the ECM can deactivate the air conditioning in certain conditions of use:
- when requested by the driver,
- when starting the engine,
- if the engine overheats (in order to reduce the power the engine has to supply),
- when the engine speed is very high (to protect the compressor),
- during transition phases (e.g. under heavy acceleration when overtaking, anti-stalling and moving off strategies). These conditions are only taken into account when they occur repeatedly, so as to prevent system instabilities (incorrect deactivation).
- when reading certain malfunctions.

Cold loop air conditioning control:

The air conditioning is controlled in a cold loop and this function is controlled by several control units. The ECM is responsible for:
- Authorising requests for cold according to passenger compartment, refrigerant pressure, coolant temperature.
- Calculating the power absorbed by the compressor (from the refrigerant pressure).
- The control of the fan assembly according to the vehicle speed, refrigerant pressure and engine coolant temperature.

The driver asks for the air conditioning to be switched on using the air conditioning switch. This request for cold air is either authorised or not, depending on the measured pressure. If this pressure is outside the operating limits, the cold loop strategy is not activated.

> Note:
> Requests to operate the fan assembly can be made by the ECM but these are sent on the CAN. These requests depend on the air conditioning but also on the coolant temperature and vehicle speed.

Thermal regulation of the passenger compartment heating circuit:

In a direct injection engine, fuel is injected directly into the combustion chamber. This leads to heat being lost through the upper part of the engine and consequently, the cylinder head cooling circuit is smaller in size.

The effect of this is that the temperature of the coolant which flows through this circuit rises more slowly. However, this coolant is used by the passenger compartment heating system. In very cold conditions, it is therefore difficult to reach a comfortable passenger compartment temperature quickly.

WARNING LAMP CONTROL

Instrument panel display:

The ECM displays certain information on the instrument panel relating to engine operation. This concerns five functions: MI (Malfunction Indicator) for the EOBD (European On Board Diagnostic), pre/post heating (glow), coolant temperature and engine malfunctions: Severity 1 (non-critical malfunction) and Severity 2 (stop immediately). These five functions are represented by 3 warning lights or messages displayed by the ECM.

Pre/post heating (glow) warning light:

This warning light is used as an operating indicator light and as a system malfunction indicator light:
– Permanently lit during + after turning ignition switch "ON": indicates preheating of the glow plugs.

After preheating and an automatic 3 second off period, the warning light will come on if a level 1 malfunction occurs (leading to reduced operation and reduced safety levels). The driver should carry out repairs as soon as possible.

Temperature/emergency stop warning light:

This warning light is used as an operating indicator light and as a system malfunction indicator light. It lights up for **3 seconds** when the ignition is switched on (automatic test procedure controlled by the instrument panel).
– Permanently on: indicates engine overheating or a level 2 malfunction.

If the malfunction reaches a critical level, the injection is cut off automatically after a few seconds.
In the event of overheating, it is up to the driver whether to stop the vehicle or continue driving.

PROGRAMMING OF WARNING LIGHTS ON THE INSTRUMENT PANEL:

Orange SERVICE warning light (level 1):

This warning light comes on and is **accompanied by the injection faulty message**.

The driver should carry out repairs as soon as possible.

Red STOP warning light (level 2):

This warning light comes on and is **accompanied by the injection malfunction message**.

The driver should carry out repairs as soon as possible.

Excess pollution orange OBD warning light:

This warning light, in the form of an engine symbol, comes on for about 3 seconds when the ignition is switched on then goes out. It never comes on when the engine is running.

CONNECTION

ECM harness connector (E61), 32-terminals

Terminal No.	Item
1	CAN H
2	K-line (Data link connector)
3	Not used
4	Not used
5	Stop lamp switch
6	Accelerator position sensor 2 ground
7	CAN L
8	Not used
9	Not used
10	Not used
11	Not used
12	Accelerator position sensor 2 signal
13	Not used
14	Not used
15	Not used
16	Not used
17	Not used
18	Accelerator pedal position sensor 2 power supply
19	Not used
20	Not used
21	Not used
22	Ignition switch signal
23	Not used
24	Not used
25	Not used
26	Not used
27	Not used
28	Accelerator position sensor 1 ground
29	Accelerator position sensor 1 power supply
30	Accelerator position sensor 1 signal
31	Not used
32	Not used

ECM harness connector (F134), 48-terminals and 32-terminals

Terminal No.	Item
33	Not used
34	APP sensor shield ground
35	Not used
36	Not used
37	Not used
38	EGR volume control valve
39	Fuel flow actuator
40	Not used
41	Knock sensor (accelerometer) shield ground
42	Not used
43	Not used
44	Knock sensor (accelerometer) power supply
45	Knock sensor (accelerometer ground)
46	Not used
47	Common rail pressure sensor power supply
48	Turbocharger air pressure sensor power
49	EGR volume control solenoid valve
50	Not used
51	Intake air temperature sensor power supply
52	Turbocharger air temperature sensor power supply
53	Engine coolant temperature sensor power supply
54	Fuel temperature sensor power supply
55	Crankshaft position sensor power supply
56	Camshaft position sensor
57	Common rail fuel pressure sensor
58	Turbocharger air pressure sensor
59	EGR volume control valve
60	Not used
61	Intake air temperature sensor ground
62	Turbocharger air temperature sensor ground (models without intercooler)
63	Engine coolant temperature sensor ground
64	Fuel temperature sensor ground
65	Crankshaft position sensor ground
66	Camshaft position sensor ground
67	Common rail fuel pressure sensor ground
68	Turbocharger air pressure sensor ground Turbocharger air pressure and temperature sensor's ground (models with intercooler)
69	EGR volume control valve
70	Not used
71	Not used
72	Not used

CONNECTION

ECM harness connector (F134), 48-terminals and 32-terminals (continued)

Terminal No.	Item
73	Injector 2 ground
74	Injector 2 power supply
75	Injector 4 ground
76	Injector 4 power supply
77	Injector 3 ground
78	Injector 3 power supply
79	Injector 1 ground
80	Injector 1 power supply
81	Not used
82	Not used
83	Refrigerant pressure sensor power supply
84	Not used
85	Not used
86	Not used
87	Not used
88	Not used
89	Refrigerant pressure sensor
90	Glow relay
91	Not used
92	Not used
93	Not used
94	Not used
95	Not used
96	Not used
97	Not used
98	Glow relay
99	Not used
100	Not used
101	Not used
102	Not used
104	ECM power supply
105	Not used
106	Not used
107	Refrigerant pressure sensor ground
108	Not used
109	ECM power supply
110	ECM power supply
111	ECM ground
112	ECM ground

DTC and DF code table:

DTC	DF code	Diagnostic tool headings
P0087	**DF130**	Fuel flow capacity function
P0089	**DF053**	Fuel rail pressure regulation function
P0110	**DF039**	Intake air temperature sensor circuit
P0115	**DF001**	Engine coolant temperature sensor circuit
P0180	**DF098**	Fuel temperature sensor circuit
P0190	**DF007**	Common rail pressure sensor circuit
P0200	**DF052**	Injector control circuit
P0201	**DF026**	Injector circuit cylinder 1
P0202	**DF027**	Injector circuit cylinder 2
P0203	**DF028**	Injector circuit cylinder 3
P0204	**DF029**	Injector circuit cylinder 4
P0225	**DF008**	Accelerator pedal position sensor 1 circuit
P0231	**DF024**	Low-pressure actuator control circuit
P0235	**DF089**	Turbocharger boost sensor circuit
P0301	**DF059**	Cylinder 1 misfire
P0302	**DF060**	Cylinder 2 misfire
P0303	**DF061**	Cylinder 3 misfire
P0304	**DF062**	Cylinder 4 misfire
P0325	**DF121**	Knock sensor circuit
P0335	**DF005**	Crankshaft position sensor circuit
P0340	**DF112**	Camshaft position sensor circuit
P0380	**DF025**	Glow plug diagnostic connection
P0382	**DF017**	Glow plug control circuit
P0400	**DF114**	EGR solenoid valve circuit
P0403	**DF016**	EGR control circuit
P0409	**DF010**	EGR position sensor circuit
P0500	**DF014**	Vehicle speed sensor circuit
P0513	**DF037**	Immobiliser
P0530	**DF049**	Refrigerant pressure sensor circuit
P0560	**DF047**	ECM supply voltage

DTC and DF code table:

DTC	DF code	Diagnostic tool headings
P0571	**DF050**	Brake switch circuit
P0604	**DF107**	ECM memory
P0606	**DF038**	ECM
P0608	**DF113**	Sensor supply voltage
P0609	**DF122**	Supply voltage pedal potentiometer track 2
P0685	**DF015**	ECM relay control circuit
P2120	**DF009**	Accelerator pedal position sensor 2 circuit
P2226	**DF003**	Atmospheric pressure sensor circuit
P2264	**DF057**	Water in diesel detector circuit
C001	**DF116**	Multiplex network (CAN circuit)

ECM REPLACEMENT, PROGRAMMING OR REPROGRAMMING OPERATION

Following items can be (re)programmed via the DLC using the CONSULT-II
- System configuration
- Injector's indivisual correction parameter (value)

Before replacing the ECM in after-sales operations, the following data must be readout using CONSULT-II:

– The **individual injector correction** parameters to be noted to appropriate paper or CONSULT-II copying function.

NOTE: The individual injector correction value for each injector must be entered manually after the ECM has been replaced or (re)programmed by reading the individual injector correction value on each injector (Refer to replacing injectors).

IMPORTANT: It is not possible to test an ECM from the parts stores because it cannot be fitted to any other vehicle.

REPLACING THE INJECTORS

NOTE: The individual injector correction is a calibration made on **each injector** in the factory in order to **adjust its flow** precisely.

These correction values are written on a label affixed to each injector then entered into the computer which then controls each injector taking into account its individual **manufacturing variations**.

When replacing one or more injectors, the parameters of the injector output concerned must be modified. **The system can be configured using the CONSULT-II** (Refer to injector).

P0089 **DF053** **STORED**	COMMON RAIL FUEL PRESSURE REGULATION FUNCTION 1.DEF : At minimum limit 2.DEF : At maximum limit 3.DEF : Below minimum threshold 4.DEF : Above maximum threshold 5.DEF : High flow current < minimum 6.DEF : High flow current > maximum 7.DEF : Low flow current < minimum 8.DEF : Low flow current > mimimum

NOTES	**Special notes:** If **DTC P0089** is present: engine may stop with malfunction indicator lights up **(levels 1 and 2)**.
	Priority when dealing with a number of DTCs: If DTC **P0089** and **DTC P0180 or P0190** are present, deal with **P0180 or P0190** first.
	Conditions for applying the diagnostic procedure to the stored DTCs: The fault is declared present with the **engine running**.

4.DEF ***6.DEF*** ***8.DEF***	***NOTES***	**Special notes:** None.

Check the fuel flow actuator connection. Repair if necessary.
Measure the resistance between **terminal 1 and 2 of the fuel flow actuator,** if it is not approximately **5.3 Ω ± 0.5 Ω at 20°C, replace the actuator.**
Check the condition of the ECM (**F134**) harness connector and replace it if necessary.
Check the insulation, continuity **and absence of interference resistance of the connection:** ● ECM (**F134**) terminal 39 and fuel flow actuator harness connector terminal 2 (Refer to wiring diagram "EC-IMV/D-01".) Repair if necessary.
Check: – **that fuel is present** in the tank, – **that there is no air** in the fuel circuit, – the condition of the **fuel filter**. Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0089 **DF053** Cont'd	

1.DEF ***2.DEF*** ***3.DEF*** ***5.DEF*** ***7.DEF***	***NOTES***	**Special notes:** None.

Check **for fuel** in the tank.
Carry out **Test 7 "High pressure system check"**.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0087 **DF130** **STORED**	FLOW CAPACITY FUNCTION

NOTES	**Special notes:** If this DTC is present, engine may stop when malfunction indicator illuminates (levels 1 and 2).
	Condition for applying the diagnostic procedure to stored DTCs: The DTC is declared present **when the engine is running**

Check the **connection** of the fuel flow actuator **(IMV)** and repair if necessary.
Measure the resistance across terminals 1 and 2 of the fuel flow actuator. **Replace the flow actuator** if the resistance is not approximately **5.3** Ω ± **0.5** Ω **at 20 °C**.
Check the condition of the ECM (**F134**) harness connector. Repair if necessary.
Check the **insulation, continuity and absence of unwanted resistance** on the following connection: ● ECM (**F134**) terminal 39 and fuel flow actuator harness connector 2. Repair if necessary
Check: - **that fuel is present** in the tank, - **that there is no air** in the fuel circuit, - the condition of the **fuel filter**. Repair if necessary.
If the DTC persists, carry out a **"HIGH-PRESSURE PUMP" test (see TEST section)**.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0110 **DF039** **PRESENT**	INTAKE AIR TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth (ground) CO.1 : Open circuit or short circuit + 12V

NOTES	**Priority when dealing with a number of DTCs:** If DTCs P0110 and P0608 are present, deal with DTC P0608 (sensor voltage supply) first.
	Special notes: None

Check the condition of the **intake air temperature sensor harness connector** and repair it if necessary.
Check the condition of the ECM harness connector (F134) and repair if necessary.
At the terminal, measure the **resistance** of the **intake air temperature sensor,** if it is not approximately **2051** Ω ± **20** Ω **at 25** °**C** replace the air temperature sensor.
Check the **insulation, continuity and absence of interference resistance** of the connections: ● ECM (F134) terminal 51 and intake air temperature sensor harness connector terminal 1 ● ECM (F134) terminal 61 and intake air temperature sensor harness connector terminal 2 (Refer to wiring diagram "EC-IATS-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0115 **DF001** **PRESENT**	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth (ground) CO.1 : Open circuit or short circuit to + 12V

NOTES	**Special notes:** If DTC **P0115** with low speed cooling fan motor operation is present . If cooling fan 1 is suspected, then cooling fan motor 2 is switched on for vehicles with air conditioning.

Check the condition of the **engine coolant temperature sensor harness connector.**
Repair it if necessary.

Check the condition of the ECM harness connector (F134) and repair if necessary.

At the terminal, measure the **resistance** of the **engine coolant temperature sensor,** if it is not approximately **2252** Ω ± **112.16** Ω **at 25** °**C,** replace the engine coolant temperature sensor.

Check the **insulation, continuity and absence of interference resistance** of the connections:

- ECM (F134) terminal 63 and ECT sensor terminal 1
- ECM (F134) terminal 53 and ECT sensor terminal 4
  (Refer to wiring diagram "EC-ECTS-01".)

Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0180 **DF098** **PRESENT**	FUEL TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth (ground) CO.1 : Open circuit or short circuit + 12V

NOTES	**Special notes:** None.

Check the condition of the **fuel temperature sensor harness connector** and repair it if necessary.
Check the condition of the ECM harness connector (F134) and repair if necessary.
At the terminal, measure the **resistance** of the **fuel temperature sensor,** if it is not approximately **2.2k Ω at 25 °C,** replace the fuel temperature sensor.
Check the **insulation, continuity and absence of interference resistance** of the connections: ● ECM (F134) terminal 64 and fuel temperature sensor harness connector terminal 1 ● ECM (F134) terminal 54 and fuel temperature sensor harness connector terminal 2 (Refer to wiring diagram "EC-FTS-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0190 **DF007** **STORED**	COMMON RAIL FUEL PRESSURE SENSOR CIRCUIT 1.DEF : Inconsistency 2.DEF : Below minimum threshold 3.DEF : Above maximum threshold CC.0 : Short circuit to earth (ground) CO.1 : Open circuit or short circuit to + 12V

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P0190** and **P0608** are both present, deal with DTC **P0608** (sensor voltage supply) first.
	Conditions for applying the diagnostic procedure to the stored DTC: The DTC is declared present after the engine is started.
	If **P0190 is present, the engine stops and is impossible to restart.** **Malfunction indicator lights up (level 1).**

Check the condition of the **common rail fuel pressure sensor harness connector** and repair if necessary.

Check the condition of the **ECM harness connector** (F134) and repair if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 67 and common rail fuel pressure sensor harness connector terminal 2
- ECM (F134) terminal 57 and common rail fuel pressure sensor harness connector terminal 3
- ECM (F134) terminal 47 and common rail fuel pressure sensor harness connector terminal 1

(Refer to wiring diagram "EC-CRFPS-01".)
Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0200 **DF052** **PRESENT**	INJECTOR CONTROL CIRCUIT CC.0 : Short circuit to earth CC.1 : Short circuit to + 12 volts

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** DTC declared present: **engine at idle speed.**
	Priorities when dealing with more than one DTC: If DTC **P0200** and DTCs **P0201, P0202, P0203 and P0204** are present, the diagnostic procedure remains the same, but you can determine the suspected injector.
	Special notes: The engine stalls when the DTC appears. **Level 1 warning light comes on**.

Turn off the ignition switch and check the injector **connections**. Repair if necessary.
Disconnect the injectors and turn on the ignition switch on. Check to see if the DTC is still present. Using CONSULT-II, check for the changes to P0200. Is P0220 present or stored?

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0200 PRESENT	If the DTC **disappears when the injectors are disconnected**, check the condition of the **ECM harness connector** (F134) and replace it if necessary. Check the **insulation, continuity and absence of interference resistance of the connections:** ● ECM (F134) terminal 80 and No.1 injector terminal 2 (+) ● ECM (F134) terminal 79 and No.1 injector terminal 1 (ground) ● ECM (F134) terminal 74 and No.2 injector terminal 2 (+) ● ECM (F134) terminal 73 and No.2 injector terminal 1 (ground) ● ECM (F134) terminal 78 and No.3 injector terminal 2 (+) ● ECM (F134) terminal 77 and No.3 injector terminal 1 (ground) ● ECM (F134) terminal 76 and No.4 injector terminal 2 (+) ● ECM (F134) terminal 75 and No.4 injector terminal 1 (ground) (Refer to wiring diagram "EC-INJECT-01 and -02".) Repair if necessary.
P0200 STORED	Injector(s) malfunctioning. Replace the injector identified by **P0201 to P0204** if present. If none of the faults identifying the malfunctioning injector circuit are present: – Switch off the engine. – Reconnect one of the four injectors. – Switch the ignition back on and, if the malfunctioning reappears as present, replace the reconnected injector. **Carry out the same procedure for the remaining injectors.**

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0201 **DF026** **PRESENT** **OR** **STORED**	CYLINDER 1 INJECTOR CIRCUIT CO : Open circuit CC : Short circuit 1.DEF : At minimum stop

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** STC declared present: **engine at idlie speed**.
	Special notes: When this DTC appears, the idle speed is stuck at **1000 rpm**, with engine noise, unstable engine speed, reduced engine performance and **malfunction indicator lights up (level 1)**.

CO ***CC***	***NOTES***	**Special notes:** None.

With the ignition switched off, wait 15 seconds.
Check the connection and condition of the **injector 1 harness connector**.
Repair if necessary.

Check the condition of the ECM harness connector (F134) and replace it if necessary.

Use command **"INJECTOR CYLINDER 1"** with CONSULT.
If 5 actuation cycles of injector 1 cannot be heard working, connect the cylinder 2 injector harness connector to the cylinder 1 injector and use command **"INJECTOR CYLINDER 2"**.
Does this injector actuation cycle work?

YES	Injector 1 is not malfunctioning, malfunction with injector 1 control circuit. Check **for continuity and make sure there is no extraneous resistance on the following connections**: ● ECM (F134) terminal 80 and injector 1 harness connector terminal 2. ● ECM (F134) terminal 79 and injector 1 harness connector terminal 1. Also check for insulation between these 2 connections. (Refer to wiring diagram "EC-INJECT-02"). Repair if necessary. If the DTC persists, replace ECM.
NO	Injector 1 malfunctioning, replace the cylinder 1 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0201 **DF026** **PRESENT** **OR** **STORED** Cont'd	

1.DEF	***NOTES***	**Special notes:** None.

Check that the injector correction value is correctly programmed into the ECM.

- Check the knock sensor shielding on ECM (F134) harness connector terminal 41.
  (Refer to wiring diagram "EC-INJECT-02".)

Check that the knock sensor is secure on the engine.
If the DTC persists, replace the cylinder 1 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0202 **DF027** **PRESENT** **OR** **STORED**	CYLINDER 2 INJECTOR CIRCUIT CO : Open circuit CC : Short circuit 1.DEF : At minimum stop

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** DTC declared present: **engine at idlie speed**.
	Special notes: When this DTC appears, the idle speed is stuck at **1000 rpm**, with engine noise, unstable engine speed, reduced engine performance and **malfunction indicator light comes on (level 1)**.

CO ***CC***	***NOTES***	**Special notes:** None.

With the ignition switched off, wait 15 seconds.
Check the connection and condition of the **injector 1 harness connector**.
Repair if necessary.

Check the condition of the ECM harness connector (F134) and replace it if necessary.

Use command **"INJECTOR CYLINDER 2"** with CONSULT.
If 5 actuation cycles of injector 2 cannot be heard working, connect the cylinder 3 injector harness connector to the cylinder 2 injector and use command **"INJECTOR CYLINDER 3"**.
Does this injector actuation cycle work?

YES	Injector 2 is not malfunctioning, malfunction with injector 2 control circuit. Check **for continuity and make sure there is no extraneous resistance on the following connections**: ● ECM (F134) terminal 74 and injector 2 harness connector terminal 2. ● ECM (F134) terminal 73 and injector 2 harness connector terminal 1. Also check for insulation between these 2 connections. (Refer to wiring diagram "EC-INJECT-02"). Repair if necessary. If the DTC persists, replace ECM.
NO	Injector 2 malfunctioning, replace the cylinder 2 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0202 **DF027** **PRESENT** **OR** **STORED** Cont'd	

1.DEF	***NOTES***	**Special notes:** None.

Check that the injector correction value is correctly entered on the ECM.

- Check the knock sensor shielding on ECM (F134) harness connector terminal 41.
  (Refer to wiring diagram "EC-INJECT-02".)

Check that the knock sensor is secure on the engine.
If the DTC persists, replace the cylinder 2 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0203 **DF028** **PRESENT** **OR** **STORED**	CYLINDER 3 INJECTOR CIRCUIT CO : Open circuit CC : Short circuit 1.DEF : At minimum stop

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** STC declared present: **engine at idlie speed**.
	Special notes: When this DTC appears, the idle speed is stuck at **1000 rpm**, with engine noise, unstable engine speed, reduced engine performance and **malfunction indicator light comes on (level 1)**.

CO ***CC***	***NOTES***	**Special notes:** None.

Switch off the ignition and wait **15 seconds**.
Check the connection and condition of the **injector connector**. Repair if necessary.

Check the condition of the **ECM harness connector** (F134). Repair if necessary.

Use **"INJECTOR 3 CYLINDER"** in active test mode with CONSULT-II.
If 5 actuation cycles of injector 3 cannot be heard working, connect the cylinder 4 injector harness connector to the cylinder 3 injector and use command **"INJECTOR 4 CYILINDER"**.
Does this injector actuation cycle work?

YES

Injector 3 is not malfunctioning, malfunction with injector 3 control circuit.
Check **for continuity and make sure there is no extraneous resistance on the connections**:

- ECM (F134) terminal 78 and injector 3 terminal 2.
- ECM (F134) terminal 77 and injector 3 terminal 1.

Also check for insulation between these 2 connections.
(Refer to wiring diagram "EC-INJECT-02"). Repair if necessary.
If the DTC persists, replace ECM.

NO

Injector 3 malfunctioning, replace the cylinder 3 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0203 **DF028** **PRESENT** **OR** **STORED** Cont'd	

1.DEF	***NOTES***	**Special notes:** None.

Check that the injector correction value is correctly entered on the ECM.

- Check the knock sensor shielding on ECM (F134) harness connector terminal 41.
  (Refer to wiring diagram "EC-INJECT-02".)

Check that the knock sensor is secure on the engine.
If the DTC persists, replace the cylinder 3 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0204 **DF029** **PRESENT** **OR** **STORED**	INJECTOR CYLINDER 4 CONTROL CIRCUIT CO : Open circuit CC : Short circuit 1.DEF : At minimum stop

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** STC declared present: **engine at idlie speed**.
	Special notes: When this DTC appears, the idle speed is stuck at **1000 rpm**, with engine noise, unstable engine speed, reduced engine performance and **malfunction indicator light comes on (level 1)**.

CO ***CC***	***NOTES***	**Special notes:** None.

Switch off the ignition and wait **15 seconds**. Check the connection and condition of the **injector connector**. Repair if necessary.
Check the condition of the **ECM harness connector** (F134). Repair if necessary.
Use **"INJECTOR 4 CYLINDER"** in active test mode with CONSULT-II. If 5 actuation cycles of injector 4 cannot be heard working, connect the cylinder 1 injector harness connector to the cylinder 1 injector and use command **"INJECTOR 1 CYILINDER"**. **Does this injector actuation cycle work?**

NO	Injector 4 is not malfunctioning, malfunction with injector 4 control circuit. Check **for continuity and make sure there is no extraneous resistance on the connections**: ● ECM (F134) terminal 76 and injector 4 terminal 2. ● ECM (F134) terminal 75 and injector 4 terminal 1. Also check for insulation between these 2 connections. (Refer to wiring diagram "EC-INJECT-02"). Repair if necessary. If the DTC persists, replace ECM.
YES	Injector 4 malfunctioning, replace the cylinder 4 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0204 **DF029** **PRESENT** **OR** **STORED** Cont'd	

1.DEF	***NOTES***	**Special notes:** None.

Check that the injector correction value is correctly entered on the ECM.

- Check the knock sensor shielding on ECM (F134) harness connector terminal 41.
  (Refer to wiring diagram "EC-INJECT-02".)

Check that the knock sensor is secure on the engine.
If the DTC persists, replace the cylinder 4 injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0225 **DF008** **PRESENT**	PEDAL SENSOR CIRCUIT TRACK 1 (APP SENSOR 1) 1.DEF : Inconsistency CO.0 : Open circuit or short circuit to earth (ground) CC.1 : Short circuit to 12 volts 2.DEF : No signal 3.DEF : Blocked component

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P0225** and **P0608** are both present, deal with **DTC P0608 "SENSOR SUPPLY VOLTAGE"** first.
	Special notes: if **DTC P0225** is present: engine speed maintained **above 1000 rpm**, and malfunction indicator lights up **(level 1)**. If **DTC P0225 and DTC P2120** both present: engine speed is fixed at **1300 rpm and** the malfunction indicator lights up **(level 1)**.

1.DEF ***3.DEF***	***NOTES***	**Special notes:** None.

Disconnect ECM harness connector (E61) from the ECM and the connector from the APP sensor and test the insulation between the two lines.

- ECM (E61) terminal 30 and 29 (Refer to wiring diagram).

Repair if necessary.
Replace the APP sensor if the DTC persists.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0225 **DF008** **(Cont'd)**	

CO.0 **CC.1** **2.DEF**	***NOTES***	**Special notes:** None.

Check the condition of the **APP sensor harness connector** and repair it if necessary.
Check the condition of the ECM harness connector (E61) and replace it if necessary.
Measure the **resistance** at the **APP sensor terminals:** **terminal 4** (+5 V) **and terminal 2** (ground) If it is not approximately **1.7 kΩ ± 0.9 kΩ**, replace the pedal potentiometer.
Check the **insulation, continuity and absence of interference resistance of the connections:** ● ECM (E61) terminal 29 and APP sensor harness connector terminal 4 ● ECM (E61) terminal 30 and APP sensor harness connector terminal 3 ● ECM (E61) terminal 28 and APP sensor harness connector terminal 2 (Refer to wiring diagram "EC-APPS-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0231 **DF024** **PRESENT**	LOW-PRESSURE ACTUATOR CONTROL CIRCUIT CO.0 : Open circuit or short circuit to earth CC.1 : short circuit to 12 volts

NOTES	**Special notes:** If fault **P0231** is present with **CO.0 or CC.1 level 1** warning light comes on. The fuel flow actuator is fully opened and the engine is stopped to prevent it from racing.

Check the connection and condition of the **fuel flow actuator connector**. Repair if necessary.
Check the condition of the ECM harness connector (F134). Repair if necessary.
Measure the resistance between the terminals **1 and 2 of the fuel flow actuator**. Replace the flow actuator if the resistance is not approximately **5.3** Ω ± **0.5** Ω **at 20** °**C**.
Check the **insulation, continuity and absence of unwanted resistance** on the following connection: ● ECM (F134) terminal 39 and fuel flow actuator harness connector terminal 2. (Refer to wiring diagram "EC-IMV/D-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0235 **DF089** **PRESENT**	TURBOCHARGER BOOST PRESSURE SENSOR CIRCUIT 1.DEF : Permanent low signal 2.DEF : Permanent high signal 3.DEF : Below minimum threshold 4.DEF : Above maximum threshold 5.DEF : Inconsistency 6.DEF : At maximum stop 7.DEF : At minimum stop

NOTES	**Priority when dealing with a number of DTCs:** in the event of a combination of faults **P0235** and **P0608** are both present, deal with **DTC P0608 "SENSOR SUPPLY VOLTAGE"** first.
	Special notes: Malfunction indicator lights up **(level 1)**.

1.DEF **2.DEF** **3.DEF** **4.DEF**	Check the condition of the **TC boost pressure sensor harness connector** and repair if necessary.
	Check the condition of the **ECM harness connector** (F134) and replace it if necessary.
	Check the **insulation, continuity and absence of interference resistance of the connections:** ● ECM (F134) terminal 68 and TC boost pressure sensor harness connector terminal 2 ● ECM (F134) terminal 58 and TC boost pressure sensor harness connector terminal 3 ● ECM (F134) terminal 48 and TC boost pressure sensor harness connector terminal 1 (Refer to wiring diagram "EC-TCBST-01" models without intercooler, "EC-TCBST-02" models with intercooler.) Repair if necessary.

5.DEF **6.DEF** **7.DEF**	Visually check that the turbocharger circuit is leak tight. Repair if necessary.
	Remove the air supply ducts and check that they are not blocked. Repair if necessary.
	Check the consistency between the **BARO pressure and TC boost pressure sensor**. With the engine stopped, the pressure should be approximately the same between the two sensors. Replace the TC boost pressure sensor if necessary.
	Check the **turbocharger**. Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0301 **DF059** **STORED**	CYLINDER 1 MISFIRE

NOTES	**Special notes:** If **DTC0301** is present, engine speed maintained at **1000 rpm, engine performance is reduced to 75 % and the malfunction indicator lights up (level 1)**.
	Condition for applying diagnostic procedure to the stored DTCs: DTC declared present: **engine at idle speed**.
	Priority when dealing with a number of DTCs: in the event of a combination of **DTC P0201 (CC or CO)** and **DTC P0301** deal with **DTC P0201 "CYLINDER 1 INJECTOR CONTROL CIRCUIT" (CC or CO)** first. **Priority when dealing with a number of DTCs:** in the event of a combination of **DTC P0089 (1.DEF, 2.DEF, 7.DEF)** and **DTC P0301** deal with **DTC P0089 "Pressure regulation"** first.

Check the tightness of the **cylinder** and repair if necessary.
Check the **valve clearances** and adjust them if necessary.
Check the **air inlet conduits** and the **EGR valve** and clean them if necessary.
Replace the injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0302 **DF060** **STORED**	CYLINDER 2 MISFIRE

NOTES	**Special notes:** If **DTC0302** is present, engine speed maintained at **1000 rpm, engine performance is reduced to 75 % and the malfunction indicator lights up (level 1)**.
	Condition for applying diagnostic procedure to the stored DTCs: DTC declared present: **engine at idle speed**.
	Priority when dealing with a number of DTCs: in the event of a combination of **DTC P0202 (CC or CO)** and **DTC P0302** deal with **DTC P0202 "CYLINDER 2 INJECTOR CONTROL CIRCUIT" (CC or CO)** first. **Priority when dealing with a number of DTCs:** in the event of a combination of **DTC P0089 (1.DEF, 2.DEF, 7.DEF)** and **DTC P0302** deal with **DTC P0089 "Pressure regulation"** first.

Check the tightness of the **cylinder** and repair if necessary.
Check the **valve clearances** and adjust them if necessary.
Check the **air inlet conduits** and the **EGR valve** and clean them if necessary.
Replace the injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0303 **DF061** **STORED**	CYLINDER 3 MISFIRE

NOTES	**Special notes:** If **DTC0303** is present, engine speed maintained at **1000 rpm, engine performance is reduced to 75 % and the malfunction indicator lights up (level 1)**.
	Condition for applying diagnostic procedure to the stored DTCs: DTC declared present: **engine at idle speed**.
	Priority when dealing with a number of DTCs: in the event of a combination of **DTC P0203 (CC or CO)** and **DTC P0303** deal with **DTC P0203 "CYLINDER 3 INJECTOR CONTROL CIRCUIT" (CC or CO)** first. **Priority when dealing with a number of DTCs:** in the event of a combination of **DTC P0089 (1.DEF, 2.DEF, 7.DEF)** and **DTC P0303** deal with **DTC P0089 "Pressure regulation"** first.

Check the tightness of the **cylinder** and repair if necessary.
Check the **valve clearances** and adjust them if necessary.
Check the **air inlet conduits** and the **EGR valve** and clean them if necessary.
Replace the injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0304 **DF062** **STORED**	CYLINDER 4 MISFIRE

NOTES	**Special notes:** If **DTC0304** is present, engine speed maintained at **1000 rpm, engine performance is reduced to 75 % and the malfunction indicator lights up (level 1)**.
	Condition for applying diagnostic procedure to the stored DTCs: DTC declared present: **engine at idle speed**.
	Priority when dealing with a number of DTCs: in the event of a combination of **DTC P0204 (CC or CO)** and **DTC P0304** deal with **DTC P0204 "CYLINDER 4 INJECTOR CONTROL CIRCUIT" (CC or CO)** first. **Priority when dealing with a number of DTCs:** in the event of a combination of **DTC P0089 (1.DEF, 2.DEF, 7.DEF)** and **DTC P0304** deal with **DTC P0089 "Pressure regulation"** first.

Check the tightness of the **cylinder** and repair if necessary.
Check the **valve clearances** and adjust them if necessary.
Check the **air inlet conduits** and the **EGR valve** and clean them if necessary.
Replace the injector.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0325 **DF121** **STORED**	KNOCK SENSOR CIRCUIT (ACCELEROMETER CIRCUIT)

NOTES	**Processing priority in the event of a number of DTCs:** If DTCs **P0115, P0180, P2226** are present, first deal with DTCs **P2226: Coolant temperature, P0180: Fuel temperature, and P2226: Atmospheric pressure**. A DTC on one of these sensors could lead to an incorrect trouble diagnosis on the knock sensor (accelerometer).
	Conditions for applying the diagnostic procedure to the stored DTC: DTC declared present: **engine at idle speed.**

Check the **conformity of the injectors** fitted to the vehicle in relation to the **type of vehicle and engine number** (low injector, high or very high pressure).

Check the knock sensor connection.
Repair if necessary.

Check the condition of the **ECM harness connector** (F134) and the sensor shielding on track **ECM** (F134) **terminal 41**. Repair if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 45 and knock sensor harness connector terminal 1
- ECM (F134) terminal 44 and knock sensor harness connector terminal 2

(Refer to wiring diagram "EC-KS-01".)
Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0335 **DF005** **PRESENT** **OR** **STORED**	CRANKSHAFT POSITION SENSOR CIRCUIT (FLYWHEEL) 1.DEF : Inconsistency 2.DEF : No signal 3.DEF : Too many additional teeth 4.DEF : Teeth missing 5.DEF : Additional teeth 6.DEF : Too many teeth missing

NOTES	**Special notes:** If **1.DEF, 2.DEF, 3.DEF, 6.DEF present: engine stops** and malfunction indicator lights up **(level 1)**. If **4.DEF, 5.DEF**, 75 % engine performance, malfunction indicator will not light up.
	Conditions for applying diagnostic procedure for stored DTCs: DTC declared present with the engine **cranking or idling**.

Check the condition of the **crankshaft position sensor harness connector** and repair if necessary.
Check the condition of the ECM harness connector (F134) and repair if necessary.
At the terminal, measure the **resistance** of the **crankshaft position sensor,** if it is not approximately **760**Ω replace the flywheel signal sensor.
Check the **insulation, continuity and absence of interference resistance of the connections:** ● ECM (F134) terminal 55 and crankshaft position sensor harness connector terminal 1 ● ECM (F134) terminal 65 and crankshaft position sensor harness connector terminal 2 (Refer to wiring diagram "EC-CKPS-01".) Repair if necessary.
Check that the flywheel ring gear is not suspected (missing teeth).

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0340 **DF112** **STORED**	CAMSHAFT POSITON SENSOR CIRCUIT 1.DEF : Signal Absent 2.DEF : Inconsistency

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P0340** and **P0608** are both present, deal with DTC **P0608** (sensor voltage supply) first.
	Conditions for applying the diagnostic procedure to the stored DTC: The DTC is declared **present** when the **engine is started or at idle speed (800±50 rpm).**

Check the condition of the **camshaft position sensor harness connector** and repair if necessary.

Check the condition of the **ECM harness connector** (F134) and repair if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 56 and CMP sensor harness connector terminal 2
- ECM (F134) terminal 66 and CMP sensor harness connector terminal 3
- Check power supply between CMP sensor harness connector terminal 1 and IPDM E/R terminal 33 (Refer to wiring diagram "EC-CMPS-01".)

If necessary, replace the sensor.

Check the timing gear setting. Refer to "EM section".

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0380 **DF025** **PRESENT**	GLOW PLUG DIAGNOSTIC CONNECTION CO : open circuit

NOTES	**Special notes:** This DTC only detects an open circuit.

Check the condition and connection of the **glow relay harness connector.** Change it if necessary.
Check the condition and connection of the **glow plug harness connectors.** Change them, if necessary.
Check the condition of the ECM harness connector (F134) and replace it if necessary.
Measure the resistance of each **glow plug**. The resistance should be **less than 2 Ω.** If not, replace the suspected plugs.
Check the **insulation, continuity and absence of interference resistance of the connection:** ● ECM (F134) terminal 98 and glow relay harness connector terminal 1 (Refer to wiring diagram "EC-GLOW-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0382 **DF017** **PRESENT**	GLOW RELAY CONTROL CIRCUIT (PRE HEAT) CC.1 : Short circuit to +12 volts CC.0 : Open circuit or short circuit to earth (ground)

NOTES	**Special notes:** If **P0382** is present starting is difficult (or impossible when cold). **CC.1:** plugs permanently controlled with risk of being damaged and risk of damaging the engine.

Check the condition and connection of the glow relay unit **connector**.
Repair if necessary.

Check the condition of the ECM harness connector (F134) and repair if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- Glow relay (E102) terminal 5 for power supply circuit
- ECM (F134) terminal 98 and glow relay harness connector terminal 1
- ECM (F134) terminal 90 and glow relay harness connector terminal 6
  (Refer to wiring diagram "EC-GLOW-01".)

Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0400 **DF114** **STORED**	EGR CONTROL SOLENOID VALVE CIRCUIT 1.DEF : At minimum stop 2.DEF : At maximum stop 3.DEF : Inconsistency 4.DEF : Valve jammed 5.DEF : Valve clogged

NOTES	**Condition for applying the diagnostic procedure to the DTC stored:** DTC is declared present **at idle speed**.
	Special notes: If **DTC P0400** is present, engine will be unsteady, with possible stalling. Starting problems, or even impossible when cold, with malfunction indicator lights up **(level 1)"**.

Check the condition and connection of the EGR volume control solenoid valve harness connector and repair it if necessary.
Check the condition of the ECM harness connector (F134) and repair if necessary.
Measure the resistance between **terminal 4 and 6 of the EGR volume control solenoid valve,** if it is not approximately **8**Ω ± **0.5**Ω **at 25**°, replace the solenoid valve.
Check the insulation, continuity and absence of interference resistance of the connections: ● EGR volume control solenoid valve terminal 4 for power supply circuit ● ECM (F134) terminal 38 and EGR volume control solenoid valve harness connector terminal 6 (Refer to wiring diagram "EC-EGRC/V-01".) Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0403 **DF016** **STORED**	EGR VOLUME CONTROL SOLENOID VALVE CIRCUIT CC.1 : Short circuit to +12 volts CO.0 : Open circuit or short circuit to earth (ground)

NOTES	**Conditions for applying the diagnostic procedure to the DTC stored:** DTC declared present: **at idle speed.**
	Special notes: If DTC **P0403** is present **Malfunction indicator (level 1)** lights up. Difficult to start engine or even impossible when cold.

Check the condition and connection of EGR volume control solenoid valve harness connector and repair it if necessary.

Check the condition of the ECM harness connector (F134) and repair if necessary.

Measure the resistance at the EGR volume control solenoid valve harness connector terminal.
Replace the solenoid valve if resistance is not approximately 4 kΩ ± 1.6 kΩ at 20°C between terminals 1 and 2 and approximately 1kΩ ± 0.5kΩ at 20°C between terminals 2 and 3.

Check the insulation, continuity and absence of interference resistance of the connections:
- EGR volume control solenoid valve terminal 4 for power supply circuit
- ECM (F134) terminal 38 and EGR volume control solenoid valve harness connector terminal 6 (Refer to wiring diagram "EC-EGRC/V-01".)

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0408 **DF010** **STORED**	EGR VALVE POSITION SENSOR CIRCUIT CO.0 : Open circuit or short circuit to earth (ground) CC.1 : Short-circuit to + 12V 1.DEF : Above minimum threshold 2.DEF : Below maximum threshold

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P0409** and **P0608** are both present, deal with DTC **P0608** first.
	Conditions for applying the diagnostic procedure to the stored DTC: The DTC is **declared present** after **starting the engine**.

Check the condition of the **EGR volume control** solenoid valve harness connector and repair if necessary.

Check the condition of the **ECM harness connector** (F134) and repair if necessary.

Measure the **resistance** at the **EGR control solenoid valve terminal,** if it is not approximately **4 kΩ ± 1.6kΩ at 20°C** between **terminals 1 and 2** and approximately **1 kΩ ± 0.5kΩ at 20°C** between **terminals 2 and 3**, replace the solenoid valve.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 49 and EGR volume control solenoid valve harness connector terminal 1
- ECM (F134) terminal 59 and EGR volume control solenoid valve harness connector terminal 3
- ECM (F134) terminal 69 and EGR volume control solenoid valve harness connector terminal 2
  (Refer to wiring diagram "EC-EGRC/V-01".)

Repair if necessary.

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0500 **DF014** **PRESENT**	VEHICLE SPEED INFORMATION

NOTES	**Special notes:** None.

For this type of vehicle, the ABS control unit or an additional unit (if the vehicle does not have ABS) transmits the vehicle speed on the CAN.
Test the multiplex network to be able to work on the CAN (Malfunction on the CAN H and CAN L lines between the ECM and the ABS). Also check there are no malfanctions in the ABS part or in the system which supplies the vehicle speed.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0513 **DF037** **PRESENT**	IMMOBILISER

NOTES	**Special notes:** None.

Carry out a trouble diagnosis on the multiplex network. (LAN section)
Refer to the trouble diagnosis for the keyless vehicle function. (BL section)

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0530 **DF049** **STORED**	REFRIGERANT FLUID SENSOR CIRCUIT CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC:** DTC declared present: **engine and the air conditioning are activating**.
	Priority when dealing with a number of DTCs: If DTC **P0530** and **P0608** are both present, deal with **DTC P0608 "SENSOR SUPPLY VOLTAGE"** first.

Check the **pressure sensor connection**.
Repair if necessary.

Check the condition of the **ECM (F134) harness connector**.
Repair if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections**:

- ECM (F134) terminal 83 and refrigerant pressure sensor harness connector terminal 3
- ECM (F134) terminal 89 and refrigerant pressure sensor harness connector terminal 2
- ECM (F134) terminal 107 and refriqerant pressure sensor harness connector terminal 1
  (Refer to wiring diagram "EC-RP/SEN-01".)

Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0560 **DF047** **STORED**	COMPUTER SUPPLY VOLTAGE (ECM) 1.DEF : Above maximum threshold 2.DEF : Below minimum threshold

NOTES	**Condition for applying the diagnostic procedure to stored DTC:** the DTC is declared present **when the engine is running above 1000 rpm**.

Check **the battery voltage** when the ignition is switched on. If the **battery voltage < 10 V** recharge the battery.
Check the condition of the **battery terminals**. Repair if necessary.
Check the vehicle's **charge circuit**. Repair if necessary.
Check the condition of the **ECM (E61) harness connector**. Repair if necessary.
Check the **insulation, continuity and absence of interference resistance of the connections**: ● ECM (E61) terminal 22 and fuse block (M16) harness connector. ● ECM (F34) terminal 111, 112 and engine ground. (Refer to wiring diagram "EC-MAIN-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0571 DF050 PRESENT OR STORED	STOP LIGHT SWITCH CIRCUIT 1.DEF : Signal absent 2.DEF : Inconsistency

NOTES	Conditions for applying diagnostic procedure to a stored DTC: the DTC is declared present when the ignition is switched on, when decelerating or when the brake pedal is depressed. Deal with the DTC even if it is stored.

Check the **switch connection** and repair if necessary.
Check for the presence of **+ 12 volts** on the switch supply. Repair if necessary.
Check the condition of the ECM harness connector (E61) and repair if necessary.
Check that the **switch is working.** Change it if necessary.
Check the **insulation, continuity and absence of interference resistance of the connections:** ● Stop lamp switch terminal 1 for power supply circuit ● ECM (E61) terminal 5 and stop lamp switch harness connector terminal 2 (Refer to wiring diagram "EC-BRK/SW-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0604 **DF107** **STORED**	ECM MEMORY

NOTES	**Conditions for applying the diagnostic procedure to the stored DTC**: The DTC is declared present: **with the engine running.**
	If DTC **P0604** is present: it is impossible to stop and restart the engine. **Malfunction indicator lights up (level 1).**

Re-enter **injector's individual correction value** using the **CONSULT-II.**
If the DTC persists, replace the **ECM.**

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0606 **DF038** **PRESENT**	ECM 1.DEF : Analogue/digital converter 2.DEF : Write EEPROM memory 3.DEF : Read EEPROM memory 4.DEF : Injection calibration data 5.DEF : Memory self-test 6.DEF : Non refreshed watchdog 7.DEF : Interference on the injector control line 8.DEF : Watchdog activation

NOTES	None.

7.DEF	Check the condition of the ECM harness connector (F134). Repair it if necessary.
	Check the **insulation, continuity and absence of interference resistance** of the connections: ● ECM (F134) terminal 80 and No.1 injector terminal 2 ● ECM (F134) terminal 79 and No.1 injector terminal 1 ● ECM (F134) terminal 74 and No.2 injector terminal 2 ● ECM (F134) terminal 73 and No.2 injector terminal 1 ● ECM (F134) terminal 78 and No.3 injector terminal 2 ● ECM (F134) terminal 77 and No.3 injector terminal 1 ● ECM (F134) terminal 76 and No.4 injector terminal 2 ● ECM (F134) terminal 75 and No.4 injector terminal 1 (Refer to wiring diagram "EC-INJECT-01 AND -02".) Repair if necessary.
	If the DTC persists, replace ECM.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0606 **DF038** Continued	

4.DEF	Check the condition of the ECM harness connector (F134). Repair it if necessary.
	Check that the **individual injection correction (value)** matches the injectors. If NG, write the individual correction value codes (see "Trouble diagnosis - Introduction").
	If the value corresponds correctly to the injectors, **replace ECM.**

1.DEF **2.DEF** **3.DEF** **5.DEF** **6.DEF** **8.DEF**	**Replace ECM.**

AFTER REPAIR	Follow the instructions to confirm repair. Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0608 **DF113** **PRESENT**	SENSOR SUPPLY VOLTAGE 1.DEF : AT minimum stop 2.DEF : AT maximum stop

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P0608 and P0190, P0225, P0409, P0110, P0530, P0100, P0235** are present, deal with DTC **P0608 "SENSOR SUPPLY VOLTAGE"** first.
	Special notes: If DTC **P0608** is present: the engine stops immediately and it is impossible to restart. Malfunction indicator lights up **(Level 1)**.

Check the condition and connection of all the sensor connectors **as follows:**
- engine coolant temperature sensor
- turbocharger air pressure sensor
- common rail fuel pressure sensor
- APP sensor
- EGR valve position sensor
- camshaft position sensor

Repair if necessary.

Check the condition of **ECM harness connector** (F134) **and** (E61) and repair them if necessary.

Connect the bornier in place of the ECM and check the **insulation, continuity and absence of interference resistance** of the connections:
- ECM (F134) terminal 83 and refrigerant pressure sensor harness connector terminal 1
- ECM (F134) terminal 48 and turbocharger air pressure sensor harness connector terminal 1
- ECM (F134) terminal 47 and common rail fuel pressure sensor harness connector terminal 1
- ECM (E61) terminal 29 and APP sensor 1 harness connector terminal 2
- ECM (F134) terminal 49 and EGR control valve harness connector terminal 1
- Power supply circuit between IPDM E/R terminal 33 and camshaft position sensor harness connector terminal 1
  (Refer to wiring diagram)

Repair if necessary.

If the DTC persists, **apply the trouble diagnosis strategy** to each sensor **supplied by an external terminal.**

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0609 **DF122** **PRESENT**	SUPPLY VOLTAGE PEDAL POTENTIOMETER TRACK 2 (APP sensor 2) CO.1 : Open circuit or short circuit to + 12 volts CC.0 : Short circuit to earth

NOTES	**Special notes:** When this fault appears, the idle speed is set to 1000 rpm, engine performance is reduced to 75 % and the **level 1 warning light comes on**.

CC.0	***NOTES***	**Special notes:** None.

Check the condition of the **APP sensor harness connector**. Repair if necessary.
Check the condition of the **ECM** (E61) **harness connector**. Repair if necessary.
Measure the **resistance** at the **APP sensor** terminals: **APP sensor** harness connector terminals 1 and 5 (+5V) Replace the potentiometer pedal if the resistance is not approximately **2.85 kΩ ± 2.05 kΩ**.
Disconnect **ECM** (E61) and the **APP sensor harness connector**. Check **the insulation to ground** of the connection on **terminal 18** of **ECM harness connector** (E61). Repair if necessary.
Check **the continuity of the connection** between: **APP sensor** terminal 5 and **ECM** (E61) terminal 18 Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0609 **DF122** **CONTINUED**	

CO.1	***NOTES***	**Special notes:** None.

Check the condition of the **APP sensor harness connector**. Repair if necessary.
Check the condition of the **ECM (E61) harness connector**. Repair if necessary.
Measure the **resistance** at the **APP sensor** terminals: **APP sensor** harness connector terminals 1 and 5 (+5V) Replace the APP sensor if the resistance is not approximately **2.85 kΩ ± 2.05 kΩ**.
Check the **insulation, continuity and absence of interference resistance of the connection**: ● **ECM (E61)** terminal 18 and **APP sensor** harness connector terminal 5. Repair if necessary.
Disconnect **ECM (E61) harness connector** and the **APP sensor harness connector**. Check **the insulation to +12 volts** of the connection on **terminal 18** of **ECM harness connector (E61)**. Repair if necessary.
Check **the continuity of the connections**: ● ECM (E61) terminal 18 and APP sensor 1 harness connector terminal 5 ● ECM (E61) terminal 6 and APP sensor 1 harness connector terminal 1 Repair if necessary.
Disconnect **ECM harness connector** and the **APP sensor harness connector**. **Check the insulation** between **terminal 18 and terminal 12** on **ECM harness connector (E61).** Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P0685 **DF015** **PRESENT**	ECM RELAY CONTROL CIRCUIT 1.DEF : Permanent low signal 2.DEF : Permanent high signal

NOTES	**Special notes**: The ECM relay is incorporated in the IPDM E/R.

Check the main relay supply fuse in the IPDM E/R: (20A).
Change it if necessary.

Check the condition and connection of the IPDM E/R connector and replace it if necessary.

Check the condition of the **ECM harness connector** (F134) and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 104 and IPDM E/R terminal 29
- ECM (F134) terminal 109, 110 and IPDM E/R terminal 32
- ECM (F134) terminal 111, 112 and ground
  (Refer to wiring diagram "EC-MAIN-01".)

Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P2120 **DF009** **PRESENT**	ACCELERATOR PEDAL POSITION SENSOR 2 CO.0 : Open circuit or short circuit to eartrh (ground) CC.1 : Short circuit to + 12V

NOTES	**Priority when dealing with a number of DTCs:** If DTCs **P2120** and **P0609** are both present, deal with DTC **P0609** first.
	Special note: If DTC **P2120** is present: engine speed maintained above **1000 rpm.** **Malfunction indicator lights up (level 1).** If DTCs **P2120 and P0225** are present: engine speed fixed at **1300 rpm.** **Malfunction indicator lights up (level 1).**

CO.0	***NOTES***	**Special notes:** None.

Check the condition of the **APP harness connector** and repair it if necessary.
Check the condition of the **ECM harness connector** (E61) and repair if necessary.
Measure the **resistance** at the **APP sensor terminal:** **terminal 1** (ground) **and terminal 5** (+5 V) If it is not approximately **2.85 kΩ ± 2.05 kΩ**, replace the APP sensor.
Check **the insulation against earth (ground) and the continuity of the connection:** ● ECM (E61) terminal 12 and APP sensor harness connector terminal 6 (Refer to wiring diagram "EC-APPS-01 or 02".) Repair if necessary.
Check the continuity of the connection between: ● ECM (E61) terminal 18 and APP sensor harness connector terminal 5 (Refer to wiring diagram "EC-APPS-01 or 02".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P2120 **DF009** CONTINUED 3	

CC.1	***NOTES***	**Special notes:** None.

Check the condition of the **APP sensor harness connector** and repair it if necessary.
Check the condition of the **ECM harness connector** (E61) and replace it if necessary.
Measure the **resistance** at the **APP sensor terminals:** APP sensor terminal 1 (Ground) and 5 (+ 5V) If it is not approximately **2.85 kΩ ± 2.05 kΩ**, replace the APP sensor.
Check the **insulation, continuity and absence of interference resistance of the connection:** ● ECM (E61) terminal 12 and APP sensor harness connector terminal 6 (Refer to wiring diagram "EC-APPS-01".) Repair if necessary.
Check **the insulation against + 12 volts of the connections:** ● ECM (E61) terminal 18 and APP sensor harness connector terminal 5 (Refer to wiring diagram "EC-APPS-01".) Repair if necessary.
Check **the continuity of the connections:** ● ECM (E61) terminal 6 and APP sensor harness connector terminal 1 ● ECM (E61) terminal 18 and APP sensor harness connector terminal 5 (Refer to wiring diagram "EC-APPS-01".)
Disconnect connector (E61) from the computer and the connector from the APP sensor and test the insulation between the two lines: ● ECM (E61) terminal 12 and 18 (Refer to wiring diagram "EC-APPS-01".) Repair if necessary.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

P2226 **DF003** **PRESENT**	ATMOSPHERIC PRESSURE SENSOR CIRCUIT(BARO) CC.1 : Short-circuit to + 12 volts CO.0 : Open circuit or short circuit to earth (ground)

NOTES	**Special note**: None.

Replace the ECM.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

PC001 **DF116** **PRESENT**	MULTIPLEX NETWORK (CAN COMMUNICATION LINE) 1.DEF: Carry out the multiplex network trouble diagnosis

CAN Communication Line

Description

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

Diagnostic Procedure

1. INSPECTION START

1. Turn ignition switch "ON".

2. Select "CAN DIAG SUPPORT MNTR" in "DATA MONITOR" mode with CONSULT-II.

3. Print out the CONSULT-II screen.

OK data

DATA MONITOR	
MONITOR	
CAN CIRC 1	OK
CAN CIRC 2	OK
CAN CIRC 3	OK
CAN CIRC 4	OK
CAN CIRC 5	UNKWN
CAN CIRC 6	UNKWN
CAN CIRC 7	OK

YEC641A

Check that the print out data is matched with above. If NG, go to "CAN COMMUNICATION" in LAN section.

AFTER REPAIR	Deal with any other possible DTCs. Erase the stored DTCs after repair.

SUMMARY TABLE OF DDCR INJECTION PARAMETERS:

Tool parameter code	Diagnostic tool description
PR005	EGR valve opening setpoint
PR008	Rail pressure setpoint
PR010	Rail regulation setting (reference)
PR017	Fuel flow
PR030	Accelerator pedal position
PR032	Inlet pressure
PR035	Atmospheric pressure
PR037	Refrigerant pressure
PR038	Rail pressure
PR051	EGR valve position feedback
PR055	Engine speed
PR059	Inlet air temperature
PR061	External air temperature
PR063	Fuel temperature
PR064	Coolant temperature
PR074	Battery voltage
PR077	EGR valve position sensor voltage
PR080	Rail pressure sensor voltage
PR081	Inlet temperature sensor voltage
PR086	Accelerator pedal position sensor 1 voltage
PR088	Accelerator pedal position sensor 2 voltage
PR089	Vehicle speed
PR125	Power used by the AC compressor
PR127	Heating resistor maximum authorised power
PR132	Air flow

SUMMARY TABLE OF DDCR INJECTION STATES:

TOOL STATE CODE	Diagnostic tool description
ET001	Computer + after ignition feed
ET003	Immobiliser
ET004	Air conditioning authorised
ET006	Code programmed
ET008	EGR solenoid control
ET012	Primary brake contact
ET013	Secondary brake contact
ET018	Air conditioning request
ET021	High-speed fan request
ET022	Fan low-speed request
ET023	Fast idle speed request
ET038	Engine
ET040	Clutch pedal
ET042	Cruise control - speed limiter
ET076	Starting
ET079	Air conditioning present
ET088	Request to start compressor

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

ECM STATES AND PARAMETERS:

Order	Function	Parameter or state check or action	Display and notes	Trouble diagnosis
1	**Battery voltage**	**PR074:** Battery voltage	**12 V < PR074 < 13.5 V**	**In the event of a malfunction, run the trouble diagnostic procedure for the "Charging circuit".**
2	**Engine speed**	**PR055:** Engine speed	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**
3	**Accelerator pedal position**	**PR030:** Accelerator pedal position **0%**	**Gives the position of the accelerator pedal as a %.** **PR030 = 0 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for malfunctions **Pedal sensor circuit, track 1 and track 2** (**P0225** and **P2120**) and **P0608** "Sensor reference voltage".
4	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**
5	**External air temperature**	**PR061:** External air temperature	**Gives the external air temperature in °C. This parameter is controlled by the BCM and transmitted to the injection on the multiplex network.** Default value: 20 °C.	**In the event of a malfunction, apply the trouble diagnostic procedure for this malfunction described in the BCM document.**

ECM STATES AND PARAMETERS:(Continued 1)

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
6	**Intake air temperature**	**PR059:** Intake air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
7	**Fuel temperature**	**PR063:** Fuel temperature Cold = PR064 Warm: 50C	**Gives the fuel temperature in °C. This value is given by the fuel temperature sensor.** Default value: 30 °C.	**In the event of a malfunction, apply the diagnostic procedure for malfunction DF098 Fuel temperature sensor circuit.**
8	**Air circuit pressure**	**PR035:** Atmospheric pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the computer.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
		PR032 Inlet pressure	**Shows the pressure in the inlet circuit in mbar.**	
9	**Rail pressure**	**PR038:** Rail pressure Warm or cold - 90 bar <PR038> 90 bar	**Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar.	**In the event of a malfunction, apply the diagnostic procedure for malfunction P0190 Rail pressure sensor circuit.**

ECM STATES AND PARAMETERS:(Continued 2)

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
10	**Engine**	**ET038:** Engine **+ after ignition feed**	**Gives the current status of the engine.** – **+ after ignition feed** – **CRANKING** – **RUNNING** – **MAINTAINED SUPPLY:** Supply maintained during the power latch phase. – **Stalled: When the engine has stalled.** – **PROTECTED:** When a level 2 malfunction appears or when the engine speed is limited to a certain engine speed.	**NONE.**
11	**Immobiliser**	**ET003:** Immobiliser **INACTIVE**	**Gives the status of the immobiliser system.** – **INACTIVE:** The ECM has recognised the immobiliser code transmitted by the Inteligent Key unit or BCM. – **ACTIVE:** The ECM does not recognise the immobiliser code transmitted by the Inteligent Key unit or BCM.	If **ACTIVE, follow the associated "help" given in the tool.**
12	**Code programmed**	**ET006:** **Code programmed** **YES**	**States whether the immobiliser code has been programmed by the computer or not.** – **YES:** Code programmed – **NO:** Code not programmed by the ECM.	If **NO, replace ECM.**
13	**Vehicle speed**	**PR089:** Vehicle speed	**Gives the vehicle speed in kph. This parameter is transmitted by the ABS computer or vehicle speed ECU. This information is transmitted to the injection on the multiplex network.**	**Test the multiplex network.** **Refer to ABS or vehicle speed ECU trouble diagnosis.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

START SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**ECM + after ignition feed**	**ET001:** ECM + after ignition feed **PRESENT**	**Indicates that the computer is supplied with a + after ignition feed.** **– Present** **– Absent**	**In the event of a malfunction, carry out the diagnostic procedure for P0560 "Computer supply voltage" or P0685 "Main relay circuit".**
2	**Starting**	**ET076:** Starting **AUTHORISED**	**Indicates whether or not starting has been authorised by the injection** **AUTHORISED: The injection has given starting authorisation.** **PROHIBITED: The injection has not given starting authorisation.**	**If PROHIBITED carry out a full diagnostic procedure on the preheating system.**
3	**Engine**	**ET038:** Engine **+ after ignition feed**	**Gives the current status of the engine.** **– + after ignition feed** **– CRANKING** **– RUNNING** **– MAINTAINED SUPPLY: Supply maintained during the power latch phase.** **– Stalled: When the engine has stalled.** **– Protected: When a malfunction appears or when the engine speed is limited to a certain engine speed.**	**NONE.**
4	**Battery voltage**	**PR074:** Battery voltage	**12 < PR074 < 13.5 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

PROTECTION SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Immobiliser**	**ET003:** Immobiliser **INACTIVE**	**Gives the status of the immobiliser system.** **– INACTIVE: The injection computer has recognised the immobiliser code transmitted by the Inteligent Key unit or BCM.** **– ACTIVE: The ECM does not recognise the immobiliser code transmitted by the Inteligent Key unit or BCM.**	If **ACTIVE, follow the associated "help" given in the tool.**
2	**Code programmed**	**ET006:** Code programmed **YES**	**States whether the immobiliser code has been programmed by the computer or not.** **– YES: Code programmed** **– NO: Code not programmed by the ECM.**	If **NO, replace ECM.**
3	**Battery voltage**	**PR074:** Battery voltage	**12 V < PR074 < 13.5 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

SUB SYSTEM COLD LOOP:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Air conditioning present**	**ET079:** Air conditioning present **YES**	**States whether the vehicle is fitted with air conditioning or not.** – **YES:** Air conditioning is detected by the injection computer. – **NO:** Air conditioning is not detected by the injection computer.	**If not consistent with the vehicle equipment, carry out the multiplex network test and apply the relevant procedure.**
2	**Compressor engagement request**	**ET088:** Request to start compressor **INACTIVE**	**The injection requests the IPDM E/R (via the multiplex network) to start the compressor** – **ACTIVE:** The multiplex network should not be suspected on the Automatic Transmission, IPDM E/R or Inteligent Key unit or BCM system. The Inteligent Key unit or BCM should request the injection to be engaged. The coolant pressure sensor should not be suspected. Satisfactory engine operating conditions (coolant temperature, engine load etc.). – **INACTIVE: One of the above conditions has not been fulfilled.**	**NONE.**

SUB SYSTEM COLD LOOP (Continuation 1):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
3	Air conditioning authorisation	**ET004:** Air conditioning authorised **NO**	**Non operational information, designed solely for trouble diagnosis purposes.** – **YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or stop etc.). – **NO:** One of the above conditions has not been fulfilled.	**NONE.**
4	**Refrigerant pressure**	**PR037:** Refrigerant pressure	**Gives the value in BAR for the refrigerant fluid in the system.** **2 Bar < PR037 < 27 Bar** Default value: 0 Bar.	**If there is a problem: apply the diagnostic procedure for P0530 "Refrigerant fluid sensor circuit". If the DTC persists, replace the refrigerant sensor.**
5	**Engine speed**	**PR055:** Engine speed	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the trouble diagnosis procedure for P0335 Engine speed sensor circuit.**
6	**Fast idle speed request**	**ET023:** Fast idle speed request **ABSENT**	**The Inteligent Key unit or BCM requests fast idle speed from the injection.** – **ABSENT:** The Inteligent Key unit or BCM did not make the request – **PRESENT:** The Inteligent Key unit or BCM has made a request	**If ET023is incorrect, carry out a multiplex network test using the diagnostic tool. If the test is correct refer to the Inteligent Key unit or BCM trouble diagnosis.**
7	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

SUBSYSTEM: COLD LOOP (continuation 2)

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
8	**Vehicle speed**	**PR089:** Vehicle speed	**Gives the vehicle speed in kph. This parameter is transmitted by the ABS control unit. This information is transmitted to the injection on the multiplex network.**	**Test the multiplex network. Refer to ABS trouble diagnosis.**
9	**Power used by the AC compressor**	**PR125:** Power used by the AC compressor **0 WATT**	**Gives the power used by the compressor**	**NONE.**
10	**Fan speed request ***	**ET022:** Fan low-speed request **INACTIVE**	**The injection requests the IPDM E/R to start the fans.** – **INACTIVE:** Engine speed = 0 rpm. – **ACTIVE:** Engine speed = idle speed, correct refrigerant pressure and vehicle speed = 0 km/h or high coolant temperature.	**NONE.**
11	**Fan speed request ***	**ET021:** High-speed fan request **INACTIVE**	**The injection requests the IPDM E/R to start the fans.** – **INACTIVE:** Engine speed = 0 rpm. – **ACTIVE:** Engine speed = idle speed. Refrigerant pressure > 15 Bar, vehicle speed = 0 km/h or high coolant temperature.	**NONE.**

***: When climate control is requested with the engine at idle speed and vehicle speed = 0 km/h, ET022 will always be "ACTIVE" and ET021 "INACTIVE" (except refrigerant pressure> 15 bar, vehicle speed = 0 km/h and high coolant temperature). The fans are prevented from operating under certain coolant temperature conditions when driving.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

HEATING SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

LPG/FUEL CIRCUIT SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Fuel temperature**	**PR063:** Fuel temperature Cold = PR064 Warm: 50 °C	**Gives the fuel temperature in °C.** Default value: 30 °C.	**In the event of a malfunction, perform the diagnostic procedure for malfunction: P0180 "Fuel temperature sensor circuit".**
2	**Fuel flow**	**PR017:** Fuel flow **0.0 mg/piston stroke**	**Shows the fuel flow injected in mg/piston stroke for each injector.** PR017 = 0 mg/piston stroke.	**NONE.**
3	**Rail pressure**	**PR038:** rail pressure Cold and warm: - 90 bar <PR038> 90 bar	**Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar.	**In the event of a malfunction, apply the diagnostic procedure for malfunction P0190 Rail pressure sensor circuit.**
4	**Rail pressure setpoint**	**PR008:** Rail pressure setpoint **375 bar** (Engine starting pressure instruction) Cold: 500 Bar Warm: 300 Bar	**Gives a theoretical pressure value for optimum engine operation.** 300 bar < PR008 < 500 bar.	**NONE.**
5	**Rail pressure sensor voltage**	**PR080:** Rail pressure sensor voltage Cold: 0.5 V Cold: 4.5 V	**Shows the voltage delivered by the computer on the rail pressure sensor.** 0.5 V < PR080 < 4.5 V Default value: 4.5 V	**NONE.**
6	**Engine speed**	**PR055:** Engine speed.	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

PRE-HEATING/IGNITION SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**
2	**External air temperature**	**PR061:** External air temperature	**Gives the external air temperature in °C. This parameter is controlled by the Inteligent Key unit or BCM and transmitted to the ECM on the multiplex network.** Default value: 20 °C.	**In the event of a malfunction, apply the diagnostic procedure for this malfunction described in the Inteligent Key unit or BCM document.**
3	**Inlet air temperature**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
4	**Battery voltage**	**PR074:** Battery voltage	**12 V < PR074 < 13.5 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Inlet air temperature**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
2	**Air circuit pressure**	**PR035:** Atmospheric pressure **PR032:** Inlet pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the computer.** **Shows the pressure in the inlet circuit in mbar.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow	**Air flow estimated by the injection computer.**	**NONE.**
4	**Inlet temperature sensor voltage**	**PR081:** Inlet temperature sensor voltage	**Shows the voltage delivered by the computer to supply the inlet temperature sensor**	**NONE.**
5	**Engine speed**	**PR055:** Engine speed	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

ENGINE COOLING SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

DRIVER PARAMETERS SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Accelerator pedal position**	**PR030:** Accelerator pedal position **0 %**	Indicates the percentage of the pedal position between no load and full load position **0 % < PR030 < 100 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for malfunction **Pedal sensor circuit, track 1 and track 2** (**P0225** and **P2120**) and **P0608** "Sensor reference voltage".
2	**Pedal potentiometer tracks voltage**	**PR086:** Pedal potentiometer track 1 voltage **16 %** **PR088:** Pedal potentiometer track 2 voltage **7 %**	**Shows the voltage supply percentage for tracks 1 and 2 of the pedal potentiometer.** **10 % < PR086 < 20 %** **5 % < PR088 < 15 %.**	**In the event of a malfunction**, apply the **diagnostic procedure** for malfunction **Pedal sensor circuit, track 1 and track 2** (**P0225** and **P2120**) and **P0608** "Sensor reference voltage".

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given for reference purposes only. **Application condition:** engine **off, ignition on**.

ANTIPOLLUTION / OBD SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**EGR electronic control**	**ET008:** EGR solenoid control **INACTIVE**	**Shows the condition of the EGR valve control.** – **INACTIVE:** The valve is not controlled by the computer. – **ACTIVE:** The valve is controlled by the computer.	**NONE.**
2	**Atmospheric pressure**	**PR035:** Atmospheric pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the computer.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow	**Air flow estimated by the injection computer.**	**NONE.**
4	**Fuel flow**	**PR017:** Fuel flow **0.0 mg/piston stroke**	**Shows the fuel flow out of the high-pressure pump in mg/piston stroke.**	**NONE.**
5	**EGR solenoid valve control**	**PR005:** EGR valve opening setpoint Warm or cold = - 50	**Gives a theoretical EGR valve opening value for optimum engine operation.** PR005 = PR051	**NONE.**

ANTIPOLLUTION / OBD SUBFUNCTION (cont.):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
6	**EGR valve position feedback**	**PR051:** EGR valve position feedback Warm or cold = - 50	**Gives the actual value of the EGR valve position.** PR051 = PR005	**NONE.**
7	**EGR valve position sensor voltage**	**PR077:** EGR valve position sensor voltage **1.09 V**	**Gives the EGR valve voltage according to its position.** – **INACTIVE:** The valve is not controlled by the computer. – **ACTIVE:** The valve is controlled by the computer. **0.5 V < PR077 < 4.8 V**	**NONE.**
8	**Accelerator pedal position**	**PR030:** Accelerator pedal position **0 %**	**Indicates the percentage of the pedal position between no load and full load position** **PR030 = 0 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for malfunction **Pedal sensor circuit, track 1 and track 2** (**P0225** and **P2120**) and **P0608** "Sensor reference voltage".
9	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

MAIN COMPUTER STATES AND PARAMETERS:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Battery voltage**	**PR074:** Battery voltage.	**13 V < PR074 < 14 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**
2	**Engine speed**	**PR055:** Engine speed. Cold: 900 rpm V Warm: 805 rpm	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**
3	**Accelerator pedal position**	**PR030:** Accelerator pedal position **0 %**	**Gives the position of the accelerator pedal as a %.** **PR030 = 0 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for DTCs **P0225** and **P2120** Pedal sensor circuit, track 1 and track 2 and **P0608** "Sensor reference voltage".
4	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**
5	**External air temperature**	**PR061:** External air temperature	**Gives the external air temperature in °C. This parameter is controlled by the Inteligent Key unit or BCM and transmitted to the injection on the multiplex network.** Default value: 20 °C.	**In the event of a malfunction, apply the diagnostic procedure for this malfunction described in the Inteligent Key unit or BCM document.**

MAIN COMPUTER STATES AND PARAMETERS:(Continued 1)

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
6	**Inlet air temperature**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 20 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
7	**Fuel temperature**	**PR063:** Fuel temperature Cold = PR064 Warm: 50 °C	**Gives the fuel temperature in °C. This value is given by the fuel temperature sensor.** Default value: 30 °C.	**In the event of a malfunction, apply the diagnostic procedure for malfunction P0180 Fuel temperature sensor circuit.**
8	**Air circuit pressure**	**PR035:** Atmospheric pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the computer.** 600 mbar < Cold < 1050 mbar 600 mbar < Warm < 1050 mbar	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
		PR032: Inlet pressure	**Shows the pressure in the inlet circuit in mbar.** PR032 = local atmospheric pressure	
9	**Rail pressure**	**PR038:** Rail pressure Cold: 260 Bar Warm: 230 Bar	**Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar.	**In the event of a malfunction, apply the diagnostic procedure for malfunction P0190 Rail pressure sensor circuit.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

START SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Computer + after ignition feed**	**ET001:** Computer + after ignition feed **PRESENT**	**Indicates that the computer is supplied with a + after ignition feed.** **– Present** **– Absent**	**In the event of a malfunction, carry out the diagnostic procedure for P0560 "Computer supply voltage" or P0685 "Main relay circuit".**
2	**Starting**	**ET076:** Starting **AUTHORISED**	**Indicates whether or not starting has been authorised by the injection** **AUTHORISED: The injection has given starting authorisation.** **PROHIBITED: The injection has not given starting authorisation.**	**If PROHIBITED, carry out a full diagnostic procedure on the preheating system.**
3	**Engine**	**ET038:** Engine **+ after ignition feed**	**Gives the current status of the engine.** **– + after ignition feed** **– CRANKING** **– RUNNING** **– MAINTAINED SUPPLY: Supply maintained during the power latch phase.** **– Stalled: When the engine has stalled.** **– Protected: When a malfunction appears or when the engine speed is limited to a certain engine speed.**	**NONE.**
4	**Battery voltage**	**PR074:** Battery voltage	**13 V < PR074 < 14 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

PROTECTION SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Immobiliser**	**ET003:** Immobiliser **INACTIVE**	**Gives the status of the immobiliser system.** **– INACTIVE: The injection computer has recognised the immobiliser code transmitted by the UCH.** **– ACTIVE: The injection computer does not recognise the immobiliser code transmitted by the Inteligent Key unit or BCM.**	If **ACTIVE, follow the associated "help" given in the tool.**
2	**Code programmed**	**ET006:** Code programmed **YES**	**States whether the immobiliser code has been programmed by the computer or not.** **– YES:** Code programmed **– NO: Code not programmed by the ECM.**	If **NO, replace ECM.**
3	**Battery voltage**	**PR074:** Battery voltage	**13 V < PR074 < 14 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

SUB SYSTEM COLD LOOP:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Air conditioning present**	**ET079:** Air conditioning present **YES**	**States whether the vehicle is fitted with air conditioning or not.** – **YES:** Air conditioning is detected by the ECM. – **NO:** Air conditioning is not detected by the ECM.	**If not consistent with the vehicle equipment, carry out the multiplex network test and apply the relevant procedure.**
2	**Compressor engagement request**	**ET088:** Request to start compressor **INACTIVE**	**The injection requests the IPDM E/R (via the multiplex network) to start the compressor** – **ACTIVE:** The multiplex network should not be faulty on the Automatic Transmission, IPDM E/R. The UCH should request the injection to be engaged. The refrigerant pressure sensor should not be faulty. Satisfactory engine operating conditions (coolant temperature, engine load etc.). – **INACTIVE:** One of the above conditions has not be fulfilled or no request has been made by the driver so **ET004 = NO**.	**NONE.**

SUB SYSTEM COLD LOOP (Continuation 1):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
3	Air conditioning authorisation	**ET004:** Air conditioning authorised **NO**	**Non operational information, designed solely for trouble diagnosis purposes.** – **YES:** Satisfactory engine operating conditions (coolant temperature, engine load etc.). The vehicle is not in a specific movement phase (hill start or stop etc.). – **INACTIVE:** One of the above conditions has not be fulfilled or no request has been made by the driver so **ET088 = INACTIVE**.	**NONE.**
4	**Refrigerant pressure**	**PR037:** Refrigerant pressure.	**Gives the value in BAR for the refrigerant fluid in the system.** **2 Bar < PR037 < 27 Bar** Default value: 0 Bar.	**If there is a problem: apply the diagnostic procedure for P0530 "Refrigerant fluid sensor circuit". If the DTC persists, replace the refrigerant sensor.**
5	**Engine speed**	**PR055:** Engine speed Cold: 900 rpm V Warm: 805 rpm	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**

SUBSYSTEM: COLD LOOP (continuation 2)

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
6	**Fast idle speed request**	**ET023:** Fast idle speed request **ABSENT**	**The BCM requests fast idle speed from the injection.** – **ABSENT:** The IPDM E/R did not make the request – **PRESENT:** The IPDM E/R has made a request	**If ET023 is incorrect, carry out a multiplex network test using the diagnostic tool. If the test is correct refer to the IPDM E/R diagnostic procedure**
7	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**
8	**Vehicle speed**	**PR089:** Vehicle speed	**Gives the vehicle speed in kph. This parameter is transmitted by the ABS control unit. This information is transmitted to the injection on the multiplex network.**	**Test the multiplex network.** **Refer to ABS trouble diagnosis.**

COLD LOOP SUBSYSTEM (continuation 3):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
9	**Power used by the AC compressor**	**PR125:** Power used by the AC compressor **0 WATT**	**Gives the power used by the compressor**	**NONE.**
10	**Fan speed request ***	**ET022:** Fan low-speed request **INACTIVE**	**The injection requests the IPDM E/R to start the fans.** – **INACTIVE:** The request is not made by the injection because ET088 = INACTIVE and ET004 = NO. – **ACTIVE:** The request is made by the injection. ET088 = ACTIVE and ET004 = YES. (correct refrigerant pressure and vehicle speed = 0 km/h or high coolant temperature).	**NONE.**
		ET021: High-speed fan request **INACTIVE**	**The injection requests the UPC to start the fans.** – **INACTIVE:** The request is not made by the injection because ET088 = INACTIVE and ET004 = NO. – **ACTIVE:** The request is made by the injection. ET088 = ACTIVE and ET004 = YES. Refrigerant pressure > 15 Bar, vehicle speed = 0 km/h or high engine coolant temperature.	

***: When climate control is requested with the engine at idle speed and vehicle speed = 0 km/h, ET022 will always be "ACTIVE" and ET021 "INACTIVE" (except refrigerant pressure> 15 bar, vehicle speed = 0 km/h and high coolant temperature). The fans are prevented from operating under certain coolant temperature conditions when driving.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

HEATING SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

LPG/FUEL CIRCUIT SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Fuel temperature**	**PR063:** Fuel temperature Cold = PR064 Warm: 50 °C	**Gives the fuel temperature in °C.** Default value: 30 °C.	**In the event of a malfunction, perform the diagnostic procedure for DTC P0180 "Fuel temperature sensor circuit".**
2	**Fuel flow**	**PR017:** Fuel flow 10 < Cold < 2 mg/ piston stroke 4 < Warm < 6 mg/ piston stroke	**Shows the fuel flow injected in mg/ piston stroke for each injector.**	**None.**
3	**Rail pressure**	**PR038:** Rail pressure Cold: 260 Bar Warm: 230 Bar	**Gives the pressure of the diesel in the injection rail in Bar. This pressure is supplied by the sensor on the rail.** Default value: 2000 Bar.	**In the event of a malfunction, apply the diagnostic procedure for DTC P0190 Rail pressure sensor circuit.**
4	**Rail pressure setpoint**	**PR008:** Rail pressure specification **375 bar**. (Engine starting pressure specification). Cold: 260 Bar Warm: 230 Bar	**Gives a theoretical pressure value for optimum engine operation.**	**None.**
5	**Rail pressure sensor voltage**	**PR080:** Rail pressure sensor voltage	**Shows the voltage delivered by the computer on the rail pressure sensor.** 0.5 V (0 bar) < PR080 < 4.5 V (1600 bar)	**None.**
6	**Engine speed**	**PR055:** Engine speed. Cold: 900 rpm V Warm: 805 rpm	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for DTC P0335 Engine speed sensor circuit.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

PRE-HEATING/IGNITION SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**
2	**External air temperature**	**PR061:** External air temperature	**Gives the external air temperature in °C. This parameter is controlled by the BCM and transmitted to the injection on the multiplex network.** Default value: 20 °C.	**In the event of a malfunction, apply the diagnostic procedure for this malfunction described in the BCM document.**
3	**Inlet air temperature**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
4	**Battery voltage**	**PR074:** Battery voltage	**12 V < PR074 < 14 V**	**In the event of a malfunction, run the diagnostic procedure for the "Charging circuit".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

AIR CIRC SUBFUNCTION (TURBOCHARGING/INLET.):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Inlet air temperature**	**PR059:** Inlet air temperature Cold = PR061 Warm: 30 °C	**Gives the inlet air temperature in °C. This information is provided by the air temperature/ pressure sensor.** Default value: 30 °C.	**In the event of a malfunction, refer to parameter interpretation PR059 "Inlet air temperature".**
2	**Air circuit pressure**	**PR035:** Atmospheric pressure **PR032:** Inlet pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the ECM.** **Shows the pressure in the inlet circuit in mbar.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow 350 < Cold < 400 mg/piston stroke 300 < Warm < 350 mg/piston stroke	**Air flow estimated by the ECM.**	**None.**
4	**Inlet temperature sensor voltage**	**PR081:** Inlet temperature sensor voltage	**Shows the voltage delivered by the computer to supply the inlet temperature sensor**	**None.**
5	**Engine speed**	**PR055:** Engine speed. Cold: 900 rpm V Warm: 805 rpm	**Gives the engine's rotational speed in rpm.**	**In the event of a malfunction, apply the diagnostic procedure for P0335 Engine speed sensor circuit.**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

ENGINE COOLING SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

DRIVER PARAMETERS SUB FUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**Accelerator pedal position (APP sensor)**	**PR030:** Accelerator pedal position **0 %**	**Indicates the percentage of the pedal position between no load and full load position** **0 % < PR030 < 100 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for DTCs **P0225** and **P2120** Pedal sensor circuit, track 1 and track 2 and **P0608** "Sensor reference voltage"
2	**Pedal potentiometer tracks voltage (APP sensor)**	**PR086:** Pedal potentiometer track 1 voltage **16 %** **PR088:** Pedal potentiometer track 2 voltage **7 %**	**Shows the voltage supply percentage for tracks 1 and 2 of the pedal potentiometer.** **10 % < PR086 < 20 %** **5 % < PR088 < 15 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for DTCs **P0225** and **P2120** Pedal sensor circuit, track 1 and track 2 and **P0608** "Sensor reference voltage"

NOTES	Only carry out conformity check after a **full check** using the diagnostic tool. The values indicated in this conformity check are given as examples. **Test conditions:** Engine **at idle speed**.

ANTIPOLLUTION / OBD SUBFUNCTION:

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
1	**EGR solenoid valve control**	**ET008:** EGR solenoid control **INACTIVE**	**Shows the condition of the EGR valve control.** – **INACTIVE:** The valve is not controlled by the computer. – **ACTIVE:** The valve is controlled by the computer.	**None.**
2	**Atmospheric pressure**	**PR035:** Atmospheric pressure	**Gives the atmospheric pressure in mbar. The sensor is incorporated in the ECM.**	**If not consistent, check PR035 = PR032 = local atmospheric pressure, with the engine stopped and ignition on.**
3	**Air flow**	**PR132:** Air flow 350 < Cold < 400 mg/piston stroke 300 < Warm < 350 mg/piston stroke	**Air flow estimated by the ECM.**	**None.**
4	**Fuel flow**	**PR017:** Fuel flow 10 < Cold < 12 mg/piston stroke 4 < Warm < 6 mg/piston stroke	**Shows the fuel flow out of the high-pressure pump in mg/piston stroke.**	**None.**
5	**EGR valve opening setpoint**	**PR005:** EGR valve opening setpoint Warm: 20%	**Gives a theoretical EGR valve opening value for optimum engine operation.**	**None.**

ANTIPOLLUTION / OBD SUBFUNCTION (cont.):

Order	Function	Parameter or state Check or action	Display and notes	Trouble diagnosis
6	**EGR valve position feedback**	**PR051:** EGR valve position feedback Warm approximately 20%	**Gives the actual value of the EGR valve position.** Default value: 30%	**NONE.**
7	**EGR valve position sensor voltage**	**PR077:** EGR valve position sensor voltage	**Gives the EGR valve voltage according to its position.** – **INACTIVE:** The valve is not controlled by the computer. – **ACTIVE:** The valve is controlled by the computer. **0.5 V < PR077 < 4.8 V**	**NONE.**
8	**Accelerator pedal position**	**PR030:** Accelerator pedal position **0 %**	**Indicates the percentage of the pedal position between no load and full load position** **0 < PR030 < 100 %**	**In the event of a malfunction**, apply the **diagnostic procedure** for DTCs **P0225** and **P2120** Pedal sensor circuit, track 1 and track 2 and **P0608** "Sensor reference voltage"
9	**Coolant temperature**	**PR064:** Coolant temperature Warm: 90 °C	**Gives the coolant temperature in °C.** Default value: 80 °C.	**In the event of a malfunction, refer to parameter interpretation PR064 "Coolant temperature".**

PR059	INLET AIR TEMPERATURE SENSOR

NOTES	**Special notes:** Only perform the checks if the parameter is incorrect.

Check the condition of the turbocharger air temperature pressure sensor connections.
If necessary replace the sensor.
Measure the **resistance** across **terminals 1 and 2** of the air temperature - pressure sensor:

8950 < R in Ω at **- 10** °**C < 9901**
7054 < R in Ω at **- 5** °**C < 7784**
5605 < R in Ω at **- 0** °**C < 6169**
3618 < R in Ω at **- 10** °**C < 3964**
2400 < R in Ω at **- 20** °**C < 2620**
1645 < R in Ω at **- 30** °**C < 1787**

Replace the air temperature - pressure sensor, if necessary.

PR064	ENGINE COOLANT TEMPERATURE

NOTES	**Special notes:** Only perform the checks if the parameter is incorrect.

Check the condition of the engine coolant temperature sensor connections.
If necessary replace the sensor.
Measure the **resistance** between terminals **1** and **4** of the **coolant temperature sensor**.

- **R at - 10 °C =** 12.46 kΩ ± 1128 Ω.
- **R at 25 °C =** 2252 Ω ± 112.6 Ω.
- **R at 50 °C =** 811.4 Ω ± 38.4 Ω.
- **R at 80 °C =** 282.6 Ω ± 7.83 Ω.

If the value is incorrect, replace the engine coolant temperature sensor.

NOTES	**Only consult the tests after following the diagnostic procedure chart.**

Some specific checks are grouped under the << tests >> heading and are used as required in different diagnostic charts.

TEST 1: Low pressure circuit check

TEST 2: Electrical circuit check

TEST 3: Injector check

TEST 4: Parameter check

TEST 5: Air inlet circuit check

TEST 6: ECM check

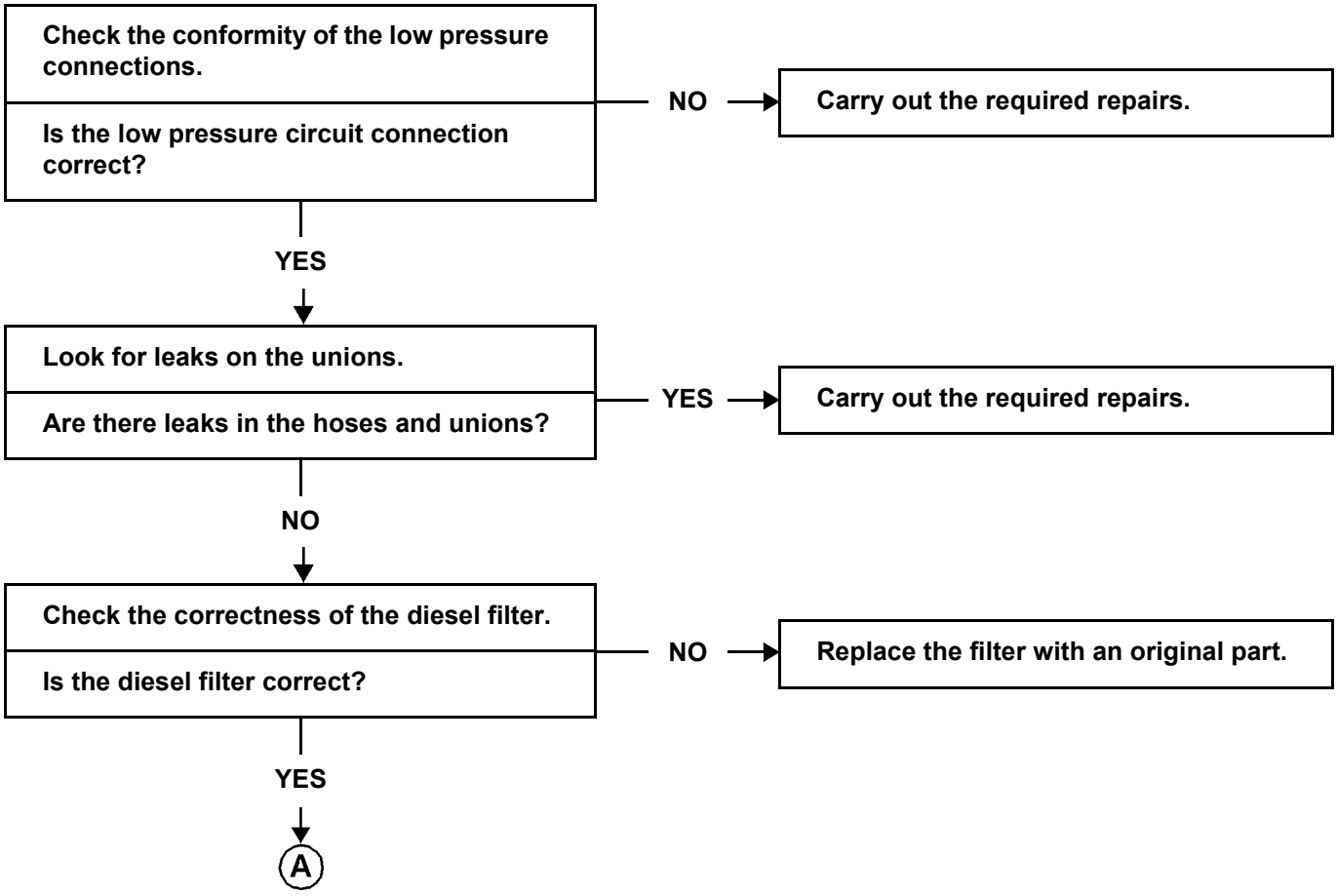
TEST 7: High pressure pump check

TEST 8: High pressure circuit tightness check

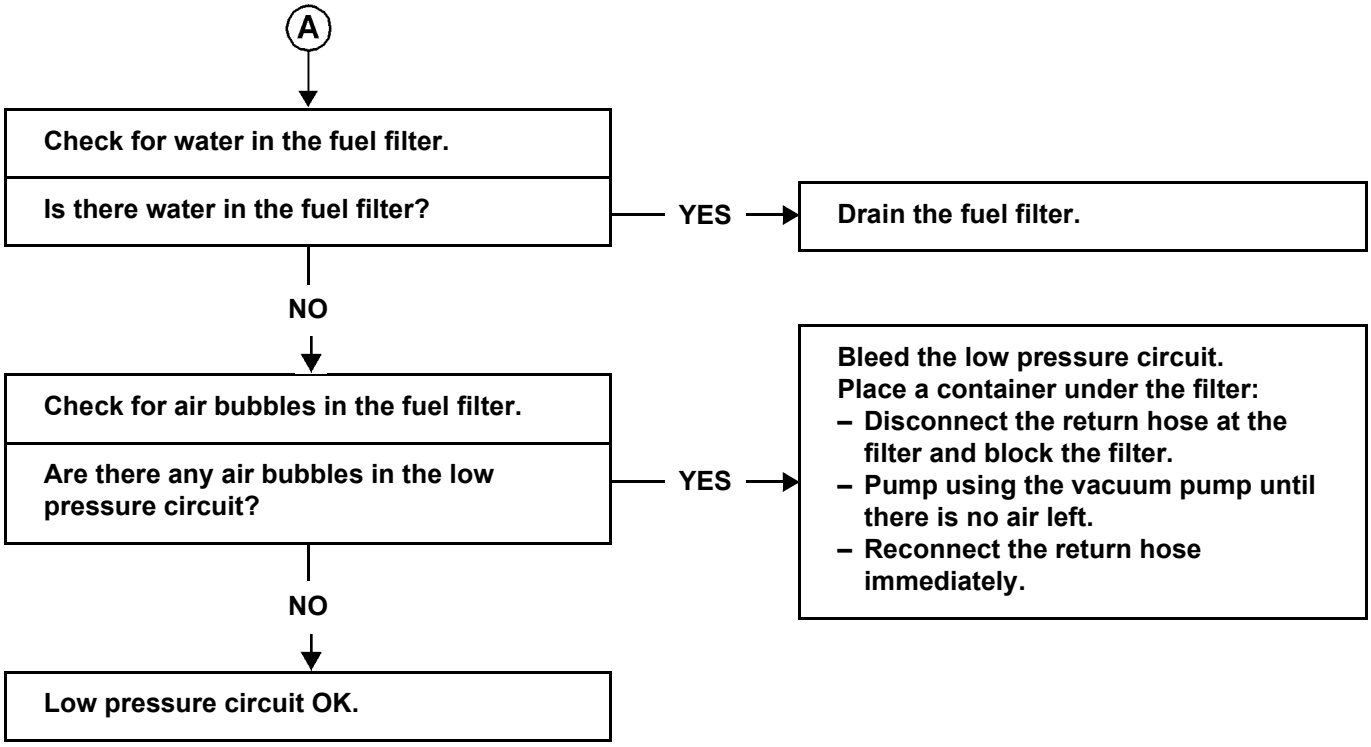
TEST 9: Injector tightness check

TEST 10: Injector return flow in starting phase

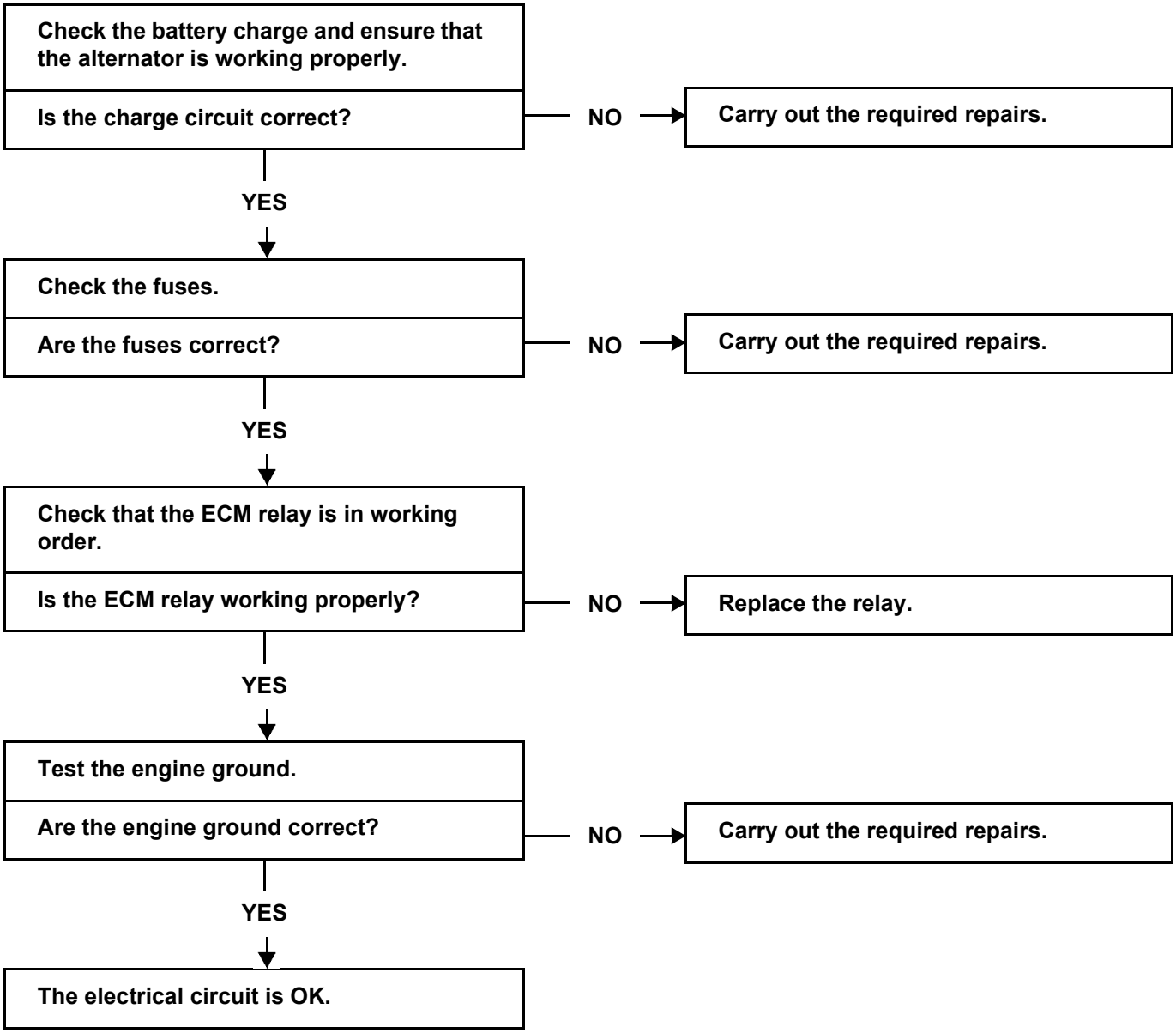
TEST 1	LOW PRESSURE CIRCUIT CHECK



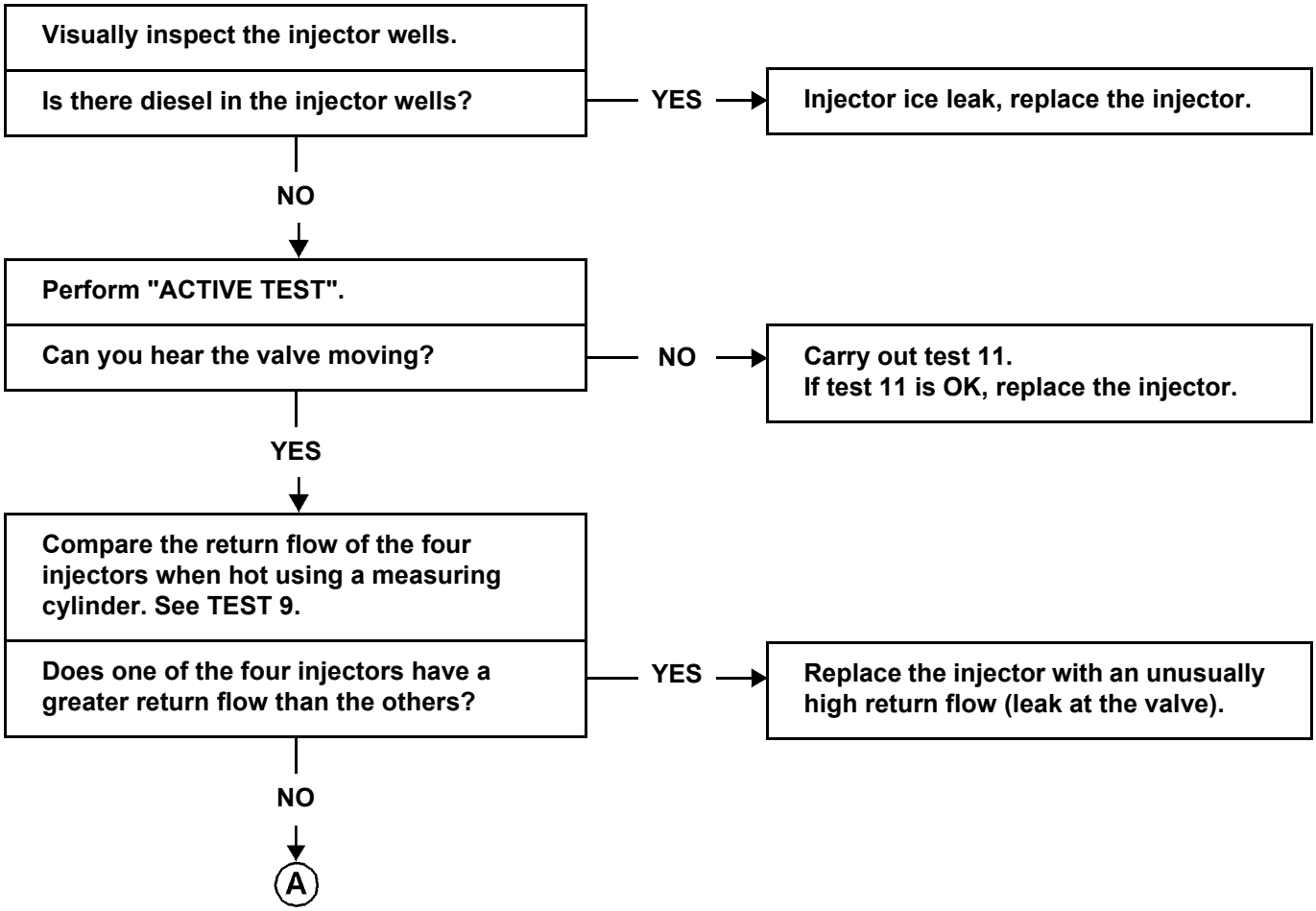
TEST 1 Cont'd	



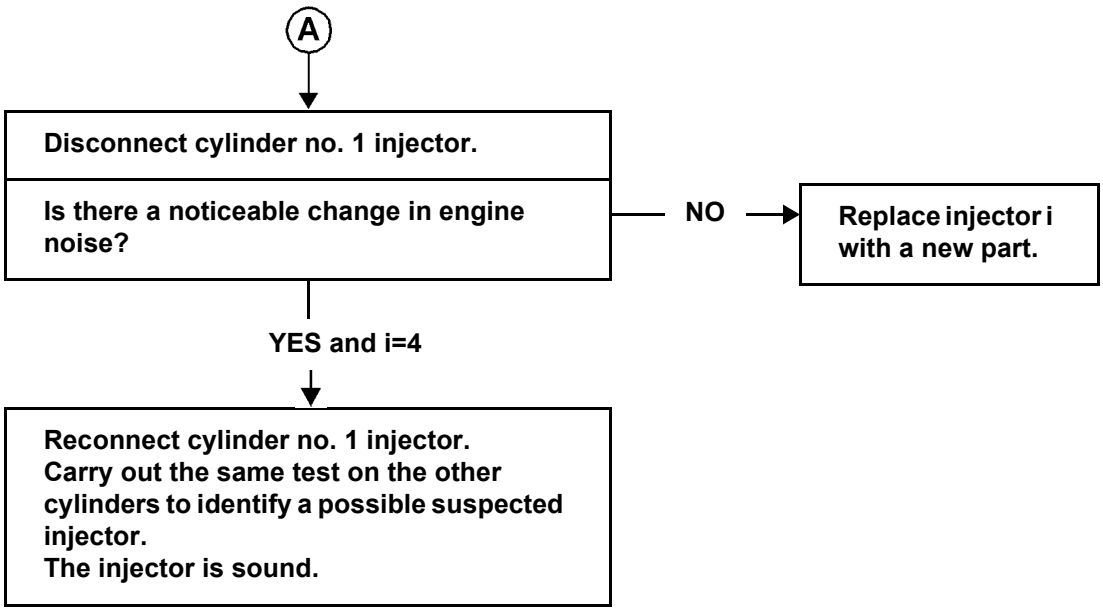
TEST 2	ELECTRICAL CIRCUIT CHECK



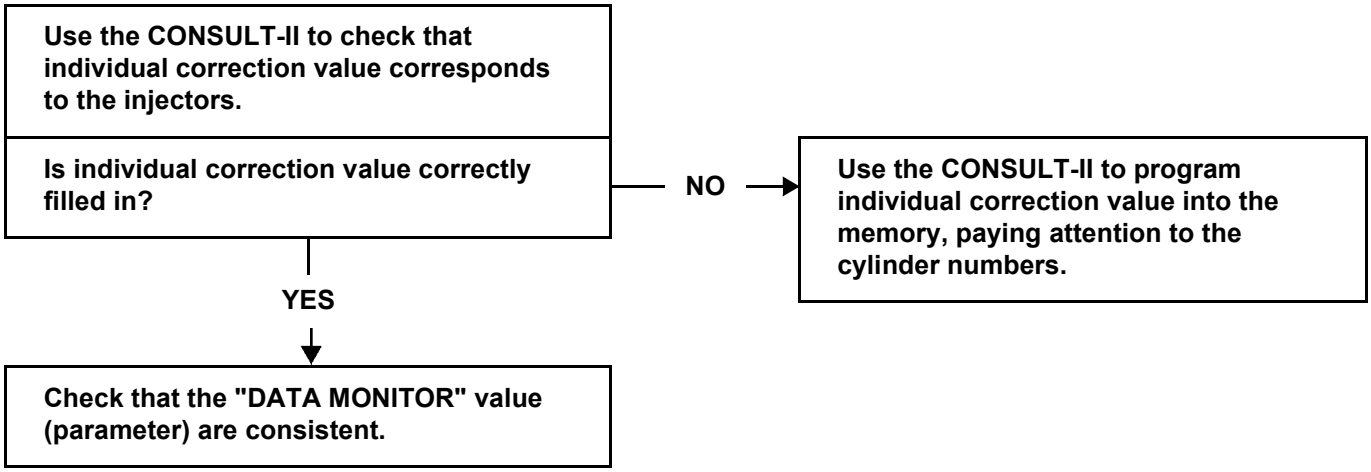
TEST 3	INJECTOR CHECK



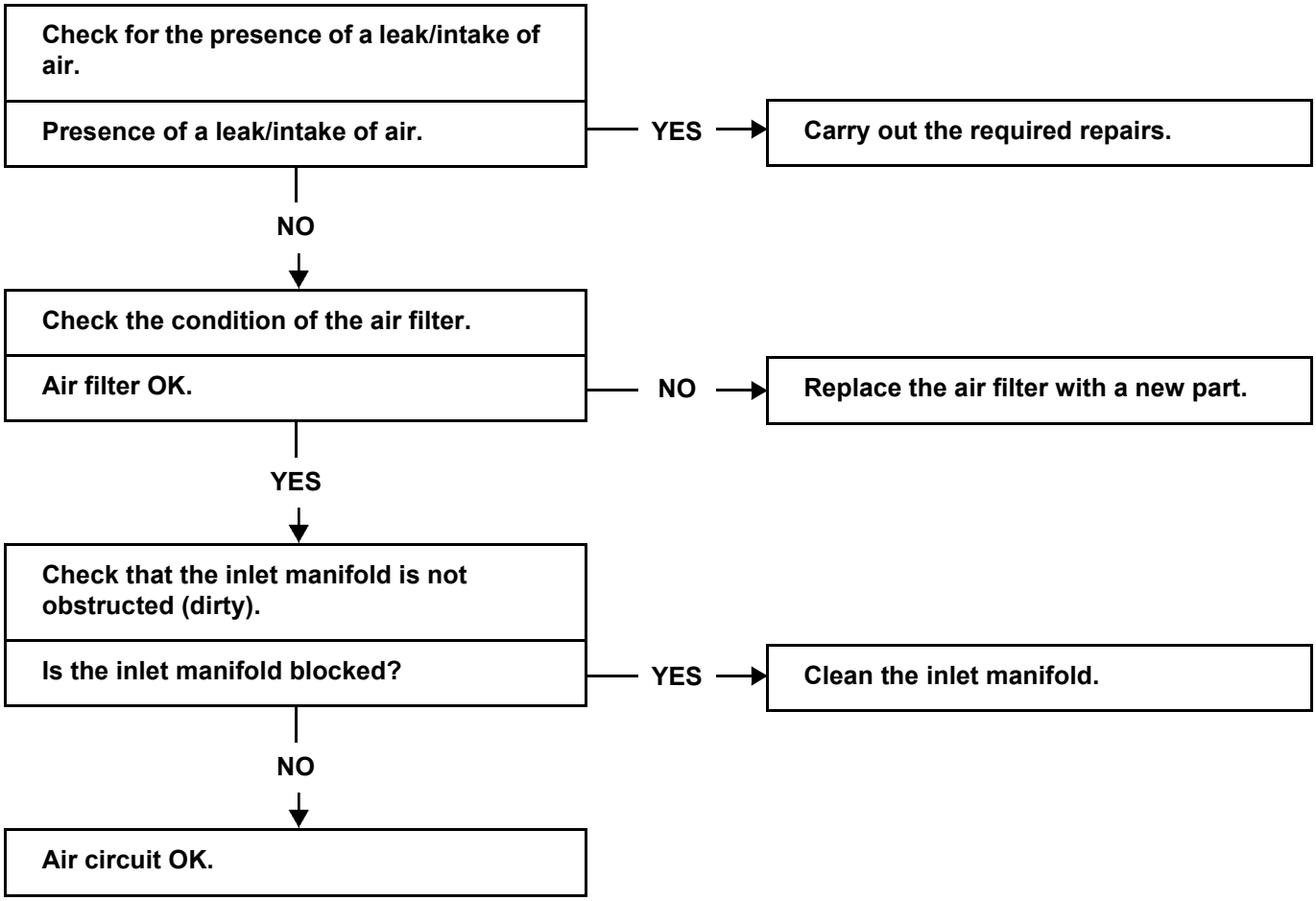
TEST 3 Cont'd	



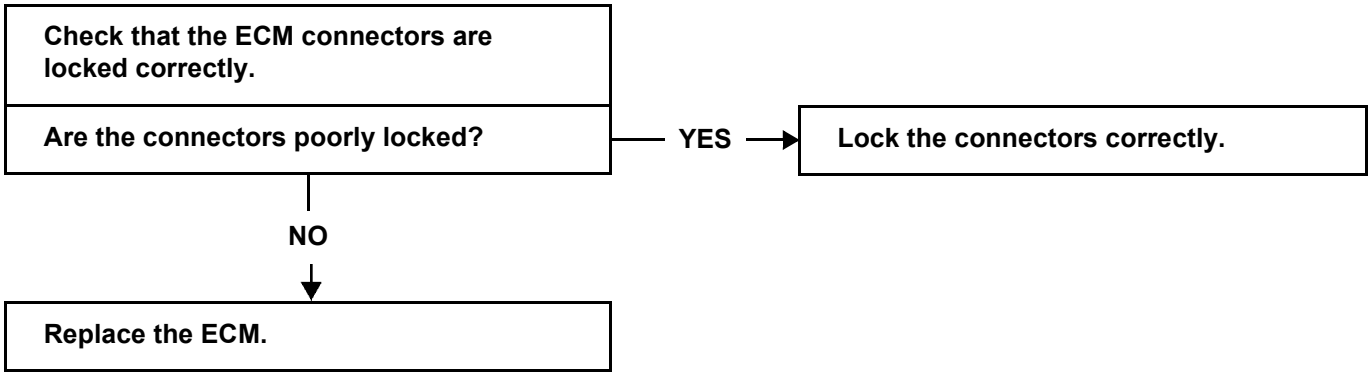
TEST 4	PARAMETER CHECK



TEST 5	AIR INLET CIRCUIT CHECK



TEST 6	ECM CHECK (COMPUTER)



TEST 7	High pressure system check

NOTES	**Special notes:** Certain malfunctions make it impossible to carry out this test, deal with them first. **IMPORTANT: It is useless and dangerous to engage the starter motor for more than 5 seconds.**

It is possible to check the high pressure supply pump capacity by carrying out the following procedure:
- **With the ignition off, disconnect** the low pressure actuator from the pump (**IMV brown connector**) and connect a test adaptor (test IMV).
- Disconnect the 4 injectors.
- Switch on the ignition, connect the fault finding tool and re-establish dialogue with the injection system.
- On the screen, display **Main states and parameters** of the ECM.
- Brake and press the "START" button. **The starter will cut out automatically** after **5 secs**.
- Read the maximum rail pressure value **PR038** during the test on the fault finding tool.

Is the rail pressure greater than 1050 bar?

NO

Is the rail pressure greater than 900 bar?

NO

Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**). Switch off the ignition and reconnect the 4 injectors and low pressure actuator electrically. Switch the ignition back on, and clear the injection faults using the fault finding tool.

Carry out TEST 11.

YES

Repeat the test when cold. Coolant temperature = Ambient air temperature.

Is the rail pressure greater than 1050 bar?

YES

NO

Make sure that the ignition circuit is working correctly (minimum engine speed **200 rpm**). Switch off the ignition and reconnect the 4 injectors and low pressure actuator electrically. Switch the ignition back on, and clear the injection faults using the fault finding tool.

Carry out TEST 11.

YES

The pump can supply the operating pressure. Switch off the ignition and reconnect the 4 injectors and low pressure actuator electrically. Switch the ignition back on, and clear the injection faults using the fault finding tool.
Carry out fault finding on the injectors by checking the return volume of the 4 injectors **(See TEST 9 injector sealing check).**

Carry out fault finding on the injectors by checking the return volume of the 4 injectors.
See TEST 9 or TEST 10 if the engine does not start.

Is **TEST 9 or TEST 10** correct?

NO

Replace the faulty injector(s).

YES

Replace the high pressure pump.

TEST 8	High-pressure circuit leak check

NOTES	**Special notes:** Certain malfunctions make it impossible to carry out this test, deal with them first.

There is a command that performs a leak test on the high-pressure circuit when the engine is running.
This command can detect a leak on the high-pressure circuit if a union is improperly fitted or bolted, but cannot detect a small leak if a union is not torque tightened.
This command can only be used if the engine temperature is **above 60°C**.

Use command **AC029 "high pressure circuit sealing test"** the engine will automatically carry out one cycle of 4 accelerations to raise the pressure in the rail and check whether there are leaks in the high pressure circuit.

Watch out for any objects (tools, etc) on the sides of the engine housing during the four accelerations (vibrations possible).

TEST 9	Injector leak check

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first.

Command AC029 also allows you to check the return volume of each injector to detect a leak inside the injectors.

Tooling required:
- **It is essential to use 4 transparent pipes with an internal diameter of 4 mm and a length of approximately 50 cm.**
- **4 graduated measuring cylinders.**

PROCEDURE
- Check that the engine coolant temperature is **above 60°C**.
- Switch off the ignition.
- Disconnect the return pipes from the 4 injectors.
- Fit a plug in the pump venturi tube to prevent the low-pressure circuit from depriming.
- Connect the 4 transparent pipes with an internal diameter of **4 mm** and a length of **50 cm** in place of the return pipes.
- Immerse these 4 pipes into 4 graduated measuring cylinders.

Having carried out these preparations, start the engine, then let it run for **2 minutes** at idle speed.
- **Activate** command **AC029 "high pressure circuit sealing test"**: the engine will automatically perform one cycle of 4 accelerations to raise the pressure in the rail and measure the leaks inside the injectors in these conditions.
- **Once the cycle is complete, activate command AC029 again** for the correct reading of the return volume of each injector.
  At the end of both cycles, the return volume of each injector should be **35 ml at maximum**. If the return volume of one of the injectors is above **35 ml**, replace the faulty injector.
- Disconnect the 4 transparent pipes and reconnect the injector return circuit.

Watch out for any objects (tools, etc.) at the sides of the engine housing during the four cycles (vibrations possible).

TEST 10	Injector return flow in starting phase.

NOTES	**Special notes:** Certain faults make it impossible to carry out this test, deal with them first. **IMPORTANT: It is useless and dangerous to engage the starter motor for more that 5 seconds.**

In the event the engine does not start, only the static leak can be measured, that is the leak with the injector closed, inactive and not subject to any high pressure.

Make sure that the starting circuit is working correctly (minimum speed 200 rpm).

Tooling required:

- **It is essential to use four transparent pipes with an internal diameter of 4 mm and approximately 50 cm long.**
- **A test adapter (TEST IMV)**

PROCEDURE:

1 – Switch off the ignition.
2 – Disconnect the four injector return pipes.
3 – Fit a plug in the pump venturi tube to prevent the low-pressure circuit from depriming.
4 – Connect the four transparent pipes with an internal diameter of **4 mm** and a length of **approximately 50 cm**.
5 – Disconnect the low pressure actuator from the pressure (brown IMV connector) and connect the test adapter (test IMV).
6 – **Electrically disconnect the 4 injectors.**
7 – Switch on the ignition, brake and press the "START" button. **The starter cuts in automatically after 5 seconds.**
8 – Measure the amount of diesel in each pipe.

Replace the injector(s) whose leak return is greater than 10 cm.

Disconnect the four transparent diesel pipes and reconnect the injector return circuit.

Disconnect the test IMV and reconnect the low pressure actuator to the pump.

TEST 11	Diesel filter check

Check the conformity of the diesel filter.

Is the diesel filter correct?

NO → **Replace the filter with an original part.**

YES ↓

Switch off the ignition, analyse the diesel fuel in the diesel filter.
- Disconnect the diesel supply and return hoses from the filter.
- Block the filter inlets and outlets straight away with appropriate plugs.
- Remove the filter from its holder and **shake it well**, keeping the caps in place and empty the contents of the filter into a glass container by lifting up a protective cap and undoing the bleed screw.

Can you see at the bottom of the container a deposit of black particles?

NO ↓ **Diesel filter correct.**

YES ↓

Pass a magnet beneath the container to collect only all the metal particles. Take the magnet away from the container.

Do the particles collected using the magnet cover a surface area greater than 1 cm^2?

YES ↓ Replace the entire injection system.

NO ↓ **Diesel filter correct.**

NOTES	**Only consult this customer complaint after a complete check using the diagnostic tool.**

No communication with the ECM — **CHART 1**

Starting malfunction

- **The engine does not start** — **CHART 2**
- **The engine starts with difficulty or starts then stalls** — **CHART 3**
- **Starting difficult with warm engine** — **CHART 4**

Idle speed malfunction

- **Rough idle speed (pumping)** — **CHART 5**
- **Idle speed too high or too low** — **CHART 6**

Behaviour while driving

- **Unexpected acceleration/deceleration and engine stalling** — **CHART 7**
- **Response malfunction** — **CHART 8**
- **Engine stop (timing)** — **CHART 9**
- **Engine jerking** — **CHART 10**
- **Lack of power** — **CHART 11**
- **Too much power** — **CHART 12**

Road holding (continued)

- Excessive consumption — CHART 13
- Overspeed when lifting off accelerator or changing gear — CHART 14
- Engine dies when pulling away — CHART 15
- The engine does not stop — CHART 16

Noise, odours or smoke

- Clanking engine, noisy engine — CHART 17
- Squalling noise — CHART 18
- General mechanical noises — CHART 19
- Blue, white or black smoke — CHART 20
- Exhaust odours — CHART 21
- Diesel odours — CHART 22
- Smoke (blue, white or black) on acceleration — CHART 23

CHART 1	NO COMMUNICATION WITH THE ECM

NOTES	**Only consult this customer complaint after a complete check using the diagnostic tool.**

Ensure that the diagnostic tool is not causing the fault by trying to establish dialogue with a computer on another vehicle. If the tool is not at fault, and dialogue cannot be established with any other computer on the same vehicle, the cause could be a faulty computer interfering on the multiplex network.
Check the voltage of the battery and carry out the operations necessary to obtain a voltage which is to specification (**9.5 volts < U battery < 17.5 volts**).

Perform fault finding on the multiplex network using the diagnostic tool.

Check **the ECM earth (ground) point** on the left hand front shock absorber cage.

Check:
– the connection between the CONSULT-II and the DLC (wiring in good condition),
– the engine and passenger compartment fuses.

Check for the presence of **+ 12 volts before ignition** on **terminal 16**, **+ 12 volts after ignition** on **terminal 8** and an **earth (ground)** on **terminals 4 and 5** of the diagnostic socket.
Repair if necessary.

Connect the CONSULT-II and check the **insulation, continuity and absence of interference resistance of the connections:**

- ECM (F134) terminal 109 and IPDM E/R harness connector terminal 32
- ECM (F134) terminal 110 and IPDM E/R harness connector terminal 32
- ECM (E61) terminal 22 and Fuse block (M16)
- ECM (F134) terminal 104 and IPDM E/R harness connector terminal 29
- ECM (F134) terminal 111 and ground
- ECM (F134) terminal 112 and ground
- ECM (E61) terminal 2 and DLC terminal 7
  (Refer to wiring diagram "EC-MAIN-01".)

Repair if necessary.

CHART 2	THE ENGINE DOES NOT START

NOTES	Only consult this customer complaint after a complete check using the CONSULT-II.

Check that the fuel tank is correctly filled and that the fuel type is suitable.

Is the fuel type suitable and the tank correctly filled?

NO → **Refill the fuel tank correctly.**

YES

Is the starter motor working properly?

NO → **Carry out the required repairs.**

YES

Check the low pressure circuit using TEST 1.

Check for leaks in the high pressure circuit.

Check the electrical circuit using TEST 2.

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CHART 2 CONTINUED 1	

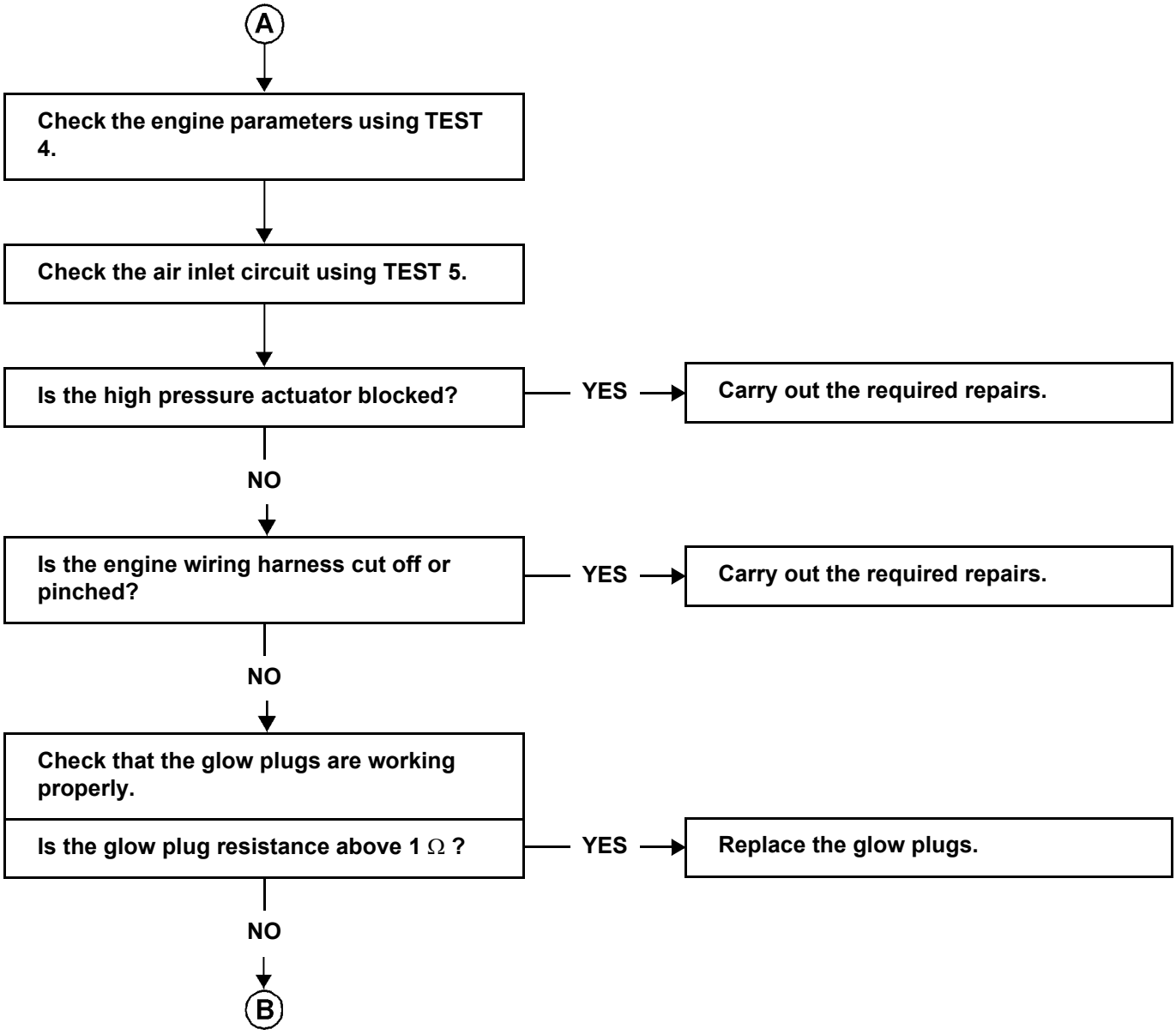
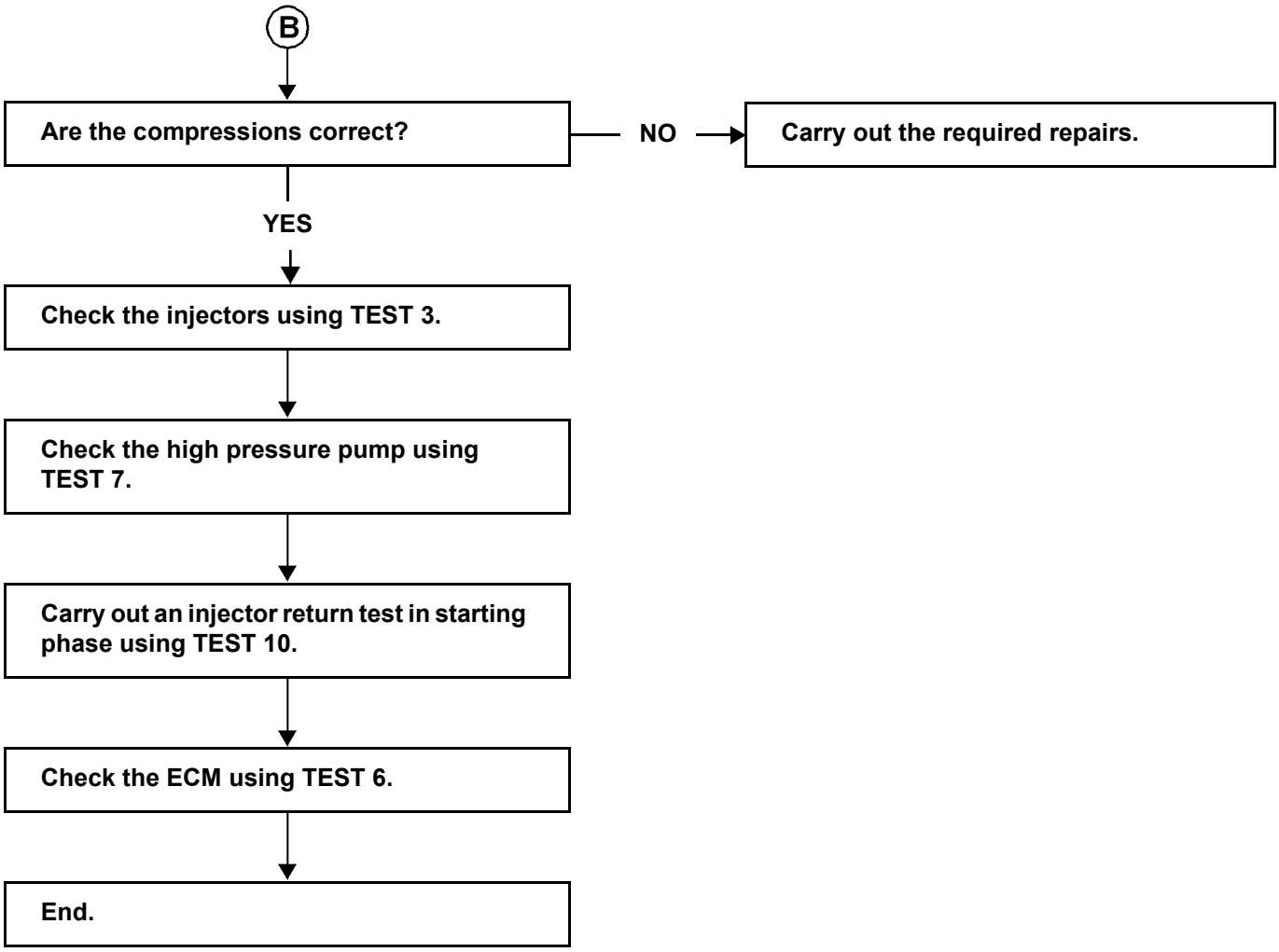


CHART 2 CONTINUED 2	



AFTER REPAIR	Check that the system is operating correctly.

CHART 3	THE ENGINE STARTS WITH DIFFICULTY OR STARTS THEN STALLS

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Check that the fuel tank is correctly filled and that the fuel type is suitable.

Is the fuel type suitable and the tank correctly filled?

NO → **Refill the fuel tank correctly.**

YES

Check the low pressure circuit using TEST 1.

Check for leaks in the high pressure circuit.

Check the electrical circuit using TEST 2.

Ⓐ

CHART 3 CONTINUED 1	

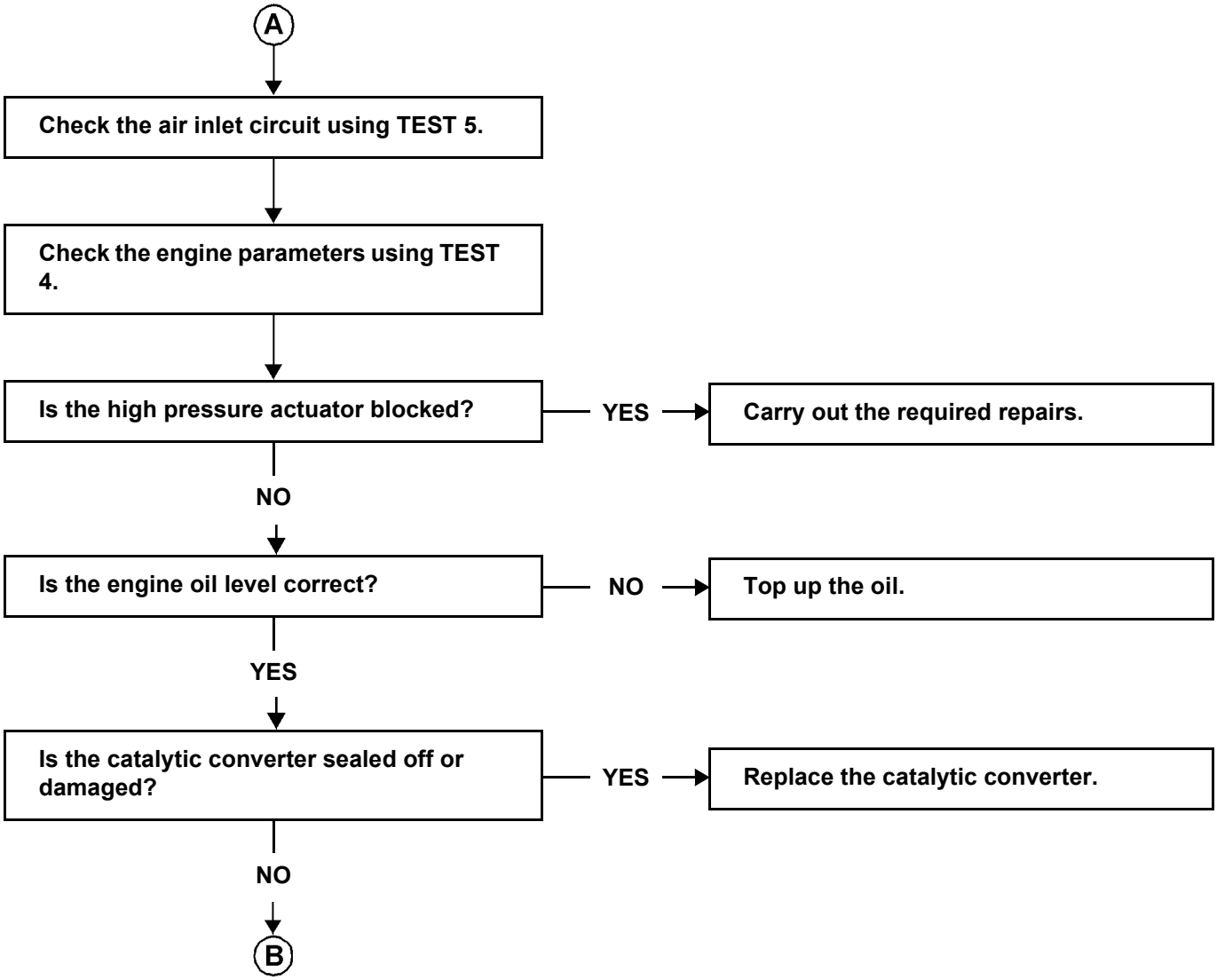


CHART 3 CONTINUED 2	

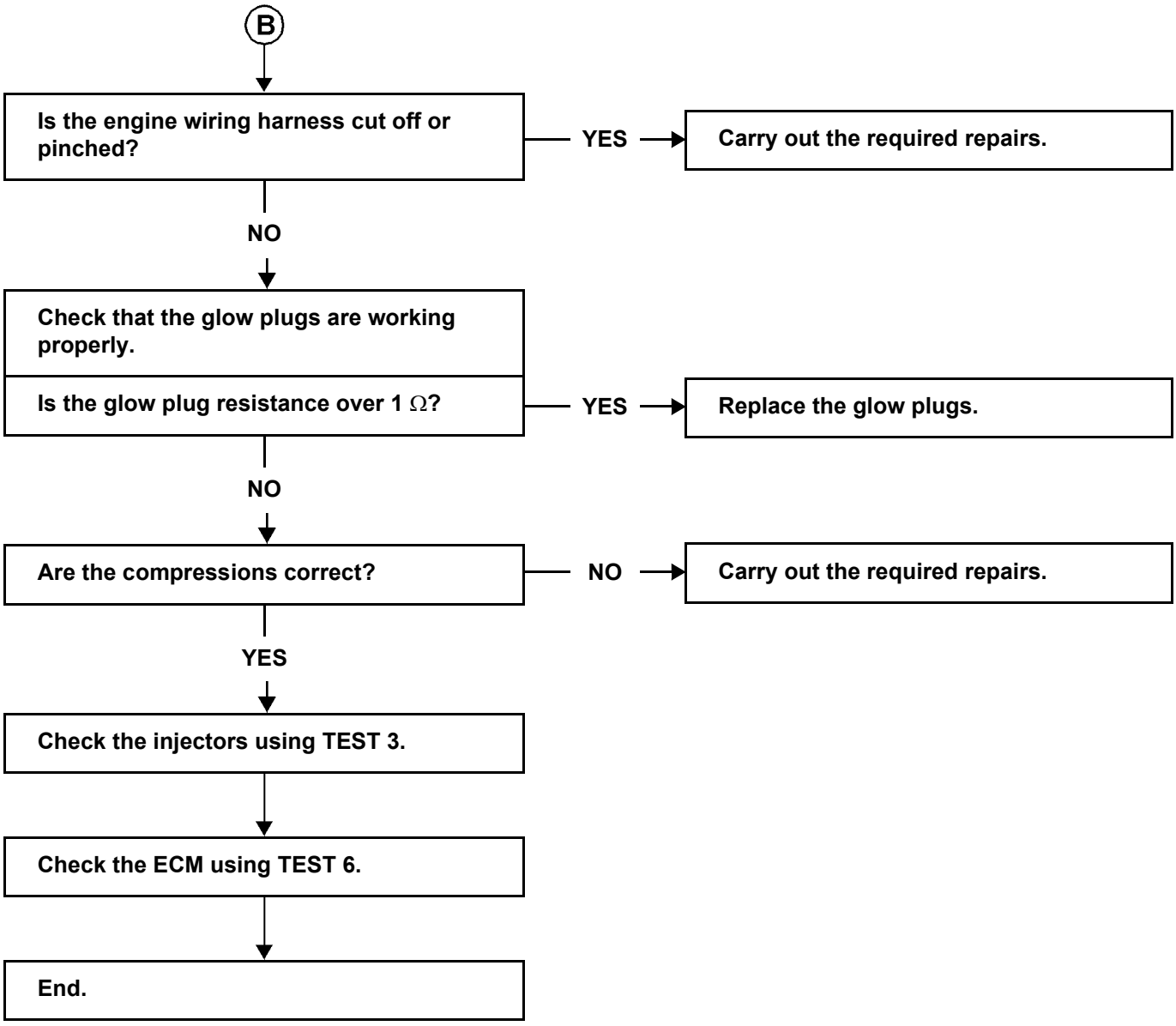


CHART 4	STARTING DIFFICULT WITH WARM ENGINE

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

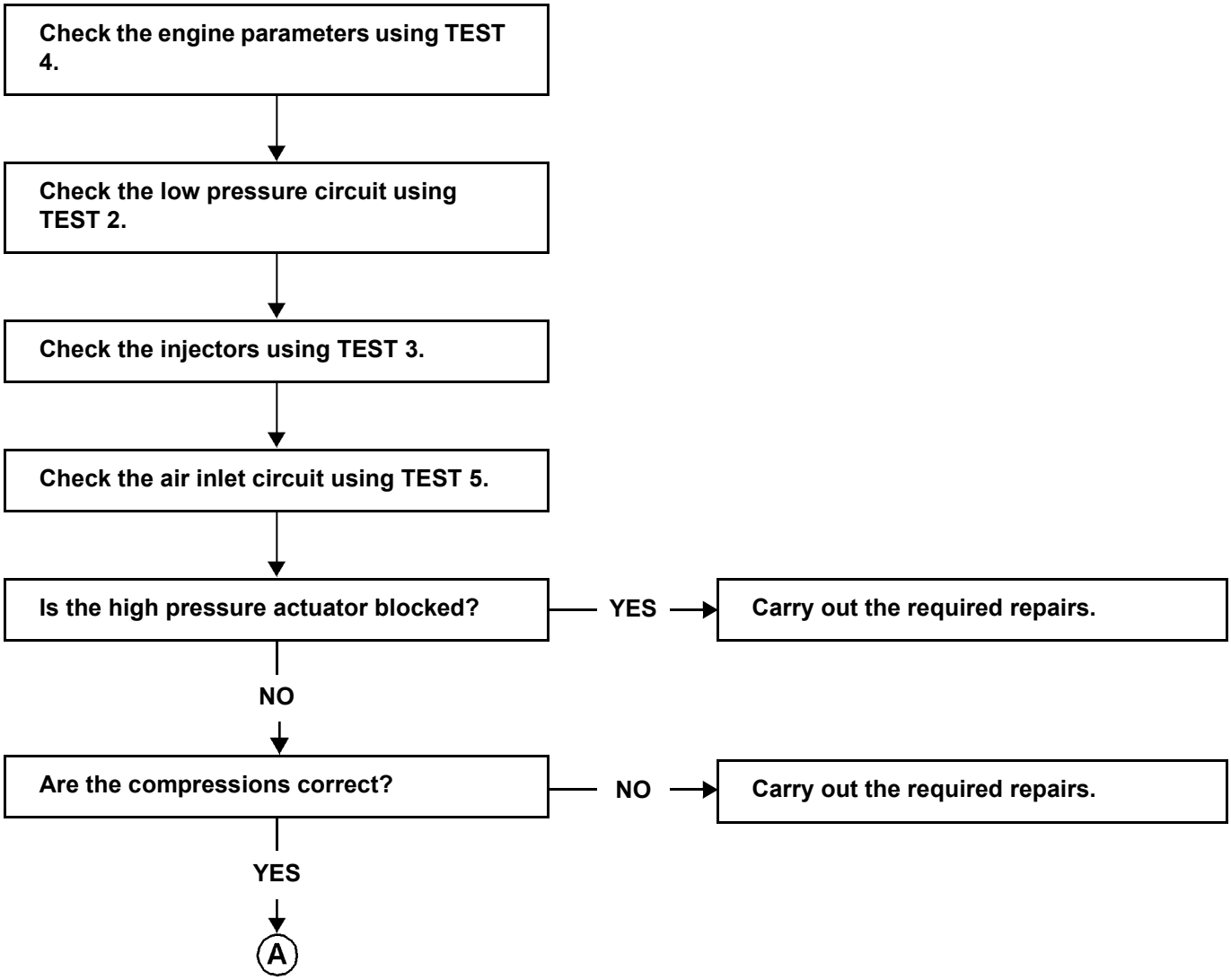


CHART 4 Cont'd	

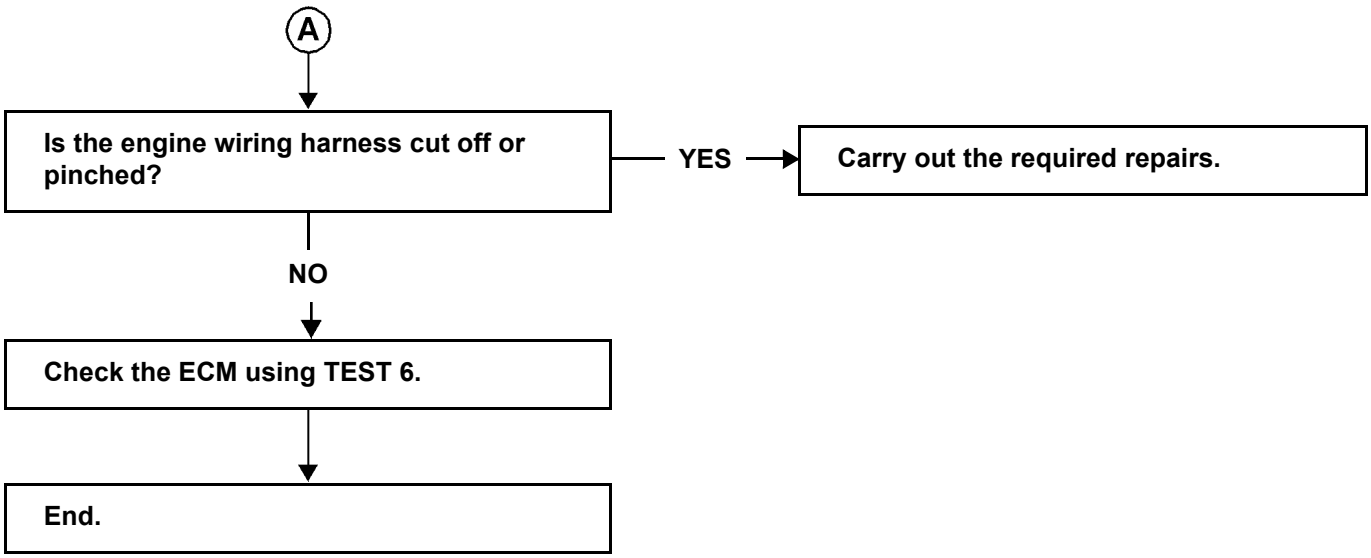


CHART 5	ROUGH IDLE SPEED (PUMPING)

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

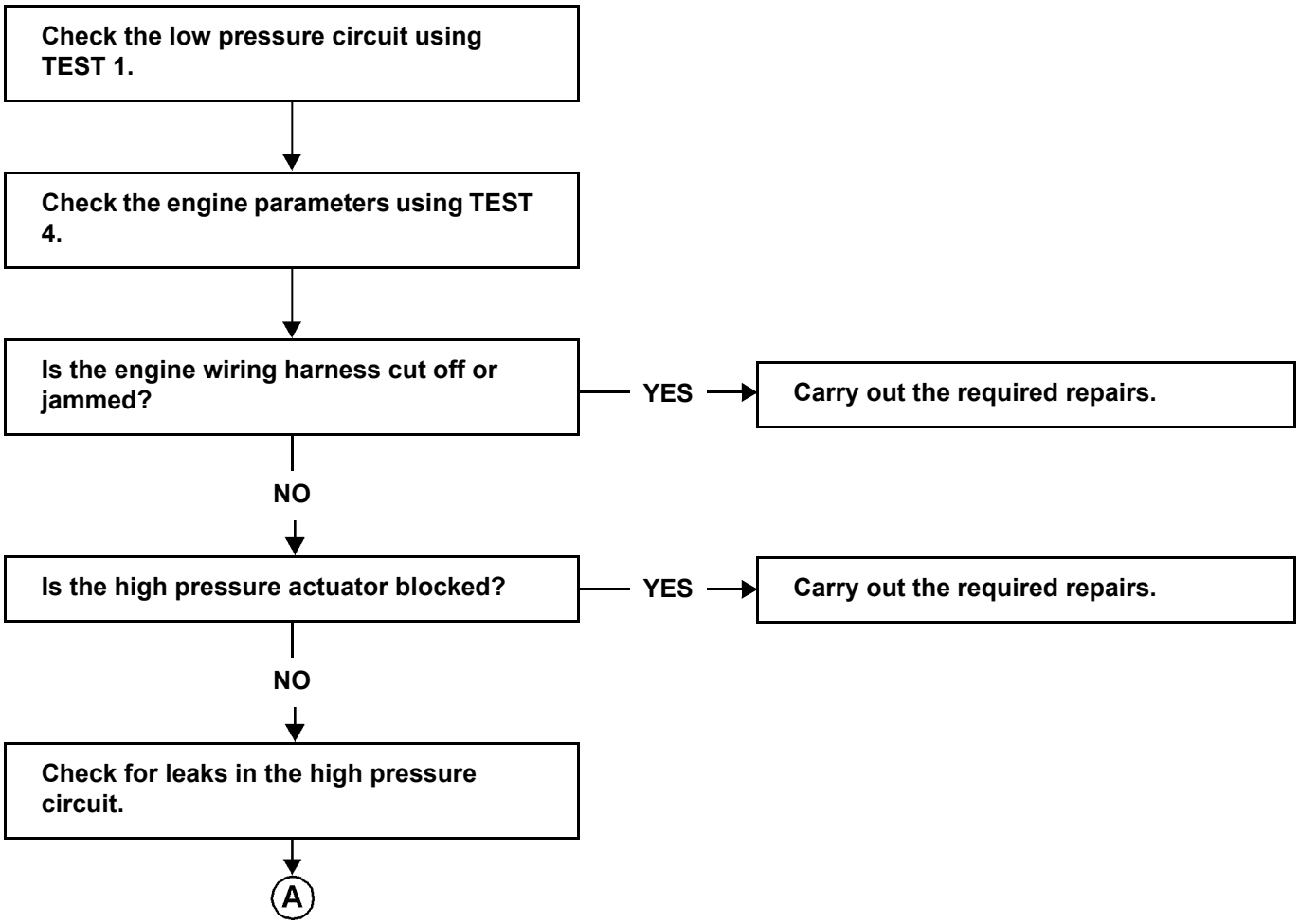


CHART 5 Cont'd	

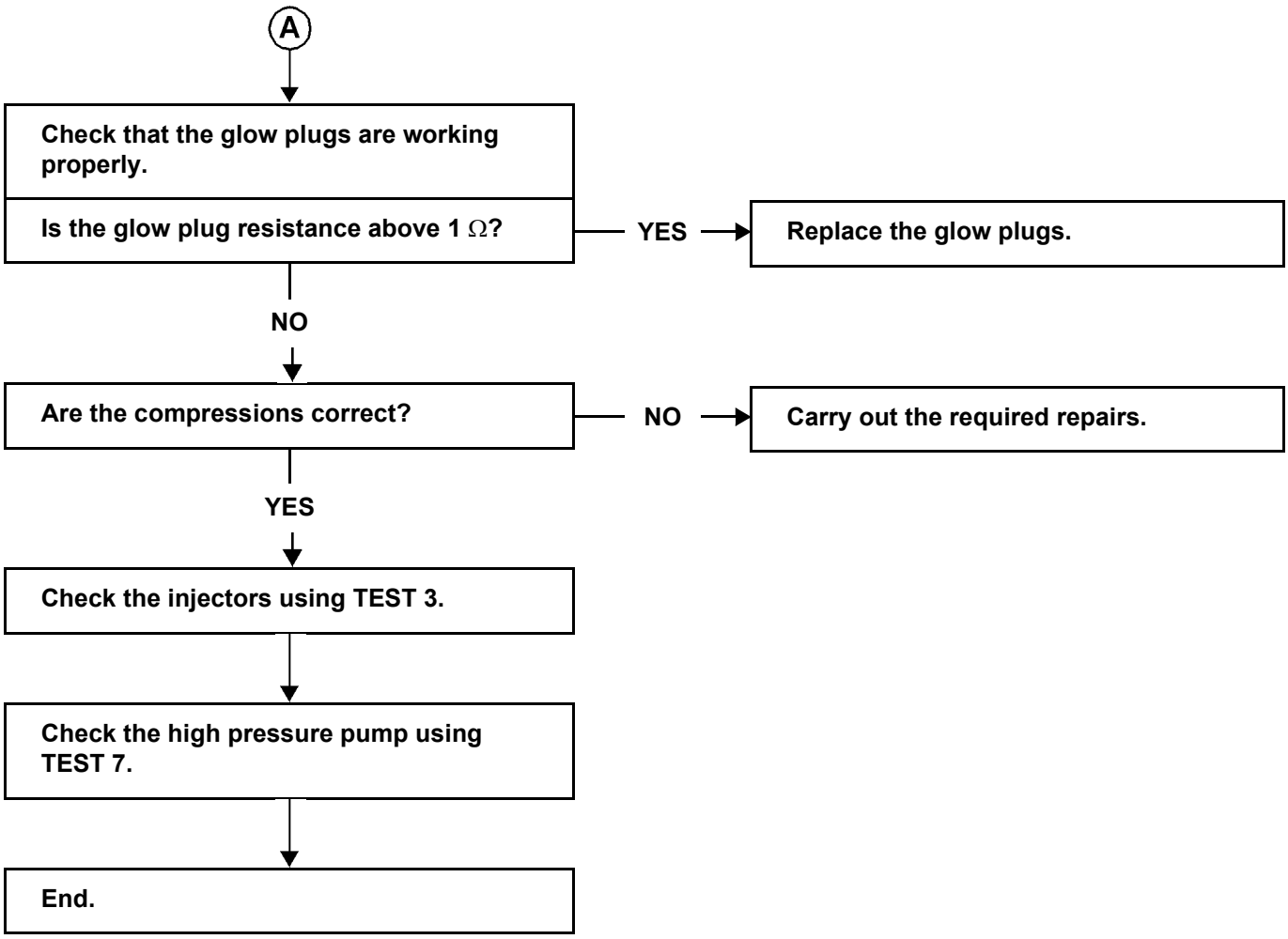


CHART 6	IDLE SPEED TOO HIGH/TOO LOW

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

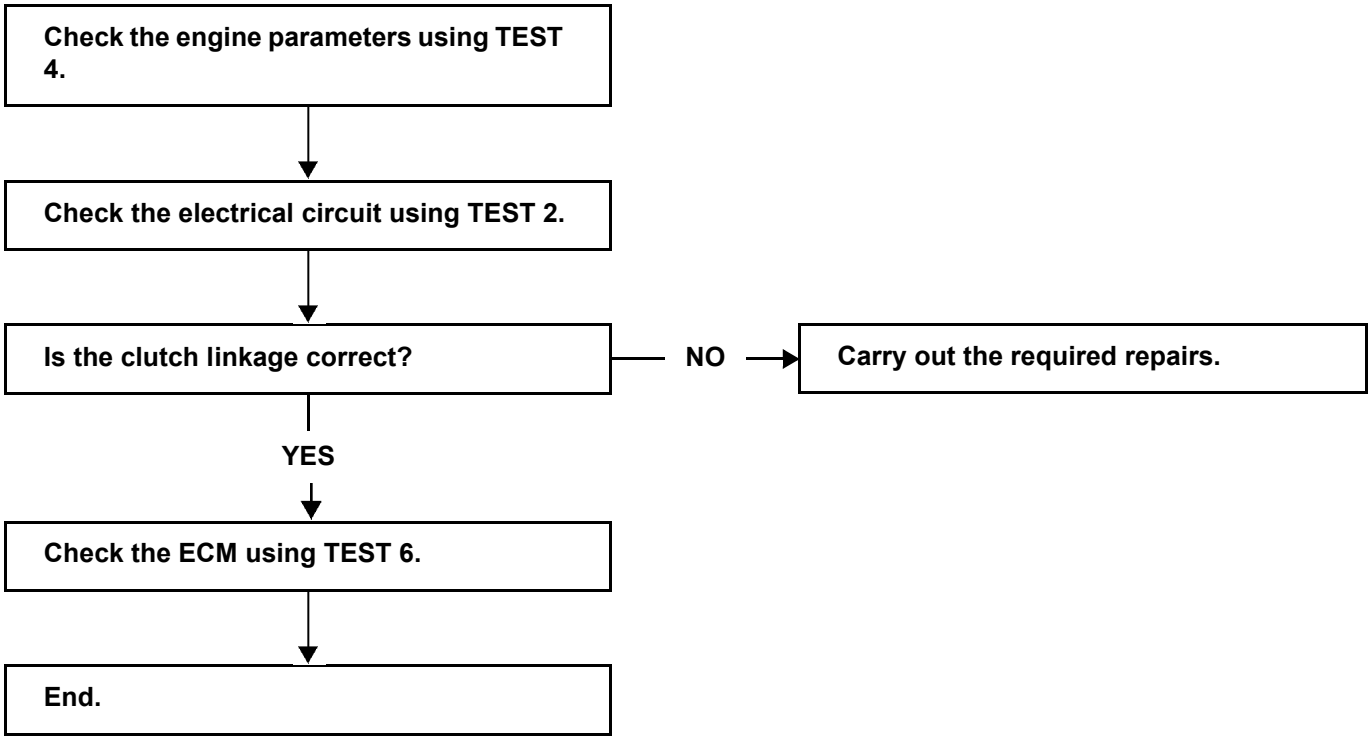


CHART 7	UNEXPECTED ACCELERATION/DECELERATION AND ENGINE OVERCHARGING

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

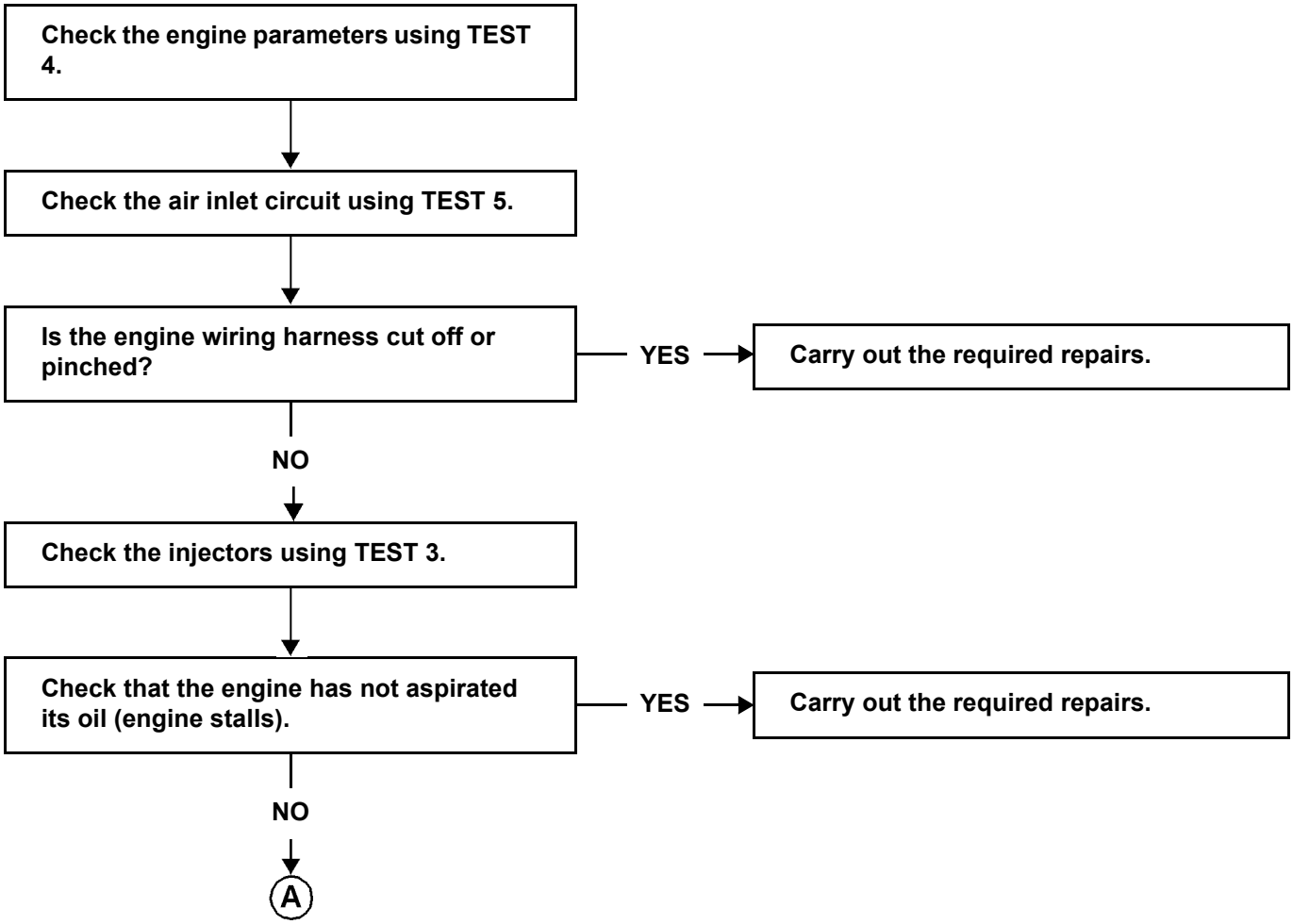


CHART 7 Cont'd	

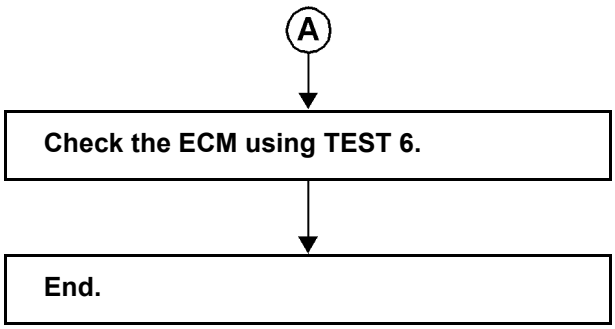


CHART 8	RESPONSE MALFUNCTION

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

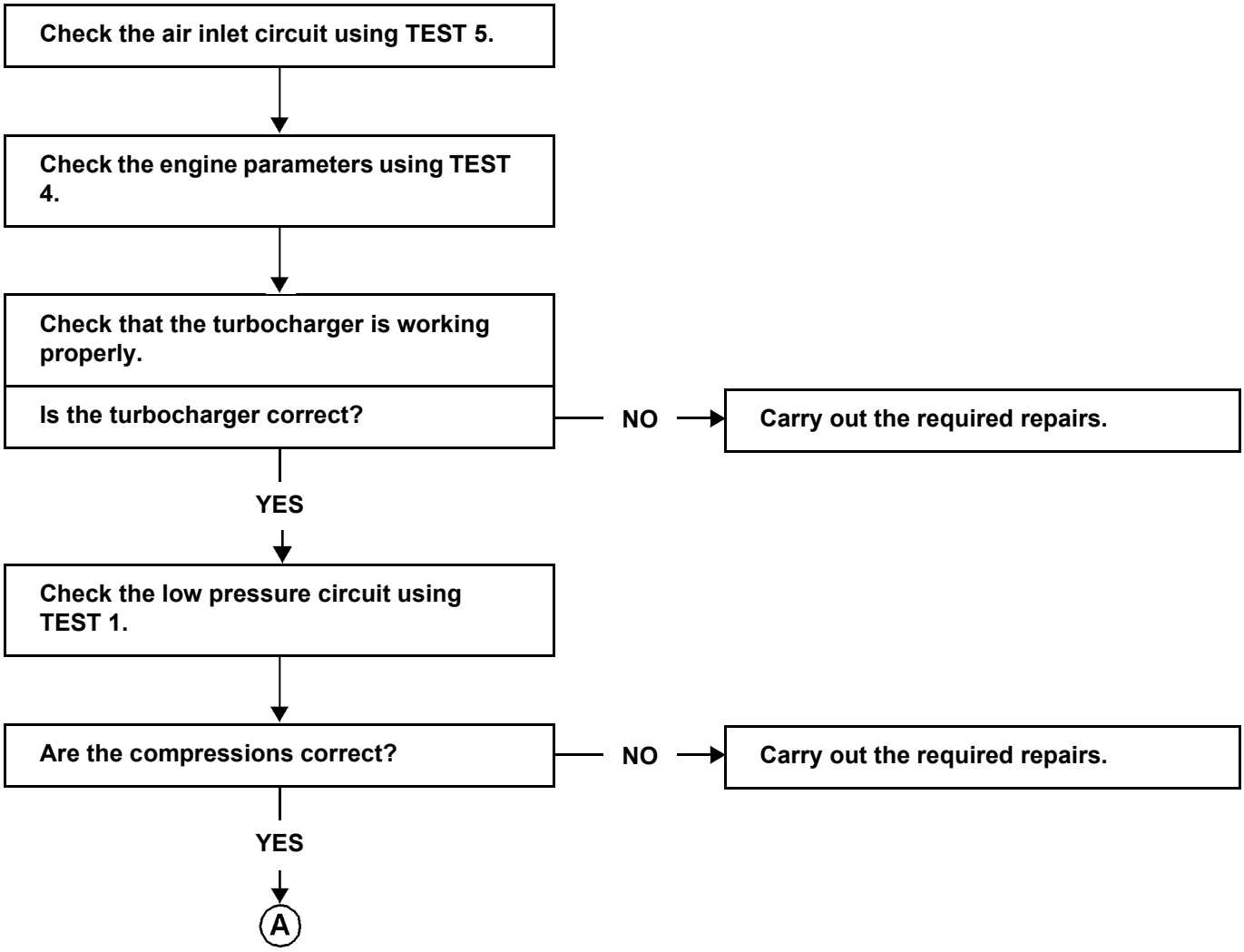


CHART 8 Cont'd	

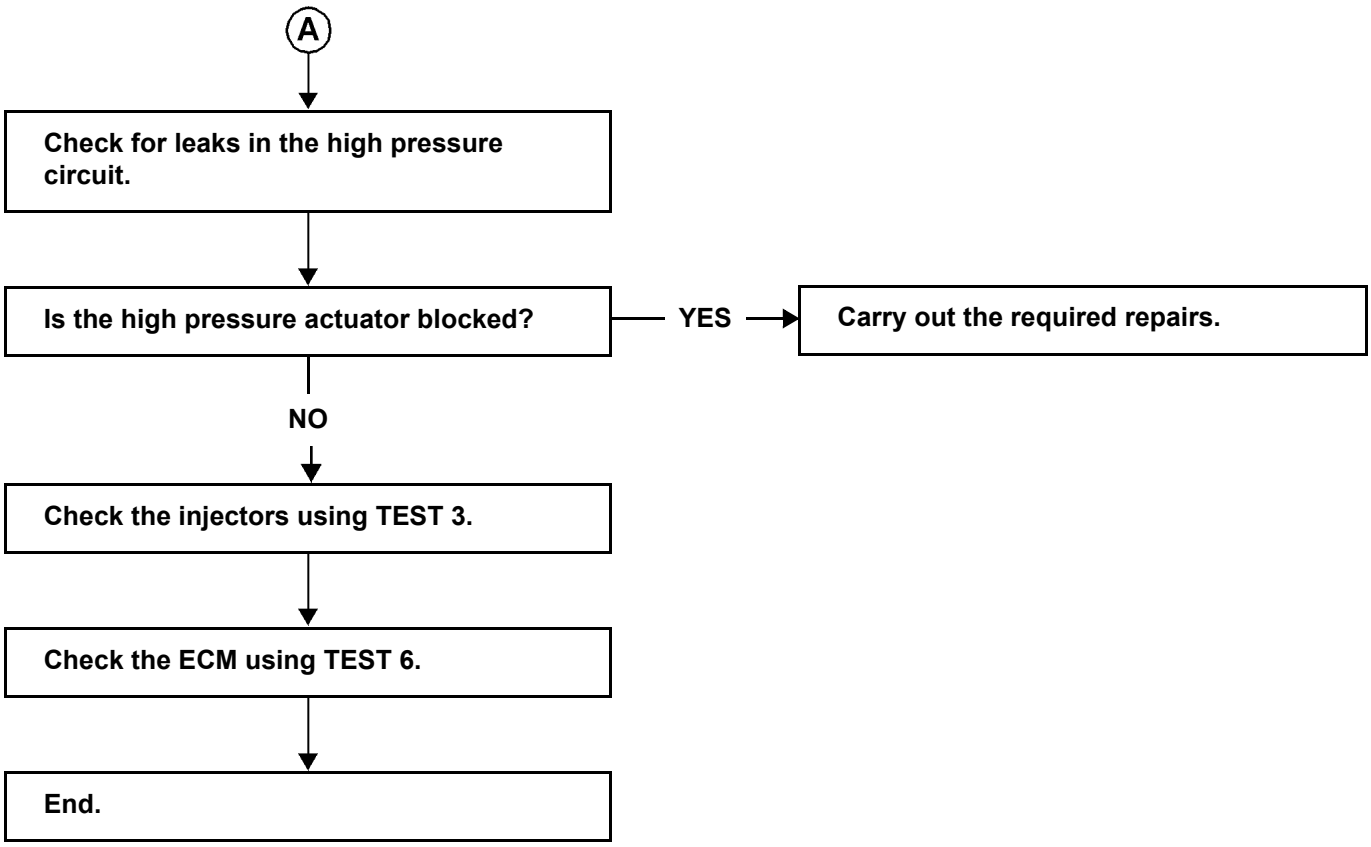


CHART 9	ENGINE STOP/STALLING

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Check that the fuel tank is correctly filled and that the fuel type is suitable.

Is the fuel type suitable and the tank correctly filled?

NO → **Refill the fuel tank correctly.**

YES

Check the low pressure circuit using TEST 1.

Check for leaks in the high pressure circuit.

Check the electrical circuit using TEST 2.

Check the engine parameters using TEST 4.

NO

Ⓐ

CHART 9 CONTINUED 1	

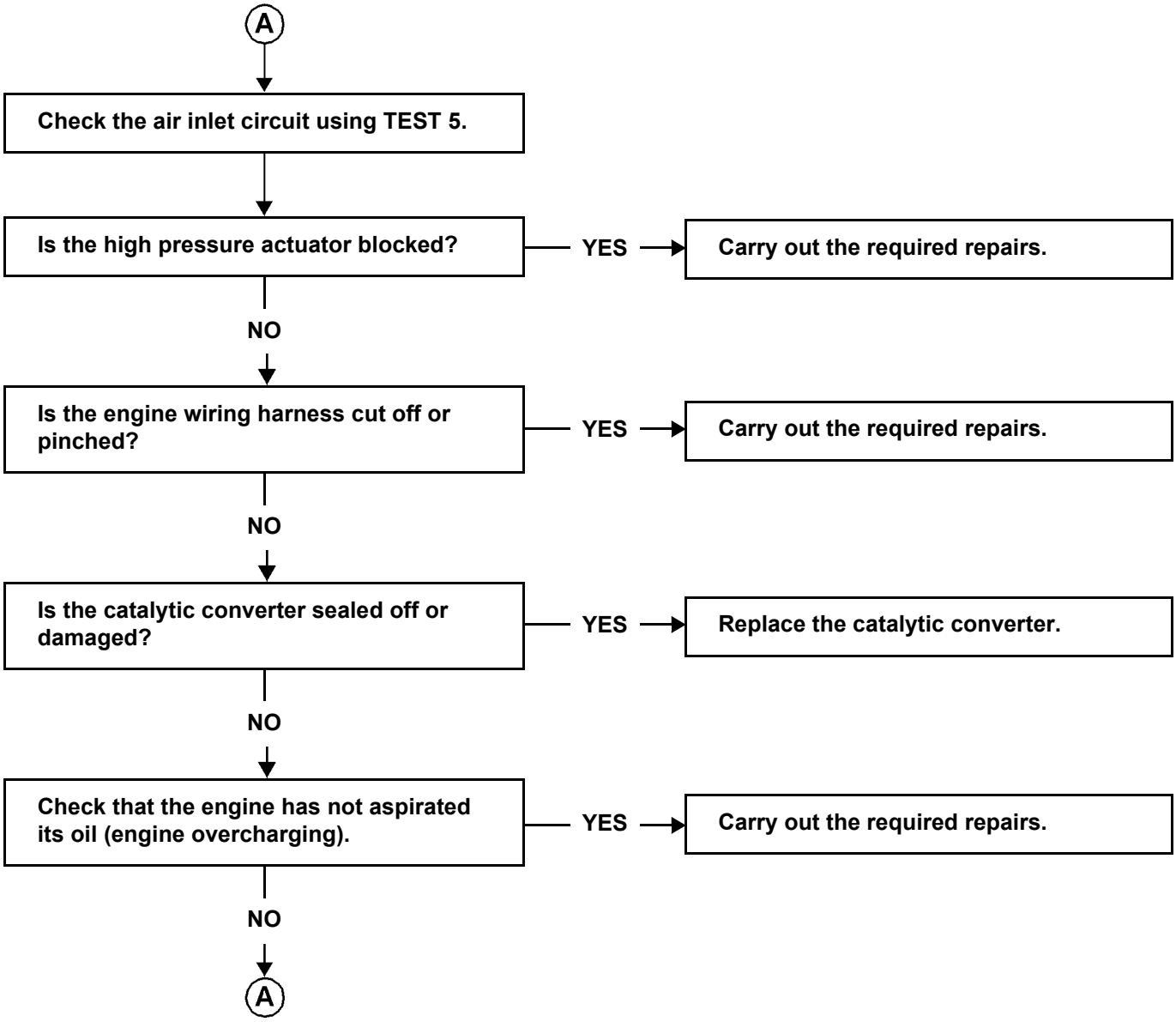


CHART 9 CONTINUED 2	

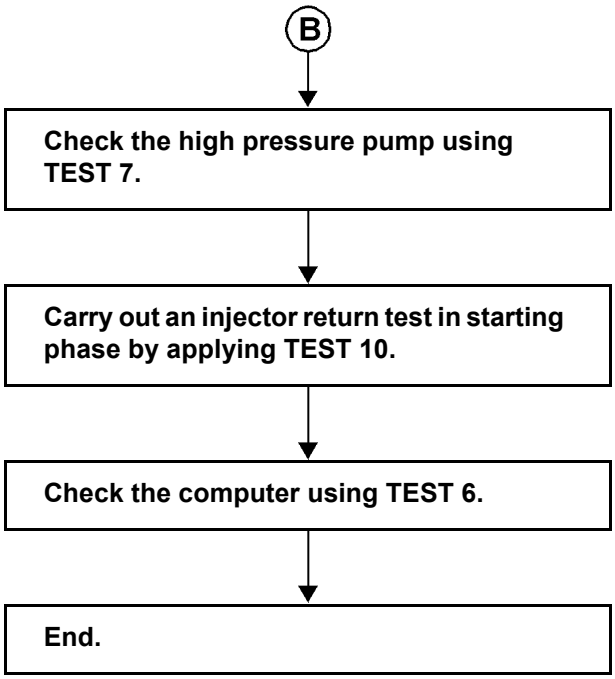


CHART 10	ENGINE JERKING

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

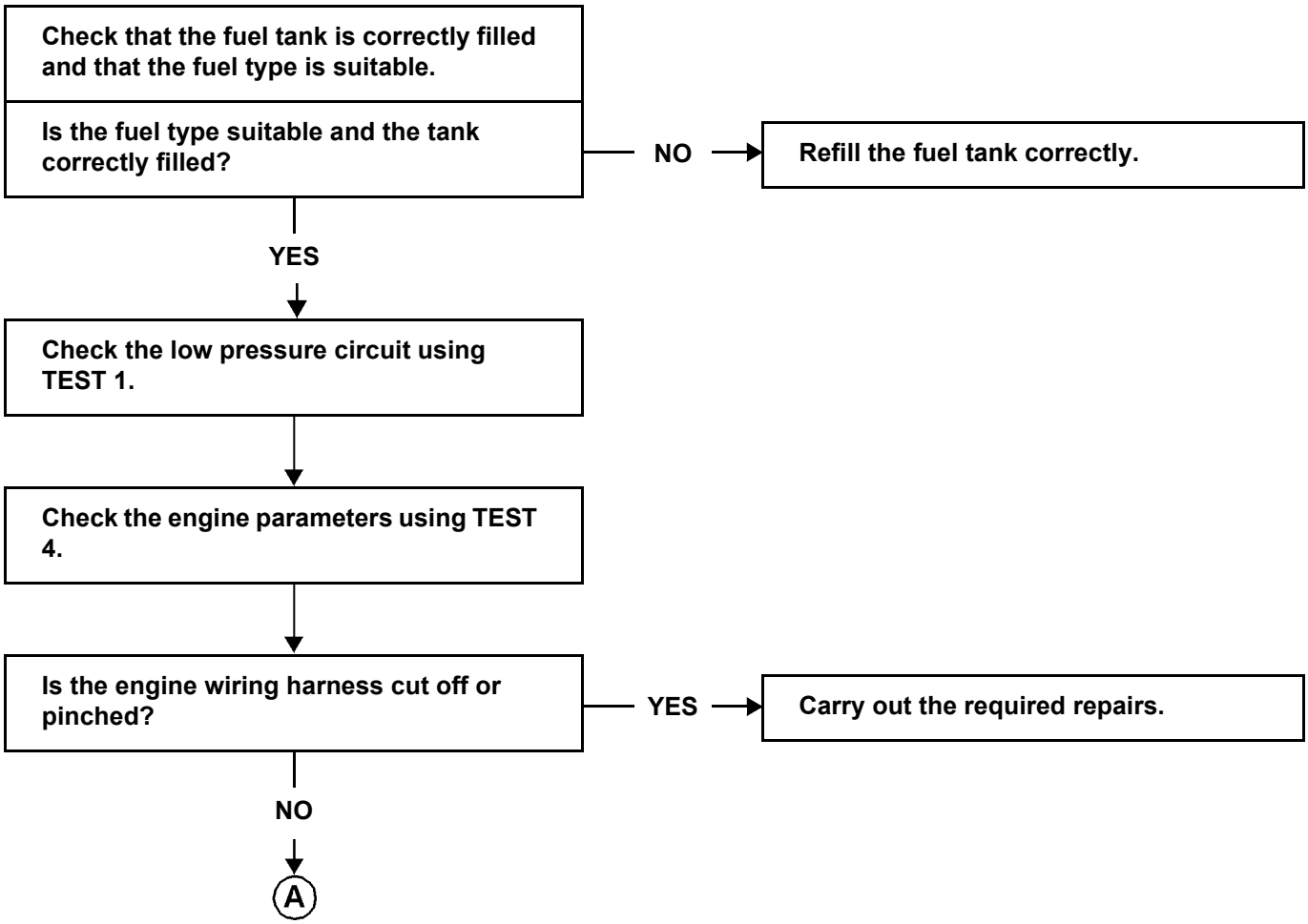


CHART 10 CONTINUED 1	

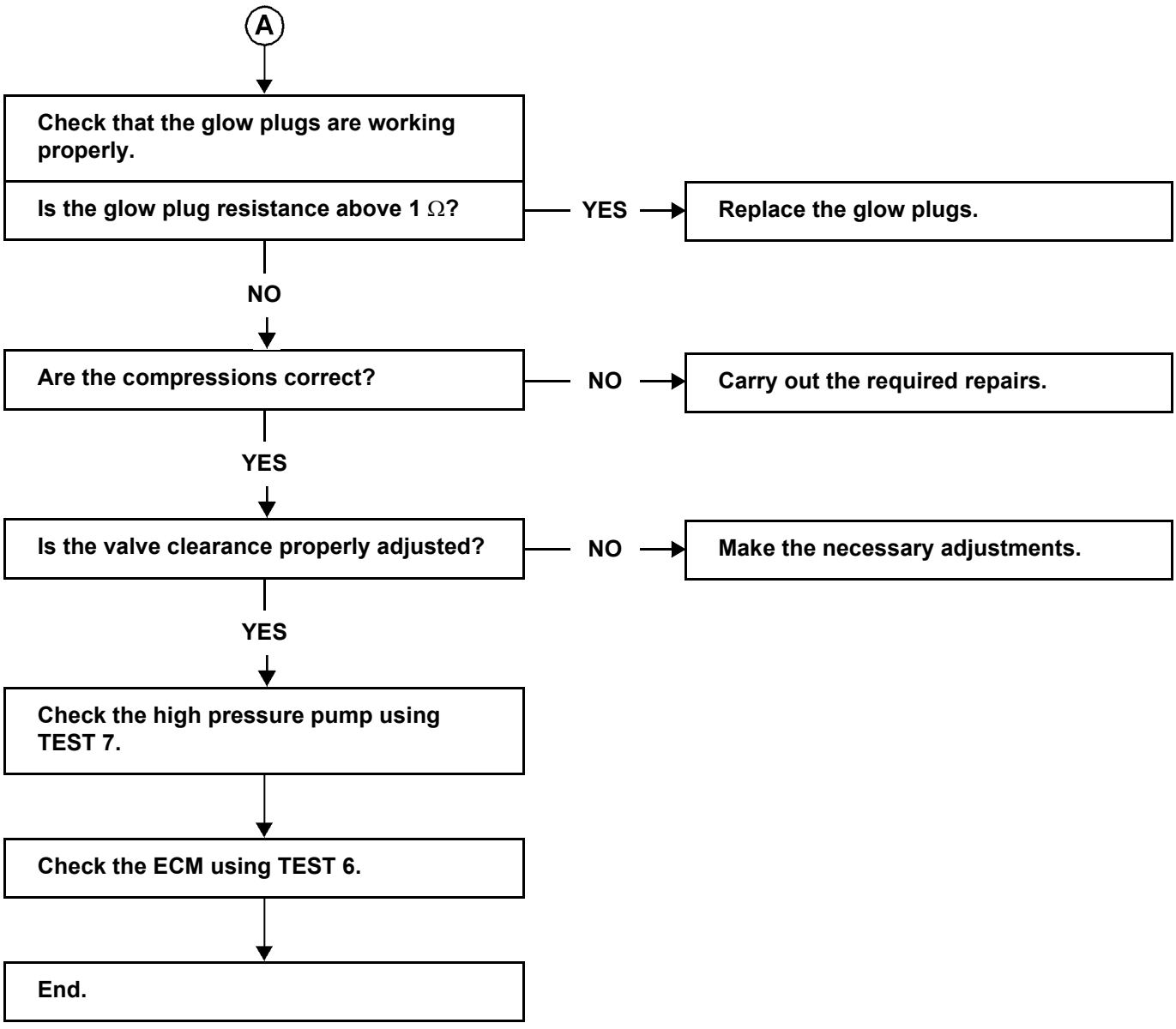


CHART 11	LACK OF POWER

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the air inlet circuit using TEST 5.

↓

Is the engine oil level correct? — **NO** → **Top up the oil.**

YES

↓

Is the catalytic converter sealed off or damaged? — **YES** → **Replace the catalytic converter.**

NO

↓

Check that the turbocharger is working properly.

Is the turbocharger correct? — **NO** → **Carry out the required repairs.**

YES

↓

Ⓐ

CHART 11 Cont'd	

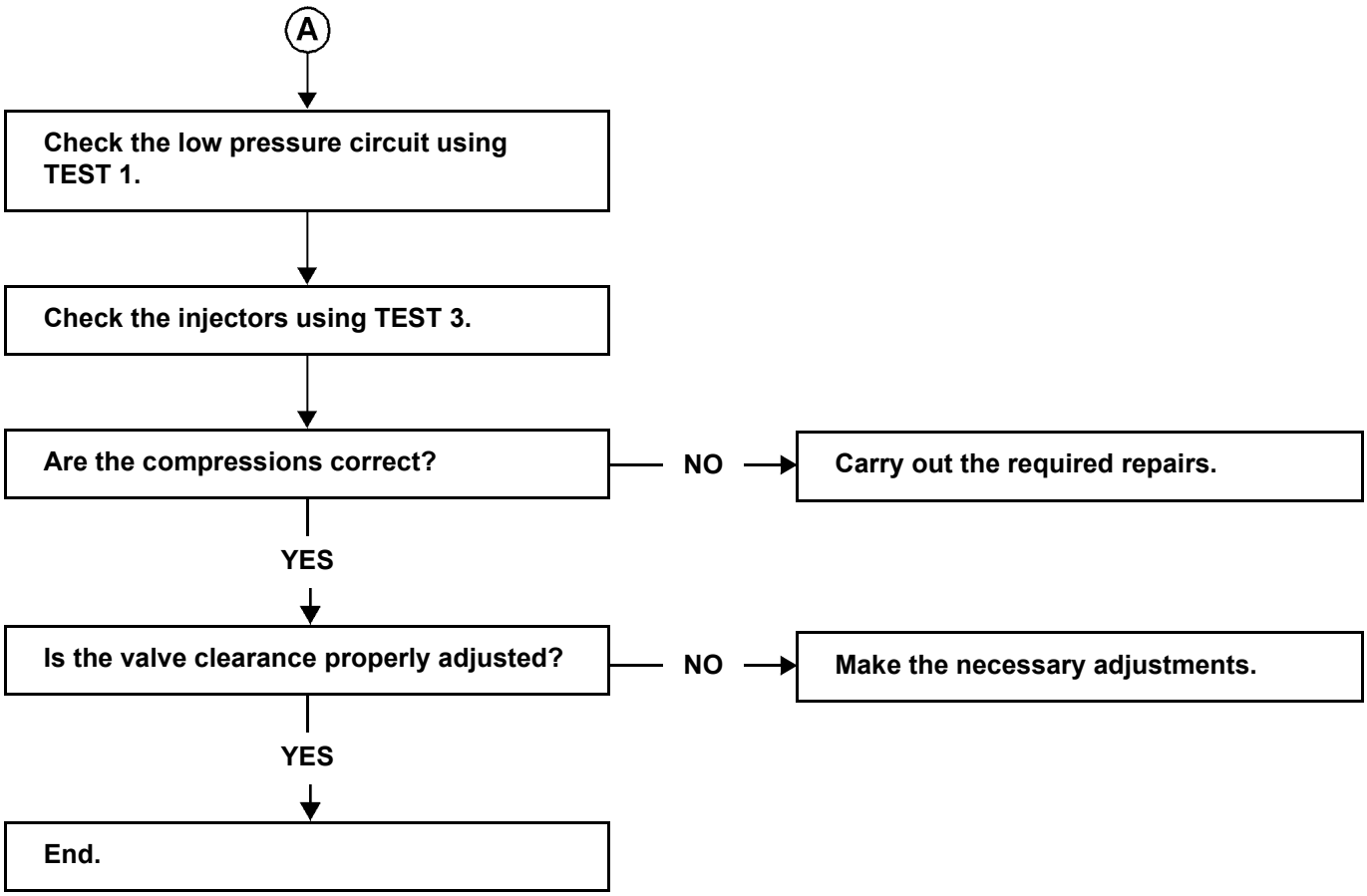


CHART 12	TOO MUCH POWER

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

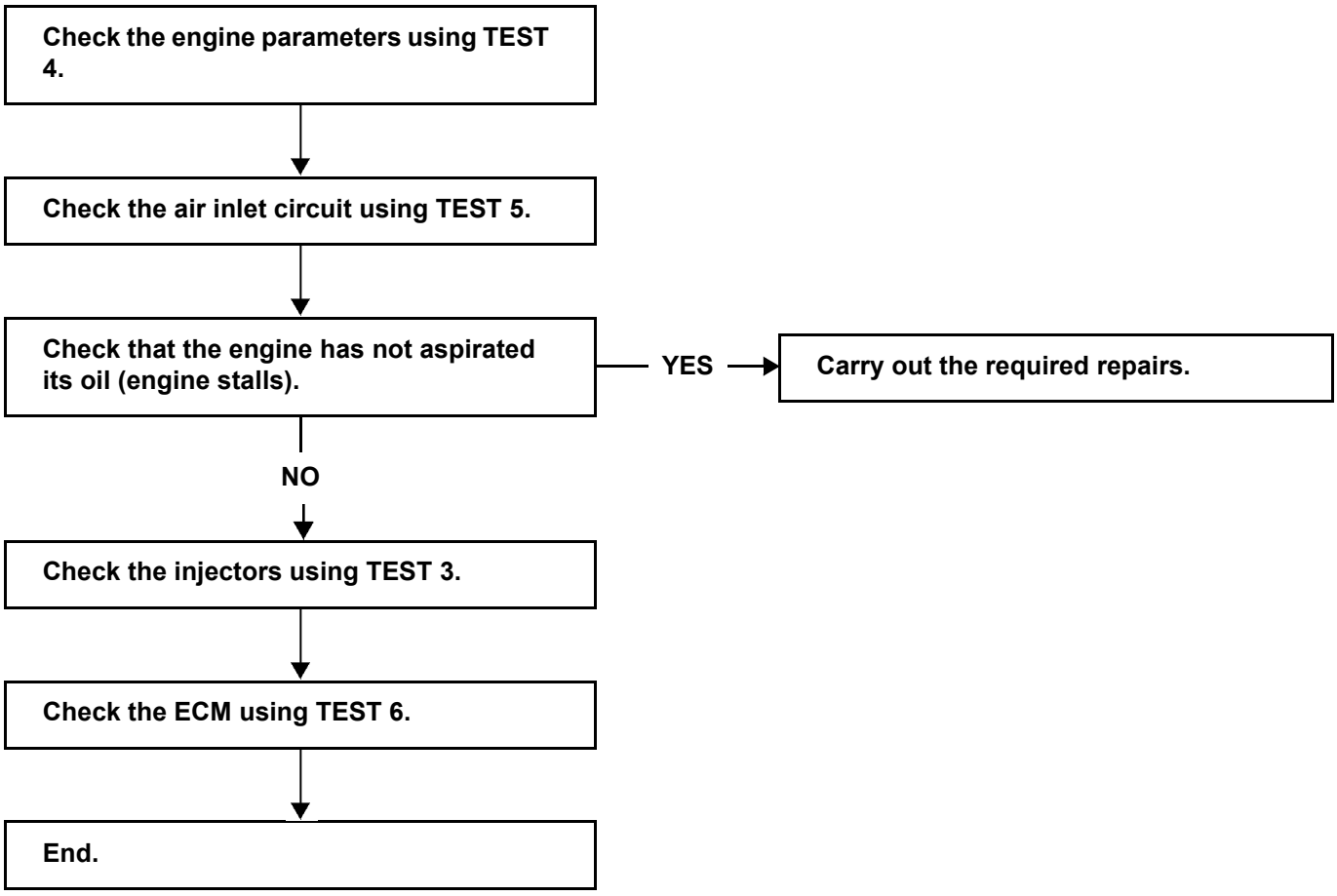


CHART 13	EXCESSIVE CONSUMPTION

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

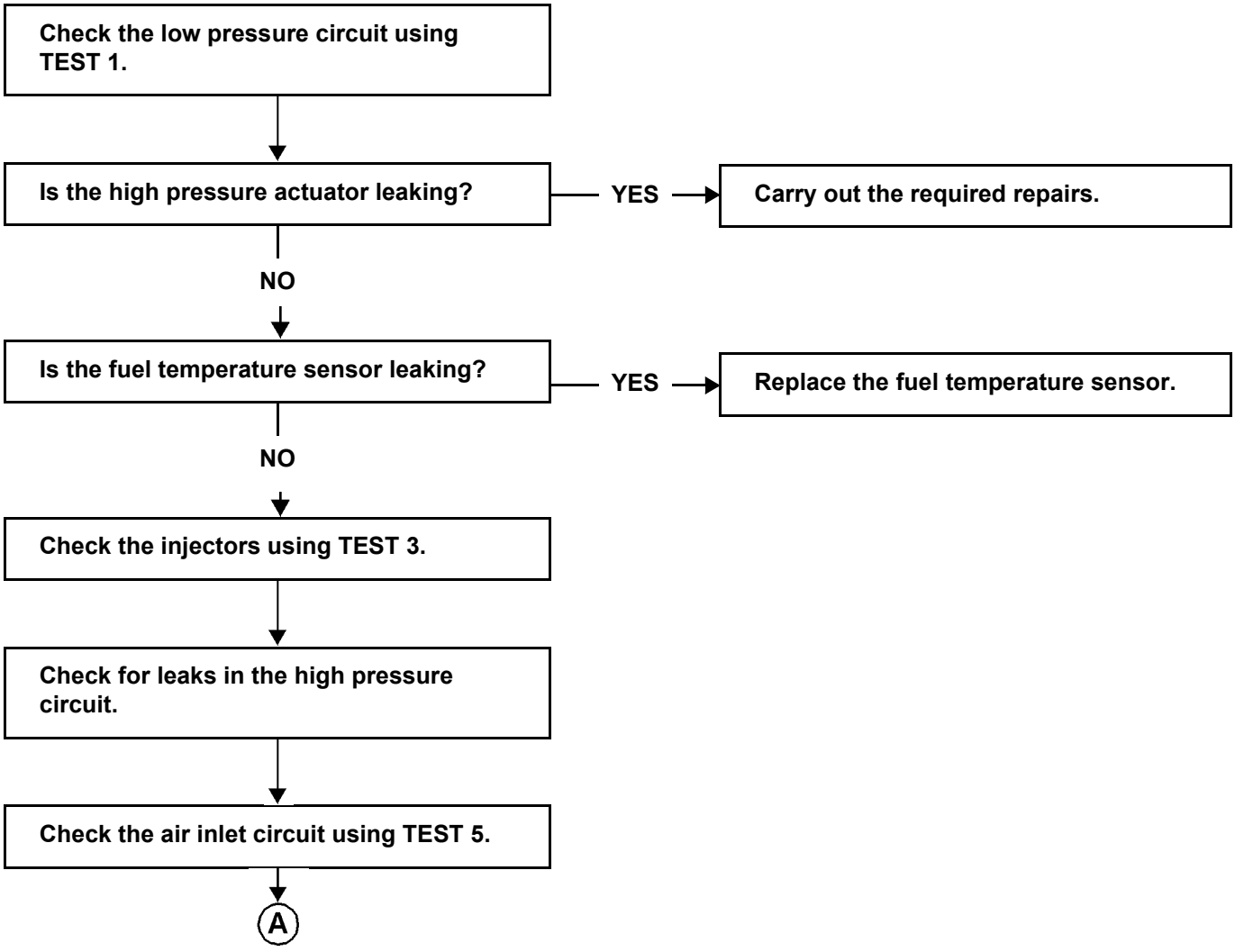


CHART 13 CONTINUED 1	

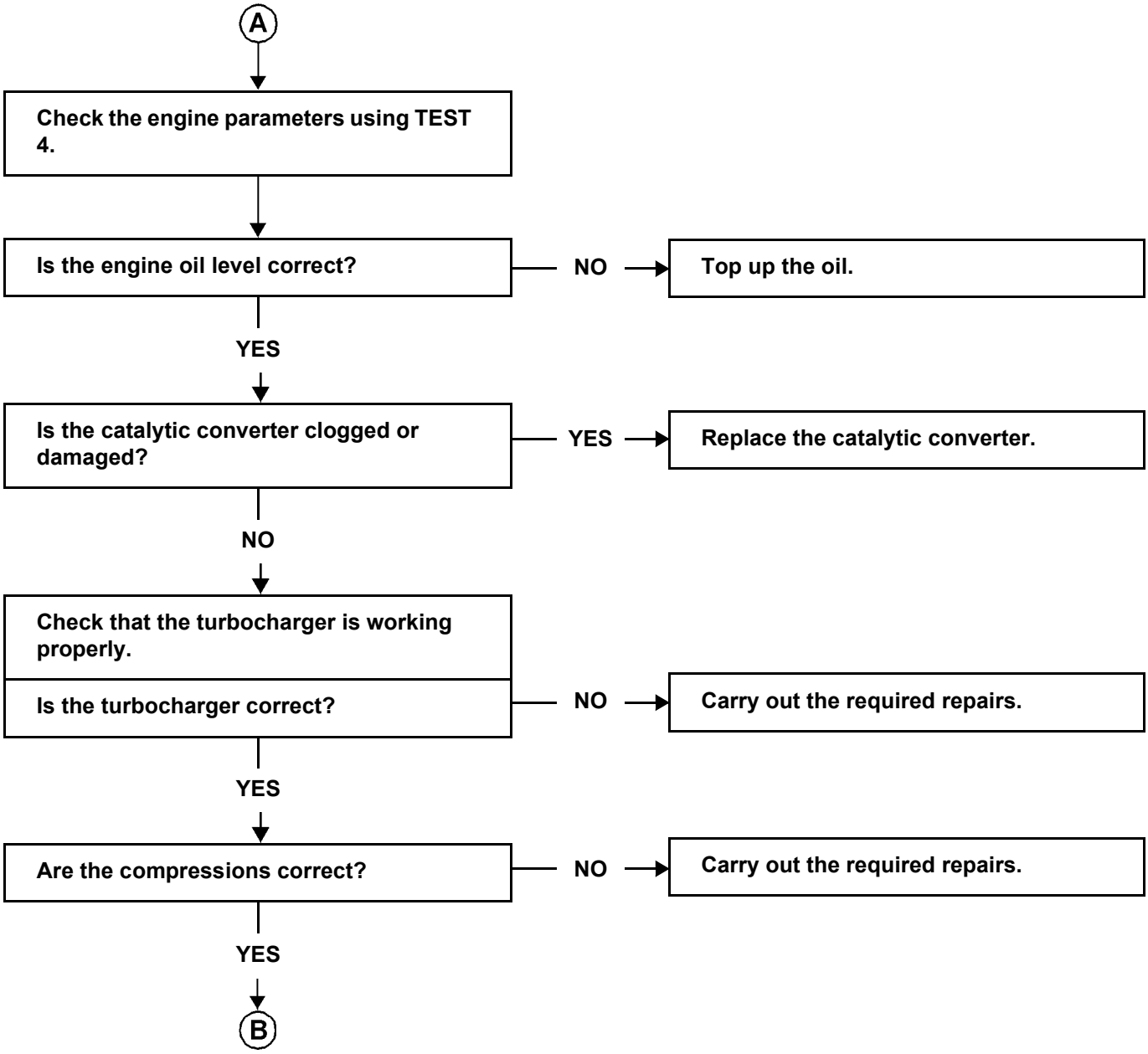


CHART 13 CONTINUED 2	

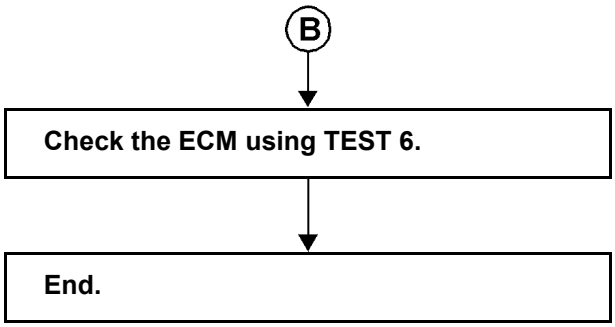


CHART 14	OVERSPEED WHEN LIFTING OFF ACCELERATOR OR CHANGING GEAR

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

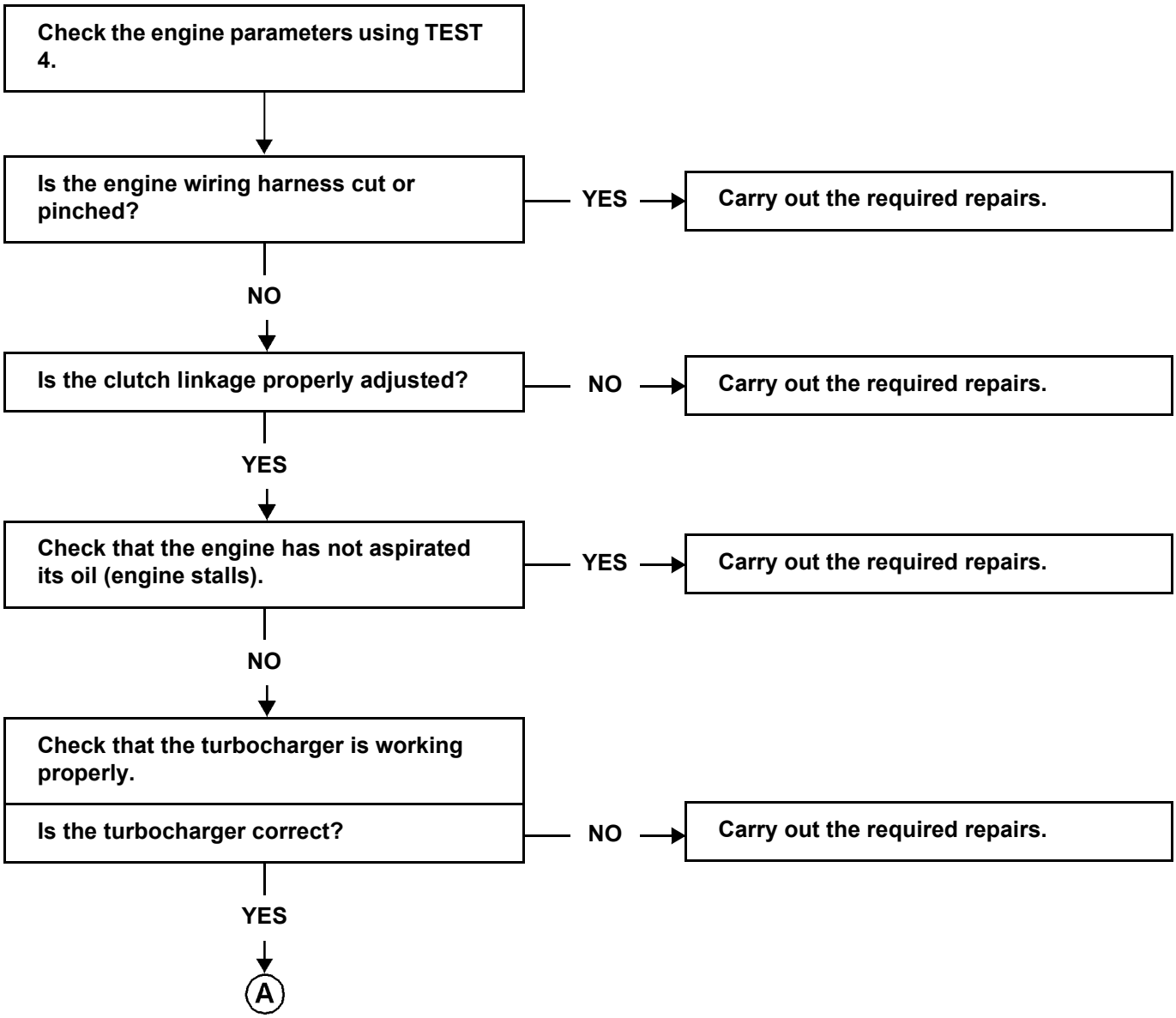


CHART 14 Cont'd	

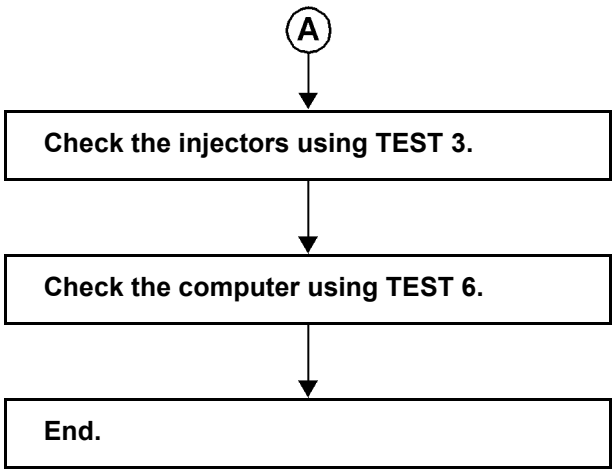


CHART 15	ENGINE DIES ON PULLING AWAY

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

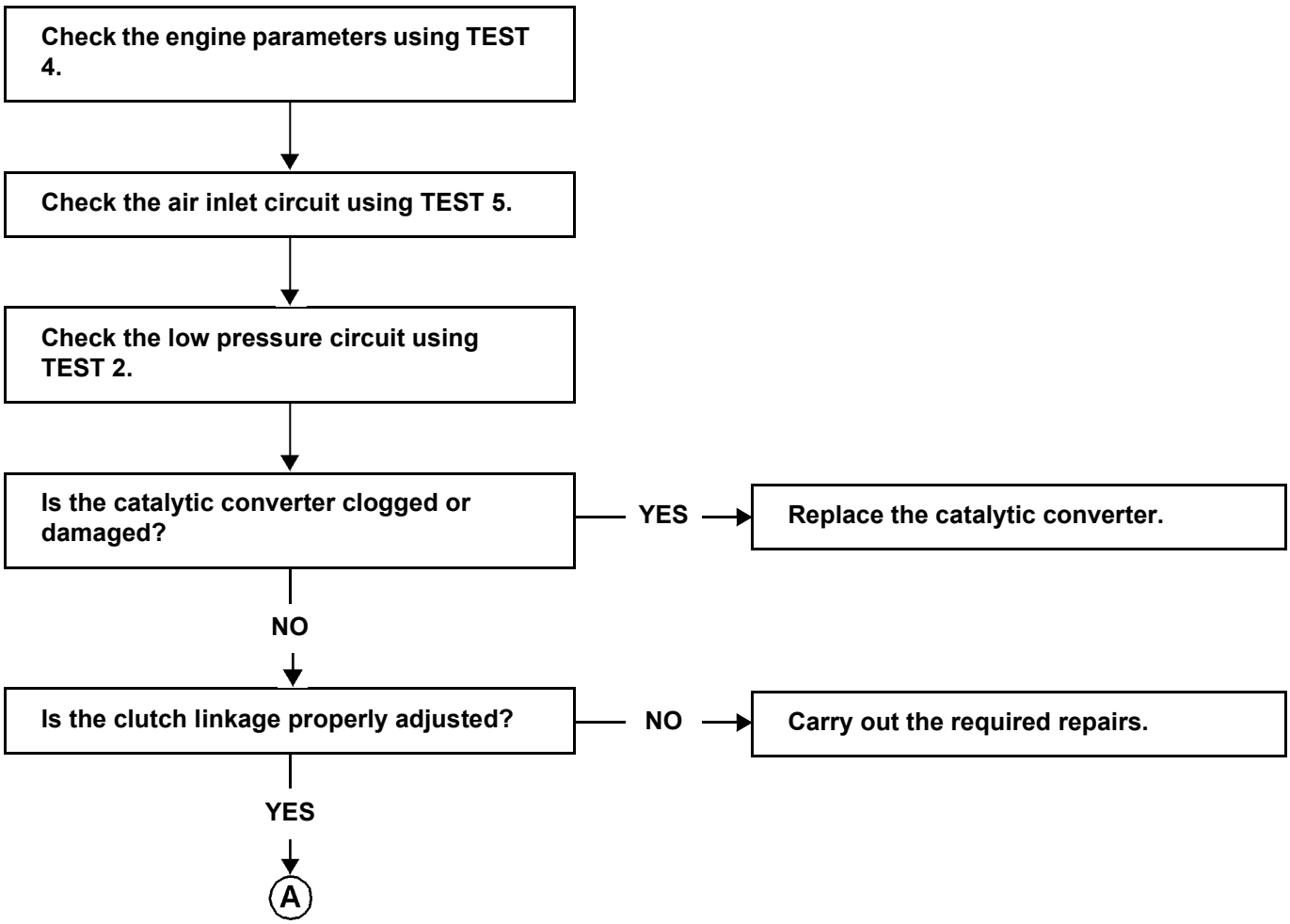


CHART 15 Cont'd	

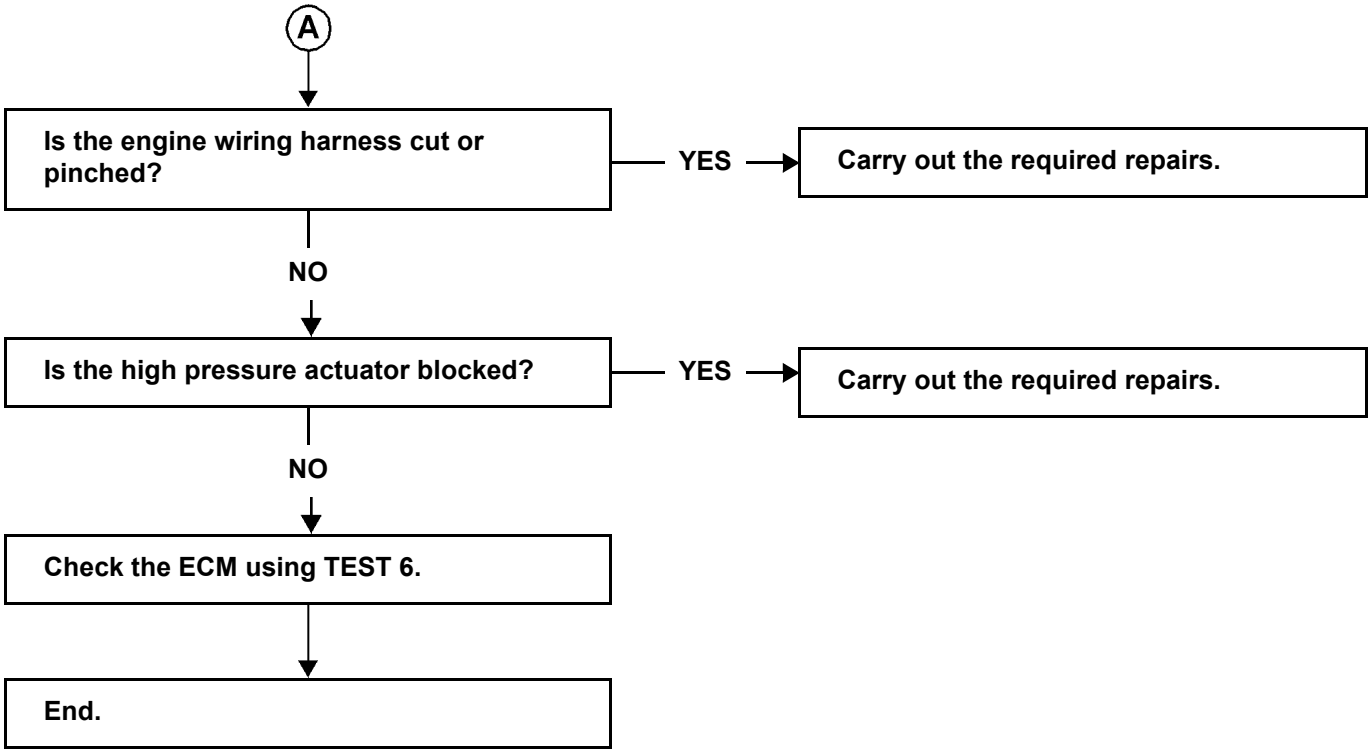


CHART 16	THE ENGINE DOES NOT STOP

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

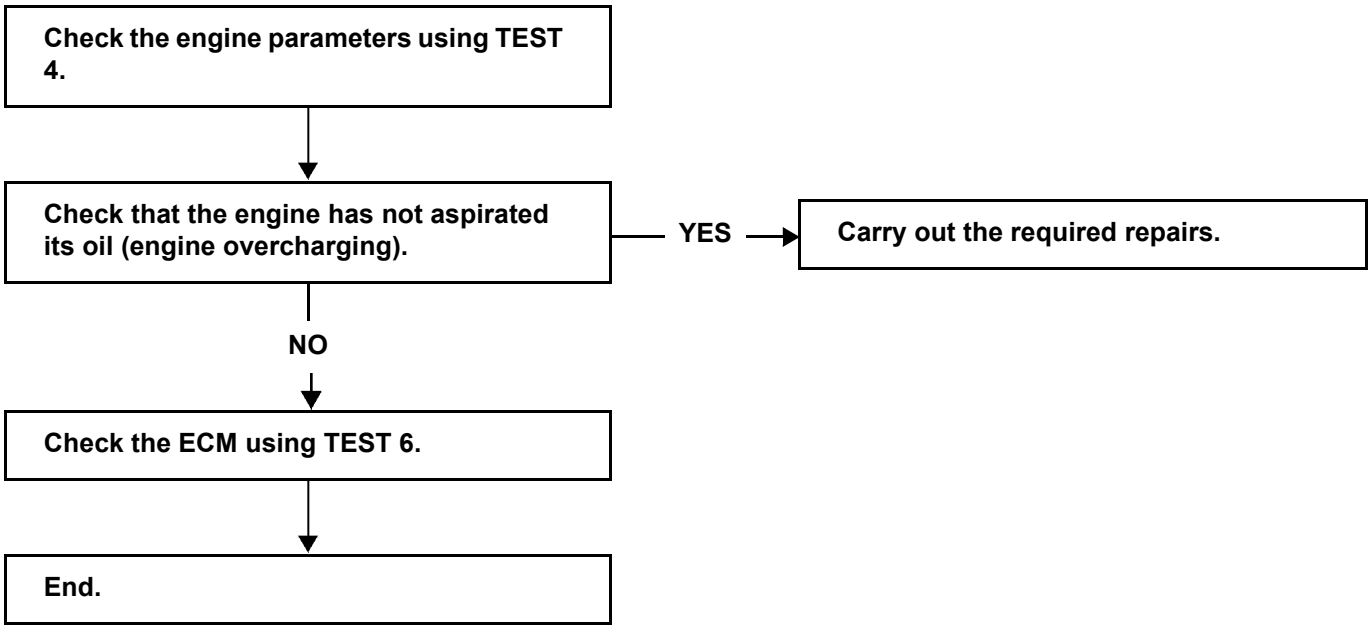


CHART 17	CLANKING ENGINE, NOISY ENGINE

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Check the engine parameters using TEST 4.

↓

Check the air inlet circuit using TEST 5.

↓

Check that the glow plugs are working properly.

Is the glow plug resistance above 1 Ω? — **YES** → **Replace the glow plugs.**

NO

↓

Are the compressions correct? — **NO** → **Carry out the required repairs.**

YES

↓

Check the low pressure circuit using TEST 1.

↓

Ⓐ

CHART 17 Continued	

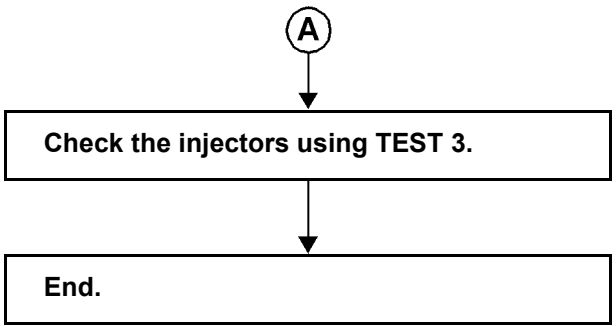


CHART 18	SQUALLING NOISE

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

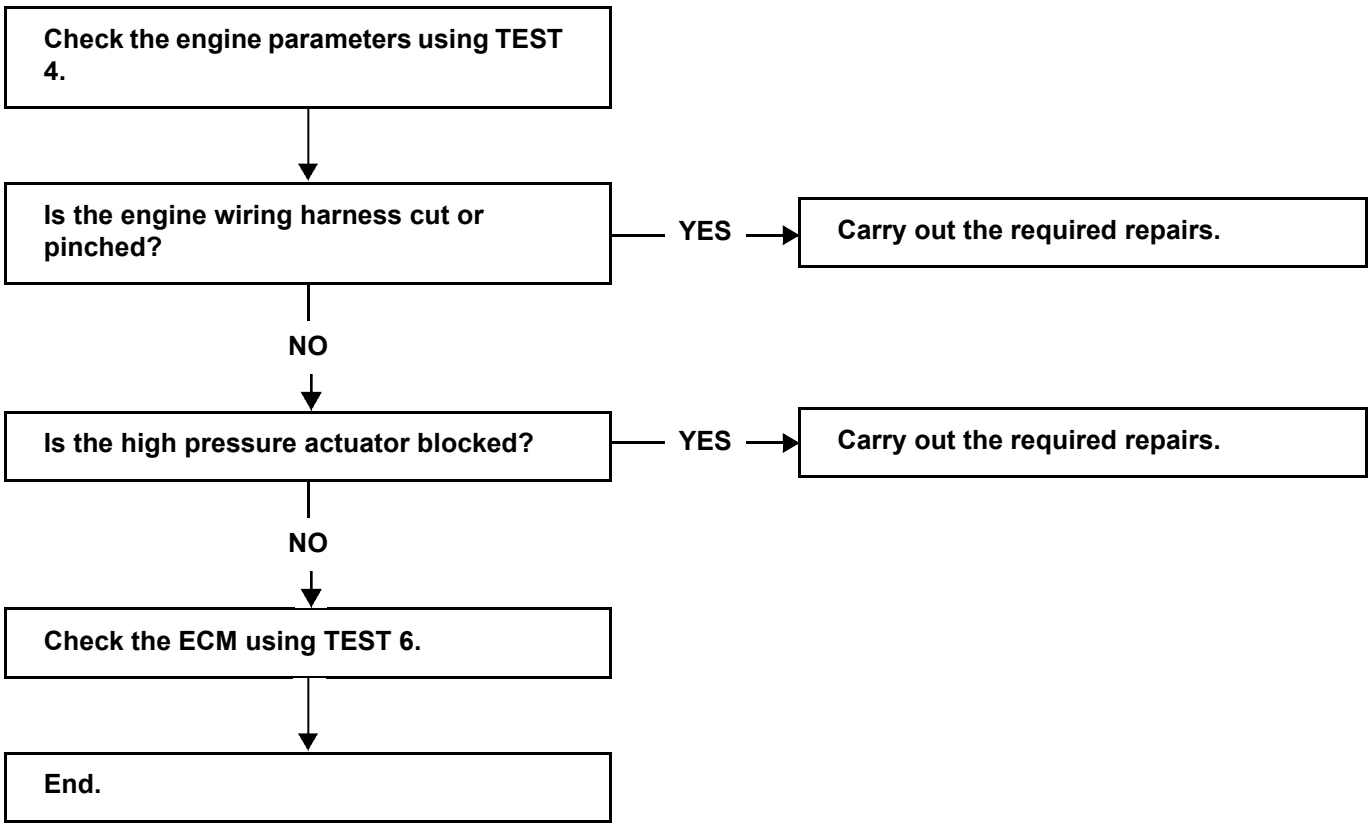


CHART 19	VARIOUS MECHANICAL NOISES

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Check that the injectors are not making a buzzing noise (injector discharge).

YES → **Carry out the required repairs.**

NO

Are the mounting clips on the injector pipes broken or missing?

YES → **Carry out the required repairs.**

NO

Check the engine parameters using TEST 4.

Is the catalytic converter clogged or damaged?

YES → **Replace the catalytic converter.**

NO

Check the air inlet circuit using TEST 5.

Ⓐ

CHART 19 Cont'd	

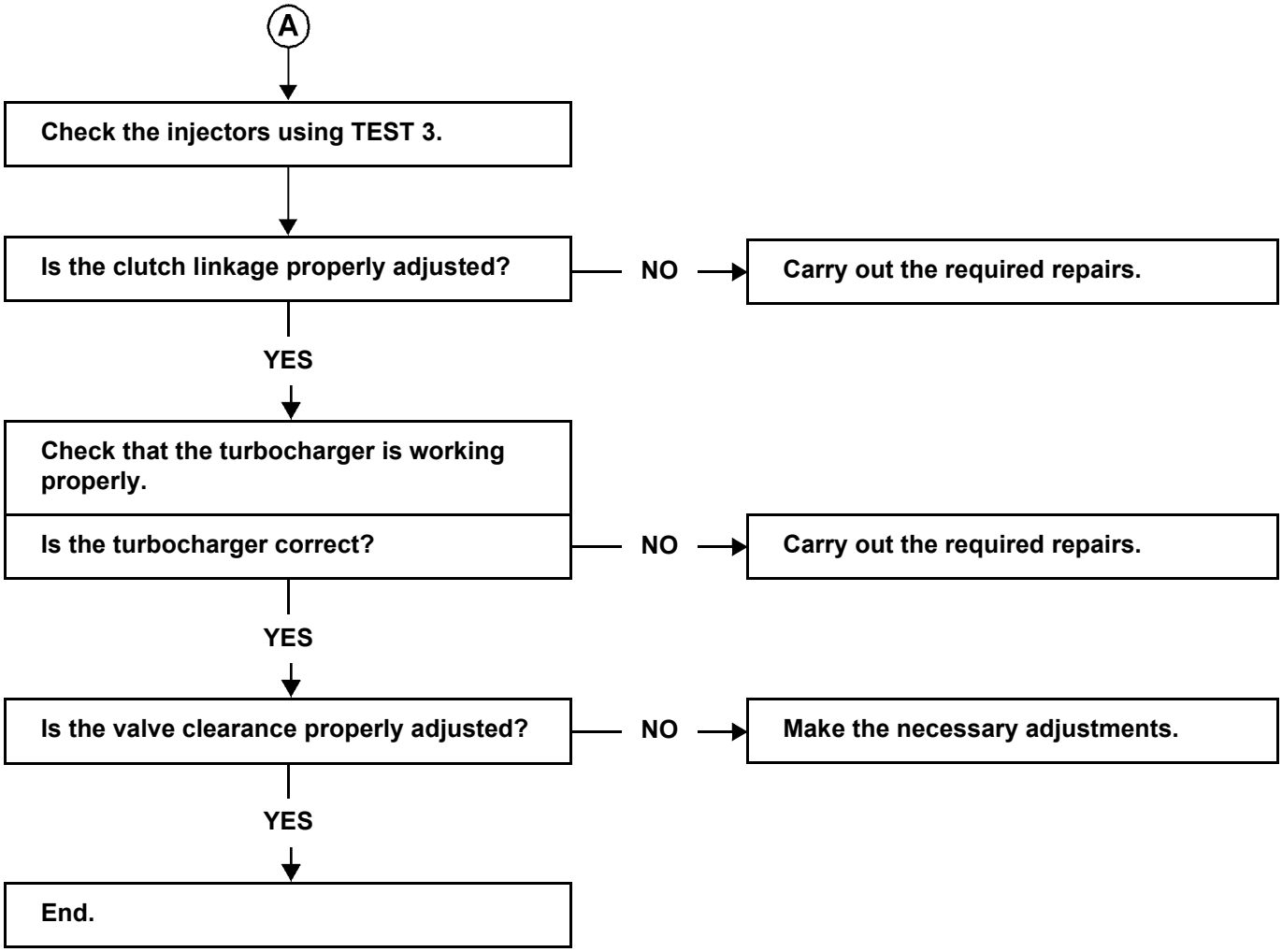


CHART 20	EXHAUST ODOURS

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

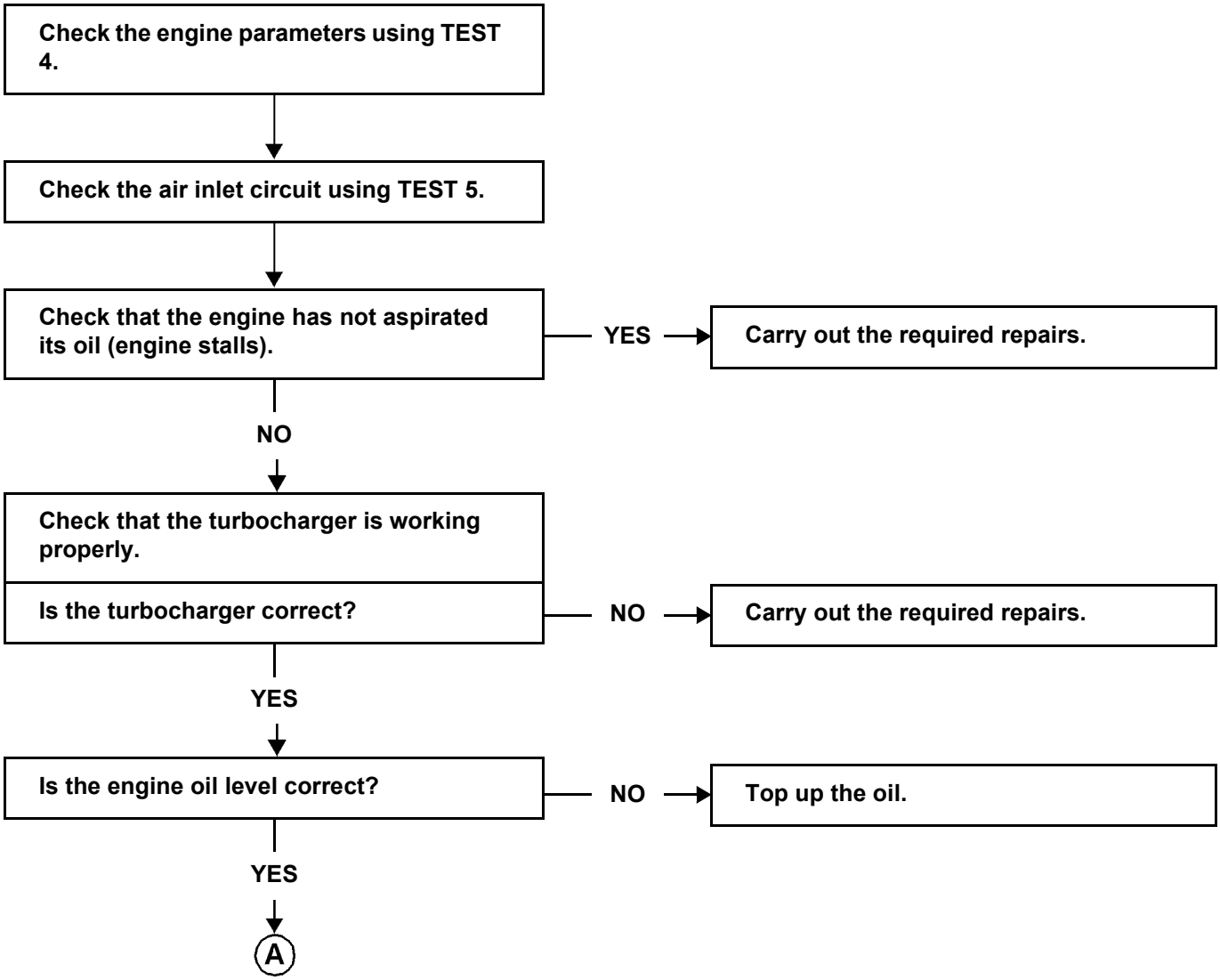


CHART 20 Cont'd	

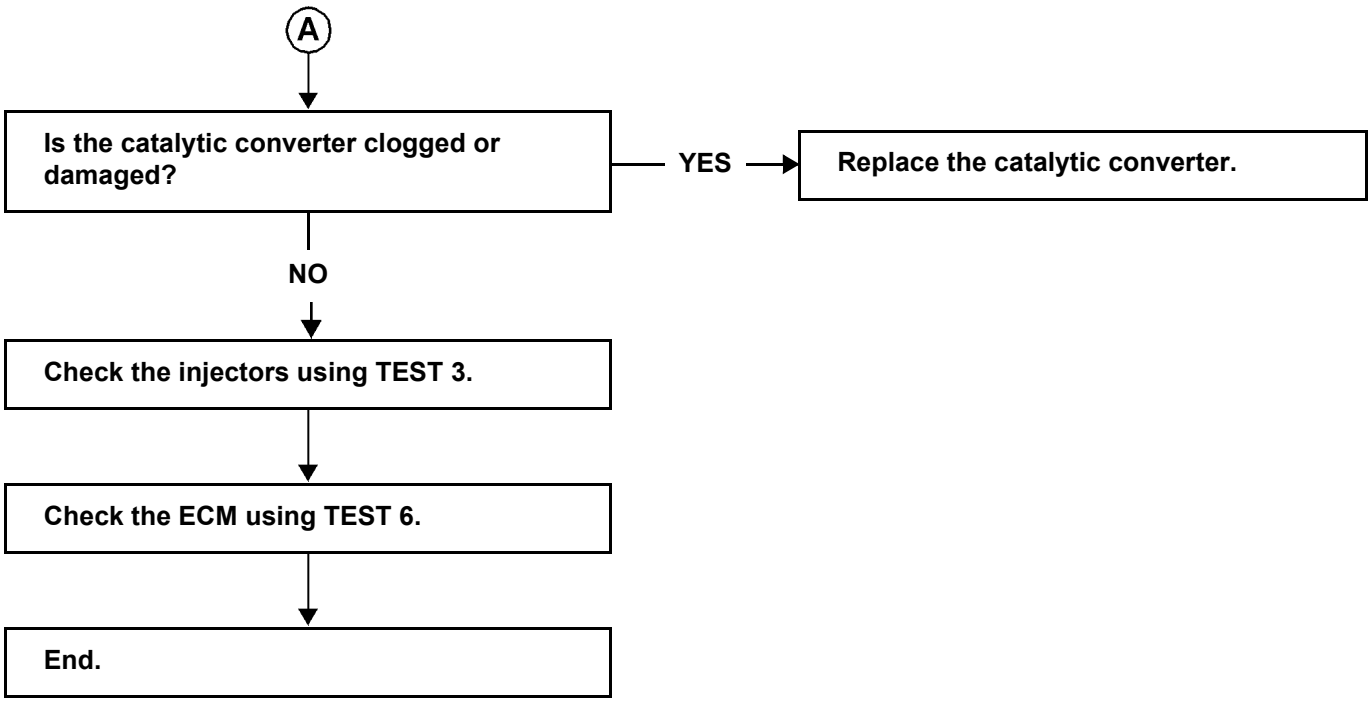


CHART 21	DIESEL ODOURS

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

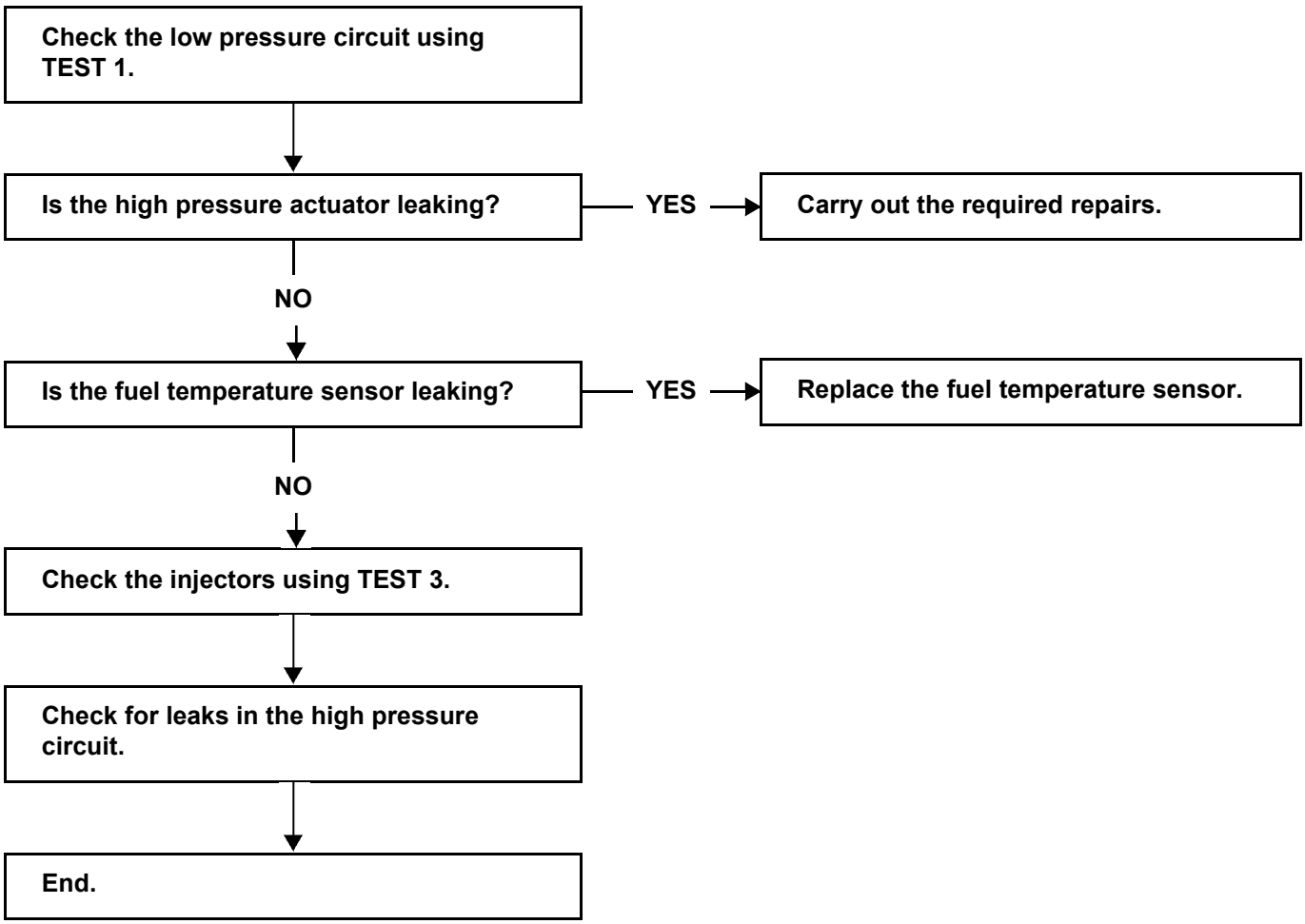


CHART 22	BLUE, WHITE OR BLACK SMOKE

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

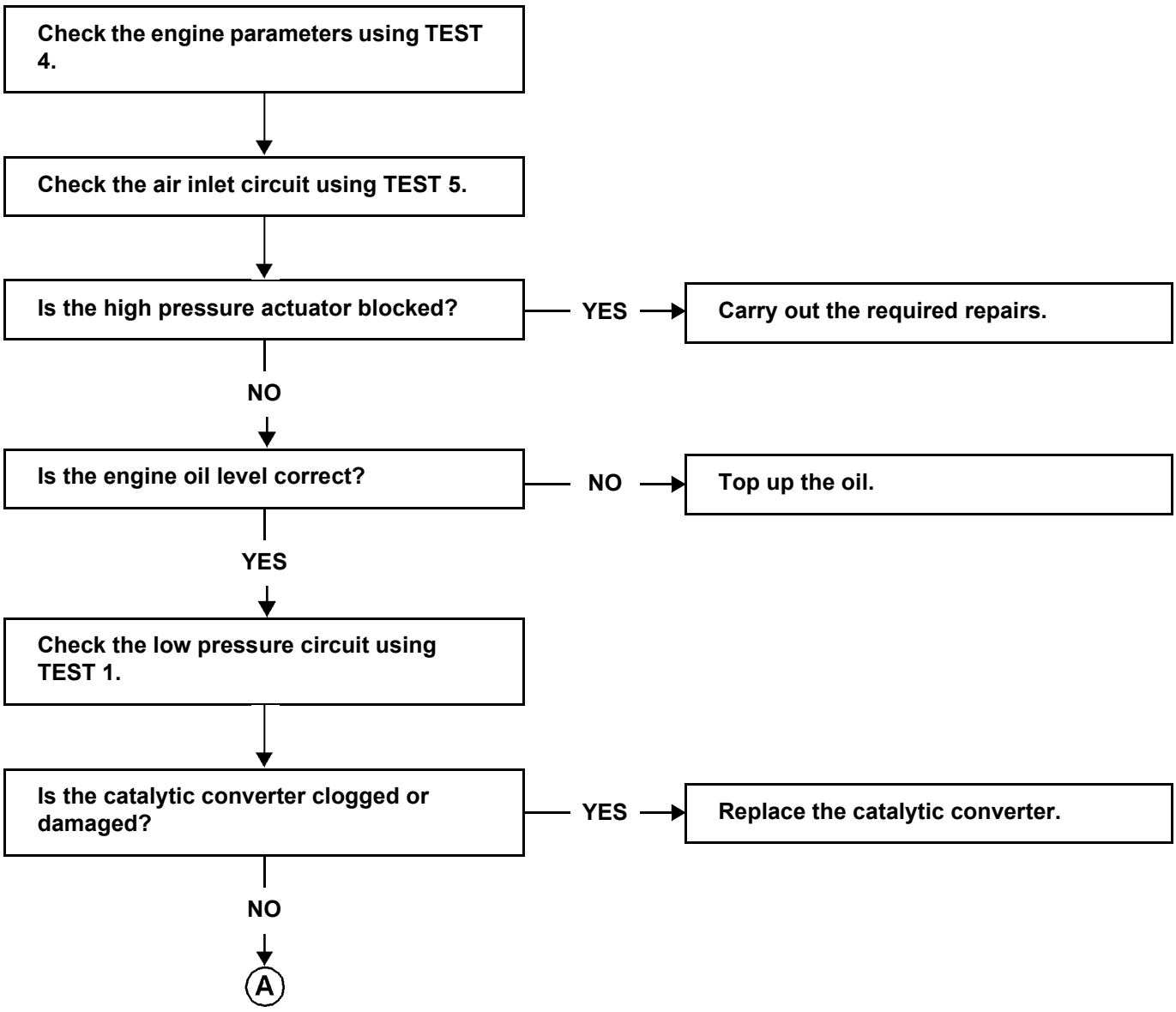


CHART 22 Cont'd	

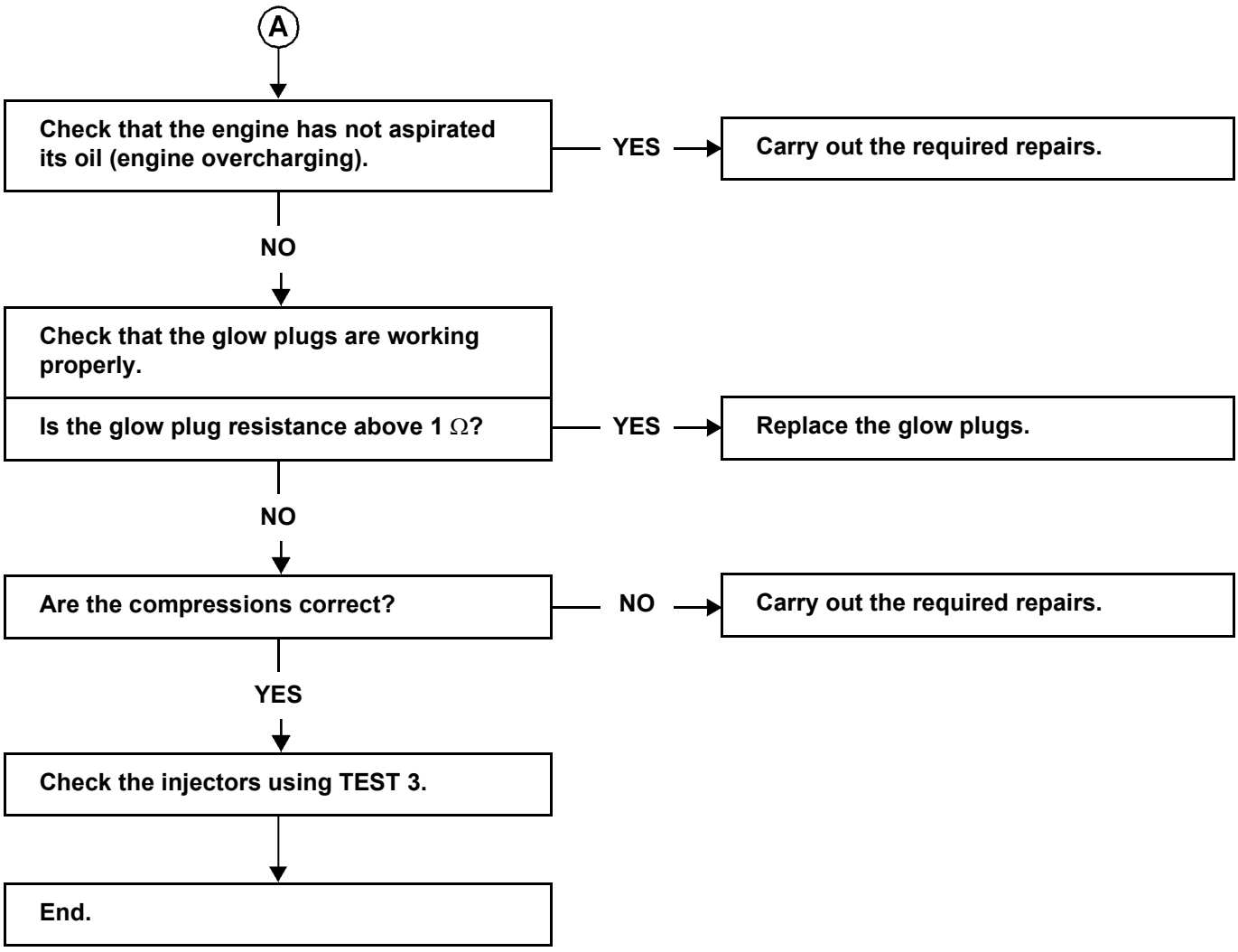


CHART 23	SMOKE (BLUE, BLACK OR WHITE) ON ACCELERATING

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

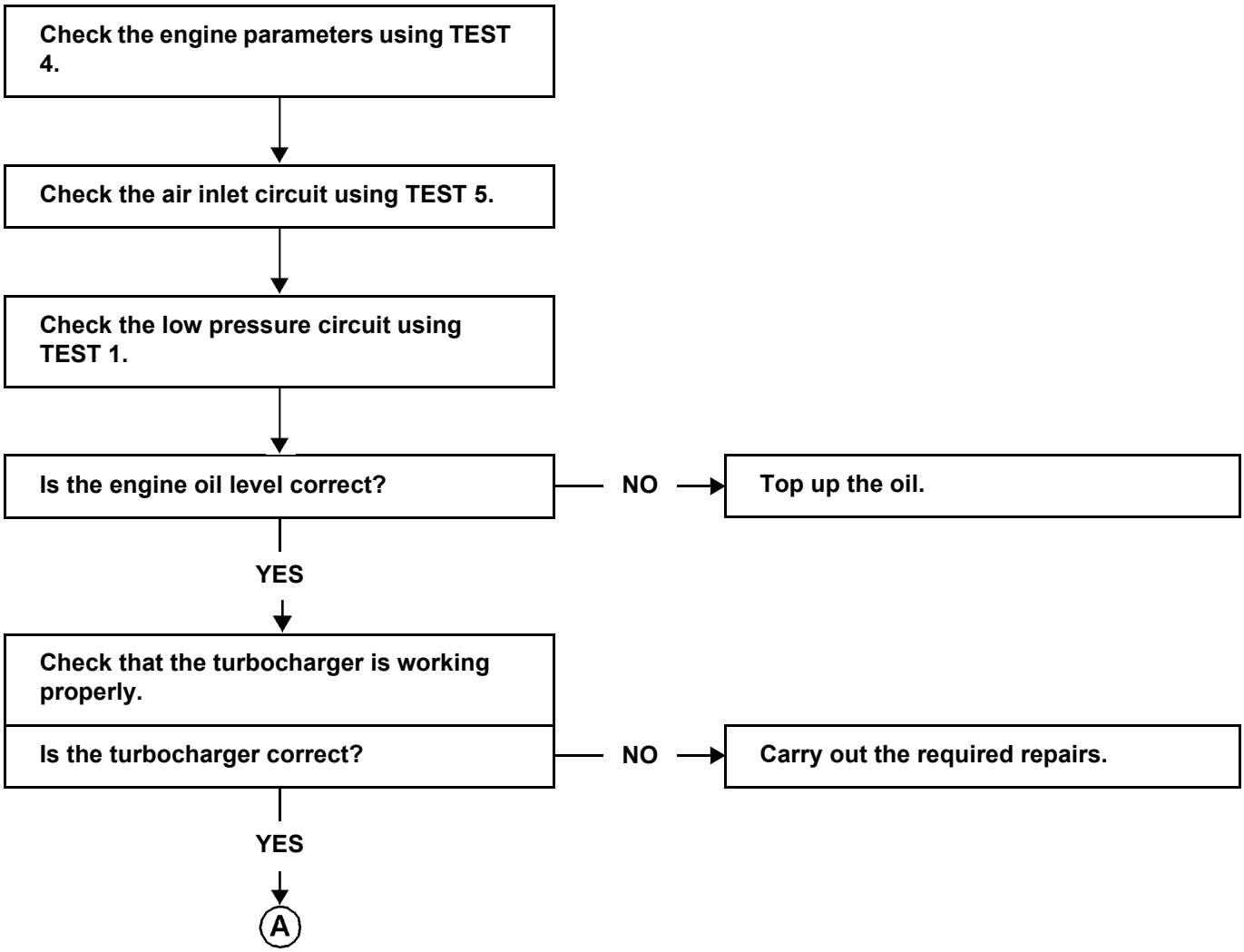


CHART 23 CONTINUED 1	

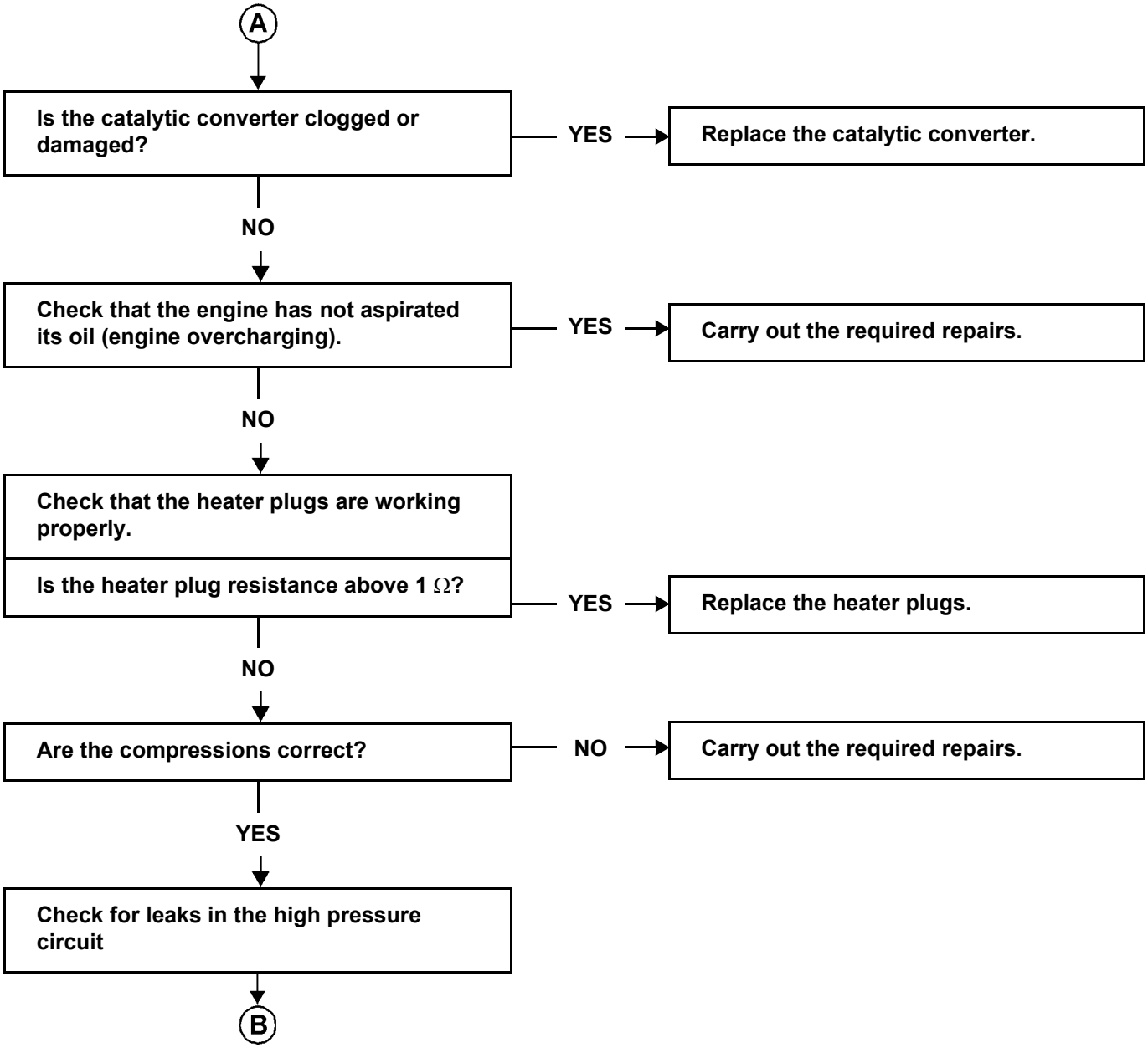
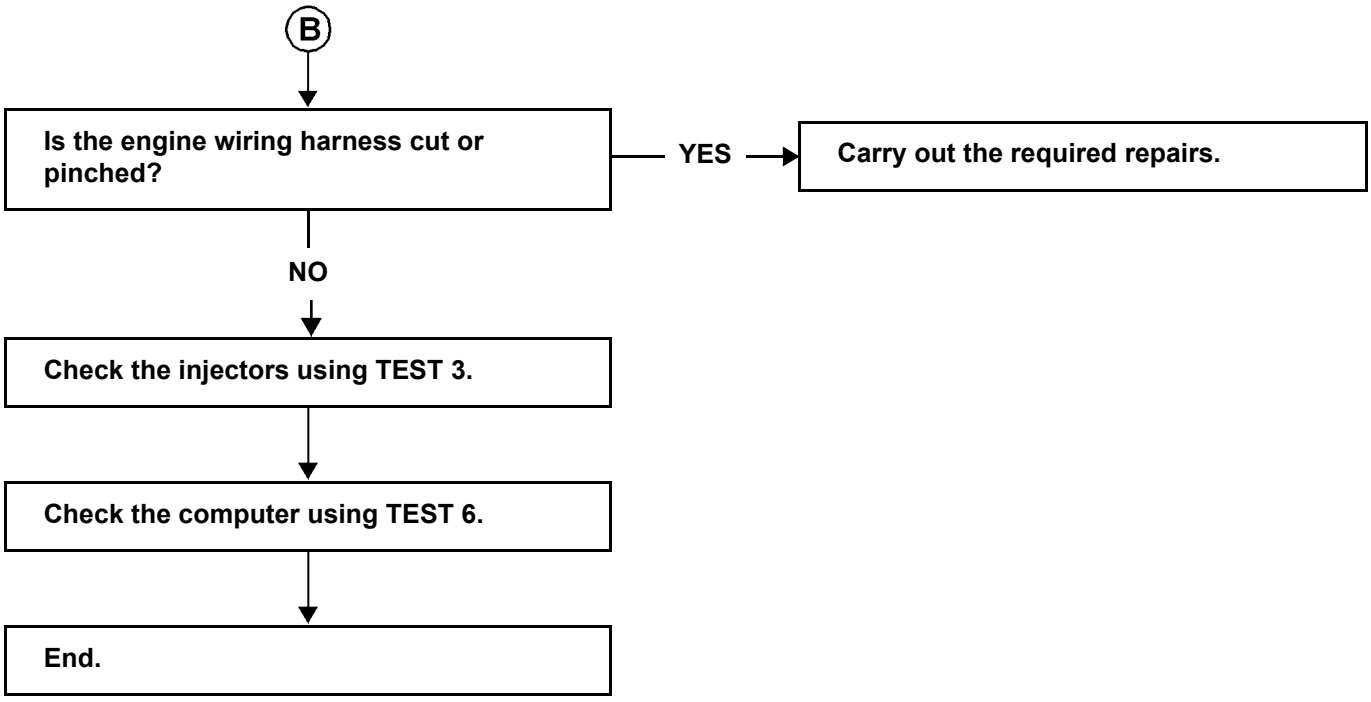
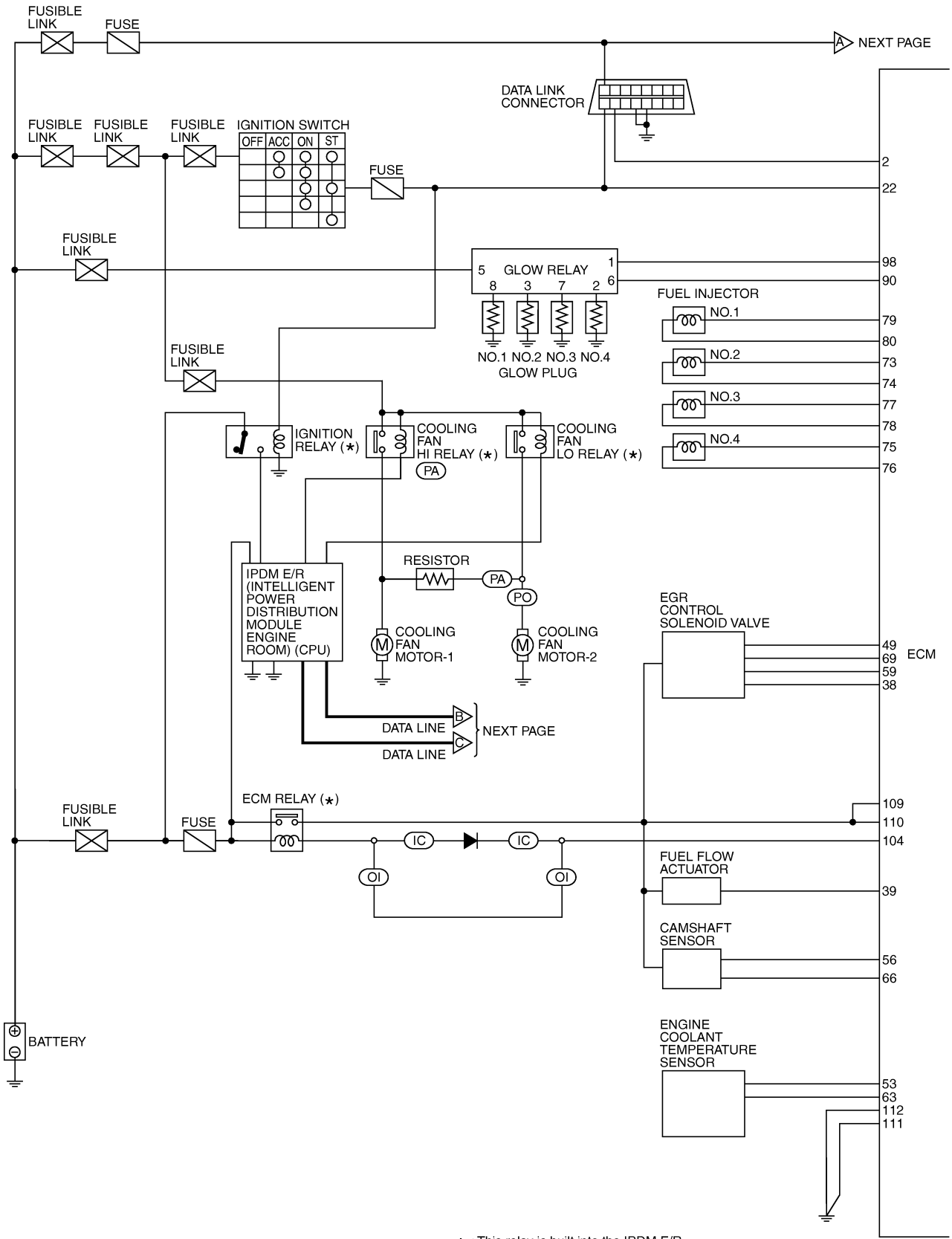


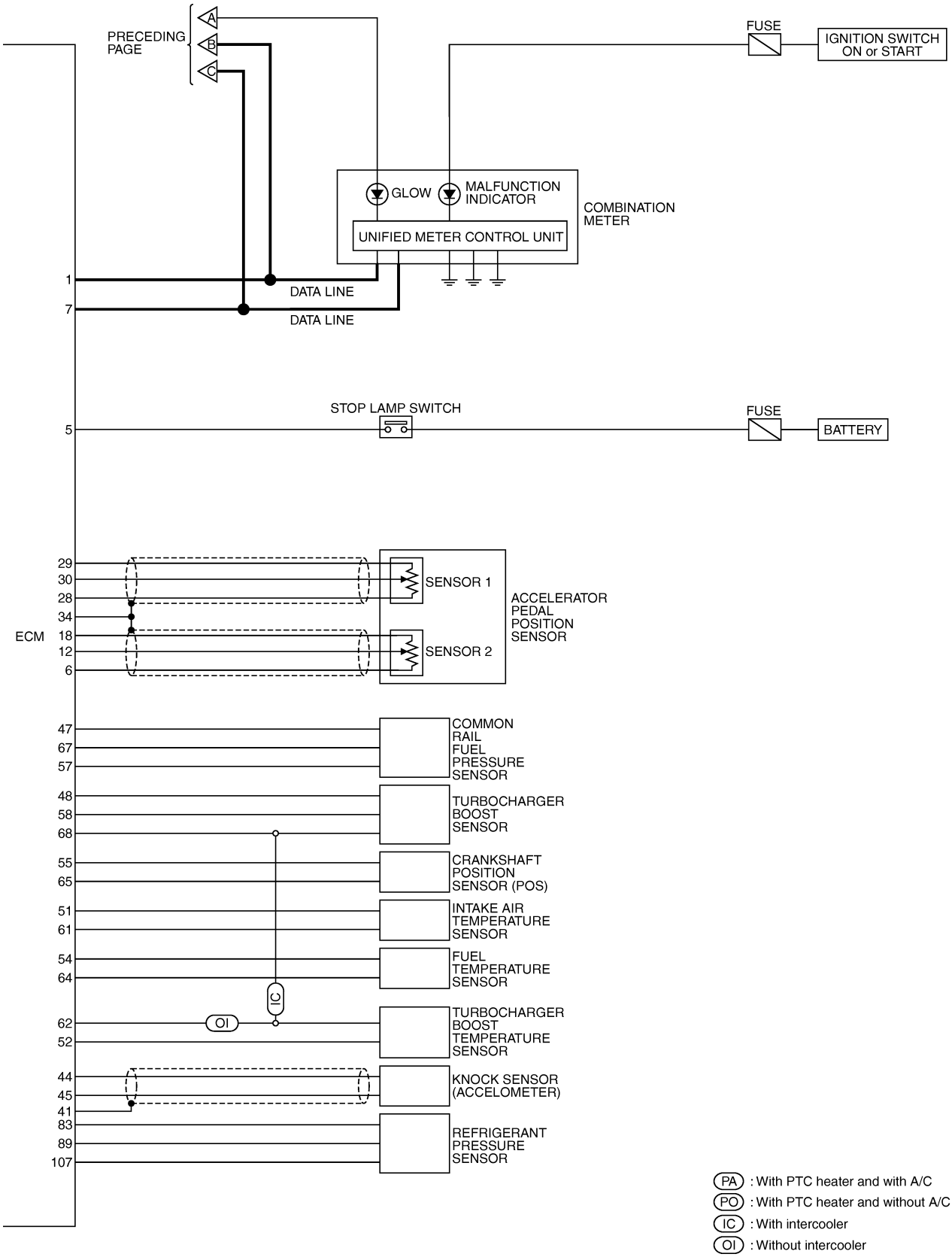
CHART 23 Cont'd	





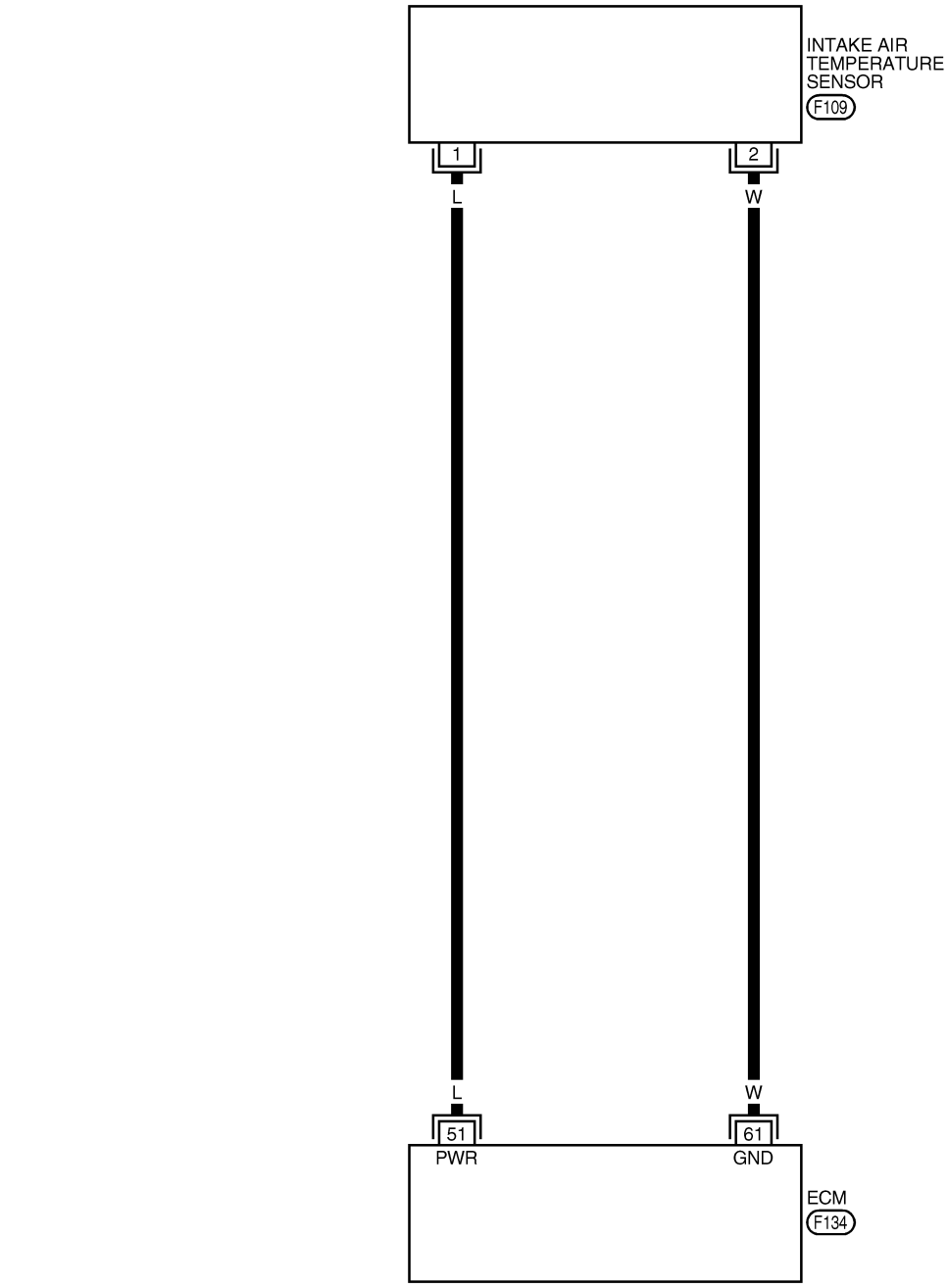
* : This relay is built into the IPDM E/R
(Intelligent power distribution module engine room).

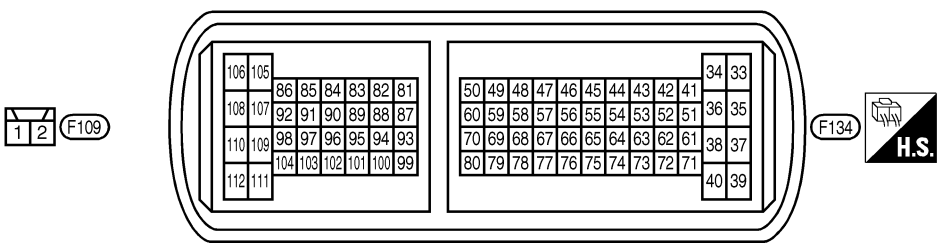
MBWA1176E


PRECEDING PAGE
A
B
C
FUSE
IGNITION SWITCH ON or START
GLOW
MALFUNCTION INDICATOR
COMBINATION METER
UNIFIED METER CONTROL UNIT
1
7
DATA LINE
DATA LINE
STOP LAMP SWITCH
FUSE
5
BATTERY
ECM
29
30
28
34
18
12
6
SENSOR 1
SENSOR 2
ACCELERATOR PEDAL POSITION SENSOR
47
67
57
COMMON RAIL FUEL PRESSURE SENSOR
48
58
68
TURBOCHARGER BOOST SENSOR
55
65
CRANKSHAFT POSITION SENSOR (POS)
51
61
INTAKE AIR TEMPERATURE SENSOR
54
64
FUEL TEMPERATURE SENSOR
IC
OI
62
52
TURBOCHARGER BOOST TEMPERATURE SENSOR
44
45
41
KNOCK SENSOR (ACCELOMETER)
83
89
107
REFRIGERANT PRESSURE SENSOR
PA : With PTC heater and with A/C
PO : With PTC heater and without A/C
IC : With intercooler
OI : Without intercooler

MBWA0967E

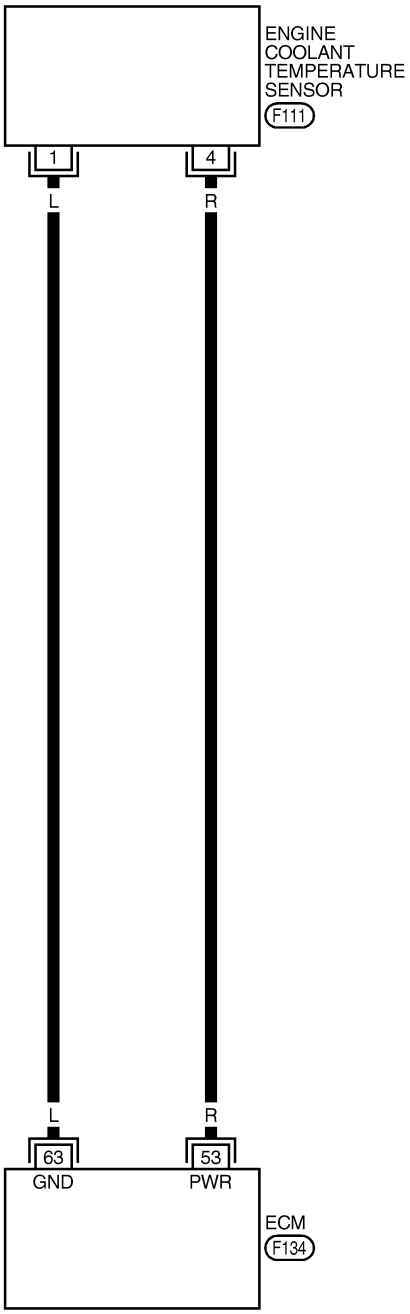
EC-IATS-01

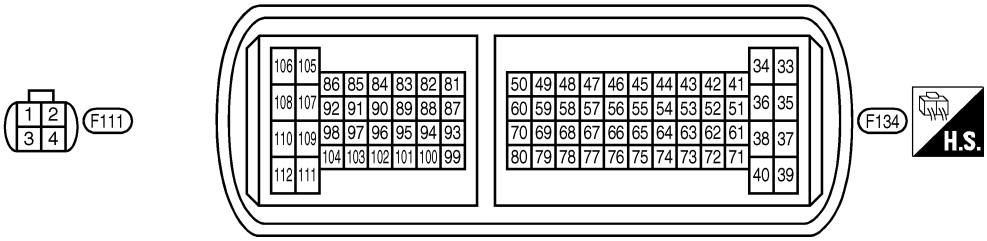




MBWA0595E

EC-ECTS-01

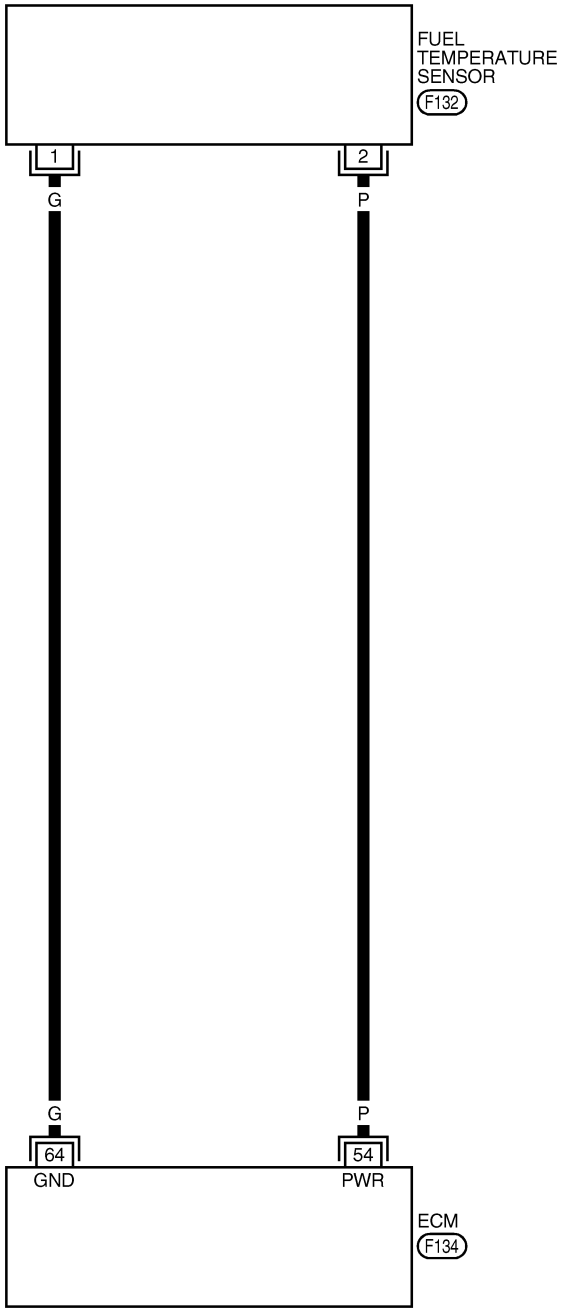


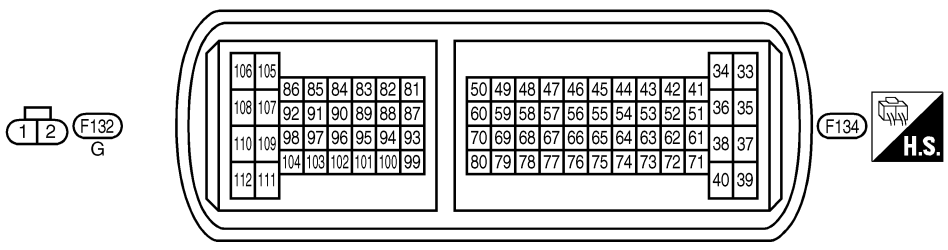


MBWA0596E

Wiring diagram - Fuel temperature sensor

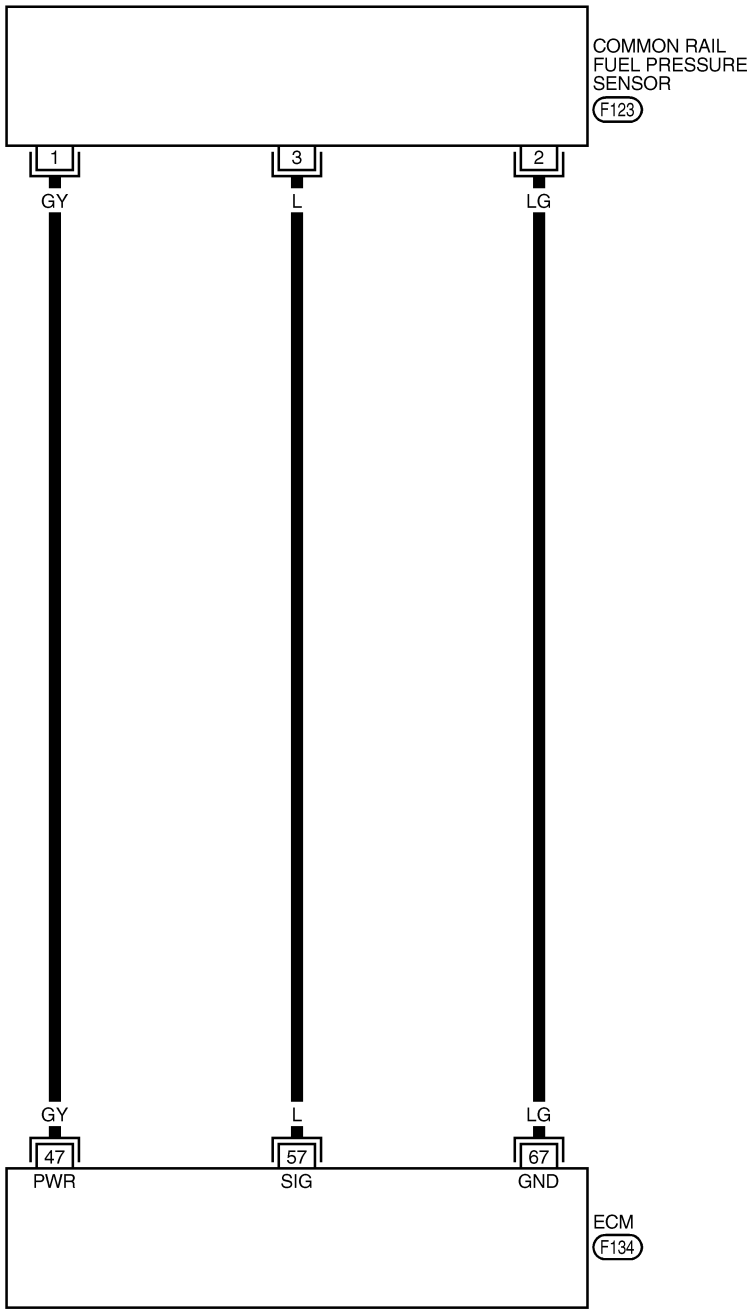
EC-FTS-01

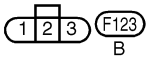


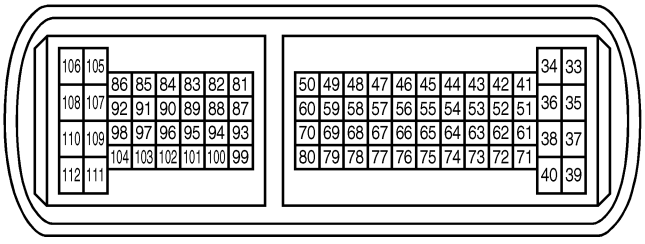


MBWA0597E

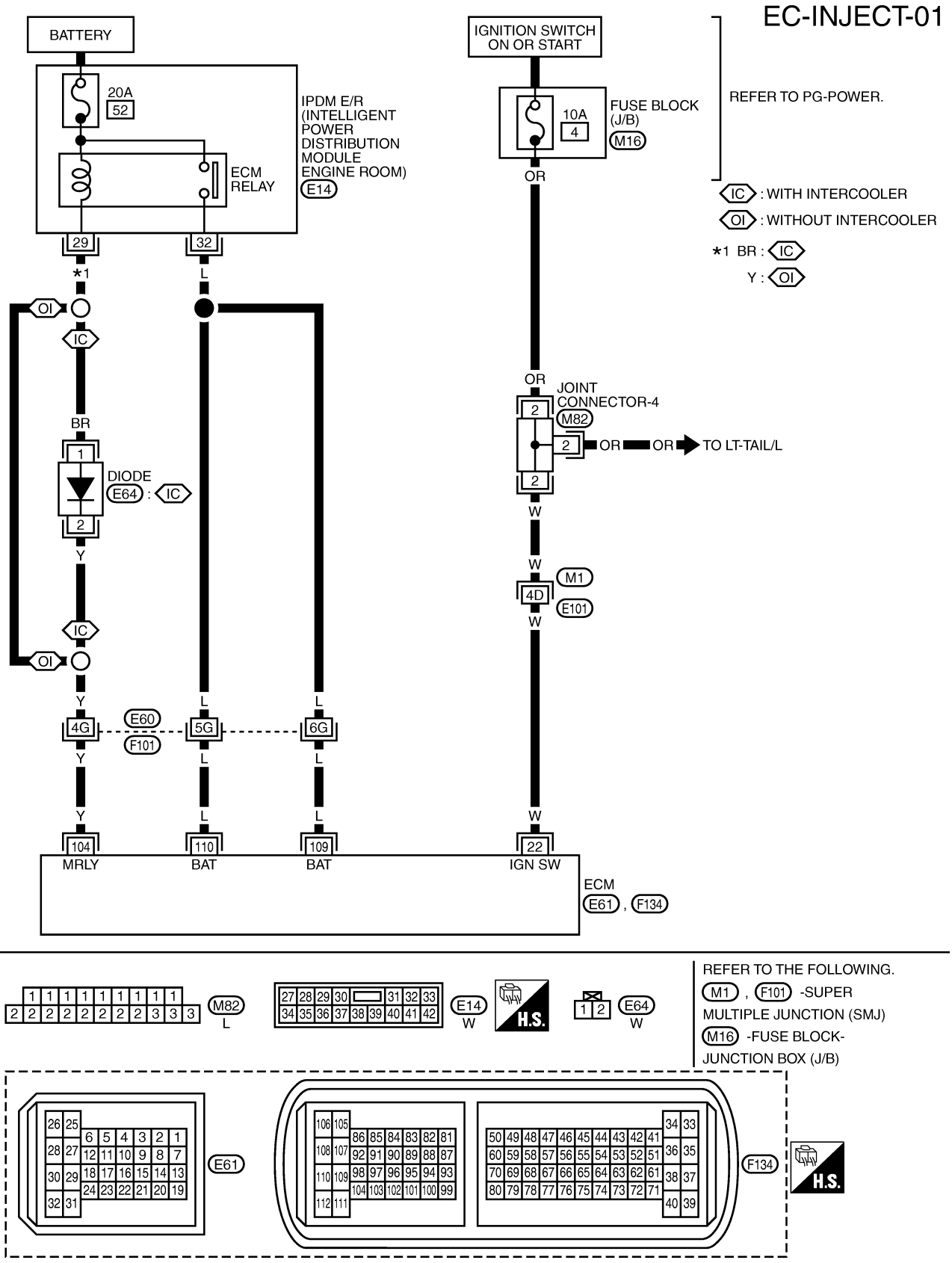
EC-CRFPS-01





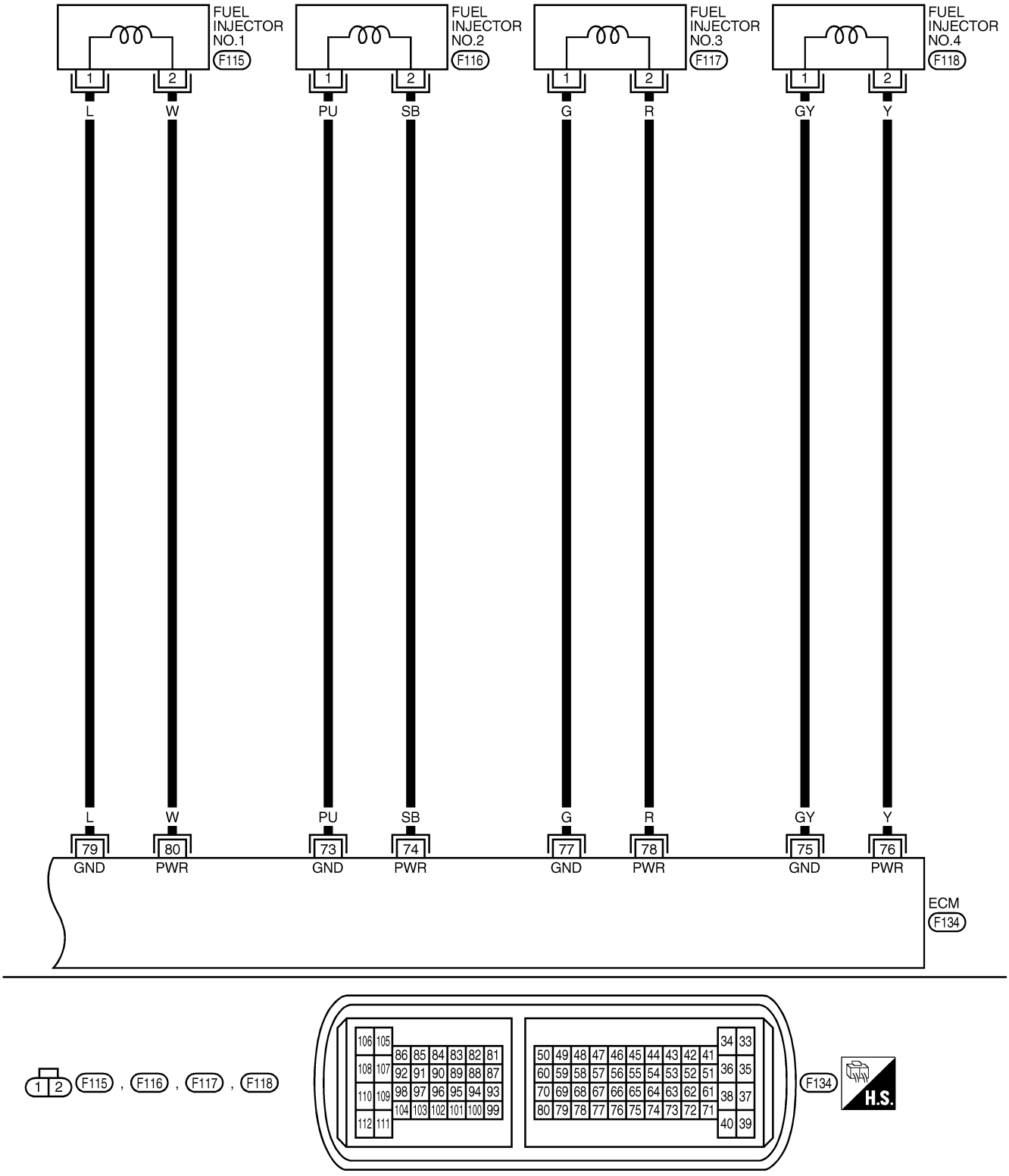


MBWA0598E


EC-INJECT-01
BATTERY
20A
52
IPDM E/R
(INTELLIGENT
POWER
DISTRIBUTION
MODULE
ENGINE ROOM)
E14
ECM
RELAY
29
32
*1
L
OI
IC
BR
1
DIODE
E64 : IC
2
Y
IC
OI
Y
4G
E60
F101
L
5G
L
6G
Y
L
L
Y
L
L
104
110
109
MRLY
BAT
BAT
IGNITION SWITCH
ON OR START
10A
4
FUSE BLOCK
(J/B)
M16
OR
REFER TO PG-POWER.
IC : WITH INTERCOOLER
OI : WITHOUT INTERCOOLER
*1 BR : IC
Y : OI
OR
JOINT
CONNECTOR-4
2
M82
2
OR
OR
TO LT-TAIL/L
2
W
W
M1
4D
E101
W
W
22
IGN SW
ECM
E61 , F134
M82
L
E14
W
H.S.
E64
W
REFER TO THE FOLLOWING.
M1 , F101 -SUPER
MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)
E61
F134
H.S.

MBWA1177E

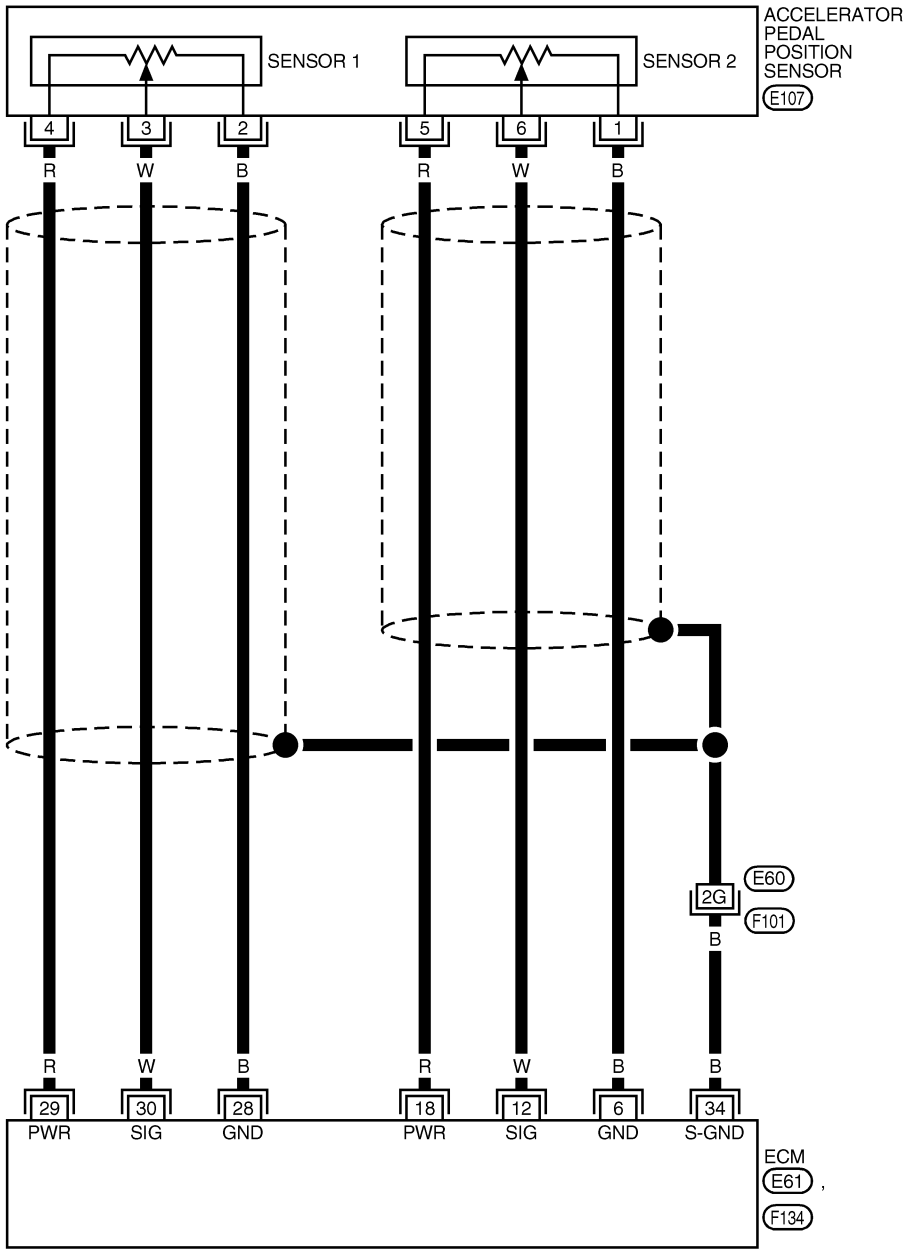
EC-INJECT-02

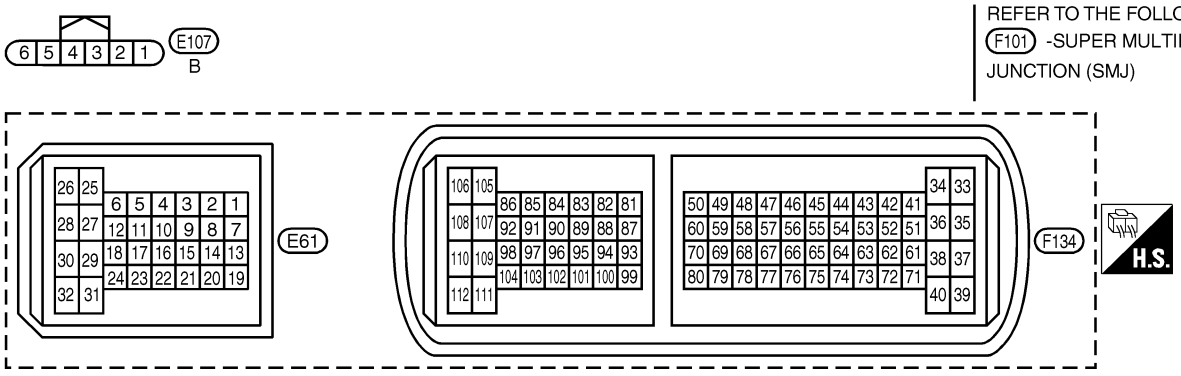


MBWA0599E

LHD models

EC-APPS-01

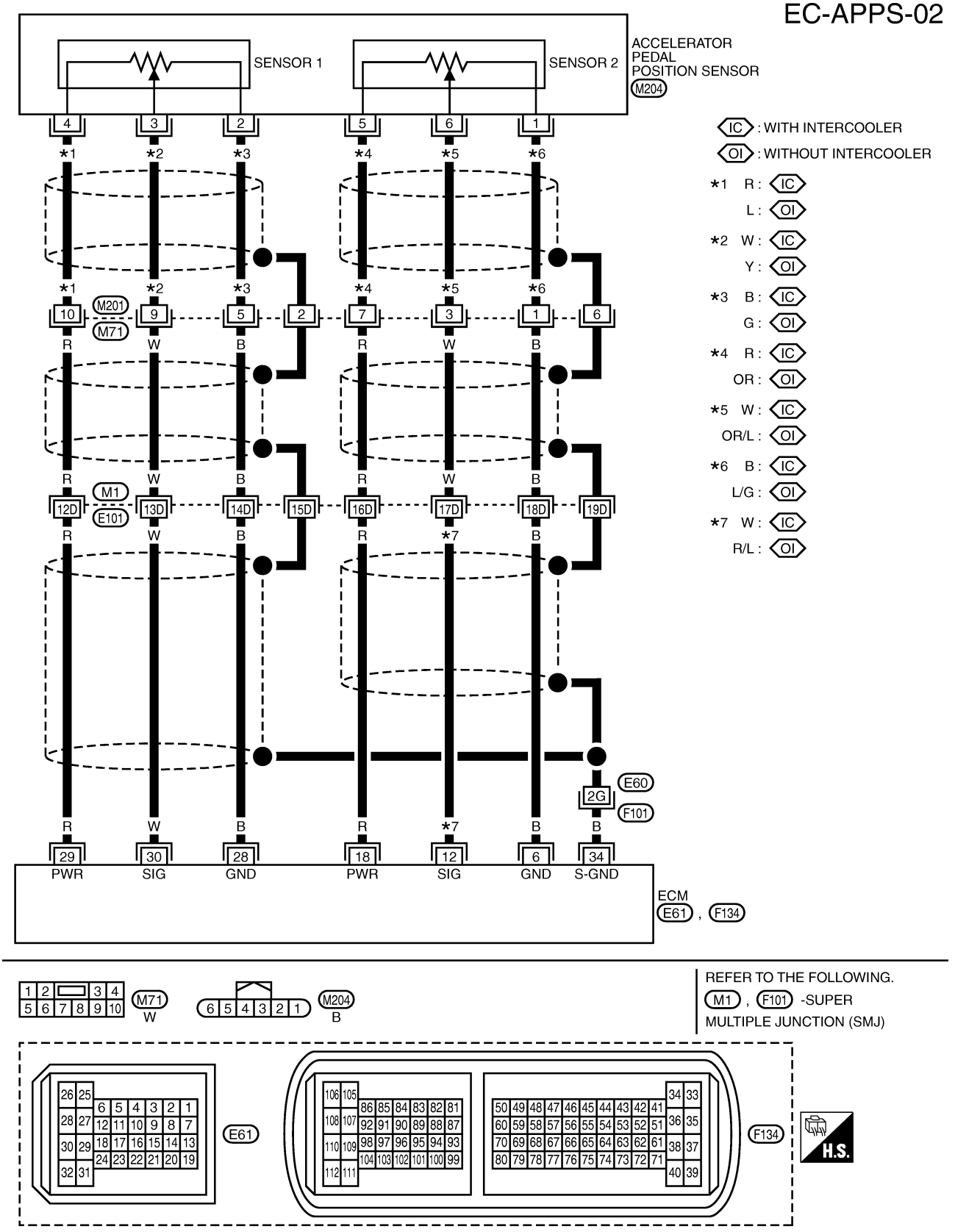




MBWA0600E

RHD models

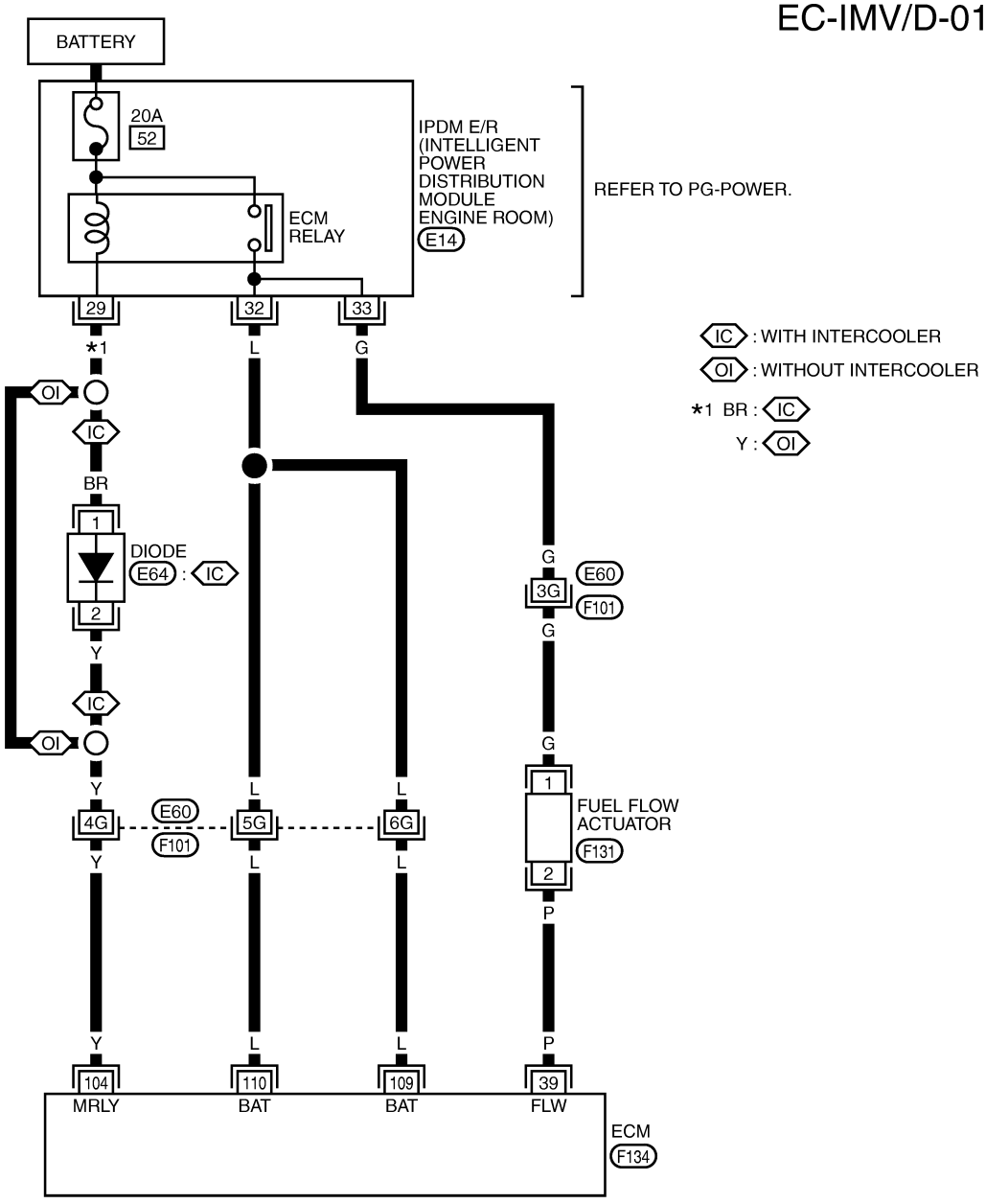
EC-APPS-02

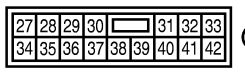


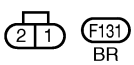
REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)

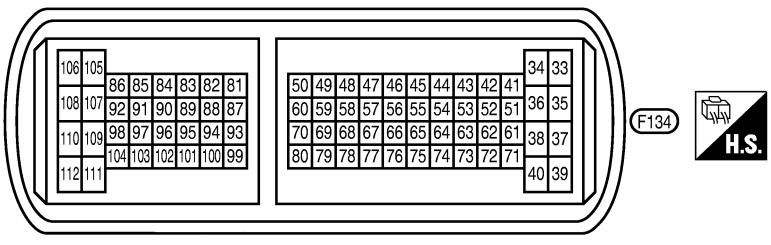
MBWA1178E

EC-IMV/D-01







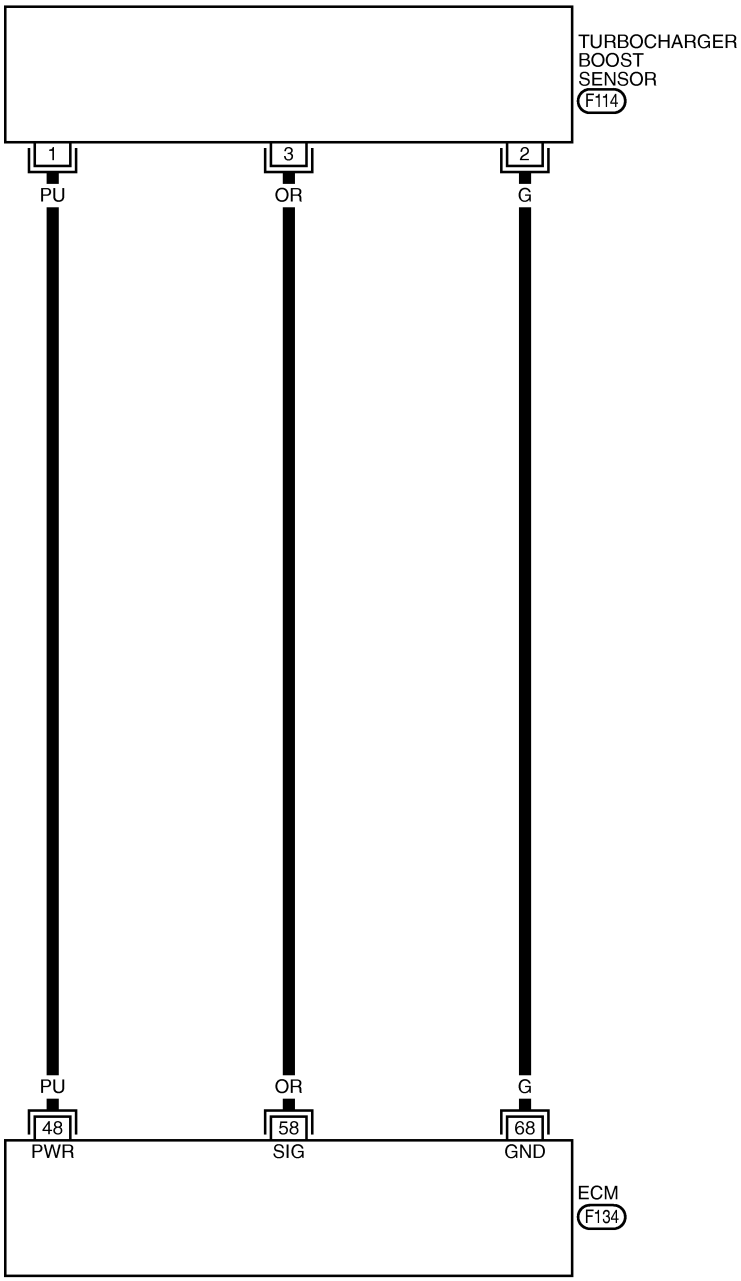


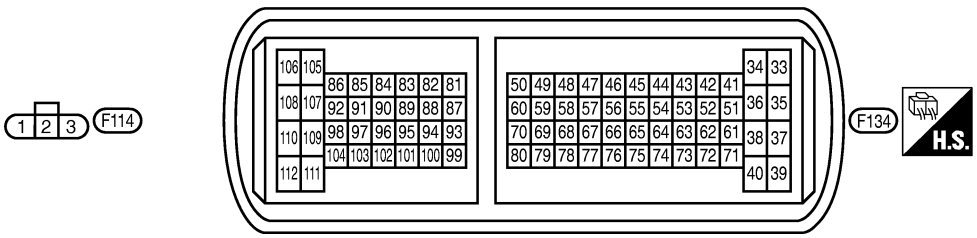
REFER TO THE FOLLOWING.
F101 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA1179E

Without intercooler

EC-TCBST-01

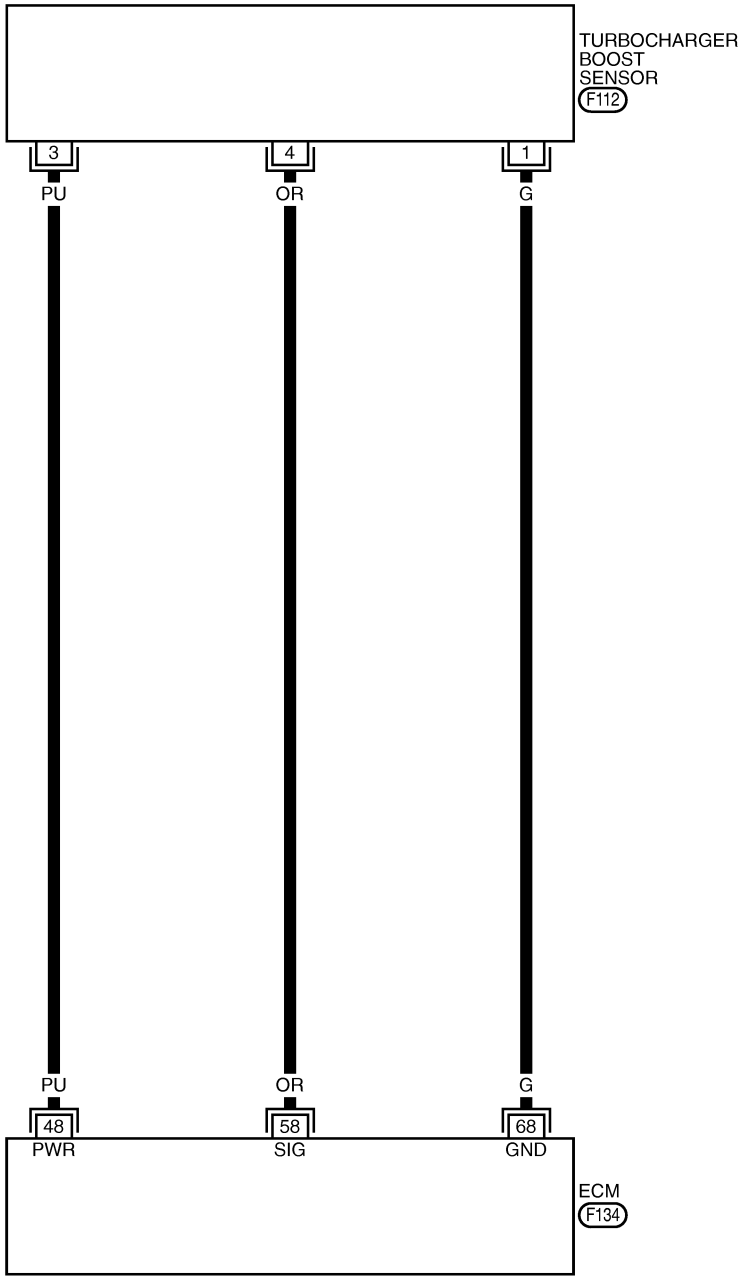


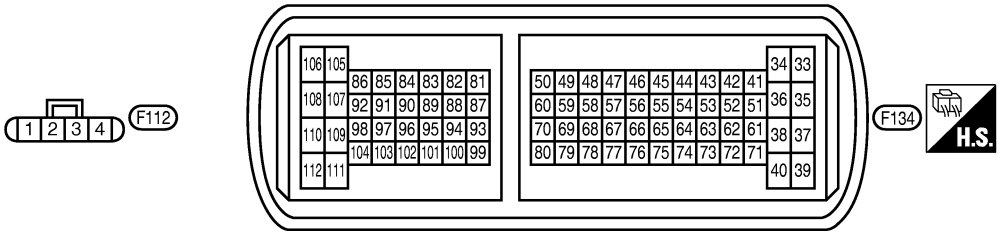


MBWA0968E

With intercooler

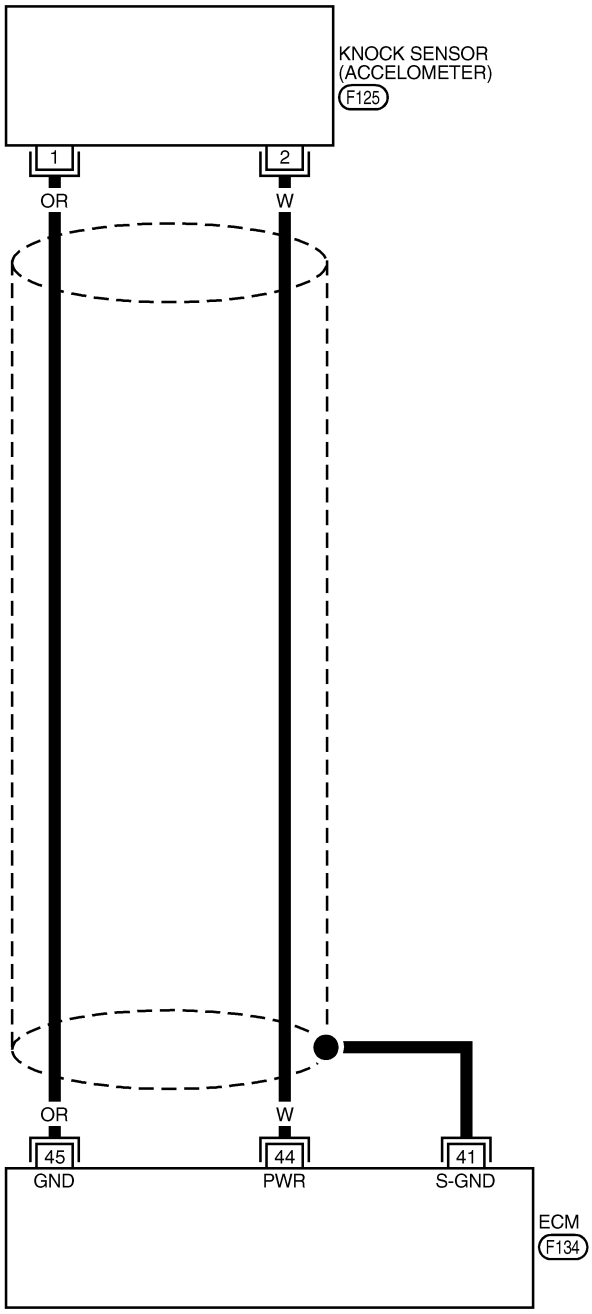
EC-TCBST-02

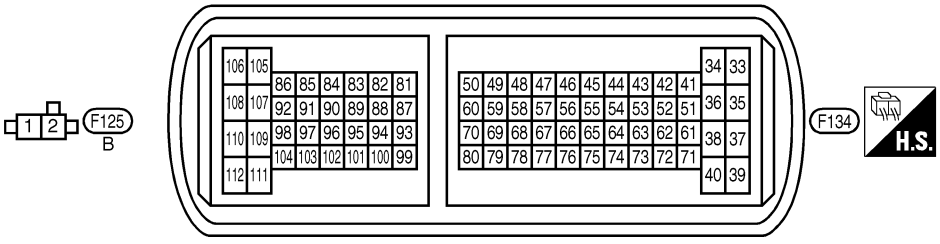




MBWA0969E

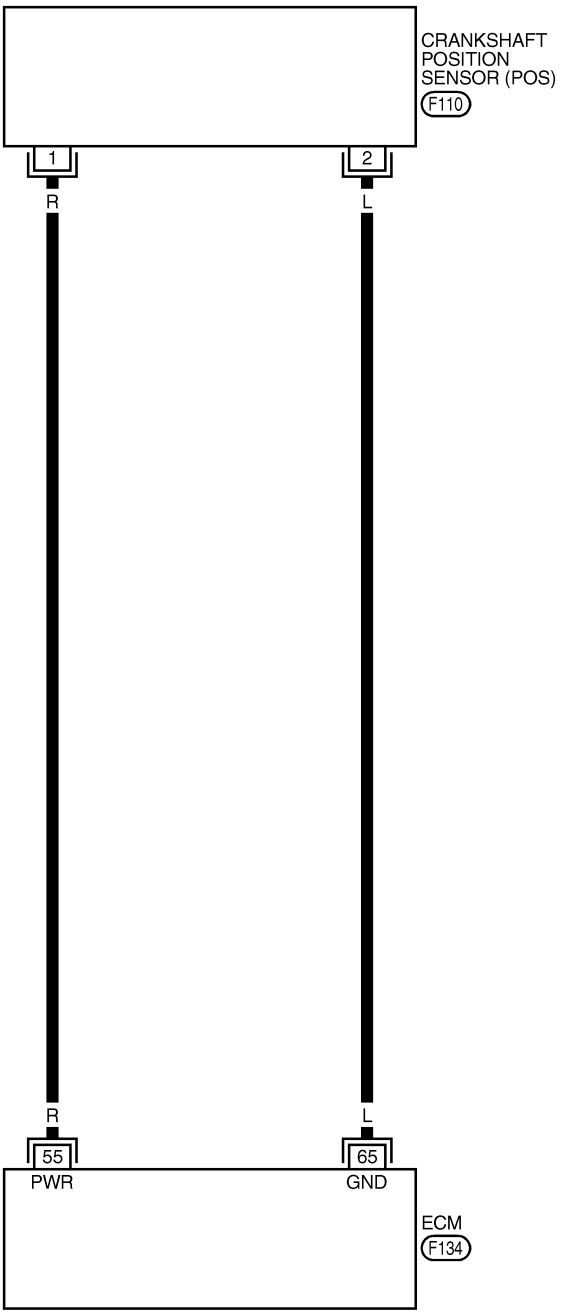
EC-KS-01

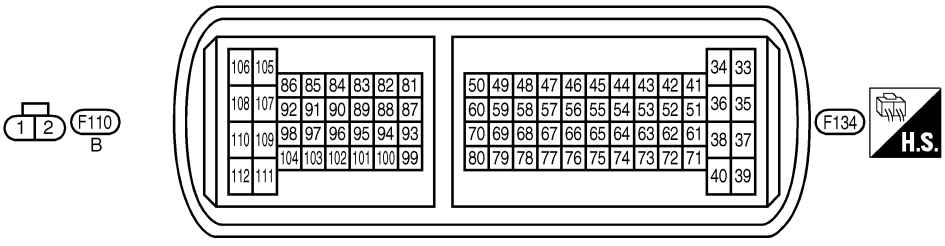




MBWA0602E

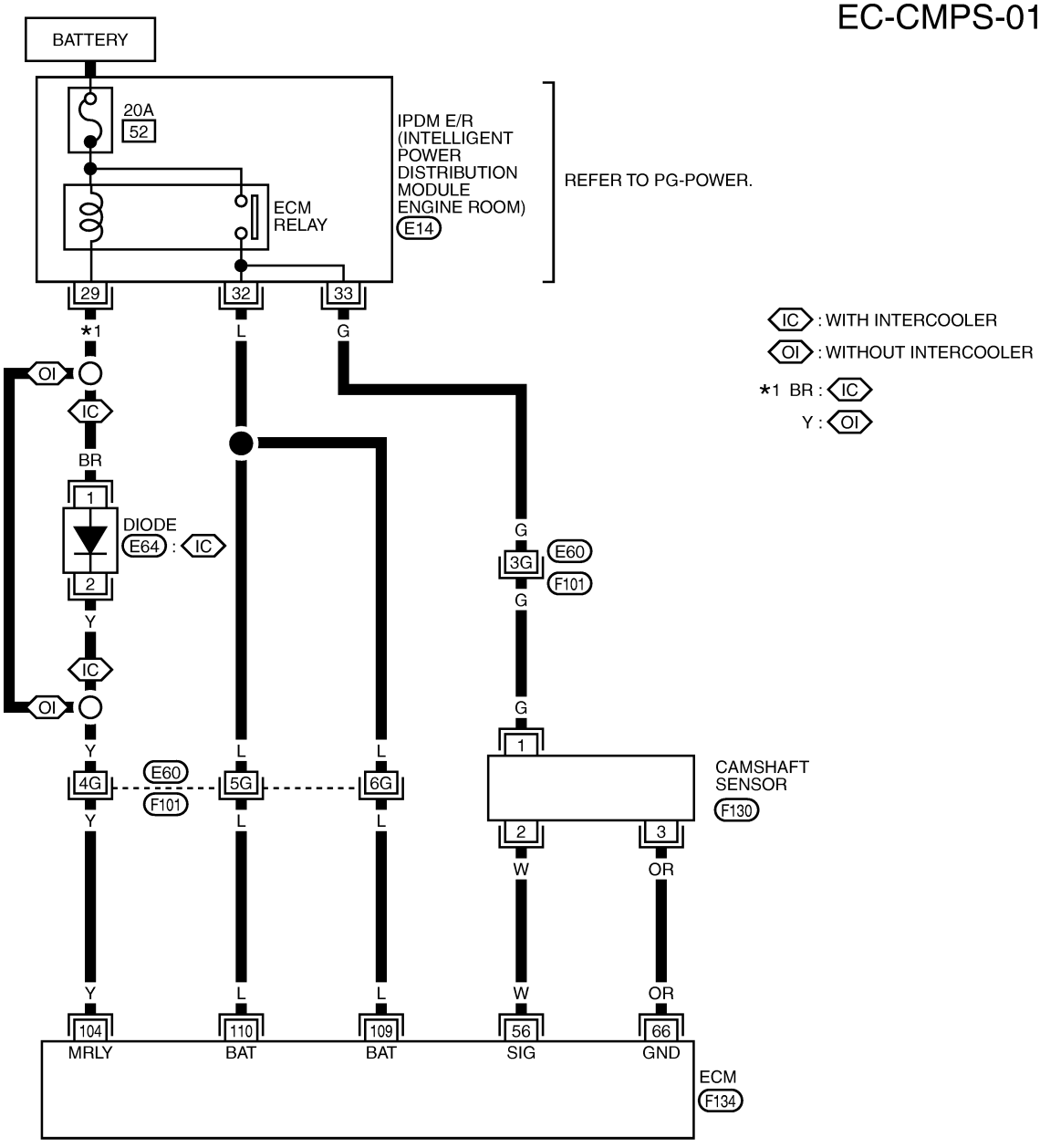
EC-CKPS-01

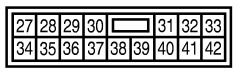


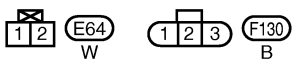


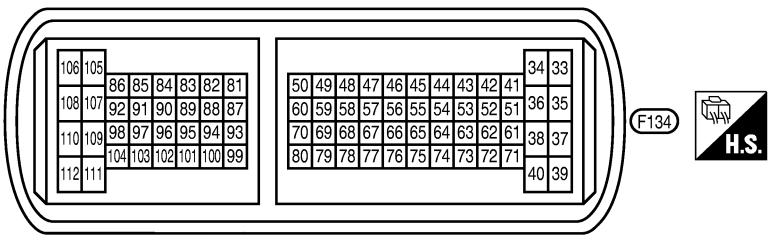
MBWA0603E

EC-CMPS-01





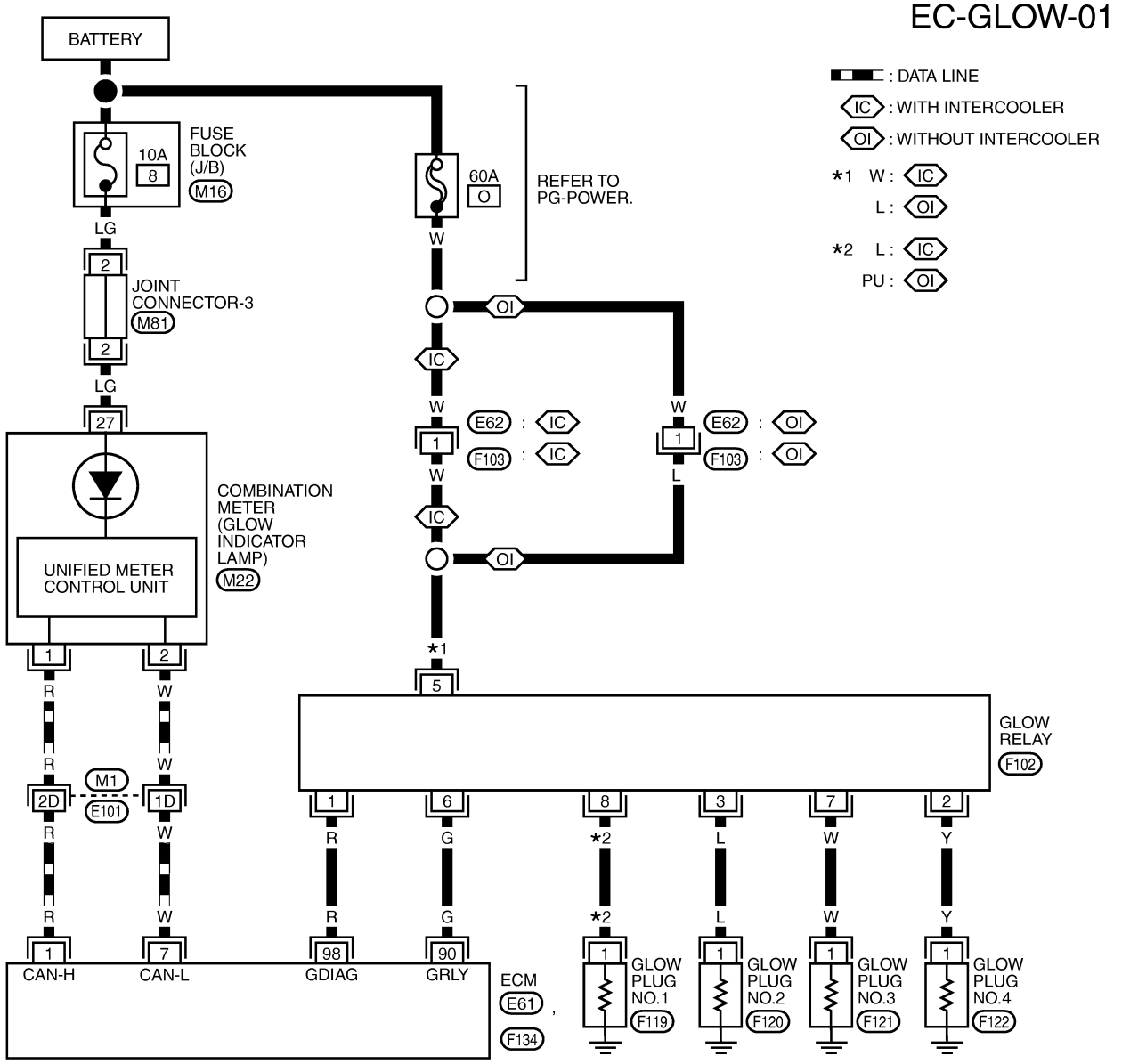


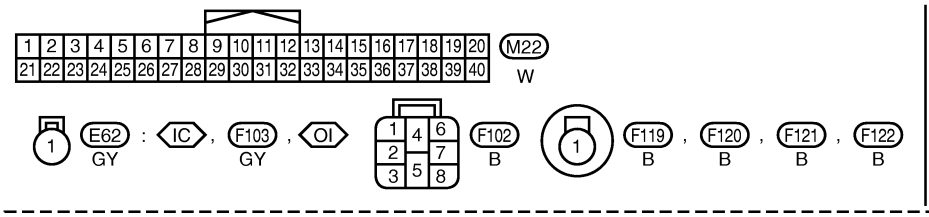


REFER TO THE FOLLOWING.
F101 -SUPER MULTIPLE JUNCTION (SMJ)

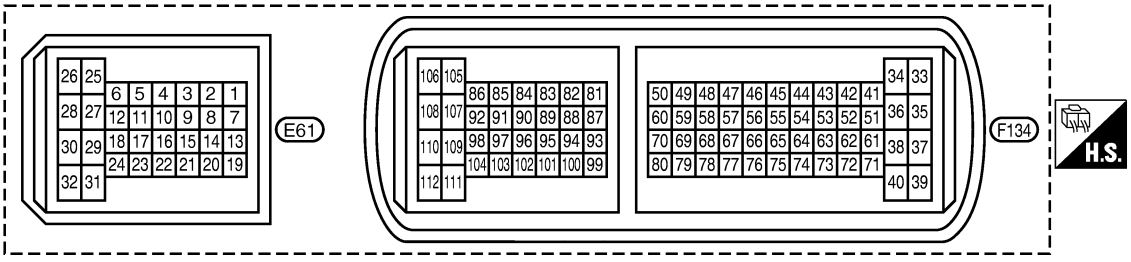
MBWA1180E

EC-GLOW-01



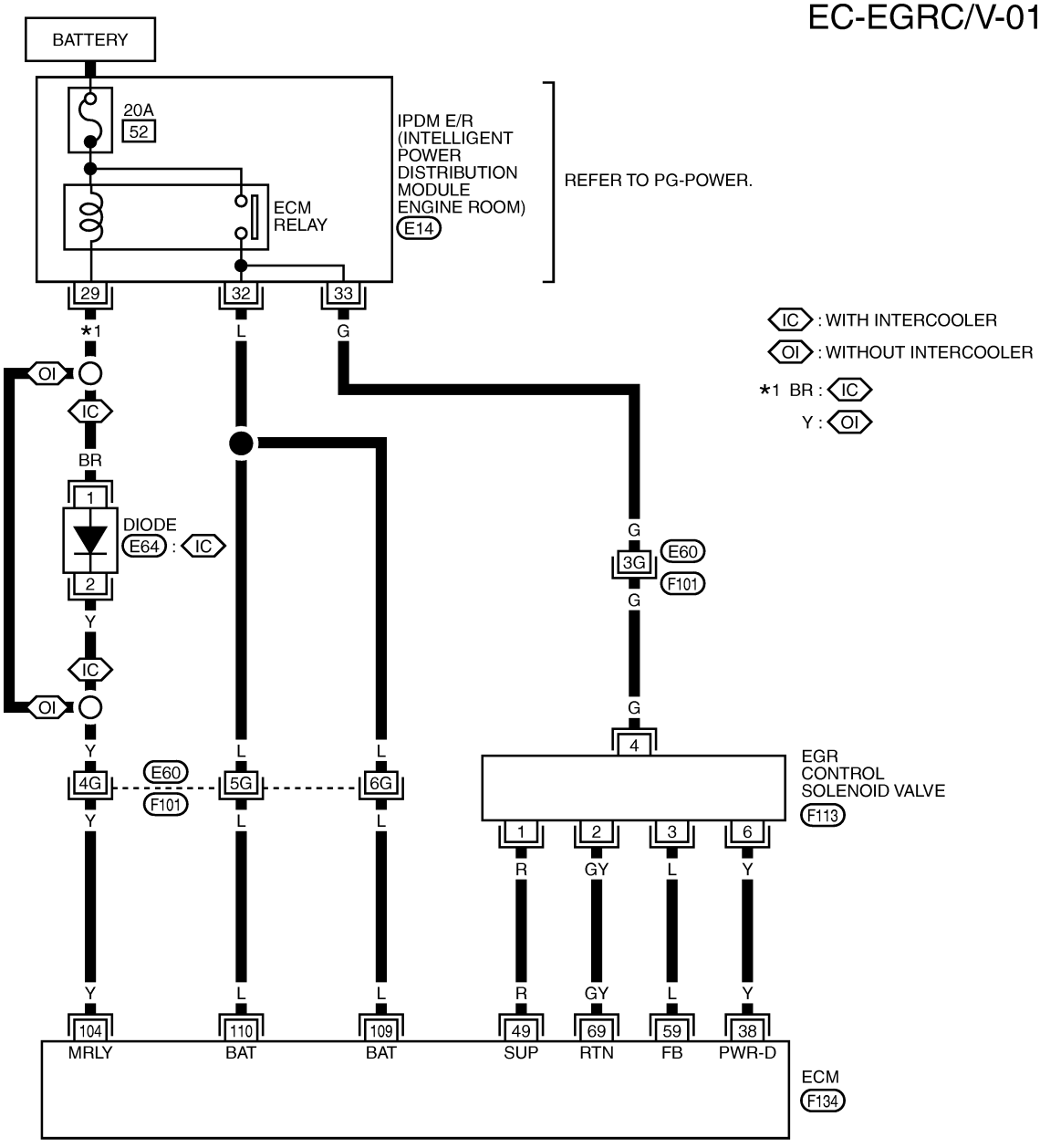


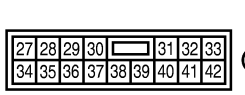
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M81 -JOINT CONNECTOR (J/C)

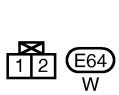


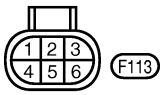
MBWA1181E

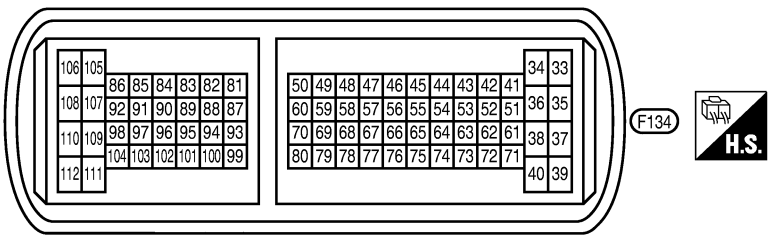
EC-EGRC/V-01







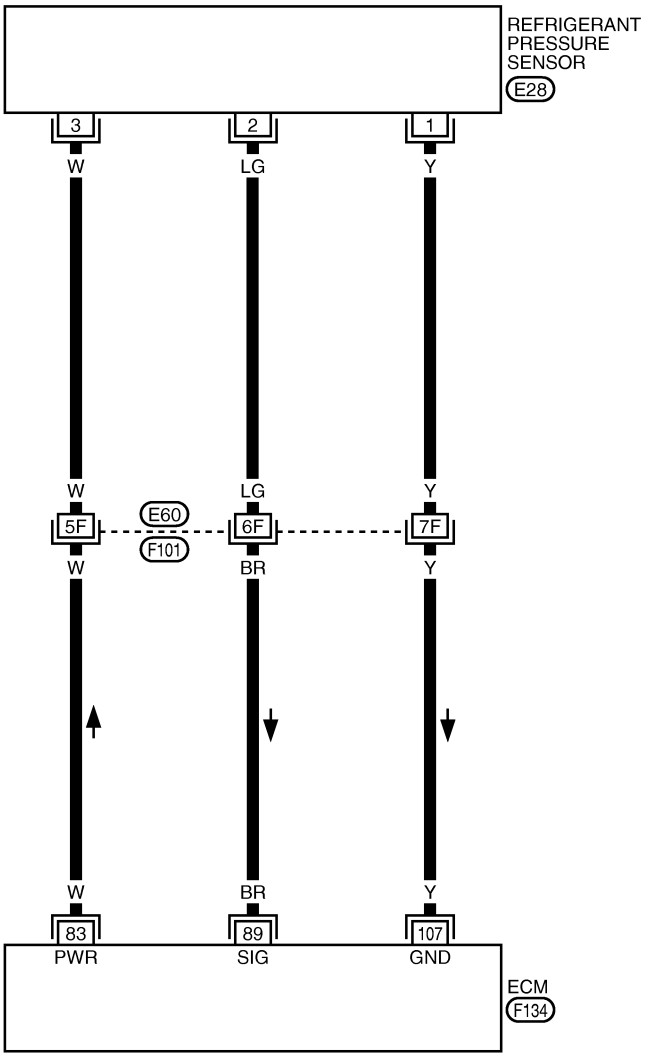


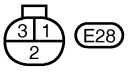


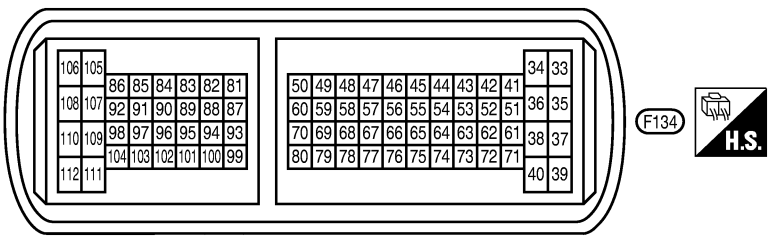
REFER TO THE FOLLOWING.
F101 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA1182E

EC-RP/SEN-01

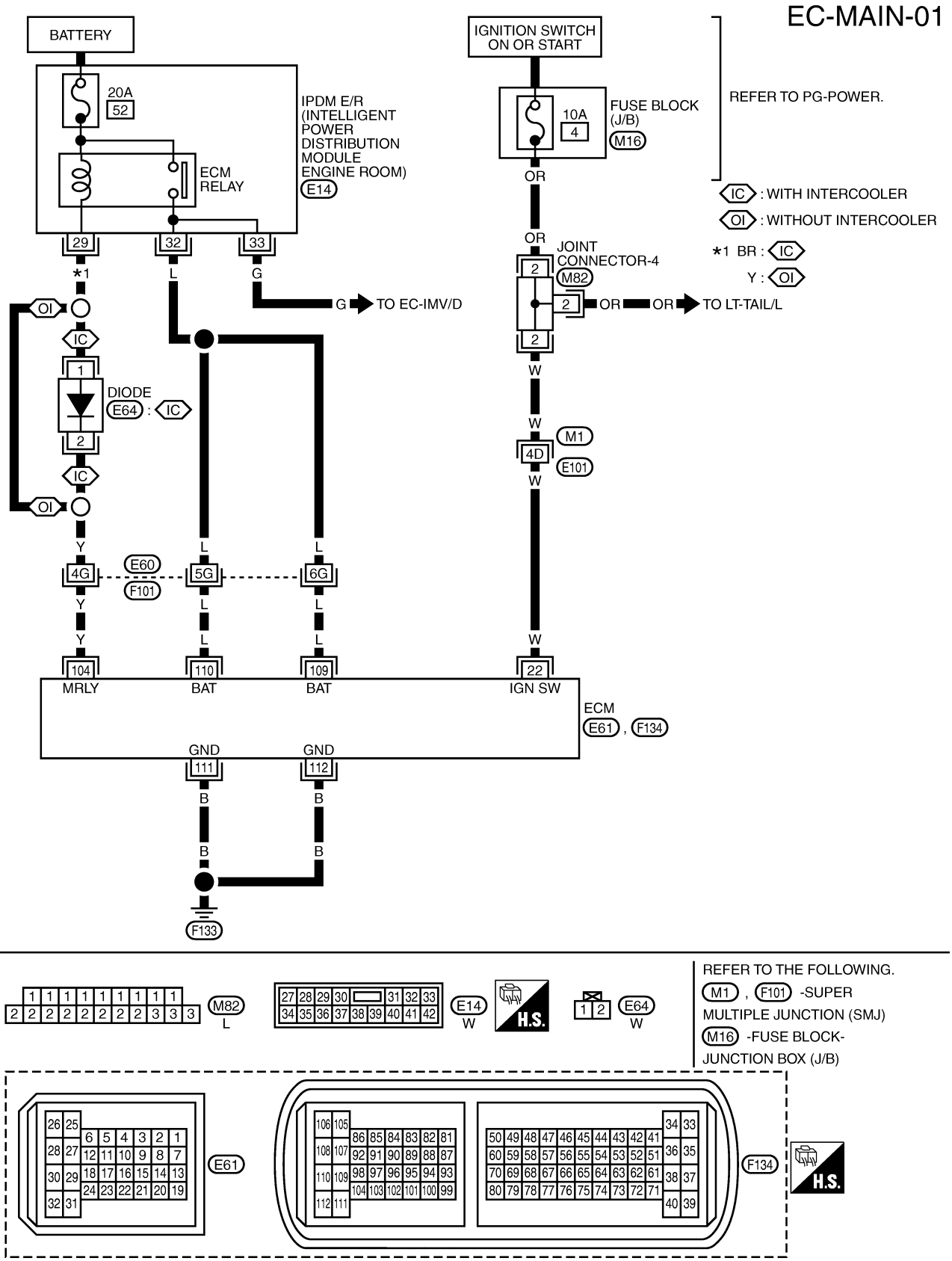






REFER TO THE FOLLOWING.
F101 -SUPER MULTIPLE JUNCTION (SMJ)

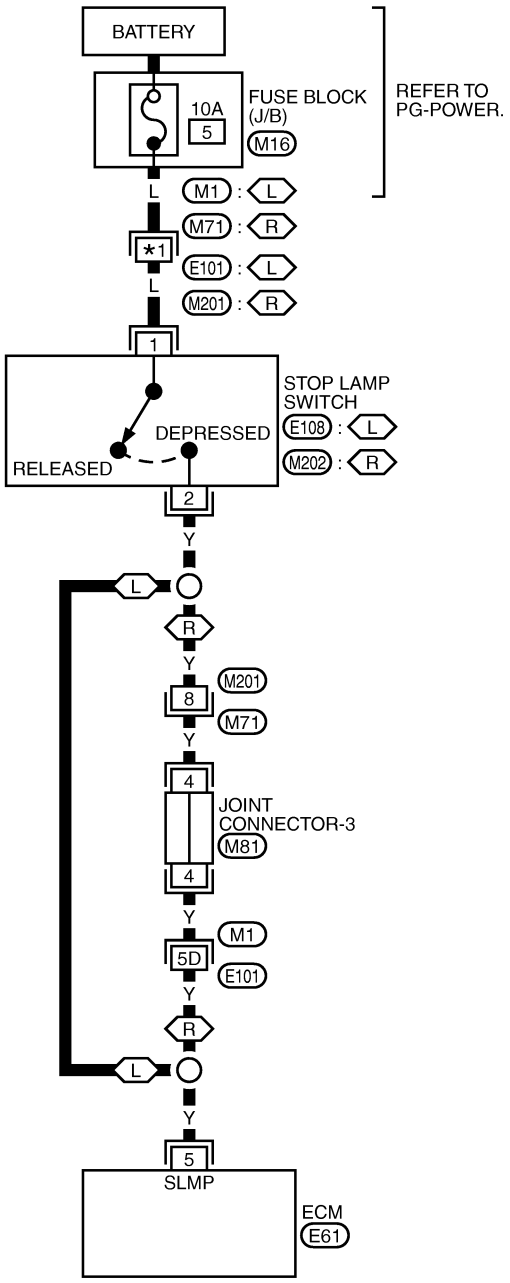
MBWA0604E

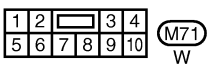

EC-MAIN-01
BATTERY
20A
52
IPDM E/R
(INTELLIGENT
POWER
DISTRIBUTION
MODULE
ENGINE ROOM)
E14
ECM
RELAY
29
32
33
*1
L
G
G
TO EC-IMV/D
OI
IC
1
DIODE
E64
:
IC
2
IC
OI
Y
4G
E60
F101
5G
6G
L
Y
L
L
Y
L
L
104
110
109
MRLY
BAT
BAT
IGNITION SWITCH
ON OR START
10A
4
FUSE BLOCK
(J/B)
M16
OR
OR
JOINT
CONNECTOR-4
2
M82
2
OR
OR
TO LT-TAIL/L
2
W
W
M1
4D
E101
W
W
22
IGN SW
ECM
E61
,
F134
GND
GND
111
112
B
B
B
B
B
F133
REFER TO PG-POWER.
IC
: WITH INTERCOOLER
OI
: WITHOUT INTERCOOLER
*1 BR :
IC
Y :
OI
M82
L
E14
W
H.S.
1
2
E64
W
REFER TO THE FOLLOWING.
M1
,
F101
-SUPER
MULTIPLE JUNCTION (SMJ)
M16
-FUSE BLOCK-
JUNCTION BOX (J/B)
E61
F134
H.S.

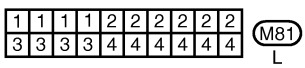
MBWA1183E

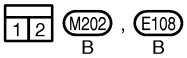
EC-BRK/SW-01

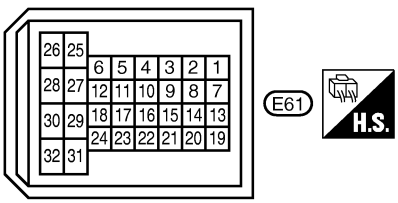
L : LHD MODELS
R : RHD MODELS
*1 8D : L
4 : R









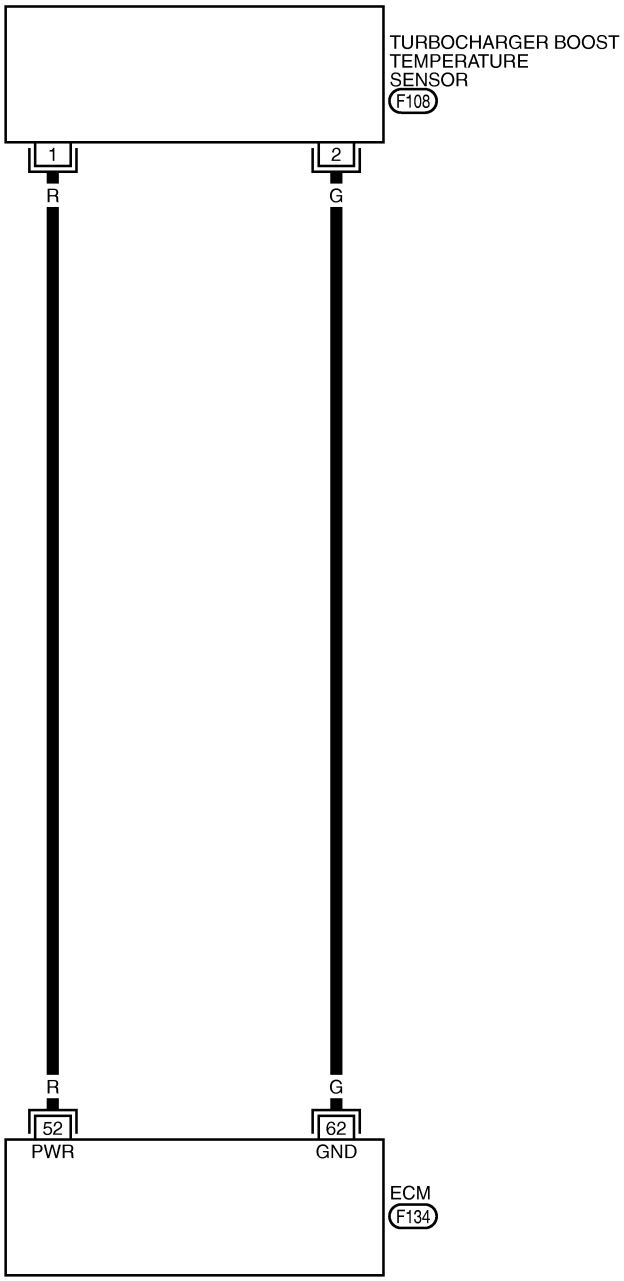


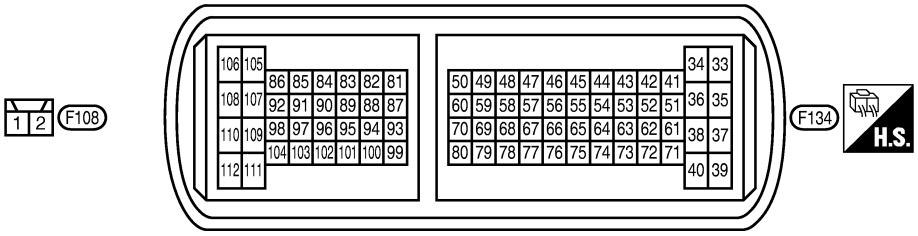
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MBWA0605E

Without intercooler

EC-BTS-01

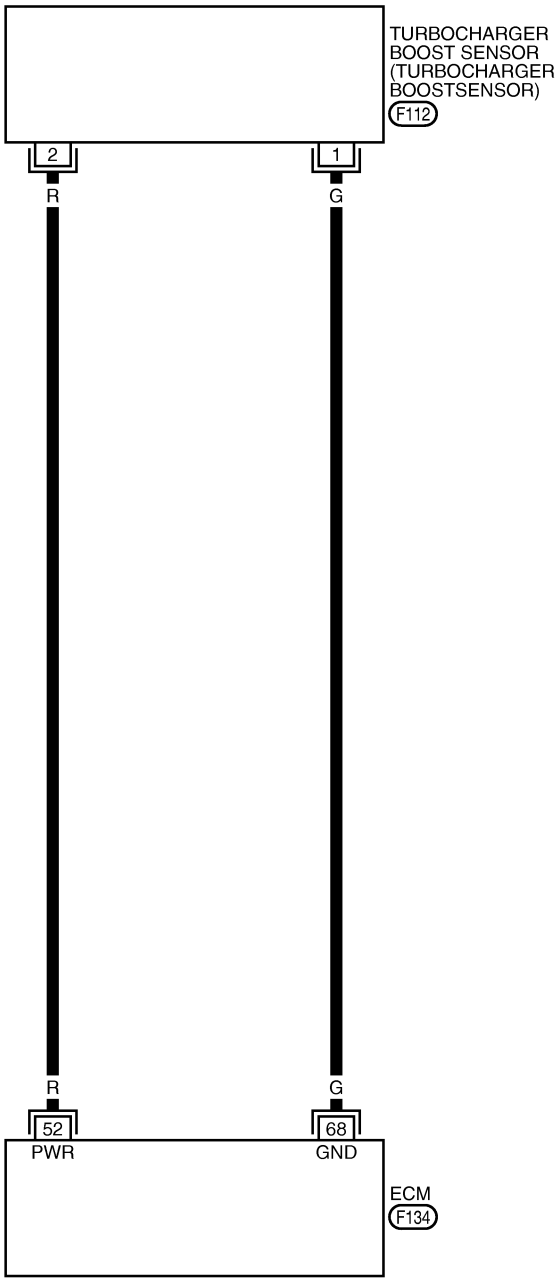


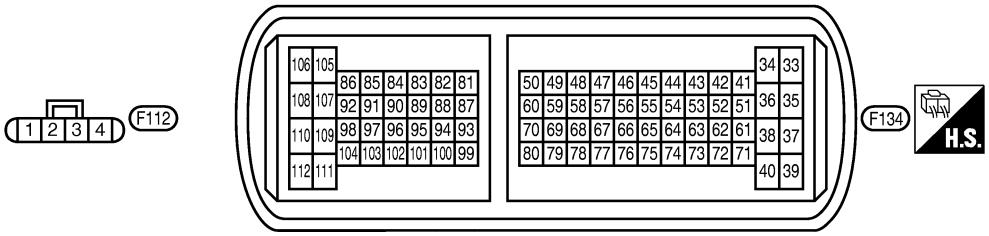


MBWA0971E

With intercooler

EC-BTS-02

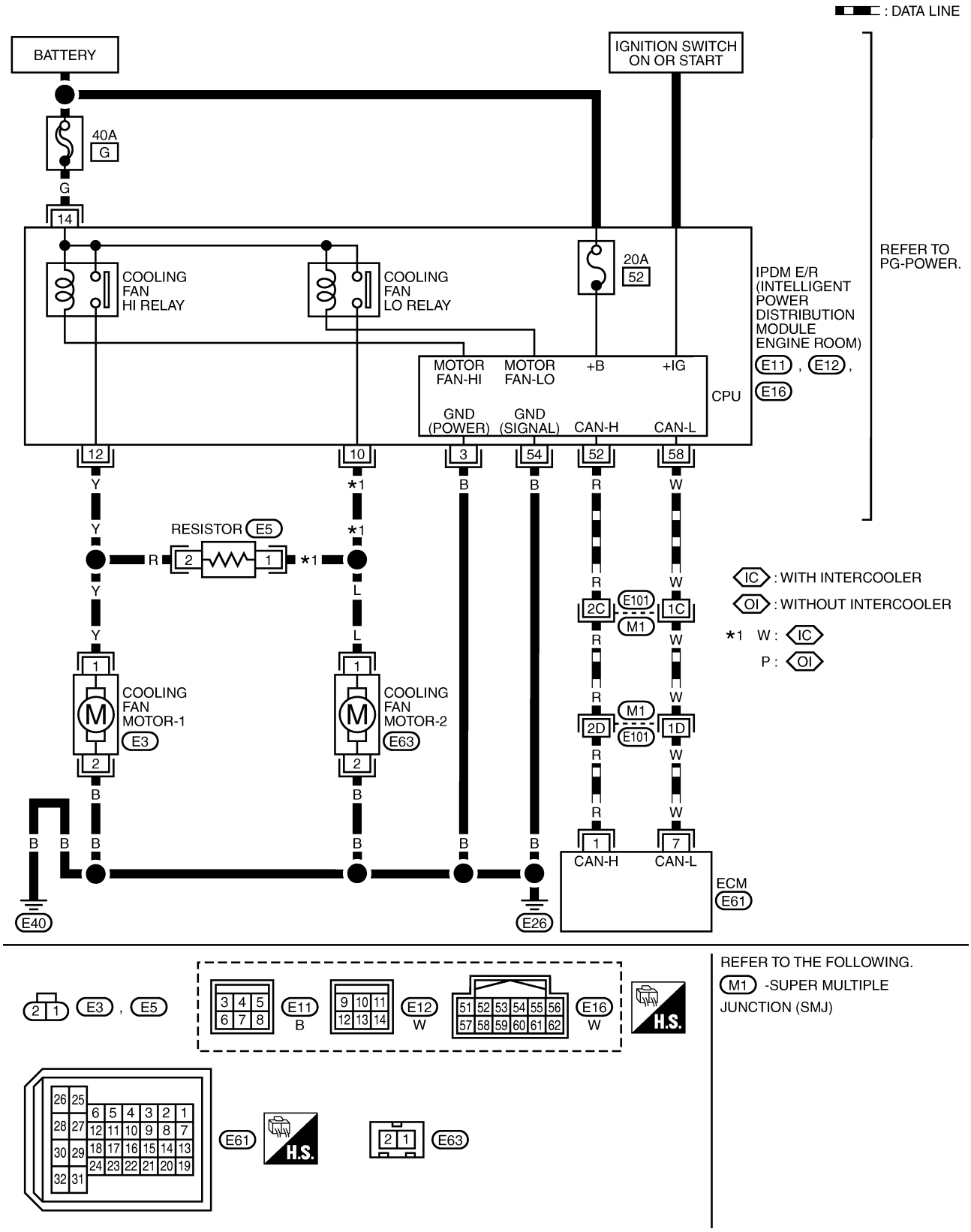




MBWA0972E

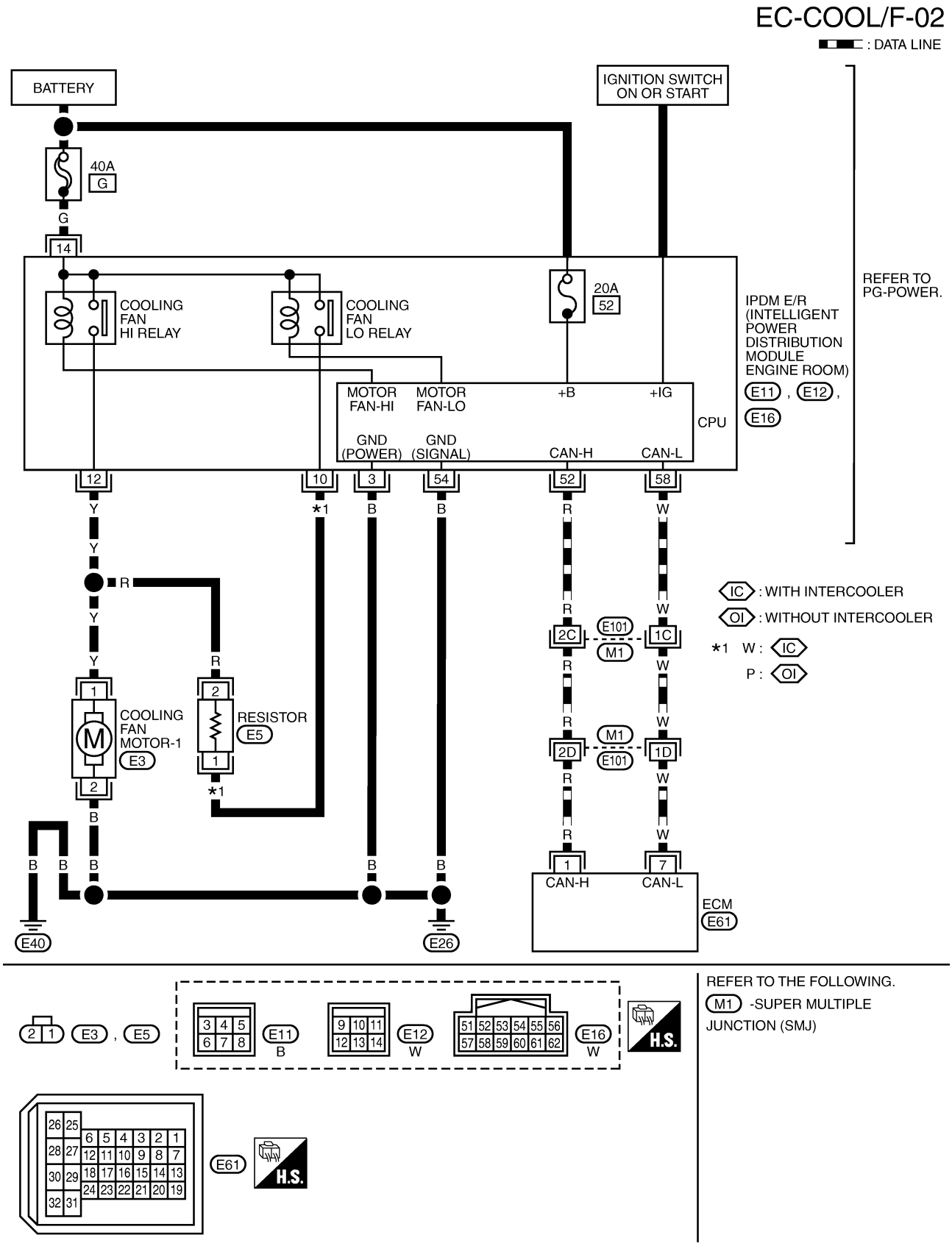
With DTC heater

EC-COOL/F-01



MBWA1184E

With air conditioner

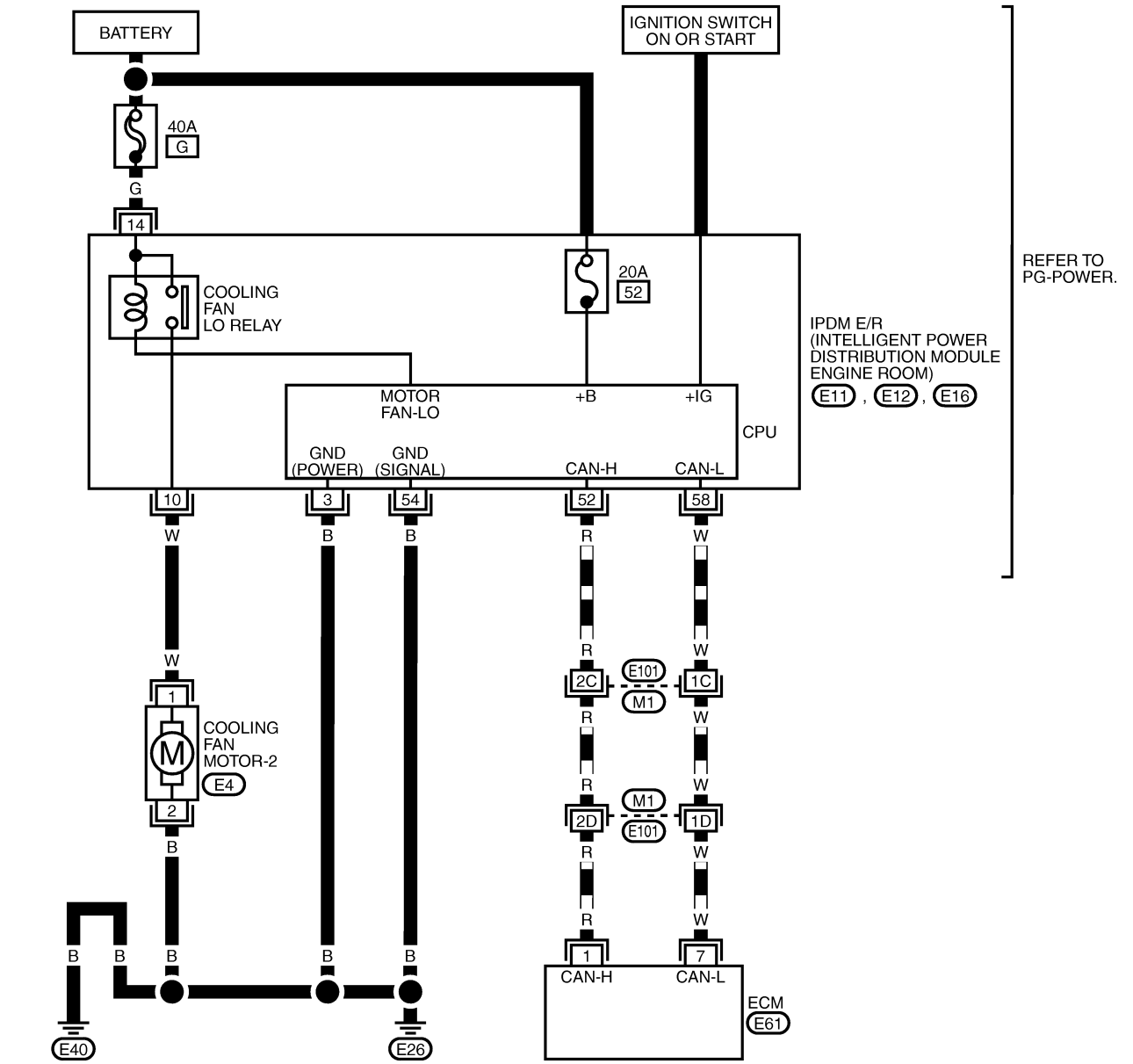


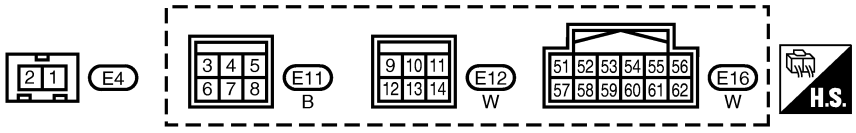
MBWA1185E

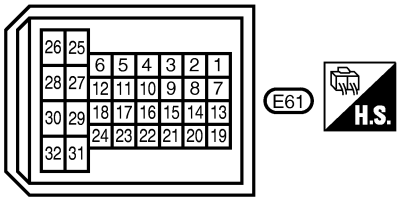
Without air conditioner

EC-COOL/F-03

: DATA LINE





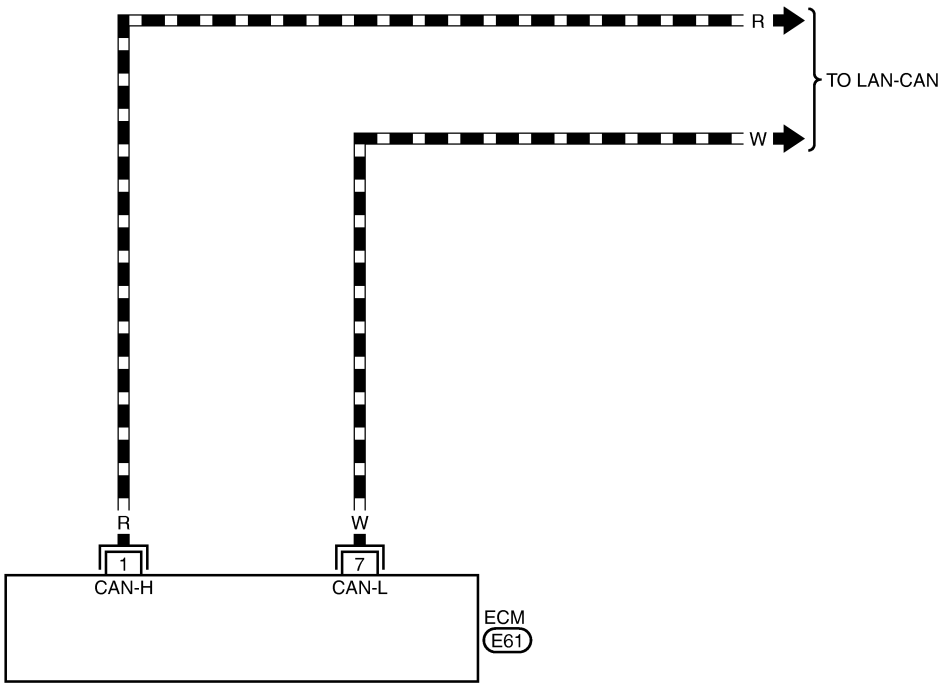


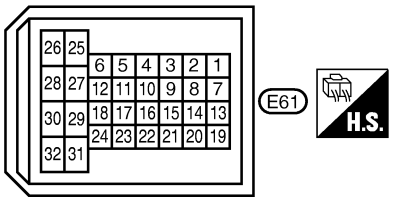
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MBWA0511E

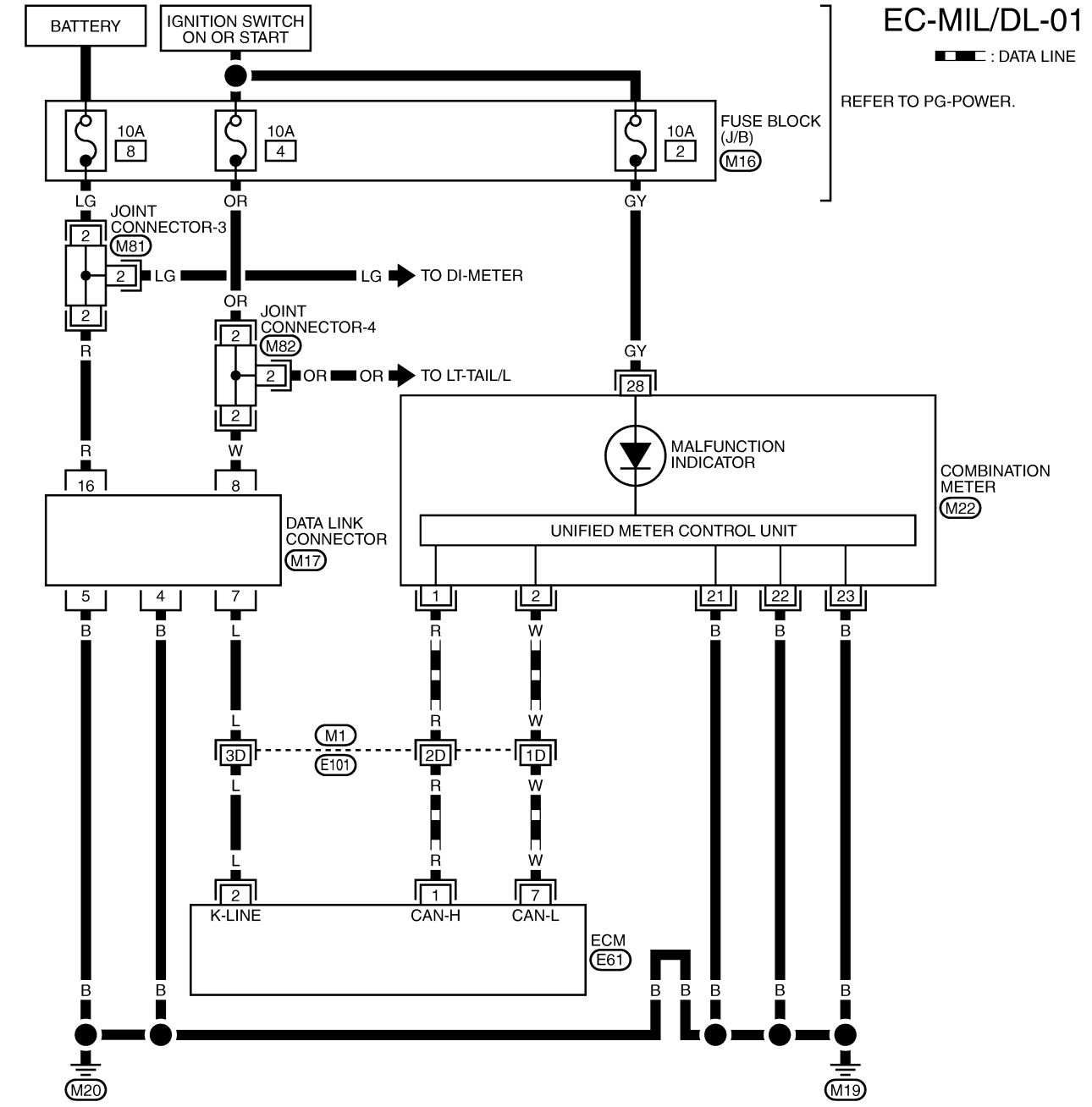
EC-CAN-01

: DATA LINE



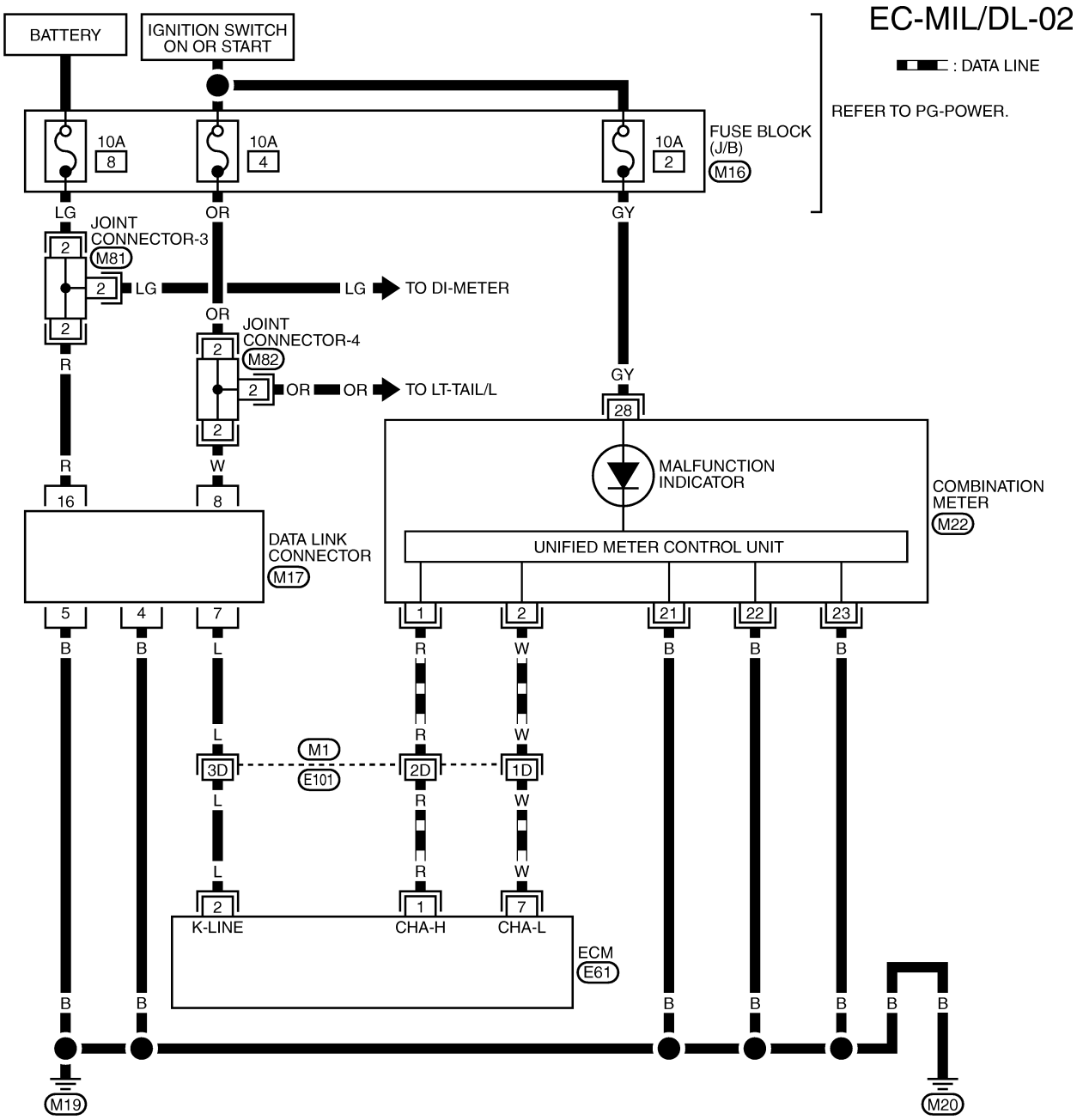


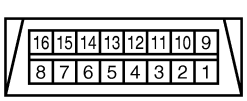
MBWA0592E

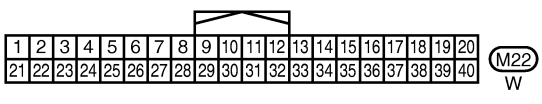


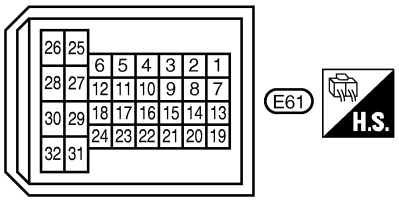
REFER TO THE FOLLOWING.
(M1) -SUPER MULTIPLE JUNCTION (SMJ)
(M16) -FUSE BLOCK -JUNCTION BOX (J/B)
(M81) , (M82) -JOINT CONNECTOR (J/C)

MBWA0607E









REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M81 , M82 -JOINT CONNECTOR (J/C)

MBWA0593E

SECTION EI
EXTERIOR & INTERIOR

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Precautions 2
CLIP AND FASTENER 3
Clip and Fastener 3
FRONT BUMPER 4
Removal and Installation 4
REMOVAL 5
INSTALLATION 5
REAR BUMPER 6
Removal and Installation 6
REMOVAL 6
INSTALLATION 7
FRONT GRILLE 8
Removal and Installation 8
REMOVAL 8
INSTALLATION 8
FRONT DEFLECTOR 9
Removal and Installation 9
REMOVAL 9
INSTALLATION 9
COWL TOP 10
Removal and Installation 10
REMOVAL 10
INSTALLATION 10
FENDER PROTECTOR 11
Removal and Installation 11
ROOF SIDE MOLDING 12
Removal and Installation 12
REMOVAL 12
INSTALLATION 12
WINDSHIELD MOLDING 13
Removal and Installation 13
REMOVAL 13
INSTALLATION 14
DOOR OUTSIDE MOLDING 15
Removal and Installation 15
REMOVAL 15
INSTALLATION 15
DOOR FINISHER 16
Removal and Installation 16
REMOVAL 16
INSTALLATION 17
BACK DOOR TRIM 18
Removal and Installation 18
REMOVAL 18
INSTALLATION 18
BODY SIDE TRIM 19
Removal and Installation (5-Door) 19
REMOVAL 19
INSTALLATION 20
Removal and Installation (3-Door) 20
REMOVAL 20
INSTALLATION 21
FLOOR TRIM 22
Removal and Installation 22
REMOVAL 22
INSTALLATION 23
HEADLINER 24
Removal and Installation 24
REMOVAL 24
INSTALLATION 25
LUGGAGE FLOOR TRIM 26
Removal and Installation 26
REMOVAL 26
INSTALLATION 27

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004PB

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions

EIS004PC

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

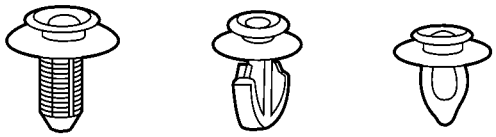
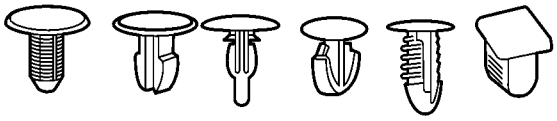
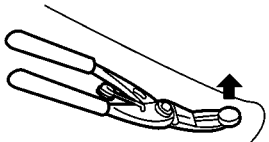
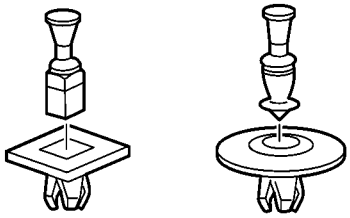
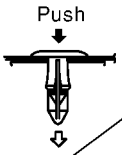
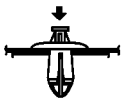
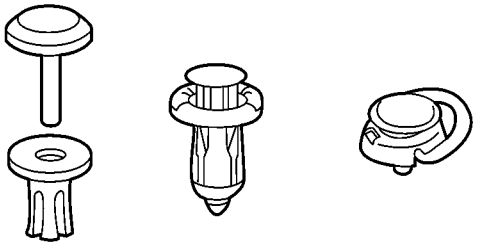
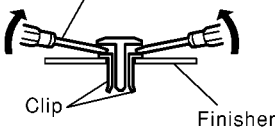
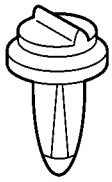
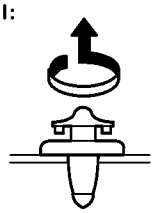
- Do not use any organic solvent, such as thinner or benzine.

CLIP AND FASTENER

PFP:76906

Clip and Fastener

EIS004PD

Symbol No.	Shapes	Removal & Installation
C101		**Removal:** Remove by bending up with flat-bladed screwdrivers or clip remover.
C103		 **Removal:** Remove with a clip remover.
C203		**Removal:** Push center pin to catching position. (Do not remove center pin by hitting it.)  Push  Push **Installation:**
C205		**Removal:** Flat-bladed screwdriver  Clip Finisher
C206		**Removal:** 

SIIA0315E

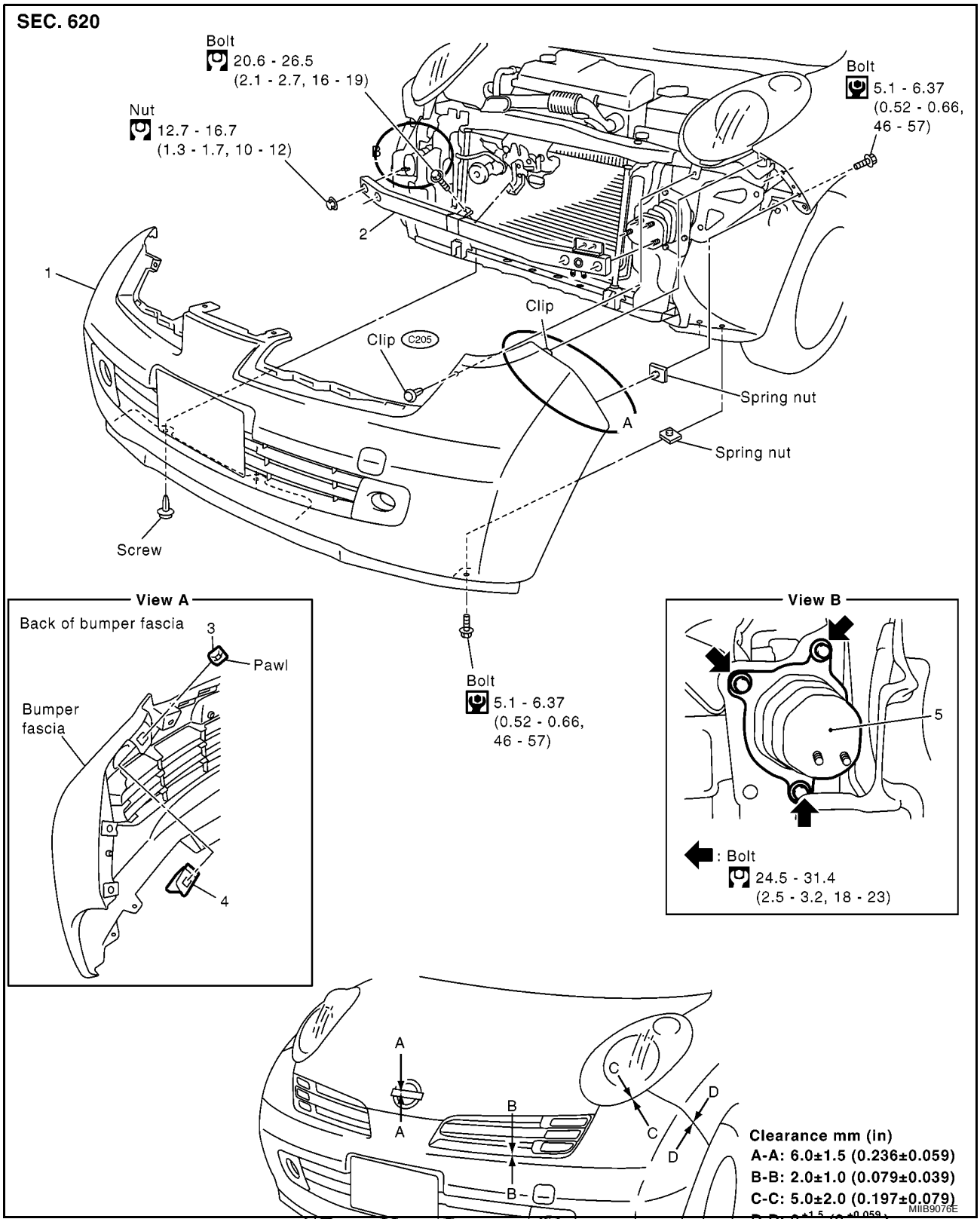
FRONT BUMPER

PFP:F2022

Removal and Installation

EIS004NZ

- Bumper fascia is made of plastic. Do not use excessive force and be sure to protect it from exposure to oil.



1. Bumper fascia
2. Bumper reinforcement
3. Bumper side bracket (upper)
4. Bumper side bracket (lower)
5. Bumper stay

REMOVAL

1. Remove front grille. Refer to EI-8, "FRONT GRILLE" in EI section.
2. Remove bumper fascia installation clip.
3. Remove fender protectors (right, left). Refer to EI-11, "FENDER PROTECTOR" in EI section.
4. Remove the bolts holding bumper fascia to front fender.
5. Pull the bumper fascia horizontal from front fender mounting surface, disengage the clip, and remove.
6. Remove the bumper side brackets (upper and lower) from the bumper fascia.
7. Remove bolts and nuts and then remove bumper reinforcement.
8. Remove bolts and bumper stay.

INSTALLATION

Install in the reverse order of removal.

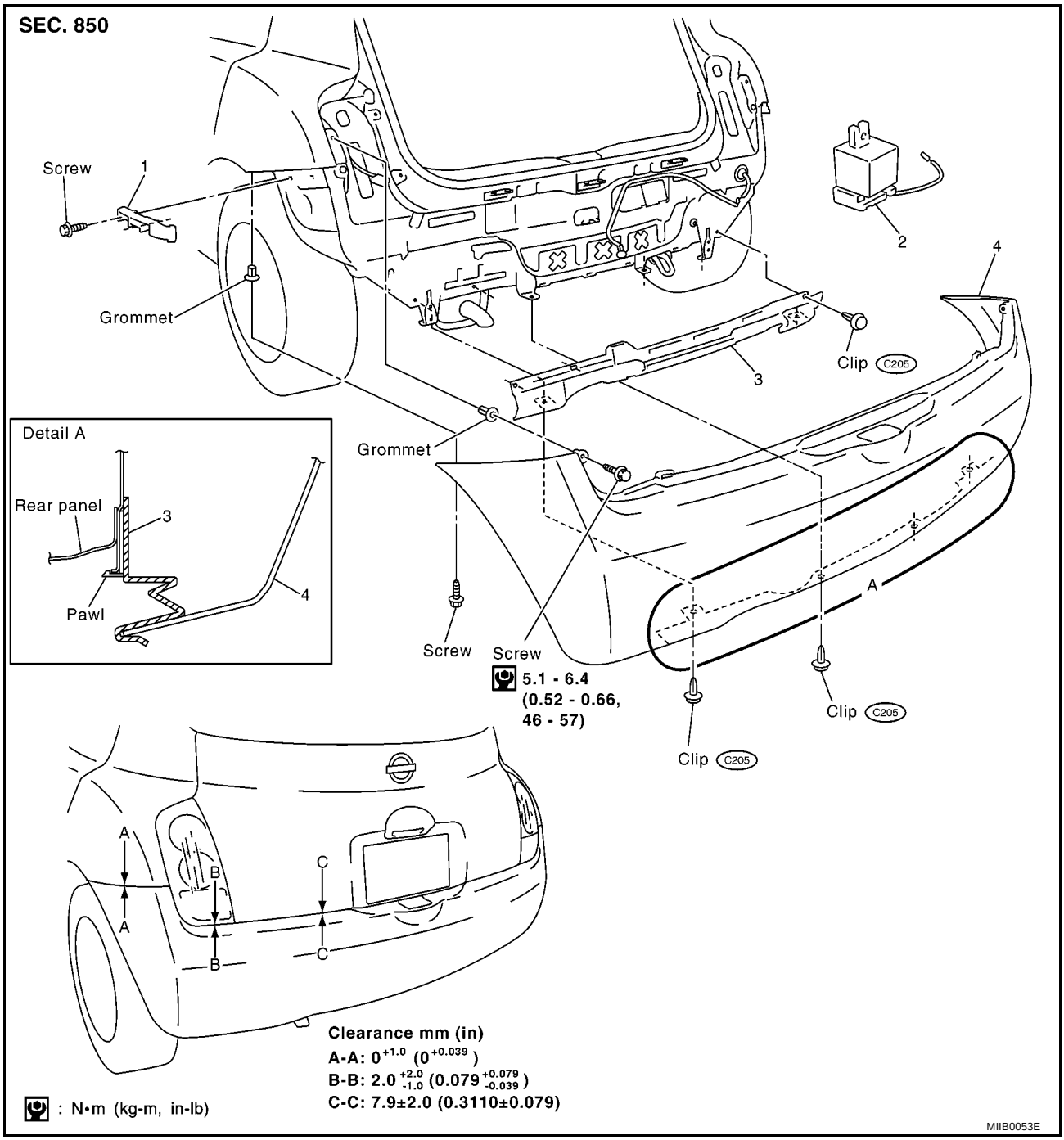
REAR BUMPER

PFP:H5022

Removal and Installation

EIS004O0

Bumper fascia is made of plastic. Do not use excessive force and be sure to protect it from exposure to oil.

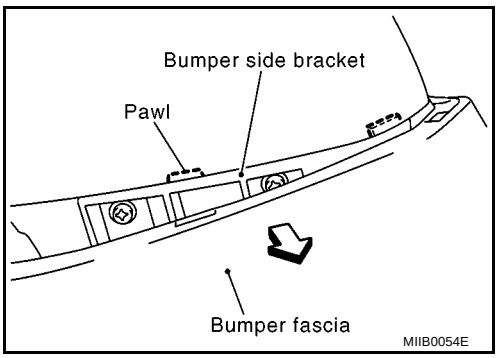


1. Bumper side bracket
2. Bumper energy shock absorber
3. Rear panel (lower)
4. Bumper fascia
5. Bumper stay

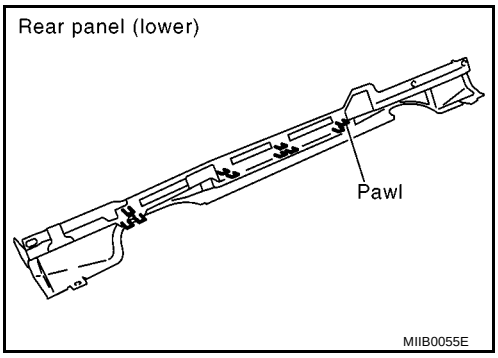
REMOVAL

1. Remove rear combination lamps (LH/RH). Refer to LT-186, "Removal and Installation" .
2. Remove bumper fascia lower bottom installation clip
3. Remove bumper fascia screws.

4. Remove bumper fascia side engaged hooks in the direction shown by the arrows in the figure.



5. Remove license plate lamp, and then pull bumper fascia straight out toward back of vehicle to remove it. Refer to LT-180, "LICENSE PLATE LAMP" .
6. Remove bumper energy shock absorber.
7. Remove the engaged rear panel (lower) mounting clips and hooks, and remove rear panel.



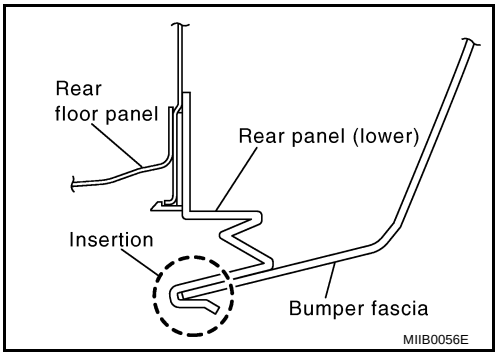
8. Remove bolts and bumper stay.

INSTALLATION

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

CAUTION:

Make sure the bumper fascia bottom edge is inserted in the rear panel (lower) insertion area.

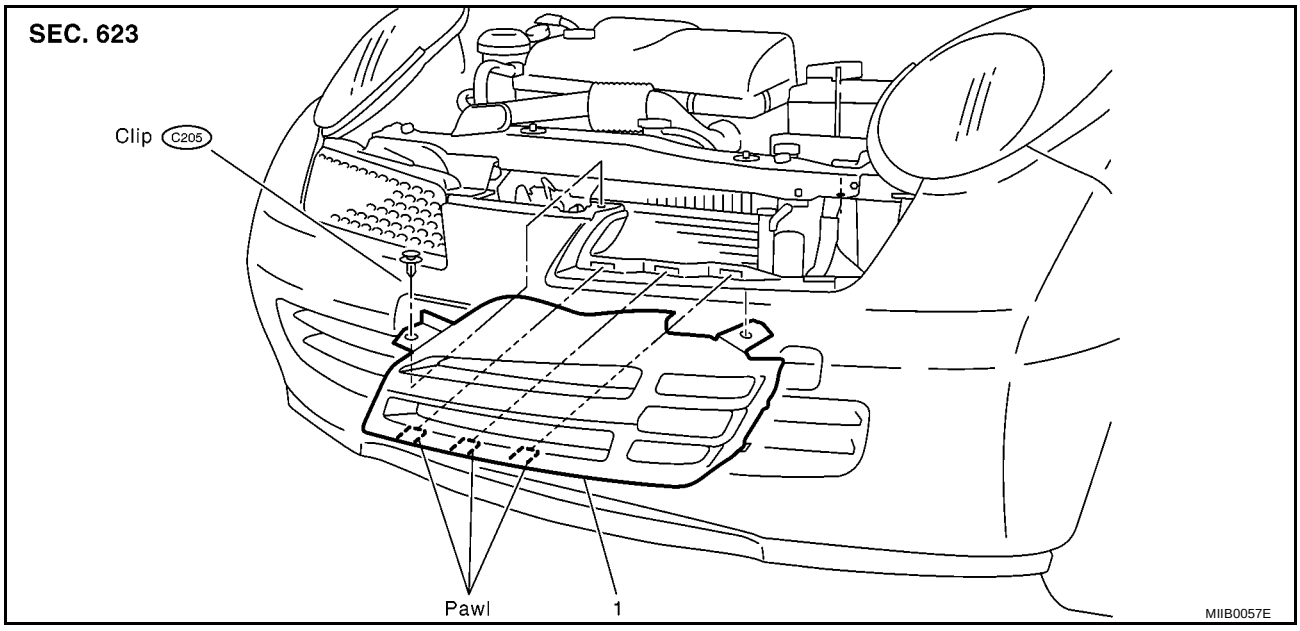


FRONT GRILLE

PFP:62310

Removal and Installation

EIS004O1



1. Front grille

REMOVAL

1. Remove mounting clips from top of front grille.
2. Insert your hand between the front grille and radiator core support (upper), and remove the front grille back hooks in order from the vehicle's center side to its outside.
3. After all hooks have been disengaged, pull front grille vehicle center side forward and remove the front turn signal lamp back insertion area and panel connector to remove the front grille vehicle center side.

INSTALLATION

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

CAUTION:

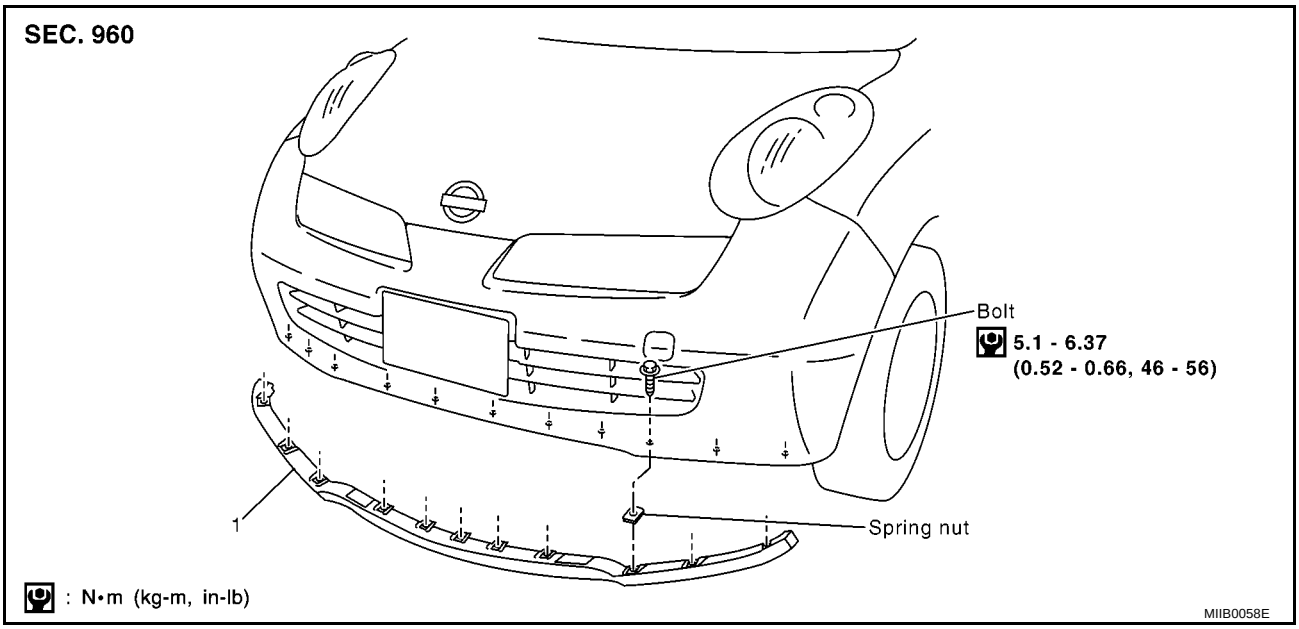
Before engaging the front grille back hooks, make sure the front turn signal lamp back insertion area is correctly inserted in the inside of the bumper fascia.

FRONT DEFLECTOR

PFP:96015

Removal and Installation

EIS004O2



1. Front deflector

REMOVAL

1. Remove front bumper. Refer to EI-4, "FRONT BUMPER" in EI section.
2. Remove bolts from front bumper inner side, and then remove front deflector.

INSTALLATION

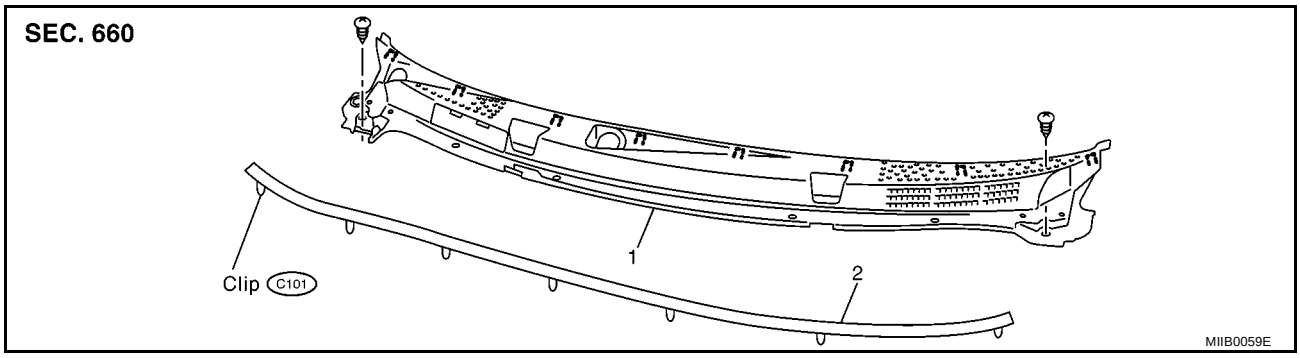
Install in the reverse order of removal.

COWL TOP

PFP:66100

Removal and Installation

EIS004O3



1. Cowl top cover
2. Cowl top seal rubber

REMOVAL

1. Remove front wiper arms (left and right). Refer to WW-5, "FRONT WIPER AND WASHER SYSTEM" , WW-48, "FRONT WIPER AND WASHER SYSTEM (WITH RAIN SENSOR)" in WW section.
2. Remove mounting screws, and the remove slat covers (LH/RH).
3. Remove cowl top seal rubber.
4. Pull cowl top over forward to remove it.

INSTALLATION

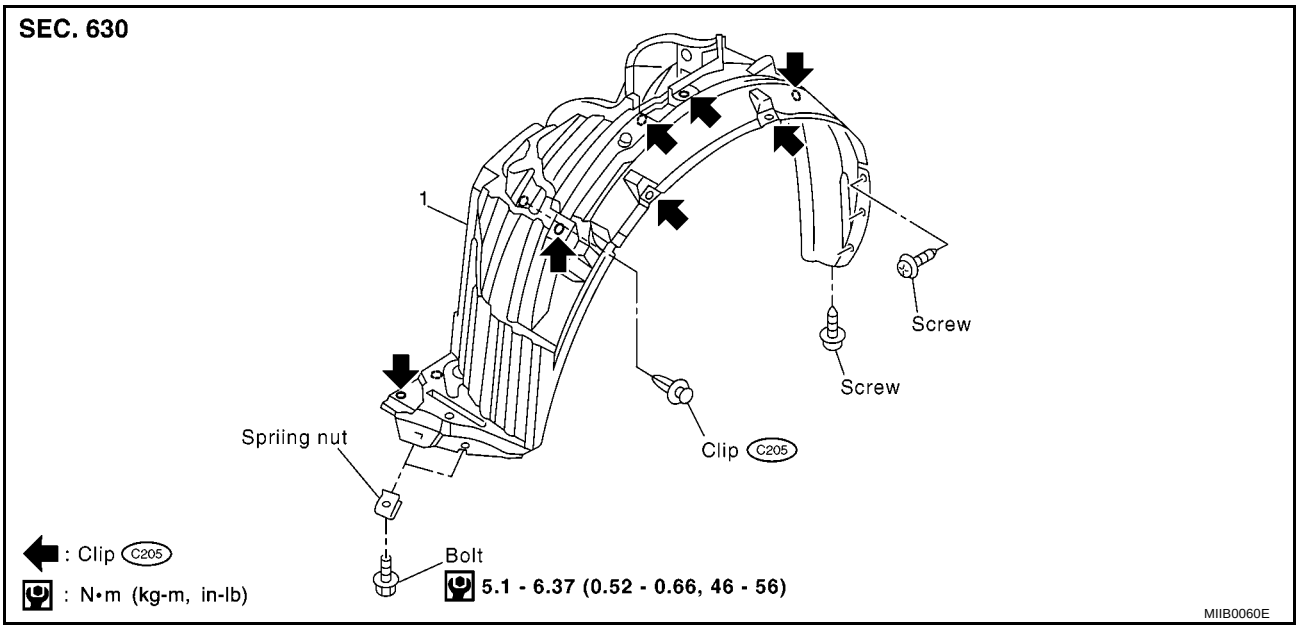
Install in the reverse order of removal.

FENDER PROTECTOR

PFP:63840

Removal and Installation

EIS004O4



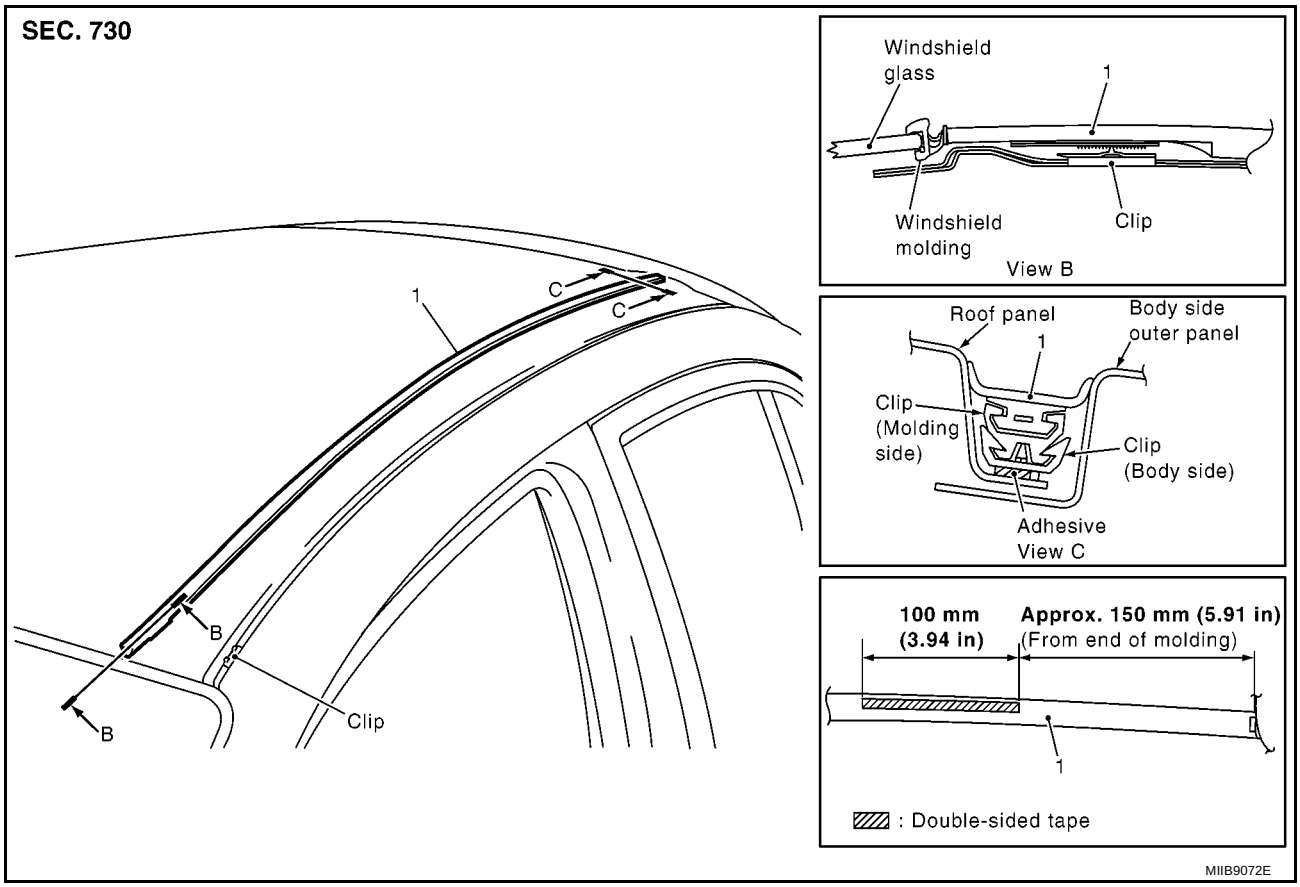
1. Fender protector

ROOF SIDE MOLDING

PFP:73854

Removal and Installation

EIS004O5



1. Roof side molding

REMOVAL

1. Use a plastic knife, etc., and lift up the end of roof side molding (back end), remove clip, and peel off double-sided tape to remove it.
2. Remove the double-sided tape remaining on roof side molding back and vehicle body.

   NOTE:
   Double-sided tape can be easily removed using double-sided tape removal agent.

INSTALLATION

NOTE:
When only installing roof side molding, conduct the following procedure from Step 3.

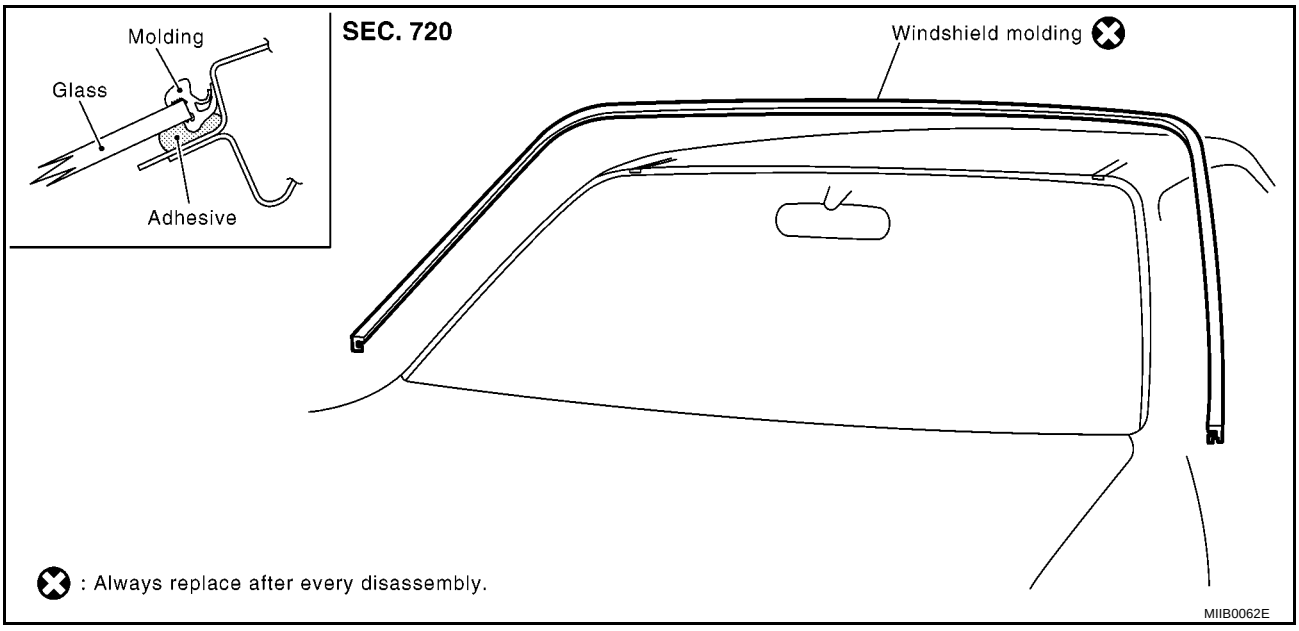
1. Clean the roof side molding clip attachment surface (body side).
2. Bond roof side molding clip (body side) to vehicle body and let sit for 40 min.
3. Apply primer (Sumitomo3M N200 or comparable product) to roof side molding back double-sided tape application area.
4. Apply double-sided tape to roof side molding back (position in figure).
5. After butting roof side molding front end against window seal molding, push in molding from front to back end, and then affix to body using clips and double-sided tape.

WINDSHIELD MOLDING

PFP:72750

Removal and Installation

EIS004O6

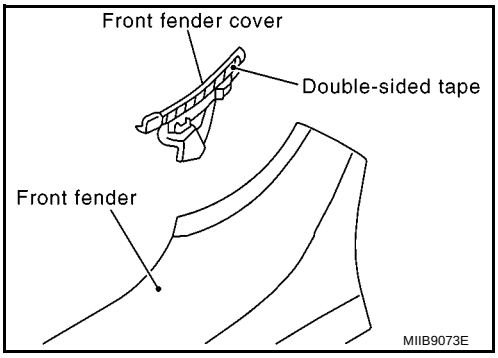


CAUTION:

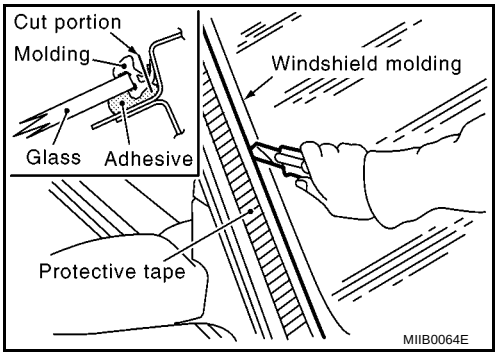
Be careful when handling adhesive and primer.

REMOVAL

1. Remove cowl top cover. Refer to EI-10, "COWL TOP" in EI section.
2. Peel off double-sided tape and remove front fender covers (LH/RH) from front fenders (LH/RH).

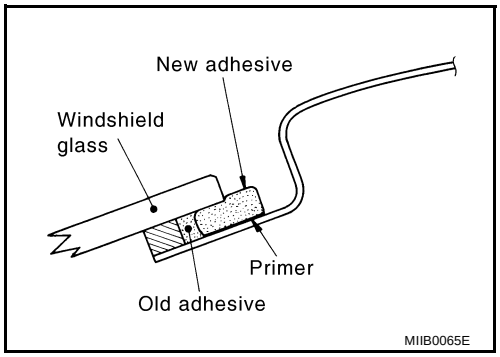


3. Apply protective tape along the contour of windshield molding and cut molding lip with cutter knife.
4. Tear off excess molding from end of molding to glass.
5. With pliers, draw out all the remaining molding left in flanged area of body to remove it completely from adhering surface on glass.



INSTALLATION

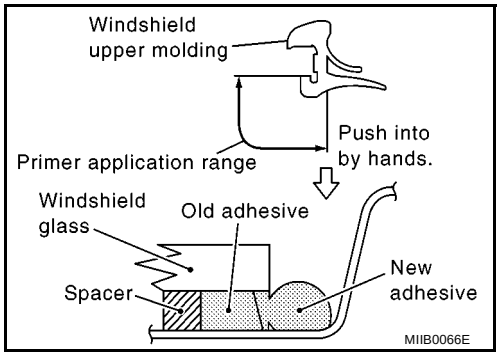
1. Apply primer between glass and panel then apply enough adhesive to allow molding adhesion.



NOTE:

- The essential function of primers is to strengthen adhesion between glass and painted surface.
- There are 2 types of primer. Never confuse the application methods.
  Primer M ⋯ for painted surfaces
  Primer G ⋯ for glass
- If primer M overflows onto a painted surface other than bonding area, quickly remove it with white gasoline.

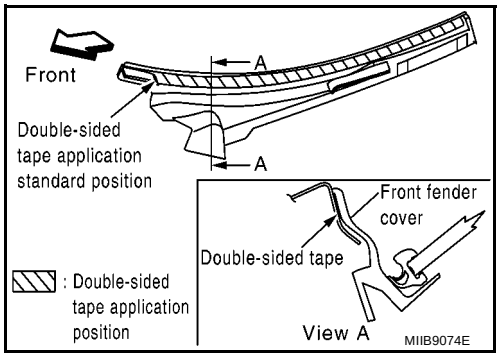
2. Apply primer to entire perimeter of molding area shown in the figure.
3. Align molding positioning mark (center of molding: white) with glass top edge center spacer positioning mark, push in so that molding's lower chin hooks onto glass, then continuing pushing toward the outside.



CAUTION:

After installing molding, make sure there are no non-standard conditions, such as a lip sticking out or wave in molding.

4. Remove protective tape.
5. Remove double-sided tape from front fender cover and apply primer (Sumitomo 3M K520) to double-sided tape application position shown in the figure. Then apply new double-sided tape and install front fender.



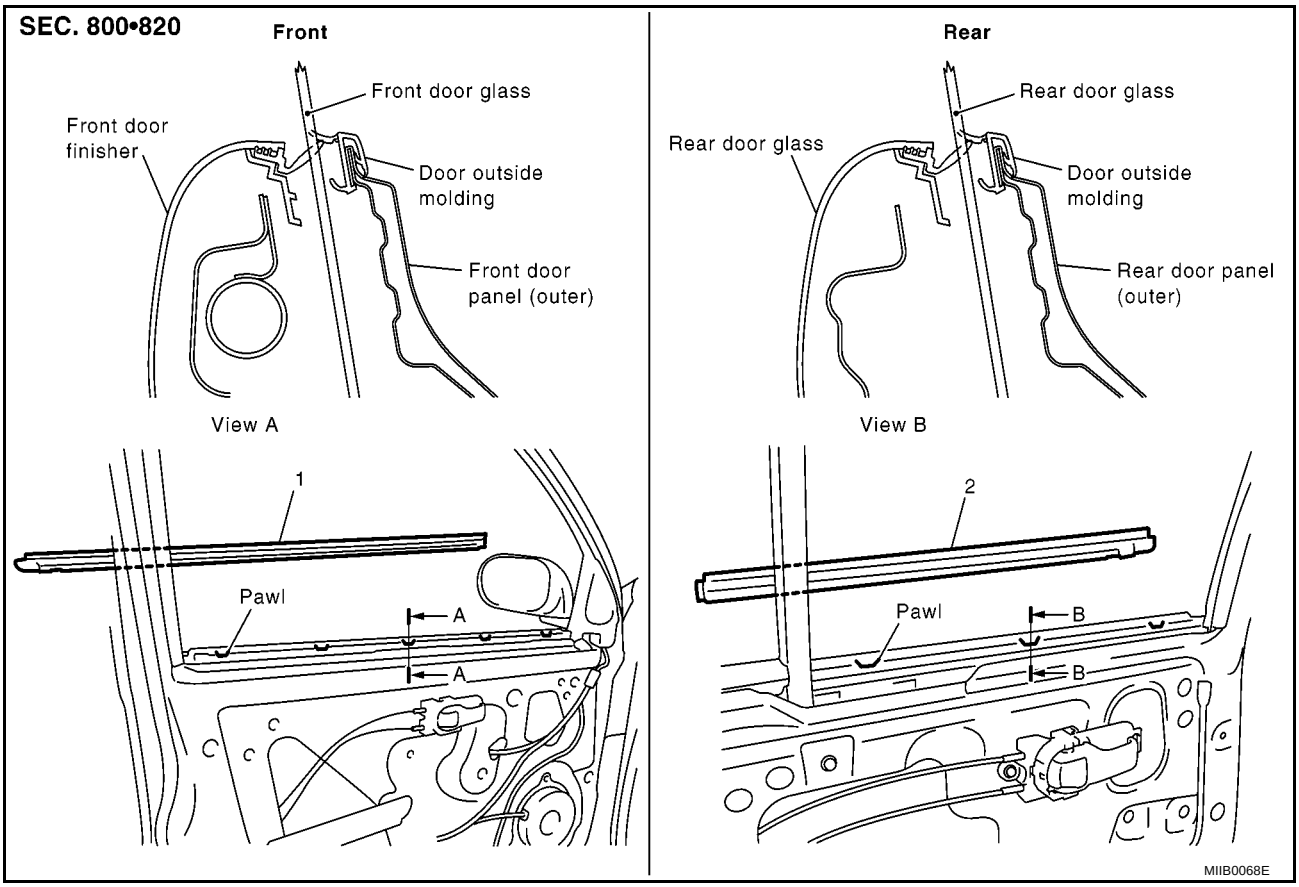
6. Install cowl top cover. Refer to EI-10, "COWL TOP" in EI section.

DOOR OUTSIDE MOLDING

PFP:82820

Removal and Installation

EIS004O7



1. Front door outside molding
2. Rear door outside molding

REMOVAL

Front

1. Fully open door glass.
2. Hold molding back end straight up and release engagement with flange hooks in order of back to front.
3. After disengaging the flange hooks, with the molding back end held up, pull molding slanted backwards to remove it.

CAUTION:

After removal, visually inspect molding, and if it is deformed, replace it with new molding.

Rear

1. Fully open door glass.
2. Hold molding straight up and remove it.

CAUTION:

After removal, visually inspect molding, and if it is deformed, replace it with new molding.

INSTALLATION

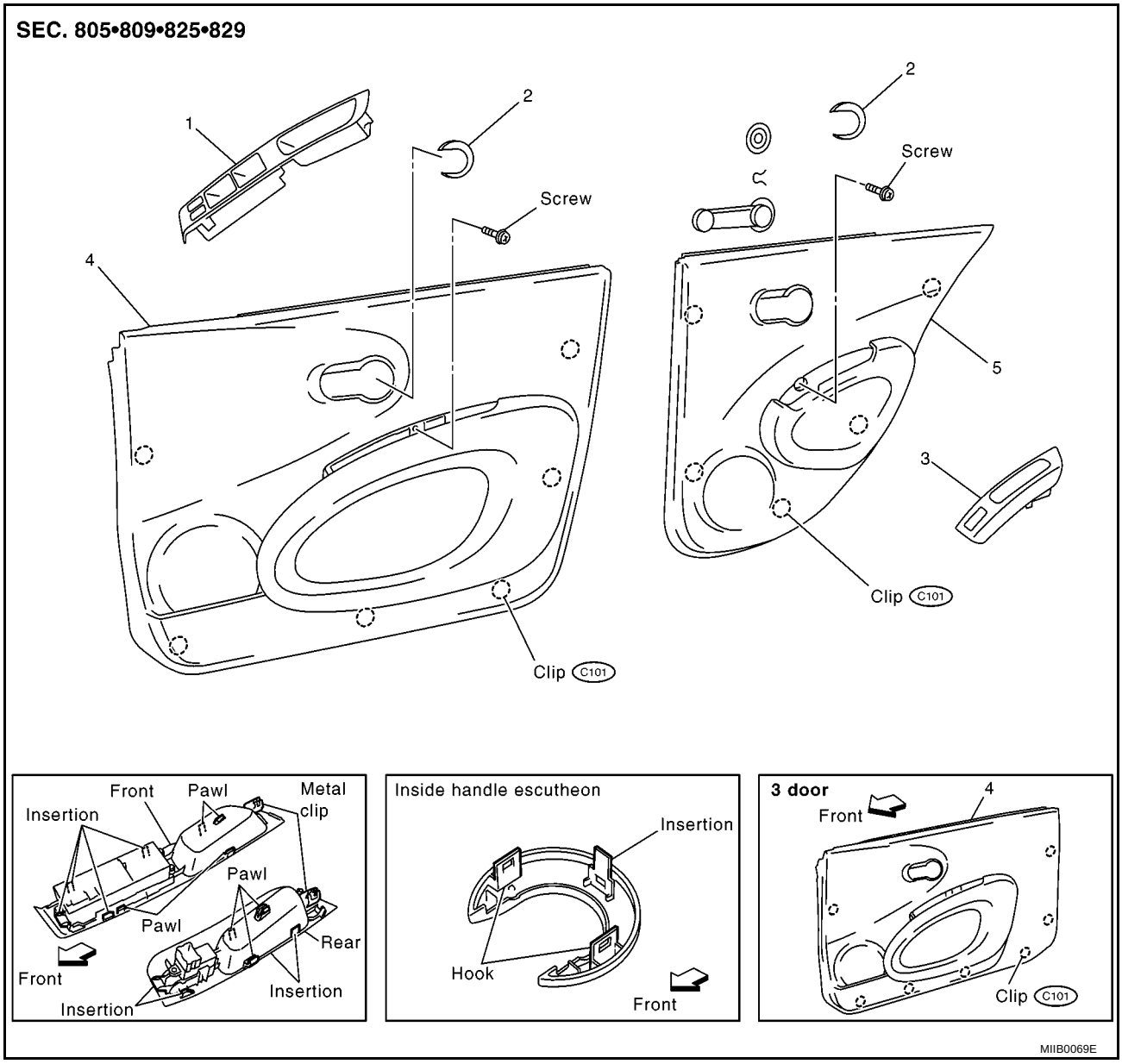
Install in the reverse order of removal.

DOOR FINISHER

PFP:80900

Removal and Installation

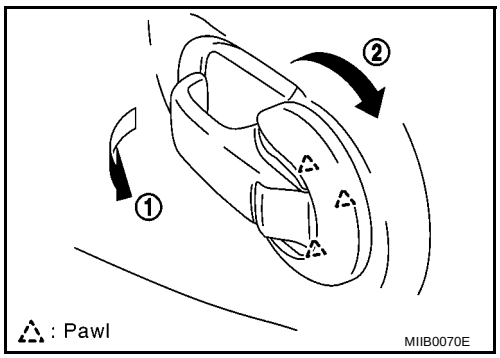
EIS004O8



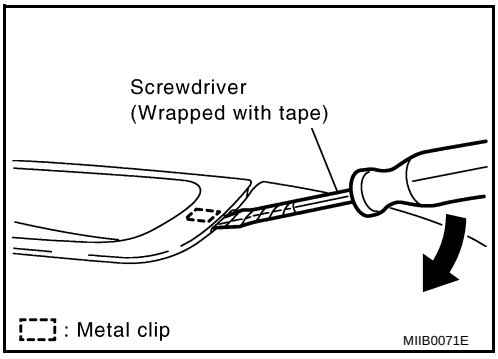
1. Power window switch finisher (front door)
2. Inside handle escutcheon
3. Power window switch finisher (rear door)
4. Front door finisher
5. Rear door finisher

REMOVAL

1. Fully open door glass.
2. Pull up inside handle lever, and then spread inside handle escutcheon top and bottom to release top and bottom hooks.
3. Slide inside handle escutcheon backwards, disengage bottom, and remove from door finisher.



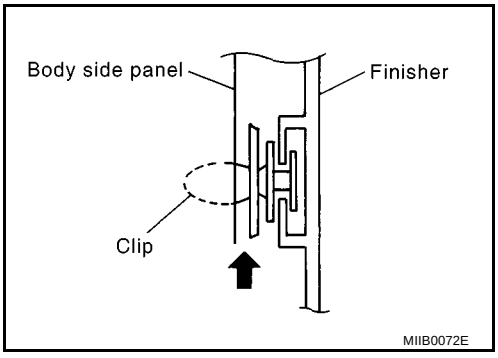
4. Insert a screwdriver wrapped with tape into back of power window switch finisher, hold up the back end, and disengage metal clips.
5. Hold up front side, remove inserted area, and remove. Pull back rear side, remove inserted area, and remove.
6. Separate the power window switch finisher back harness connector and remove it.



7. Remove door finisher screw.

8. Insert clip driver or clip clamp remover into door finisher back clip and remove clip.

NOTE:
Insert a clip driver or clip clamp remover into the part shown by the arrow (between the body side panel and the clips). Remove finisher.



9. Pull door finisher upwards to remove it from door panel.

INSTALLATION

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

CAUTION:
When installing finisher, confirm clips are accurately aligned with the holes on body side panel, then press in.

BACK DOOR TRIM

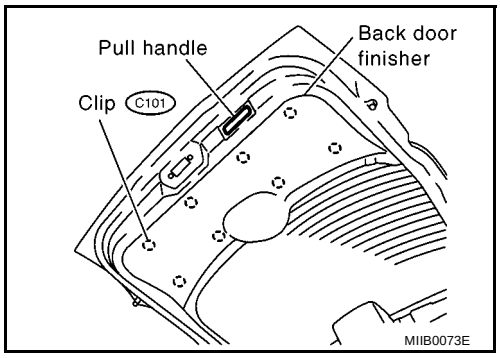
PFP:90900

Removal and Installation

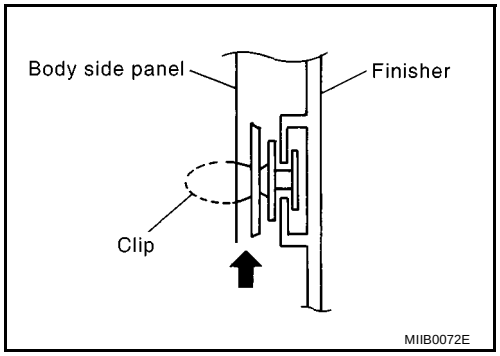
EIS004O9

REMOVAL

1. Insert clip driver or clip clamp remover into back door finisher back mounting clip area and remove clip.



NOTE:
Insert a clip driver or clip clamp remover into the part shown by the arrow (between the clips and the body side panel). Remove clips.



2. Pull back door finisher forward and remove it from back door.

INSTALLATION

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

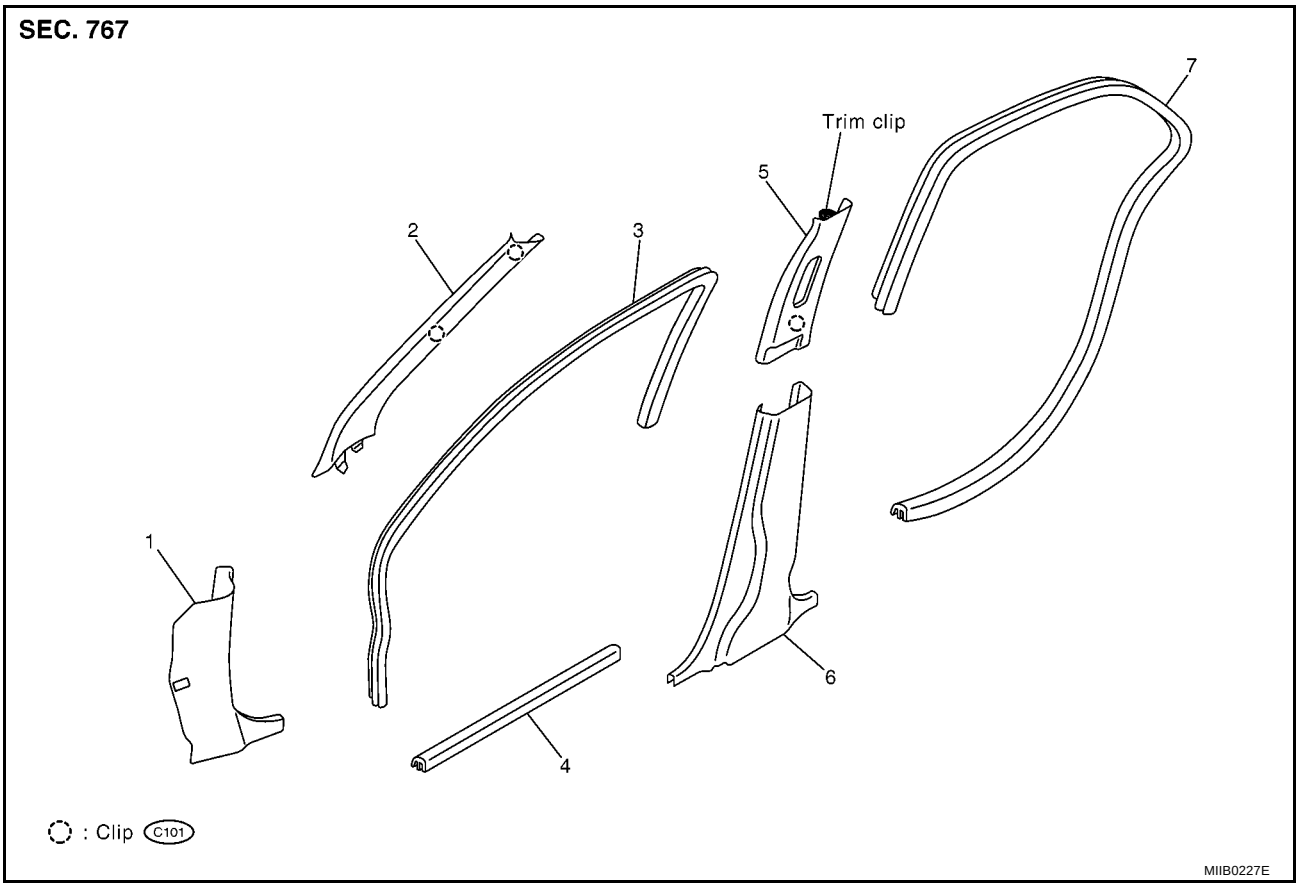
CAUTION:
When installing, confirm clips are accurately aligned with the holes on body side panel, then press in.

BODY SIDE TRIM

PFP:76913

Removal and Installation (5-Door)

EIS004OA



1. Dashboard side finisher
2. Front pillar garnish
3. Front body side welt (upper)
4. Front body side welt (lower)
5. Center pillar upper garnish
6. Center pillar lower garnish
7. Rear body side welt

REMOVAL

Dashboard Side Finisher

Pull dash side finisher slanted backwards to remove it.

Front Body Side Welt (Upper)

1. Remove the dashboard side finisher.
2. Remove front body side welt (upper) from vehicle.

Front Pillar Garnish

1. Remove front body side welt (upper).
2. Remove the mounting clips, pull the front pillar garnish from inside the passenger room, and remove it.

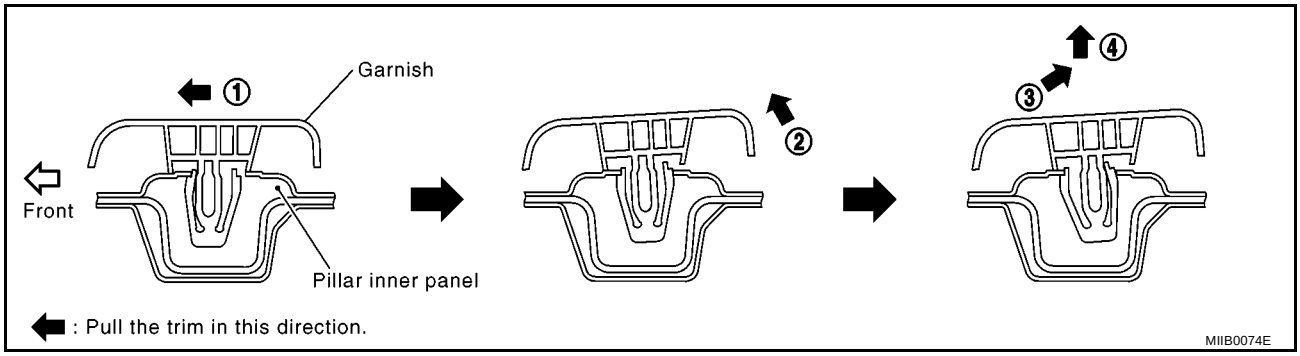
Center Pillar Lower Garnish

Spread the area engaged in the center pillar flange, remove front side first and then remove rear side in the same manner.

Center Pillar Upper Garnish

1. Remove front body side welt (upper)
2. Remove center pillar lower garnish.
3. Remove front seat belt shoulder anchor. Refer to SB-3, "Removal and Installation of Front Seat Belt" in SB section.

4. Pull center pillar upper garnish from inside passenger room, disengage clips as instructed in the figure, and remove garnish from vehicle.

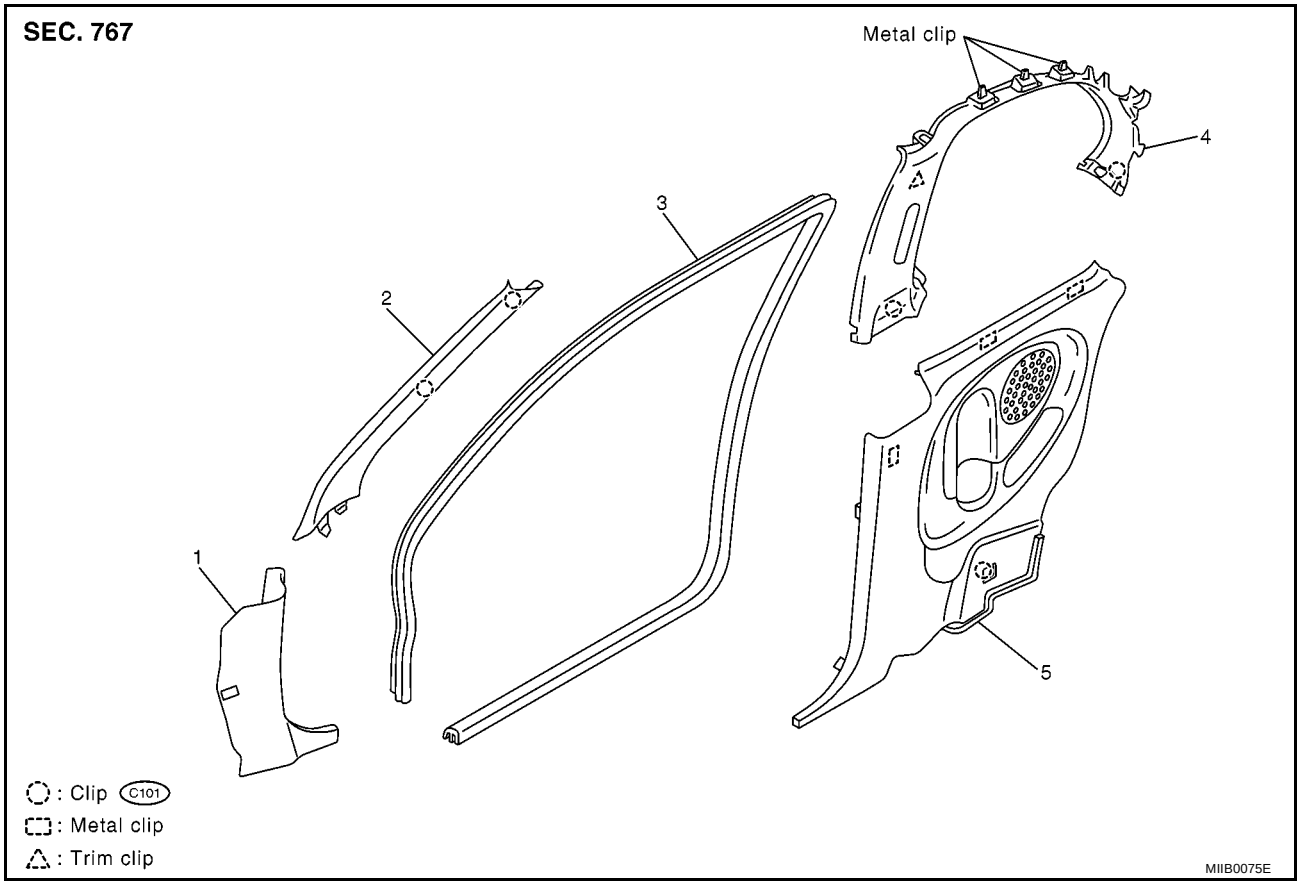


INSTALLATION

Install in the reverse order of removal.

Removal and Installation (3-Door)

EIS004OB



1. Dashboard side finisher
2. Front pillar garnish
3. Body side welt
4. Lock pillar upper garnish
5. Rear side finisher

REMOVAL

Front Pillar Garnish

1. Remove body side welt.
2. Remove the mounting clips, pull the front pillar garnish from inside the passenger room, and remove it.

Dashboard Side Finisher

Pull dash side finisher slanted backwards to remove it.

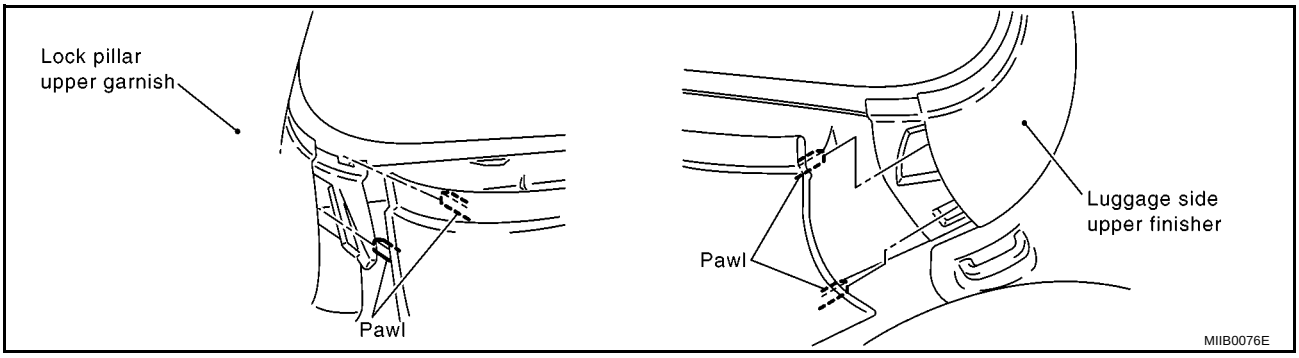
Body Side Welt

1. Remove the dashboard side finisher.

2. Remove body side welt from vehicle.

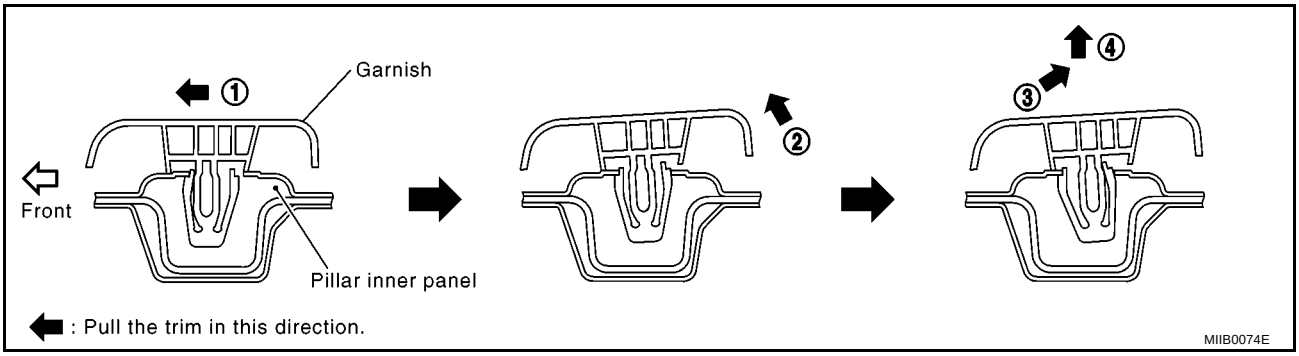
Rear Side Finisher

1. Remove body side welt.
2. Remove rear seat cushion. Refer to SE-11, "REAR SEAT" in SE section.
3. Pull rear side finisher forward, remove mounting clips, disengage lock pillar upper garnish, and remove from vehicle.



Lock Pillar Upper Garnish

1. Remove luggage side upper finisher. Refer to EI-26, "LUGGAGE FLOOR TRIM" in EI section.
2. Remove rear seat cushion. Refer to SE-11, "REAR SEAT" in SE section.
3. Remove rear side finisher.
4. Remove front seat belt shoulder anchor. Refer to SB-3, "Removal and Installation of Front Seat Belt" in SB section.
5. Disengage lock pillar upper garnish bottom clips.
6. Lower lock pillar upper garnish to bottom and disengage metal clips.
7. Pull lock pillar garnish toward passenger room, disengage clips following instructions in the figure, and remove it from vehicle.



INSTALLATION

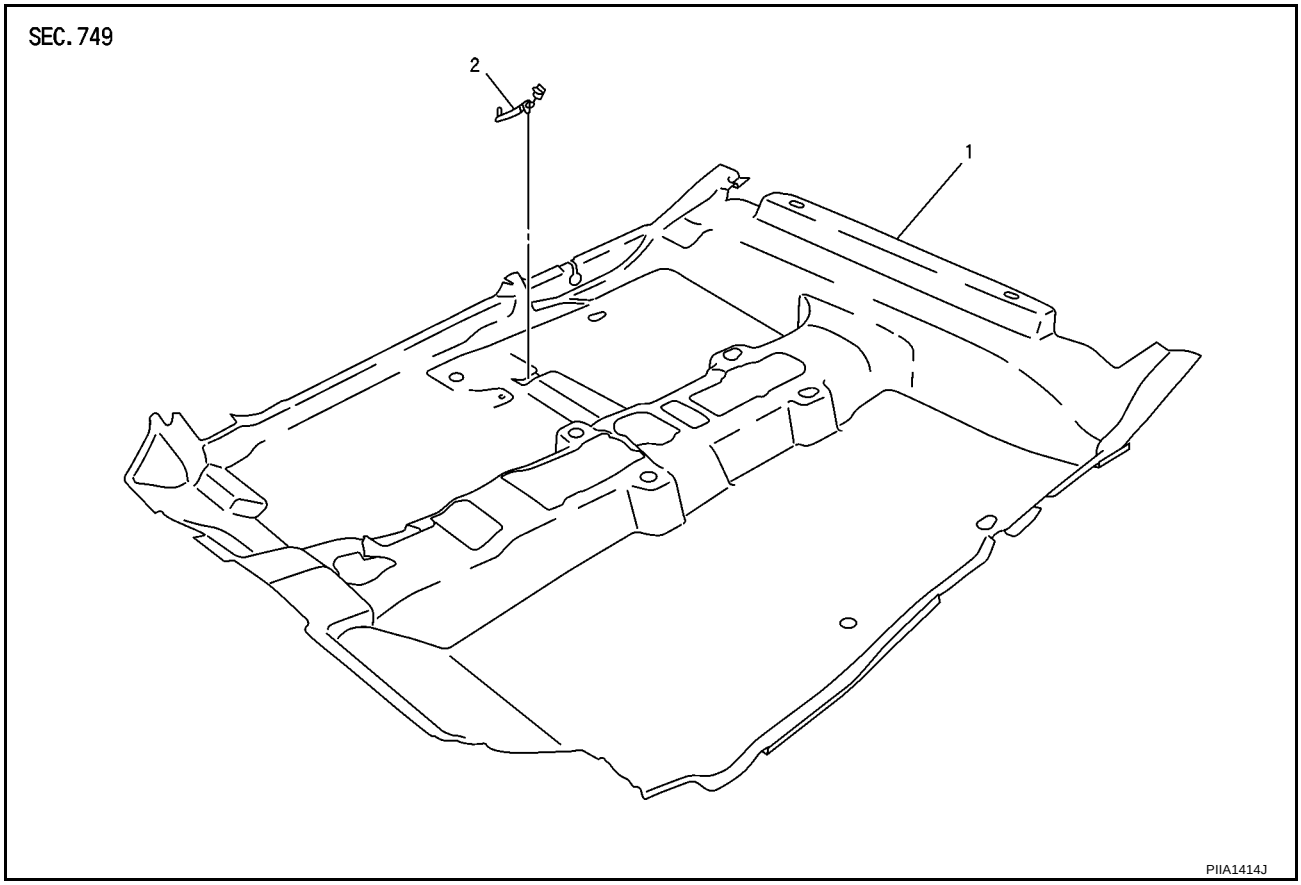
Install in the reverse order of removal.

FLOOR TRIM

PFP:74902

Removal and Installation

EIS004OC

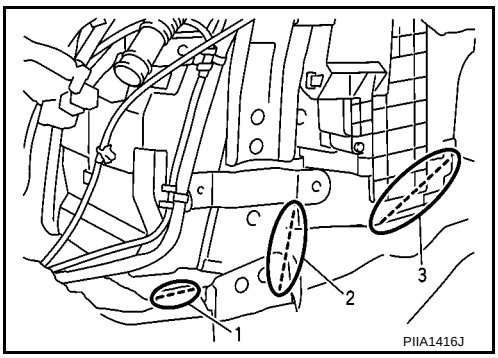


1. Floor carpet
2. Carpet hook

REMOVAL

1. Remove front seats (LH/RH) and rear seat cushion. Refer to SE-7, "FRONT SEAT" and SE-11, "REAR SEAT" in SE section.
2. Remove console box. Refer to IP-9, "REMOVAL AND INSTALLATION OF CONSOLE BOX." in IP section.
3. Remove air bag sensor unit harness connector and harness clips. Refer to SRS-48, "DIAGNOSIS SENSOR UNIT" in SRS section.
4. Remove instrument panel stay cover. Refer to IP-5, "Removal and Installation" in IP section.
5. For 5-door vehicles, remove center pillar lower garnish (LH/RH). Refer to EI-19, "Removal and Installation (5-Door)" in EI section.
6. For 3-door vehicles, remove rear side finishers (LH/RH) and luggage side lower finishers (LH/RH). Refer to EI-20, "Removal and Installation (3-Door)" and EI-26, "LUGGAGE FLOOR TRIM" in EI section.
7. Remove dash side finishers (LH/RH). Refer to EI-19, "BODY SIDE TRIM" in EI section.
8. Remove body side welts (LH/RH).
9. Remove carpet hook.
10. Remove instrument panel stay (LH).

11. Use a cutter knife, etc., to cut out sections 1 and 2 shown in the figure.
12. Rotate floor carpet until the cut out section 3 is visible, then cut out the section 3.
13. Remove floor carpet from vehicle.



INSTALLATION

Install in the reverse order of removal.

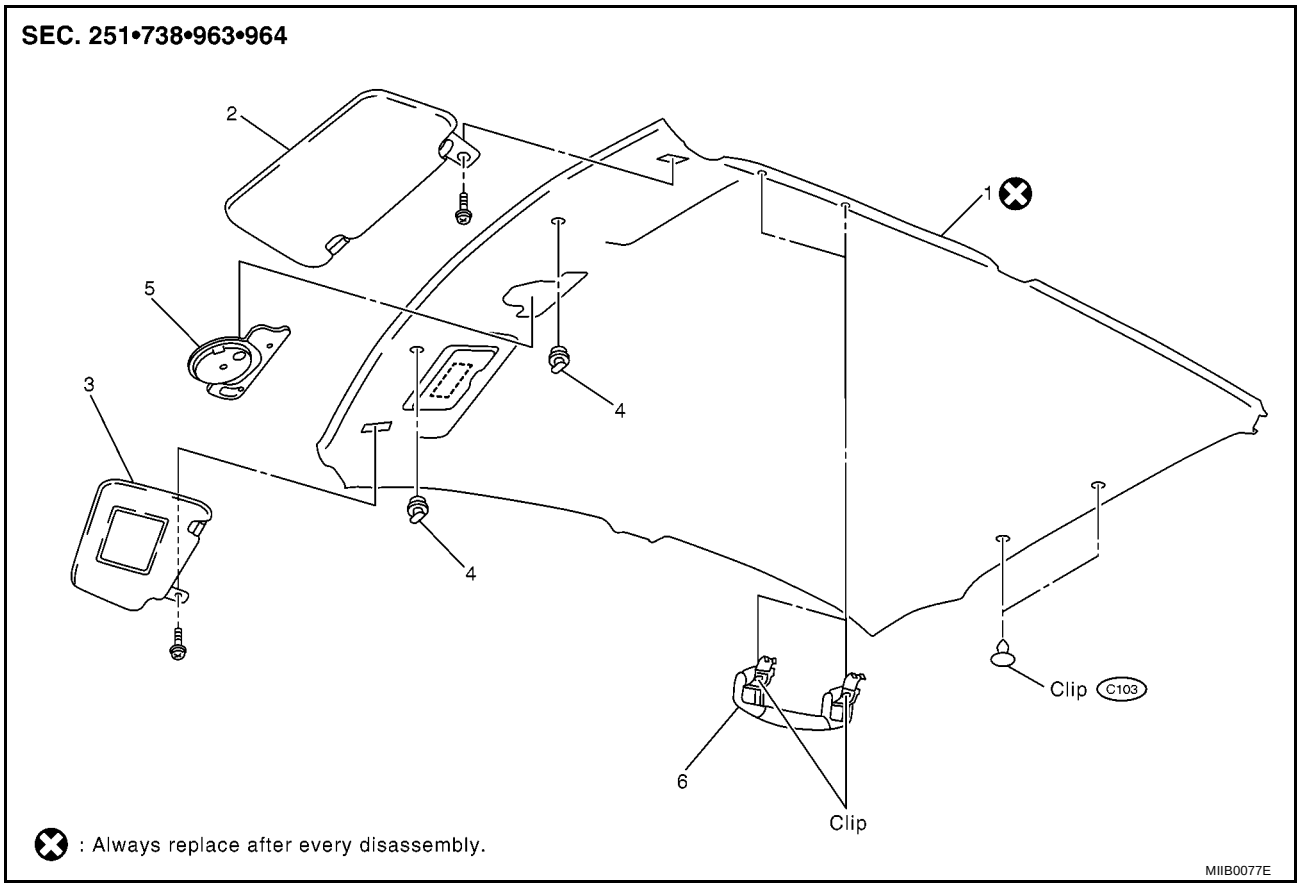
HEADLINER

PFP:73910

Removal and Installation

SMA for VIN >SJN**AK12U1353780

EIS004OD

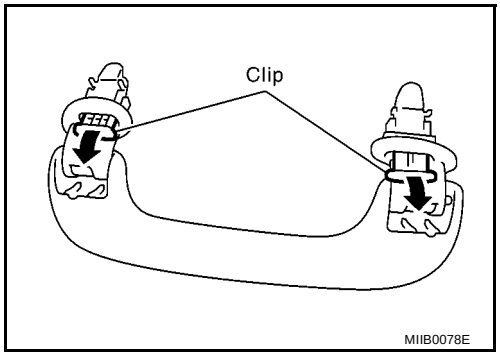


1. Headliner
2. Sunvisor (LH)
3. Sunvisor (RH)
4. Sunvisor holder
5. Room lamp (with map lamp function)
6. Assist grip (passenger seat)

REMOVAL

1. Remove front pillar garnish. Refer to EI-19, "BODY SIDE TRIM" in EI section.
2. Remove back door weatherstrip.
3. Remove luggage side upper finishers (LH/RH). Refer to EI-26, "LUGGAGE FLOOR TRIM" in EI section.
4. Remove center pillar upper garnish (5-door vehicles) and lock pillar upper garnish (3-door vehicles). Refer to EI-19, "BODY SIDE TRIM" in EI section.
5. Remove assist grip.

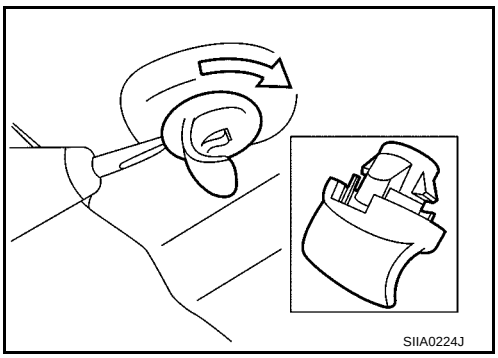
   NOTE:
   When removing assist grip, insert a thin screwdriver, etc., into the clip and move the clip outside.



6. Remove sunvisors (LH/RH).
7. Remove room lamp (with map lamp function). Refer to LT-229, "Removal and Installation" in LT section.

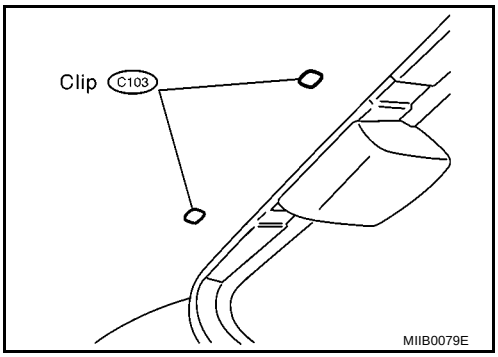
8. Remove sunvisor holder.

NOTE:
Insert a screwdriver into the cutout and rotate 90° to remove.



9. Remove vehicle rear clips.
10. Peel off headliner adhesive and remove headliner from back door opening.

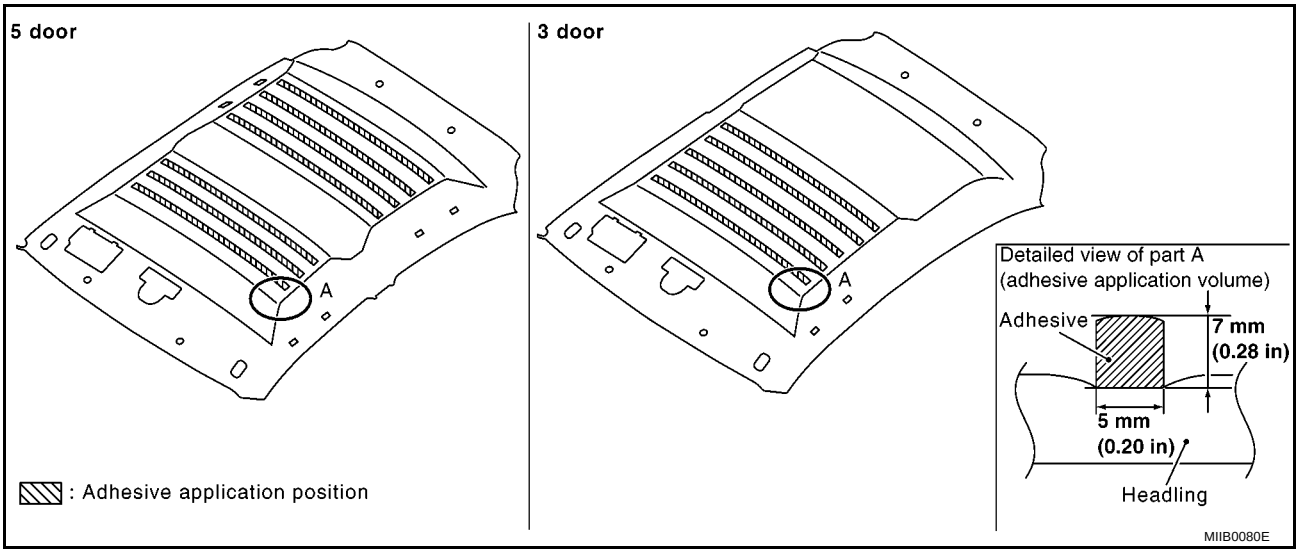
CAUTION:
The roof panel could be deformed, so do not strongly pull the headliner.



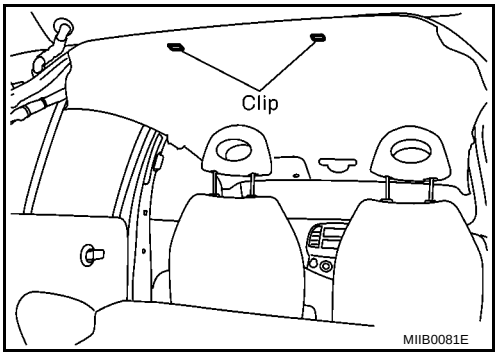
INSTALLATION

1. Remove any adhesive left on the vehicle side.
2. Apply adhesive to headliner.

Adhesive:	Yokohama Rubber Hammer Tight YM-21



3. Move front seats (LH/RH) toward front of vehicle, and fix headrests (LH/RH) in top position.
4. Place the headliner front section on the headrest and fasten the headliner rear section with the clips.
5. After installing sunvisor holder, install in the reverse order of removal.

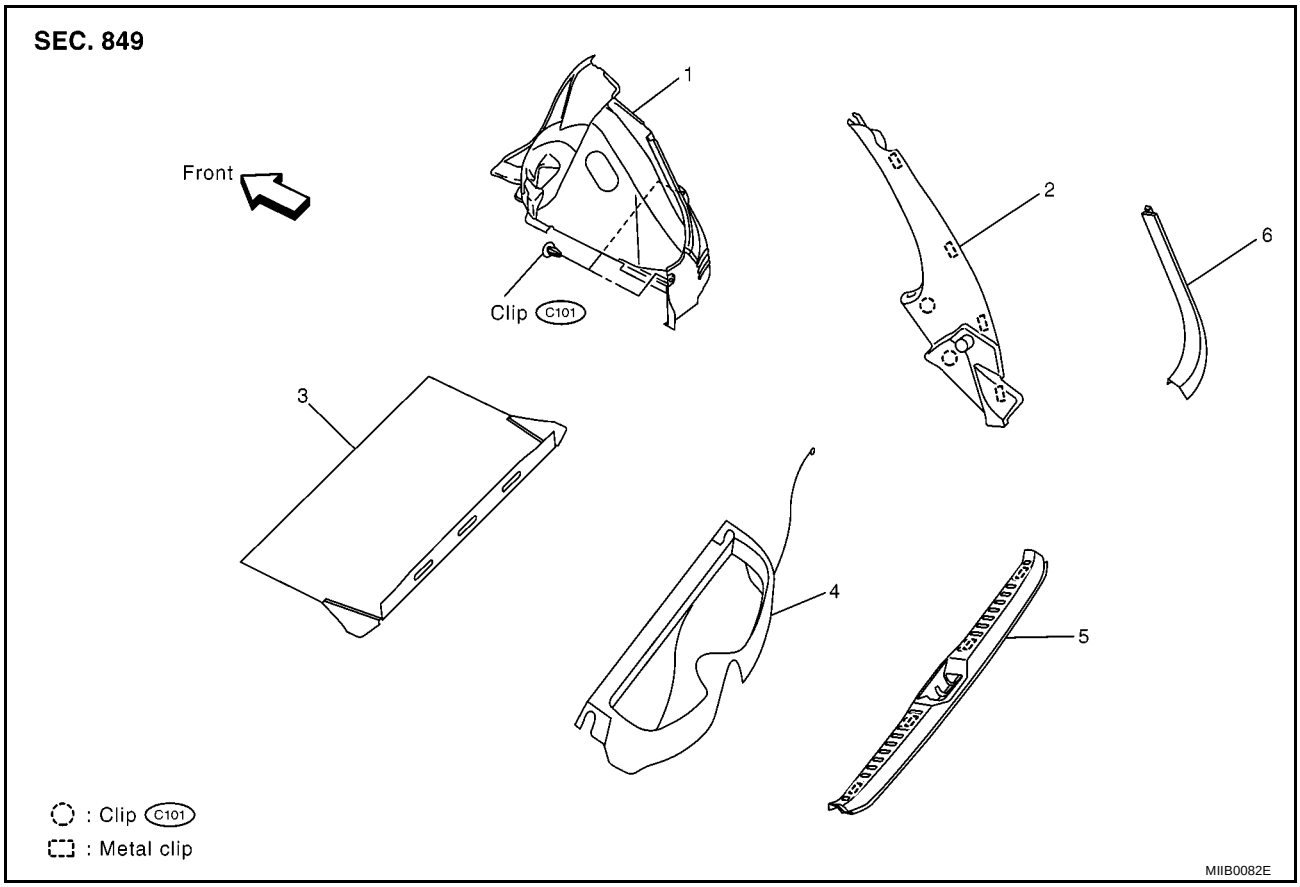


LUGGAGE FLOOR TRIM

PFP:84999

Removal and Installation

EIS004OE

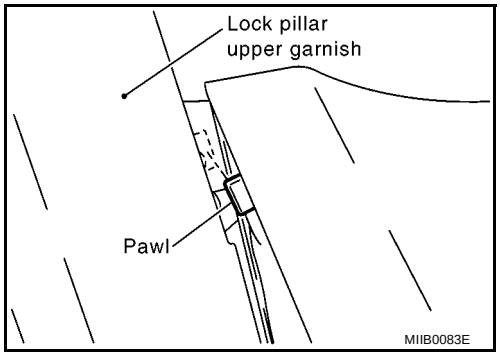


1. Luggage side lower finisher
2. Luggage side upper finisher
3. Luggage floor carpet
4. Rear parcel shelf finisher
5. Luggage rear kickplate
6. Luggage rear plate

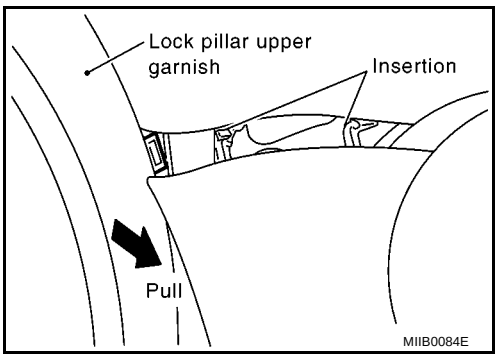
REMOVAL

Luggage Side Upper Finisher

1. Remove rear parcel shelf finisher.
2. Remove back door weather strip.
3. For 5-door vehicles, remove plastic clips and metal clips in order from luggage side upper finisher bottom.
4. For 3-door vehicles, remove the plastic clips and metal clips in order from luggage side upper finisher bottom, pull finisher straight forward, and disengage from lock pillar upper garnish.



5. Remove headliner insert, and remove luggage side upper finisher.



Luggage Side Lower Finisher (5-Door Vehicles)

1. Remove rear body side welt.
2. Remove luggage side upper finisher and luggage rear kickplate. Refer to EI-19, "BODY SIDE TRIM" and EI-26, "LUGGAGE FLOOR TRIM" in EI section.
3. Remove rear seat cushion and rear seatback. Refer to SE-11, "REAR SEAT" in SE section.
4. Remove mounting clips and then remove luggage side lower finisher.

Luggage Side Lower Finisher (3-Door Vehicles)

1. Remove body side welt.
2. Remove luggage side upper finisher and luggage rear kickplate. Refer to EI-20, "Removal and Installation (3-Door)" and EI-26, "LUGGAGE FLOOR TRIM" in EI section.
3. Remove rear seat cushion and rear seatback. Refer to SE-11, "REAR SEAT" in SE section.
4. Remove rear side finisher. Refer to EI-20, "Removal and Installation (3-Door)" in EI section.
5. Remove mounting clips and then remove luggage side lower finisher.

Luggage Rear Plate

1. Remove back door weather strip.
2. Hold up luggage rear plate, disengage metal clips, and remove plate.

Luggage Rear Kickplate

1. Remove rear parcel shelf finisher.
2. Remove back door weather strip.
3. Remove luggage rear plate.
4. Remove luggage side upper finisher.
5. Remove luggage rear kickplate.

INSTALLATION

Install in the reverse order of removal.

SECTION EM
ENGINE MECHANICAL

CONTENTS

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PRECAUTIONS 5
Precautions for Draining Coolant 5
Precautions for Disconnecting Fuel Piping 5
Precautions for Removal and Disassembly 5
Precautions for Inspections, Repairs, and Replacement 5
Precautions for Assembling and Installing 5
Parts Requiring Angle Tightening 5
Precautions for Liquid Gasket 6
REMOVAL OF LIQUID GASKET SEALING 6
LIQUID GASKET APPLICATION PROCEDURE 6
PREPARATION 7
Special Service Tools 7
Commercial Service Tools 9
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 10
NVH Troubleshooting —Engine Noise 10
Use the Chart Below to Help You Find the Cause of the Symptom. 11
DRIVE BELTS 12
Checking drive Belts 12
Tension Adjustment 12
ALTERNATOR AND A/C COMPRESSOR BELT (WITH A/C MODELS) 13
ALTERNATOR BELT (WITHOUT A/C MODELS) 13
WATER PUMP BELT 14
Removal and Installation 14
REMOVAL 14
INSTALLATION 14
Removal and Installation of Drive Belt Idler Pulley 14
REMOVAL 15
INSTALLATION 15
AIR CLEANER AND AIR DUCT 16
Removal and Installation 16
REMOVAL 16
INSTALLATION 17
Changing Air Cleaner Filter 19
REMOVAL 19
INSTALLATION 19
INTAKE MANIFOLD 20
Removal and Installation 20
REMOVAL 20
INSTALLATION 21
EXHAUST MANIFOLD AND THREE WAY CATALYST 22
Removal and Installation 22
REMOVAL 22
INSPECTION AFTER REMOVAL 23
INSTALLATION 23
OIL PAN AND OIL STRAINER 24
Removal and Installation 24
REMOVAL 24
INSTALLATION 25
INSPECTION AFTER INSTALLATION 26
IGNITION COIL 27
Removal and Installation 27
REMOVAL 27
INSTALLATION 27
SPARK PLUG (PLATINUM-TIPPED TYPE) 28
Removal and Installation 28
REMOVAL 28
INSPECTION AFTER REMOVAL 28
INSTALLATION 29
FUEL INJECTOR AND FUEL TUBE 30
Removal and Installation 30
REMOVAL 30
INSTALLATION 31
INSPECTION AFTER INSTALLATION 32
ROCKER COVER 33
Removal and Installation 33
REMOVAL 33
INSTALLATION 34
CAMSHAFT 36
Removal and Installation 36
REMOVAL 36
INSTALLATION 39

INSPECTION AFTER REMOVAL 43
Valve Clearance 45
INSPECTION 45
ADJUSTMENT 46
TIMING CHAIN 48
Removal and Installation 48
REMOVAL 49
INSPECTION AFTER REMOVAL 52
INSTALLATION 52
INSPECTION AFTER INSTALLATION 55
OIL SEAL 56
Removal and Installation of Valve Oil Seal 56
REMOVAL 56
INSTALLATION 56
Removal and Installation of Front Oil Seal 56
REMOVAL 56
INSTALLATION 57
Removal and Installation of Rear Oil Seal 57
REMOVAL 57
INSTALLATION 57
CYLINDER HEAD 59
On Vehicle Inspection 59
COMPRESSION PRESSURE INSPECTION 59
Removal and Installation 60
REMOVAL 60
INSPECTION AFTER REMOVAL 61
INSTALLATION 61
Disassembly and Assembly 62
DISASSEMBLY 63
ASSEMBLY 63
INSPECTION AFTER DISASSEMBLY 64
ENGINE ASSEMBLY 69
Removal and Installation 69
REMOVAL 70
INSTALLATION 72
INSPECTION AFTER INSTALLATION 72
CYLINDER BLOCK 73
Disassembly and Assembly 73
DISASSEMBLY 74
ASSEMBLY 76
How to Select Piston and Bearing 82
DESCRIPTION 82
HOW TO SELECT PISTON 82
HOW TO SELECT MAIN BEARING 83
Inspection After Disassembly 84
CRANKSHAFT SIDE CLEARANCE 84
CONNECTING ROD SIDE CLEARANCE 85
PISTON AND PISTON PIN CLEARANCE 85
PISTON RING SIDE CLEARANCE 85
PISTON RING END GAP 86
CONNECTING ROD BEND AND TORSION 86
CONNECTING ROD BEARING HOUSING DIAMETER (BIG END) 87
CONNECTING ROD BUSHING OIL CLEARANCE DIAMETER (SMALL END) 87
CYLINDER BLOCK DISTORTION 88
INNER DIAMETER OF MAIN BEARING HOUSING 88
PISTON TO CYLINDER BORE CLEARANCE 88
OUTER DIAMETER OF CRANKSHAFT JOURNAL 90
OUTER DIAMETER OF CRANKSHAFT PIN 90
OUT-OF-ROUND AND TEPER OF CRANKSHAFT 90
CRANKSHAFT RUNOUT 90
OIL CLEARANCE OF CONNECTING ROD BEARING 91
OIL CLEARANCE OF MAIN BEARING 91
CRUSH HEIGHT OF MAIN BEARING OR CONNECTING ROD BEARING 92
FLYWHEEL RUNOUT 92
SERVICE DATA AND SPECIFICATIONS (SDS) 93
Standard and Limit 93
GENERAL SPECIFICATIONS 93
INTAKE MANIFOLD AND EXHAUST MANIFOLD 93
DRIVE BELTS 94
SPARK PLUG 94
CYLINDER HEAD 94
VALVE 95
CAMSHAFT AND CAMSHAFT BEARING 98
CYLINDER BLOCK 98
PISTON, PISTON RING AND PISTON PIN 100
CONNECTING ROD 100
CRANKSHAFT 101
MAIN BEARING 101
CONNECTING ROD BEARING 102
MISCELLANEOUS COMPONENTS 102
Tightening Torque 103

K9K

PRECAUTIONS 105
Precautions for Drain Coolant 105
Precautions for Disconnecting Fuel Piping 105
Precautions for Removal and Disassembly 105
Precautions for Inspection, Repair and Replacement 105
Precautions for Assembly and Installation 105
Parts Requiring Angular Tightening 105
Precautions For Liquid Gasket 106
REMOVAL OF LIQUID GASKET 106
LIQUID GASKET APPLICATION PROCEDURE 106
Cleanliness Instructions Which Must Be Followed When Working On The High Pressure Direct Injection System 106
RISKS RELATING TO CONTAMINATION 106
The Sources Of Contamination 107
Precautions To Be Followed Before Any Work Is Carried Out On The Injection System 107
Cleaning Precautions To Be Followed Before Carrying Out Any Work On The Fuel System 107
Precautions To Be Followed During The Operation 107
Instructions For Fitting The Plugs 109

PREPARATION 111
Special Service Tools 111
Commercial Service Tools 114
IDENTIFICATION INFORMATION 116
Engine Identification 116
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 117
NVH Troubleshooting —Engine Noise 117
Use the Chart Below to Help You Find the Cause of the Symptom. 118
ENGINE ROOM COVER 119
Removal and Installation 119
REMOVAL 120
INSTALLATION 120
DRIVE BELTS 121
Checking Drive Belts 121
Tension Adjustment 121
MODELS WITH A/C COMPRESSOR 121
MODELS WITHOUT A/C COMPRESSOR 121
Removal and Installation 121
REMOVAL 121
INSTALLATION 122
AIR CLEANER AND AIR DUCT 123
Removal and Installation 123
REMOVAL 123
INSTALLATION 123
Changing Air Cleaner Filter 124
REMOVAL 124
INSTALLATION 124
CHARGE AIR COOLER 125
Removal and Installation 125
REMOVAL 125
INSPECTION AFTER REMOVAL 126
INSTALLATION 126
EGR UNIT 127
Removal and Installation 127
REMOVAL 127
INSTALLATION 128
EXHAUST MANIFOLD, TURBOCHARGER, CATALYST 129
Removal and Installation 129
REMOVAL 129
INSTALLATION 130
INSPECTION AFTER INSTALLATION 130
Disassembly and Assembly 131
DISASSEMBLY 131
INSPECTION AFTER DISASSEMBLY 131
ASSEMBLY 132
OIL PAN 133
Removal and Installation 133
REMOVAL 133
INSPECTION AFTER REMOVAL 135
INSTALLATION 135
INSPECTION AFTER INSTALLATION 135
GLOW PLUG 136
Removal and Installation 136
REMOVAL 136
INSTALLATION 136
VACUUM PUMP 137
Removal and Installation 137
REMOVAL 137
INSTALLATION 137
ROCKER COVER 138
Removal and Installation 138
REMOVAL 138
INSTALLATION 139
TIMING BELT 140
Removal and Installation 140
REMOVAL 140
INSTALLATION 143
CYLINDER HEAD 144
Removal and Installation 144
REMOVAL 144
INSTALLATION 145
Disassembly and Assembly 145
DISASSEMBLY 145
INSPECTION AFTER DISASSEMBLY 145
ASSEMBLY 146
ENGINE ASSEMBLY 147
Removal and Installation 147
REMOVAL 147
INSTALLATION 149
INSPECTION AFTER INSTALLATION 149
OVERHAUL 151
Tightening Torques 151
UPPER ENGINE 151
BOTTOM ENGINE 151
Standard Replacement 152
PREPARING USED ENGINE 152
Disassembly 153
REMOVING THE UPPER ENGINE 153
POSITIONING THE BELT AT THE TIMING POINT 154
DISASSEMBLY OF THE CYLINDER HEAD 158
Cleaning 160
Inspection 160
GASKET FACE 160
CAMSHAFT END PLAY 161
Valve Clearance 161
CHECKING AND ADJUSTING THE VALVE CLEARANCE 161
Assembly 162
ASSEMBLY OF THE CYLINDER HEAD 162
Disassembly of The Bottom Engine 167
REMOVAL 167
Assembly 170
INSTALLATION OF OIL JETS 170
METHOD FOR INSTALLING THE OIL COOLER

AND OIL FILTER 172
Removing The Piston Pins 172
CONNECTING ROD BEARING 172
ON THE CONNECTING ROD BODY 173
ON THE CONNECTING ROD CAP 174
INSTALLATION OF MAIN BEARING 175
ON THE CYLINDER BLOCK 176
ON THE BEARING CAPS 176
INSTALLATION OF NO. 1 BEARING 177
CONNECTING RODS / PISTON ASSEMBLY .. 177
DIRECTION FOR INSTALLATION THE SNAP RINGS ON THE PISTON 178
INSTALLATION OF THE SNAP RINGS 178
CHECKING PISTON PROTRUSION 178
INSTALLATION OF REAR OIL SEAL RETAINER AND OIL PUMP 179
INSTALLATION OF THE CRANKSHAFT SEAL GASKETS 181
INSTALLATION OF THE CYLINDER HEAD 184
TIMING ADJUSTMENT 186
BASIC INSPECTION 191
Cylinder Head 191
CYLINDER HEAD TIGHTENING PROCEDURE 191
THICKNESS OF THE CYLINDER HEAD GASKET 191
INSPECTION OF THE PISTON PROTRUSION 191
VALVE 192
VALVE SEAT 192
VALVE GUIDE 192
VALVE SPRING 194
PISTON 194
INSPECTION OF VALVE CLEARANCE 194
CAMSHAFT 195
Piston 196
PISTON MARKING 196
TABLE OF PISTON PIN HEIGHT 196
MEASURING THE PISTON DIAMETER 196
PISTON RING 197
PISTON RING END GAP 197
Connecting Rod 197
DIRECTION OF INSTALLATION OF THE CONNECTING ROD IN RELATION TO THE PISTON 198
DIRECTION FOR INSTALLATION THE SNAP RINGS ON THE PISTON 198
Crankshaft 198
WORKING OUT THE CLASS OF MAIN BEARING (ORIGINAL FITMENT) 199
Cylinder Block 199
TABLE OF CYLINDER BLOCK MAIN BEARING HOUSING INNER DIAMETERS 199
MATCHING THE MAIN BEARING 200
Main Bearing and Cap 200
MAIN BEARING 200
CONNECTING ROD BEARING 201
Preparing the engine to be on the stand 201
Parts To Be Replaced After Removal 202
Installation of Thread Inserts 203

PRECAUTIONS

PFP:00001

Precautions for Draining Coolant

EBS00OEB

- Drain coolant only after the engine has cooled down.

Precautions for Disconnecting Fuel Piping

EBS00OHR

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precautions for Removal and Disassembly

EBS00OED

- Use correct special service tool in the specified position. Always pay attention to safety.
- Be careful not to damage surface accuracy of mating or sliding surfaces.
- To prevent foreign material from entering the engine, close openings with appropriate tape as necessary.
- Arrange disassembled parts in their normal positions in order to simplify locating the cause of damage or excessive wear and to insure correct reassembly.
- The removal order of nuts and bolts should in principle move diagonally from the outside. Locations for which order is stipulated should follow that order.

Precautions for Inspections, Repairs, and Replacement

EBS00OEE

- Thoroughly inspect each part following inspection procedure, then correct or replace as necessary. Inspect new parts in the same way, and replace if necessary.

Precautions for Assembling and Installing

EBS00OEF

- Always use a torque wrench when tightening nuts and bolts.
- Unless otherwise specified, tighten nuts and bolts from inside to outside in crisscross pattern. Tighten them gradually and evenly in two to three steps.
- Always replace gasket, packing, oil seals, and O-rings with new ones.
- Thoroughly wash, clean, and blow dry each part. Be sure that engine oil and coolant passages are free of clogs.
- Remove any dirt and lint on sliding and mating surfaces. Before assembly, apply ample amount of engine oil to sliding surfaces.
- If coolant was drained, bleed air from the system.
- Follow the procedure below to make sure there are no fuel leaks.
  - Turn the ignition switch to ON (do not start engine), and with fuel pressure applied in the fuel line, check to make sure there are no fuel leaks from the connection.
  - Start the engine, and at in creased speed, check again to see if there are any fuel leaks from the connection.
- After assembly, start engine and increase the engine speed, then check coolant, fuel, oil, grease, and exhaust gas for leakage.

Parts Requiring Angle Tightening

EBS00OEG

- Use an angle wrench when attaching the following parts.
  - Cylinder head bolt
  - Main bearing cap bolt
  - Connecting rod cap nut
- The specified torque written for these parts is not the final tightening value, but is the torque used for tightening before angle tightening.
- When tightening, make sure there is no debris on the threads or mating surfaces, and lubricate the threads with engine oil.

Precautions for Liquid Gasket

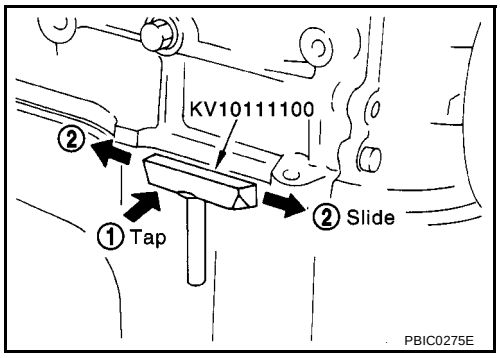
EBS00OEH

REMOVAL OF LIQUID GASKET SEALING

- Unscrew nuts and bolts. Use a seal cutter to cut the liquid gasket and remove the joined parts.

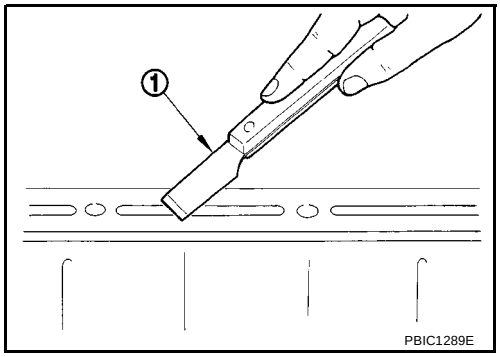
  CAUTION:
  Be careful not to damage the mating surfaces.
- In positions where a seal cutter is difficult to use, lightly tap with a plastic hammer and remove.

  CAUTION:
  When using a screwdriver, be careful not to scratch the mating surfaces.

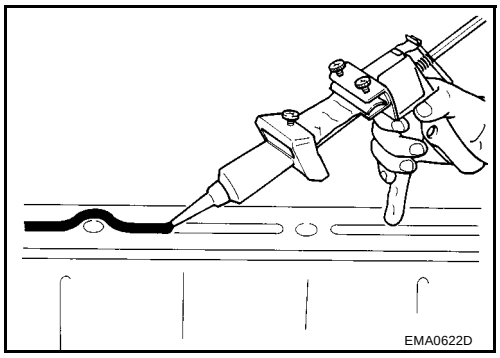


LIQUID GASKET APPLICATION PROCEDURE

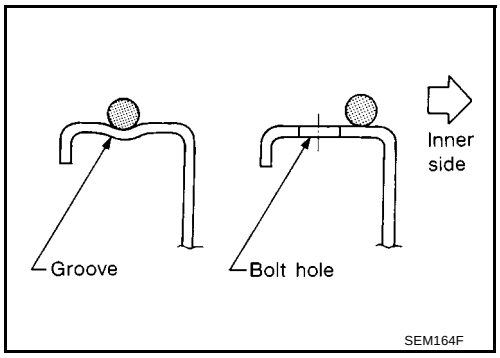
1. Using a scraper (1), remove any old liquid gasket remaining on the gasket application surface and its mating surface.
   - Remove any old liquid gasket remaining in the gasket application groove and on the threads of bolts and bolt holes.
2. Using white gasoline, wipe the gasket application surface and its mating surface to remove any moisture, oil, and foreign material.
3. Set the genuine liquid gasket in a tube presser.



4. Apply a continuous bead of liquid gasket to the specified position at the specified diameter.
   - Apply liquid gasket in the application groove.



   - Apply liquid gasket inside bolt holes. There may be times when application to the exterior is required, so follow those instructions if such are found in the text.
   - Attaching should be done within 5 minutes after gasket application.
   - Immediately wipe off any protruding liquid gasket.
   - Do nor retighten nuts and bolts after installation.
   - After finishing work, wait at least 30 minutes before refilling engine oil and coolant.



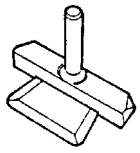
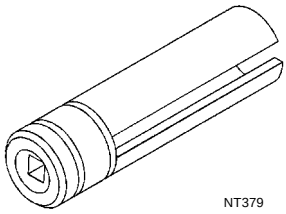
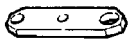
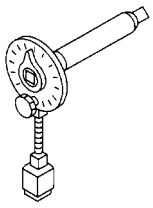
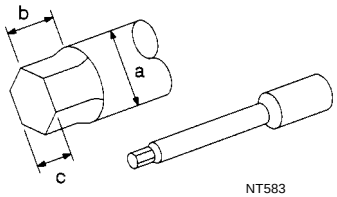
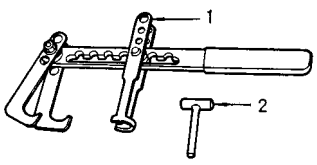
CAUTION:
Follow all specific instructions in this manual.

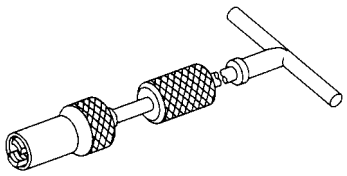
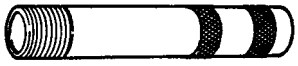
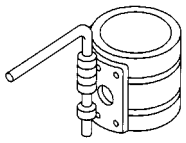
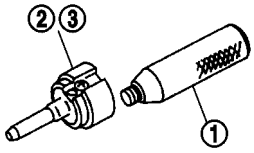
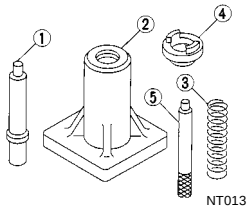
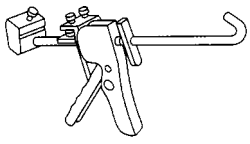
PREPARATION

PFP:00002

Special Service Tools

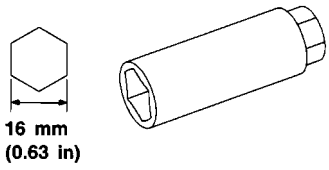
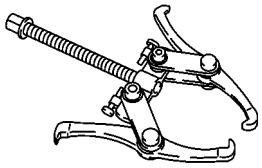
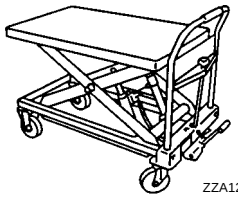
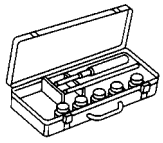
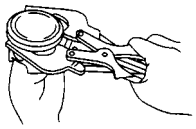
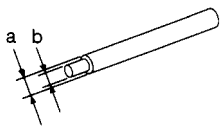
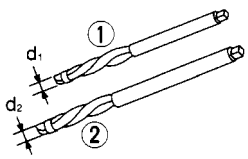
EBS00OEI

Tool number Tool name	Description
KV10111100 Seal cutter  ZZA0013D	Removing parts attached with liquid gasket
KV10117100 Heated oxygen sensor wrench  NT379	Removing and Installing heated oxygen sensor **For 22 mm (0.87 in) width hexagon nut**
KV10105630 Ring gear stopper ZZA1005D	Removing and installing crankshaft pulley Removing and installing flywheel, drive plate
KV10105610 Stopper plate  ZZA0009D	Removing and installing crankshaft pulley
KV10112100 Angle wrench  NT014	Tightening bolts for bearing cap, cylinder head, etc.
ST10120000 Cylinder head bolt wrench  NT583	Loosening and tightening cylinder head bolt **a: 13 mm (0.51 in) dia.** **b: 12 mm (0.47 in)** **c: 10 mm (0.39 in)**
KV101092S0 Valve spring compressor set 1. KV10116200 Valve spring compressor set 2. KV10109220 Adapter  ZZA0993D	Removing and installing valve mechanism

Tool number Tool name	Description
KV10107902 Valve oil seal puller  NT011	Removing valve oil seal
KV10115600 Valve oil seal drift  ZZA0996D	Installing valve oil seal
EM03470000 Piston ring compressor  NT044	piston assembly into cylinder bore
1. ST15243000 Valve seat drift 2. KV11103710 Adapter 3. KV11103720 Adapter  PBIC1120E	Installing valve seat
KV10107400 Piston pin Press stand 1. KV10107310 Center shaft 2. ST03140030 Stand 3. ST13040030 Spring 4. KV10107320 Cap 5. ST13040050 Drift  NT013	Disassembling and assembling piston with connecting rod
WS39930000 Tube presser  NT052	Pressing the tube of liquid gasket

Commercial Service Tools

EBS00OHU

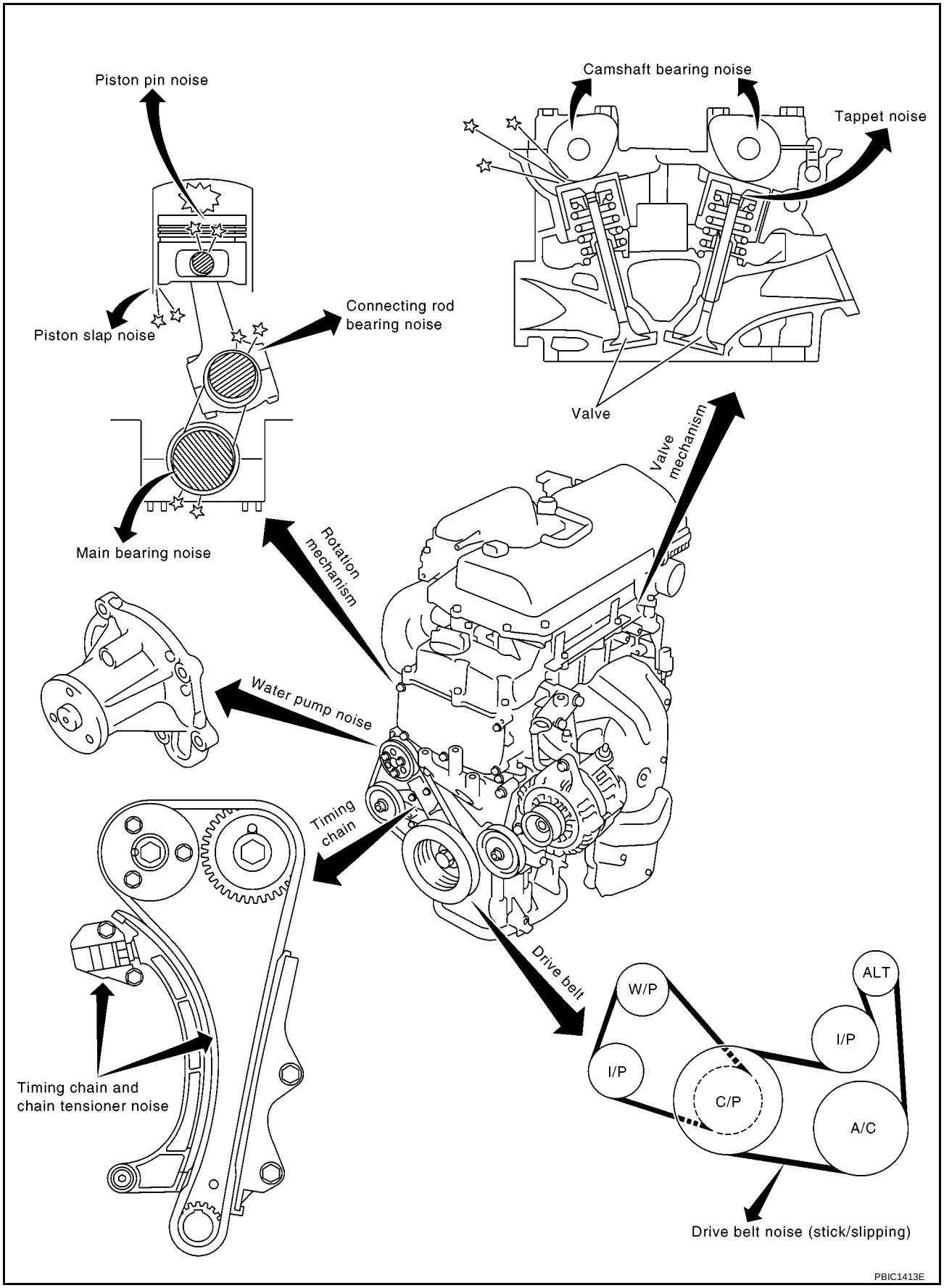
Tool name	Description
Spark plug wrench  NT047	Removing and installing spark plug
Crankshaft pulley puller  PBIC0887E	Removing crankshaft pulley
Manual lift table caddy  ZZA1210D	Removing and installing engine
Valve seat cutter set  NT048	Finishing valve seat dimensions
Piston ring expander  NT030	Removing and installing piston ring
Valve guide drift  NT015	Removing and installing valve guide **Intake & Exhaust:** **a: 9.5 mm (0.374 in) dia.** **b: 5.5 mm (0.217 in) dia.**
Valve guide reamer  NT016	Reaming valve guide **1** or hole for oversize valve guide **2** **Intake & Exhaust:** **d_1 : 5.0 mm (0.217 in) dia.** **d_2 : 9.675 mm (0.381 in) dia.**

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting —Engine Noise

EBS00OGA



Use the Chart Below to Help You Find the Cause of the Symptom.

EBS00OGB

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-45
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal clearance Camshaft runout	EM-43 EM-43
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston and piston pin clearance Connecting rod bushing clearance	EM-85 EM-87
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston-to-bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-88 EM-85 EM-86 EM-86
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing clearance (Small end) Connecting rod bearing clearance (Big end)	EM-87 EM-87
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-91 EM-90
Front of engine Timing chain cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	Timing chain cracks and wear Timing chain tensioner operation	EM-52 EM-49
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belts (Sticking or slipping)	Drive belts deflection	EM-12
	Creaking	A	B	A	B	A	B	Drive belts (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-21, "WATER PUMP"

A: Closely related B: Related C: Sometimes related —: Not related

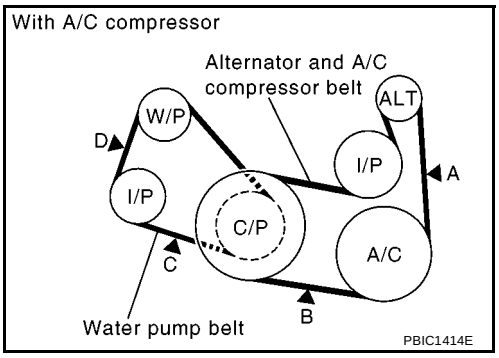
DRIVE BELTS

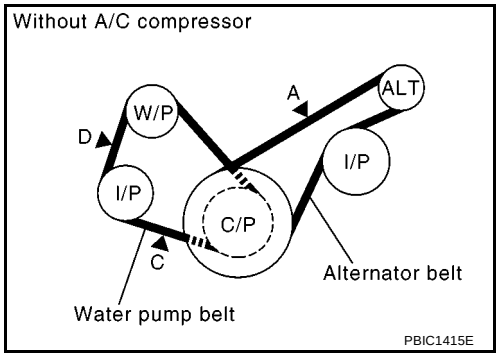
PFP:02117

Checking drive Belts

EBS00OGC

- Inspection should be done only when engine is cold or over 30 minutes after the engine is stopped.
- Turn the crankshaft pulley two times clockwise, and make sure tension on all pulleys is equal before doing the test.
- Visually check the belts for wear, damage, and cracks on inside and edges.
- When measuring deflection, apply 98.1 N (10 kg, 22lb) at the ▼ marked point.





CAUTION:

When measuring belt tension immediately after the belt is installed, first set the tension to the standard, rotate the crankshaft for more than two turns in order to eliminate variance in the belt tension between pulleys, then measure and adjust tension to the standard again.

Location	Tension [N (kg, lb)]			Deflection [mm (in)] [When pressed by force of 98.1N (10 kg, 22lb)]			
	New	At adjustment	Limit	Measuring point	New belt	At adjustment	Limit
Alternator and A/C compressor belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	6.6 - 7.8 (0.260 - 0.307)	7.3 - 8.5 (0.287 - 0.335)	13.8 (0.543)
				B	5.6 - 6.6 (0.220 - 0.260)	7.1 - 8.3 (0.280 - 0.327)	11.9 (0.469)
Alternator belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	3.1 - 4.1 (0.122 - 0.161)	9.8 - 10.6 (0.386 - 0.417)	13.8 (0.543)
Water pump belt	446 - 534 (45.5 - 54.5, 100.3 - 120.0)	348 - 436 (35.5 - 44.5, 78.2 - 98.0)	137 (14, 30.9)	C	6.7 - 7.3 (0.264 - 0.287)	7.6 - 8.6 (0.299 - 0.339)	12.4 (0.448)
				D	4.7 - 5.6 (0.185 - 0.220)	7.0 - 7.7 (0.276 - 0.303)	8.6 (0.339)

Tension Adjustment

EBS00OGD

Location	Location of adjuster and tightening method
Alternator and A/C compressor drive belt	Adjusting bolt on idler pulley
Water pump belt	Adjusting bolt on idler pulley

CAUTION:

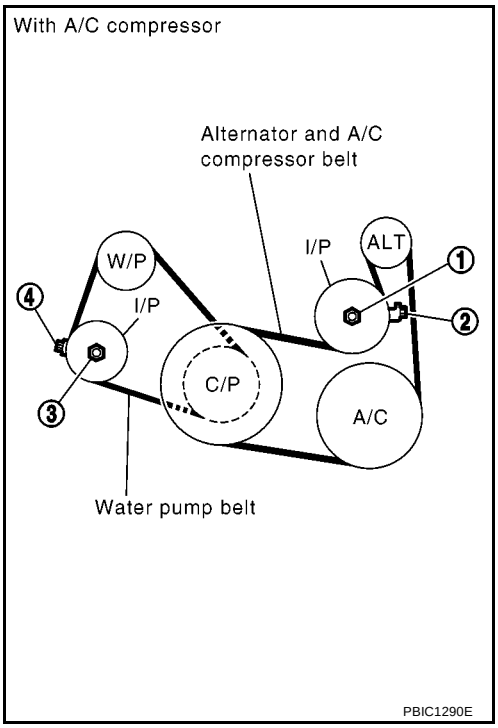
- **When the belt is replaced with new one, adjust the belt tension to the value for “New belt”, because new belt will not fully seat in the pulley groove.**
- **When tension of the belt being used exceeds “Limit”, adjust it to the value for “At adjustment”.**
- **When installing a belt, make sure that it is correctly engaged with the pulley groove.**
- **Do not allow oil or engine coolant to get on the belt.**
- **Do not twist or bend the belt strongly.**

ALTERNATOR AND A/C COMPRESSOR BELT (WITH A/C MODELS)

1. Remove RH front fender protector.
2. Loosen lock nut (1).
3. Tighten lock nut (1) with fingers.
4. Loosen lock nut (1) half a turn counter-clockwise.
5. Adjust the belt tension by turning the adjuster bolt (2).
   For the specified belt tension, refer to EM-12, "Checking drive Belts" .
6. Tighten lock nut (1).

   Nut (1) :

   : 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)
7. Turn the crankshaft pulley two times clockwise.
8. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .

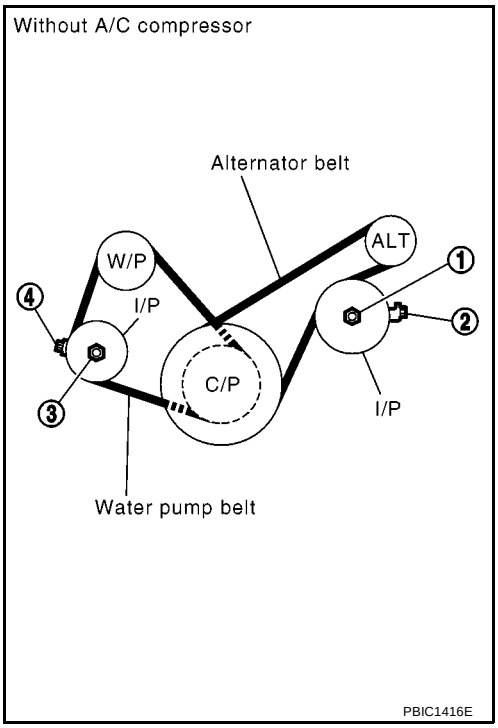


ALTERNATOR BELT (WITHOUT A/C MODELS)

1. Remove RH front fender protector.
2. Loosen lock nut (1).
3. Tighten lock nut (1) with fingers.
4. Loosen lock nut (1) half a turn counter-clockwise.
5. Adjust the belt tension by turning the adjuster bolt (2).
   For the specified belt tension, refer to EM-12, "Checking drive Belts" .
6. Tighten lock nut (1).

   Nut (1) :

   : 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)
7. Turn the crankshaft pulley two times clockwise.
8. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .



WATER PUMP BELT

1. Remove RH front fender protector.
2. Loosen lock nut (3).
3. Tighten lock nut (3) with fingers.
4. Adjust the belt tension by turning the adjuster bolt (4).
   For the specified belt tension, refer to EM-12, "Checking drive Belts" .
5. Tighten lock nut (3).

Nut (3) :

: 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)

6. Turn the crankshaft pulley two times clockwise.
7. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .

Removal and Installation

EBS00OGE

REMOVAL

- Fully loosen each belt while referring to EM-12, "Tension Adjustment" . Remove them one by one, starting with the one in the front.

INSTALLATION

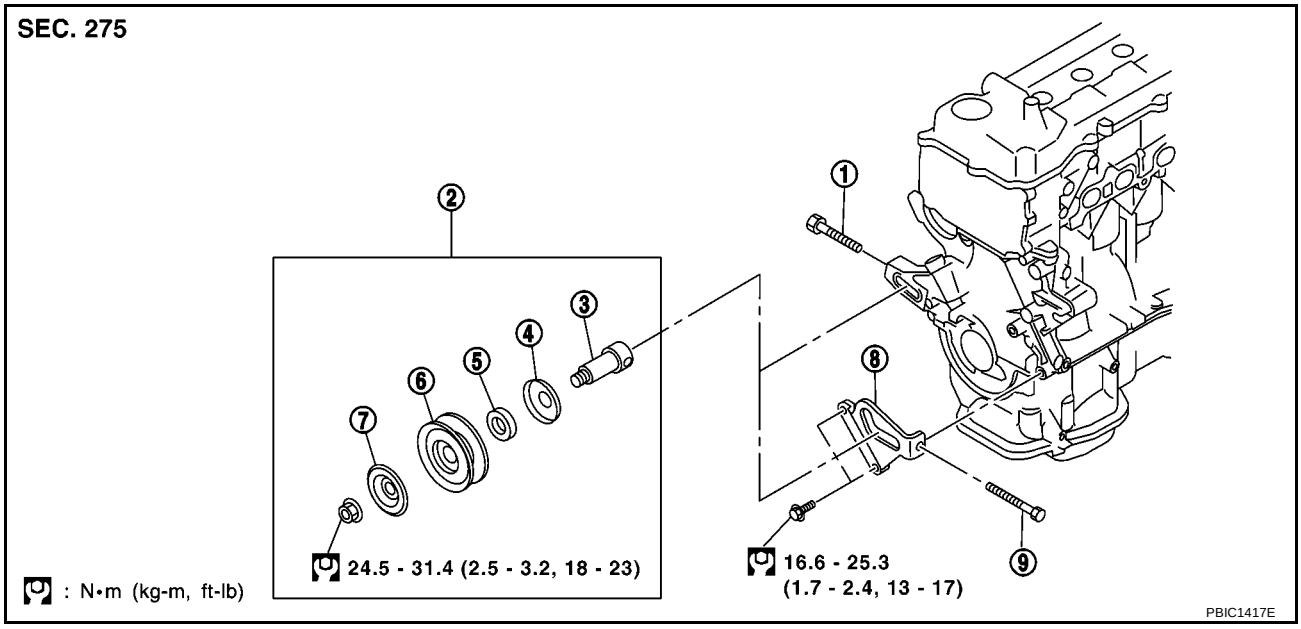
1. Install belts to the pulley in the reverse order of removal.

   CAUTION:
   - **Make sure the belt is securely inside the groove on each pulley.**
   - **Make sure there is no oil, grease, or coolant in pulley grooves.**
2. Adjust tension of each belt.

   CAUTION:
   - **When measuring belt tension immediately after the belt is installed, first set the tension to the standard, rotate the crankshaft for more than two turns in order to eliminate variance in the belt tension between pulleys, then measure and adjust tension to the standard.**
   - **When measuring belt tension, hand tighten idler pulley lock nut to eliminate any looseness.**
3. Tighten the lock nut of adjustment parts to the specified torque.
4. Make sure that tension of each belt is within the standard.

Removal and Installation of Drive Belt Idler Pulley

EBS00OGF



1. Adjuster bolt (for water pump belt)
2. Idler pulley assembly
3. Shaft

4. Cover
5. Spacer
6. Idler pulley
7. Cover
8. Bracket
9. Adjuster bolt (for alternator and A/C compressor belt)

REMOVAL

1. Remove drive belts. Refer to EM-14, "Removal and Installation" .
2. Pull the adjuster bolt out from the shaft.
3. Move the idler pulley assembly along the bracket slide groove and remove by turning the shaft end at the wider part of the groove. (For alternator and A/C compressor belt)
4. Remove the lock nut and remove the shaft by pulling towards the rear of the engine. (For water pump belt)

INSTALLATION

1. Install belts to pulley in reverse order of removal.

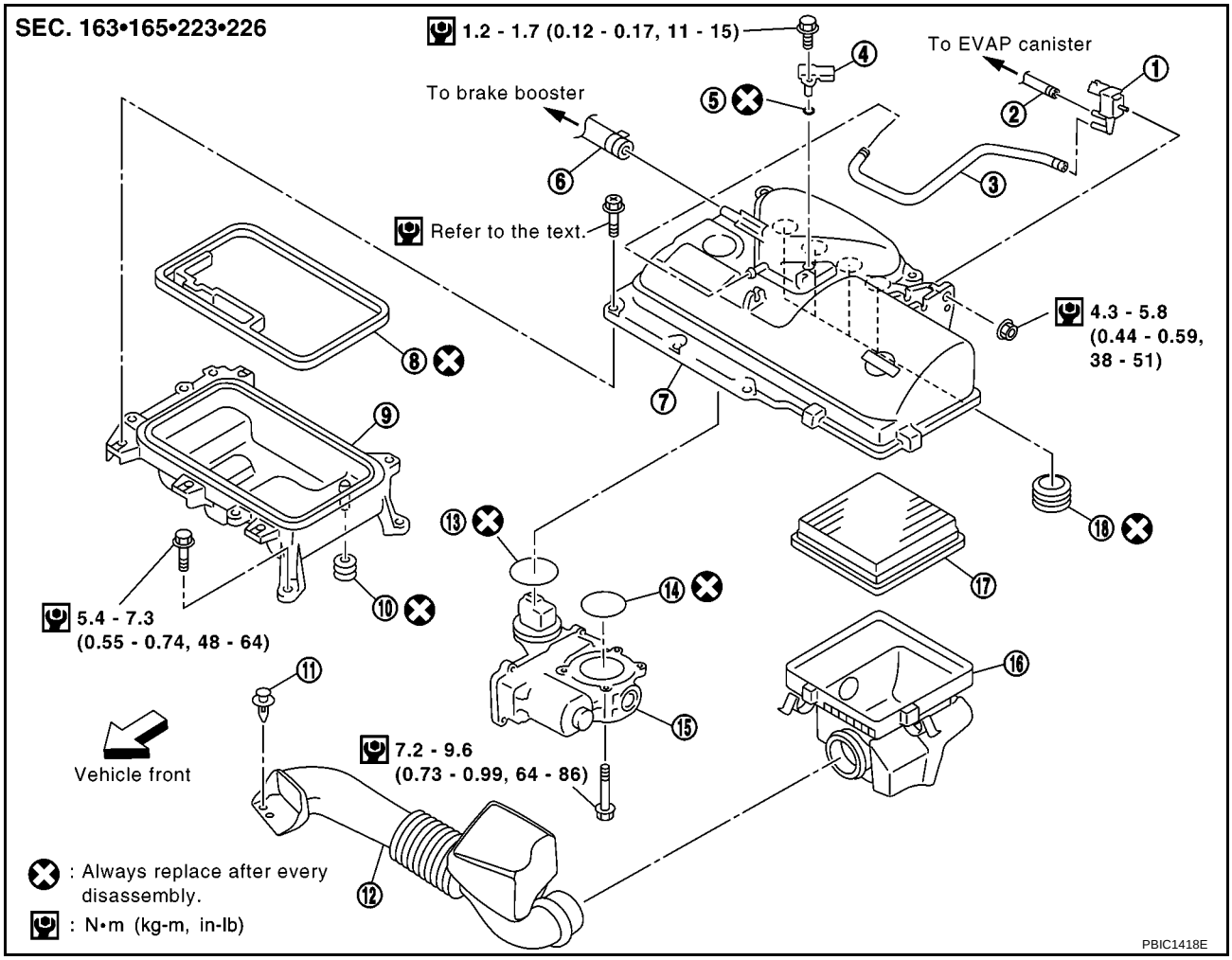
   CAUTION:
   - **Make sure belt is correctly engaged with the pulley groove.**
   - **Check for oil and coolant on belt and each pulley groove.**
2. Adjust belt tension. Refer to EM-12, "Tension Adjustment" .
3. Tighten each adjusting bolt and nut to the specified torque.
4. Make sure that tension of each belt is within the standard.

AIR CLEANER AND AIR DUCT

PFP:16500

Removal and Installation

EBS00OEO



1.	EVAP canister purge volume control solenoid valve	2.	Vacuum hose	3.	Vacuum hose
4.	Manifold absolute pressure sensor	5.	O-ring	6.	Vacuum hose
7.	Air cleaner case (upper)	8.	Gasket	9.	Air cleaner case (lower)
10.	Gasket	11.	Clip	12.	Air duct
13.	Gasket	14.	Gasket	15.	Electric throttle control actuator
16.	Air cleaner body	17.	Air cleaner filter	18.	Gasket

REMOVAL

NOTE:

The steps 1 to 2 can be skipped, moving straight to the step 3 (separation of harnesses and hoses, etc. cannot be skipped)

1. Remove the harness connector and then the manifold absolute pressure sensor.

   CAUTION:

   - **Handle manifold absolute pressure sensor with care. Avoid impacts.**
   - **Make sure no foreign matter is attached to the sensor (oils, chemicals, etc.)**

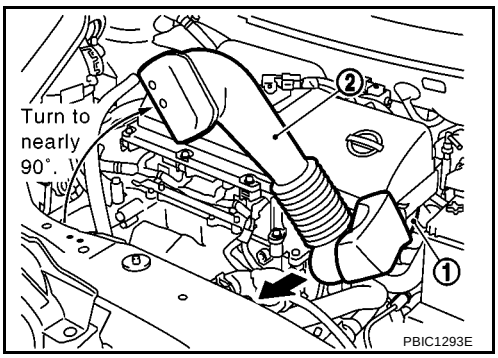
2. Remove the harness connector and vacuum hose and then the EVAP canister purge volume control solenoid valve.

   CAUTION:

   Handle EVAP canister purge volume control solenoid valve with care. Avoid impacts.

3. Remove air duct.

- Remove the clips, and with air duct (2) turned to nearly 90 degrees, pull off from the air cleaner body (1).

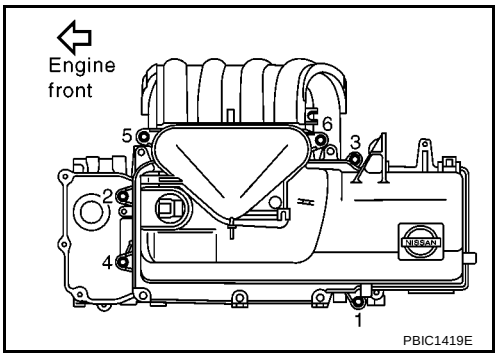


4. Remove the clips, pull the air cleaner body down then forward, and then remove the air cleaner body and the air cleaner filter.

NOTE:
Removal and disassembly of the air cleaner case (upper) and (lower) follows below.

5. Move the transaxle breather hose.
6. Remove the air cleaner case assembly in the following order.
   - The entire air cleaner case (upper and lower) is referred to as the air cleaner case assembly.

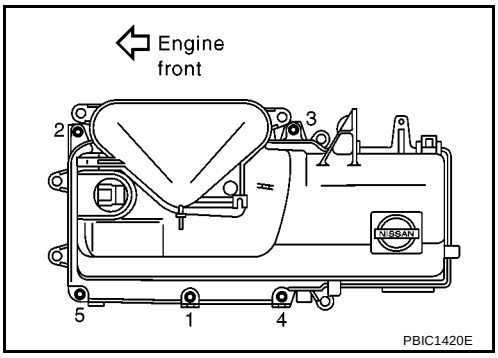
a. Separate the harness connector from the electronic throttle control actuator.
b. Separate the brake booster vacuum hose.
c. Loosen bolts in the reverse of the order shown in figure.



7. Remove the air cleaner case assembly by raising.
   - Slowly raise the force evenly on the intake manifold joint to lift it and remove the air cleaner case assembly.

CAUTION:
- **To avoid damaging parts, do not use sudden force.**
- **Block the intake manifold openings with tape to make sure no foreign particles get inside it while you are removing the air cleaner case assembly.**

8. Loosen the bolts in reverse of the order shown in the figure and separate the air cleaner case (upper) and (lower).



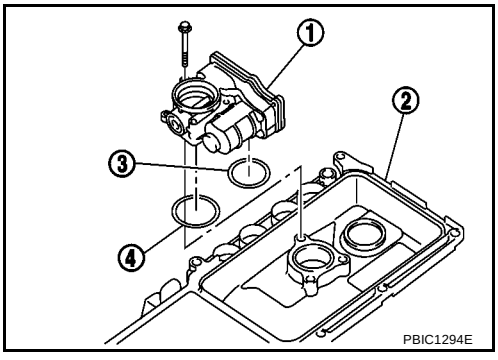
9. Remove the electronic throttle control actuator from the air cleaner case (upper).
   - Turn the air cleaner case (upper) over on the protective sheet to make sure the surface does not get scratched.
   - The electronic throttle control actuator should be handled with the following precautions in mind.

CAUTION:
- **Handle electronic throttle control actuator with care. Avoid impacts.**
- **Do not disassemble or adjust.**

INSTALLATION

1. Install the electronic throttle control actuator (1) to the air cleaner case (upper) (2) in the following procedure:

a. Install the gasket (3) to the connector base.
b. Attach the gasket (4) to the outer groove on the throttle bore on the side of the air cleaner case (upper) (2).
c. Install electronic throttle control actuator.
   - There is no pre-determined order in which the mounting bolts should be tightened.
   - Perform the “Throttle Valve Closed Position Learning” when harness connector of the electric throttle control actuator is



disconnected. Refer to EC-42, "Throttle Valve Closed Position Learning" (WITH EURO-OBD), EC-503, "Throttle Valve Closed Position Learning" (WITHOUT EURO-OBD).

- Perform the “Idle Air Volume Learning” and “Throttle Valve Closed Position Learning” when the electric throttle control actuator is replaced. Refer to EC-42, "Idle Air Volume Learning" and EC-42, "Throttle Valve Closed Position Learning" (WITH EURO-OBD), EC-503, "Idle Air Volume Learning" and EC-503, "Throttle Valve Closed Position Learning" (WITHOUT EURO-OBD).

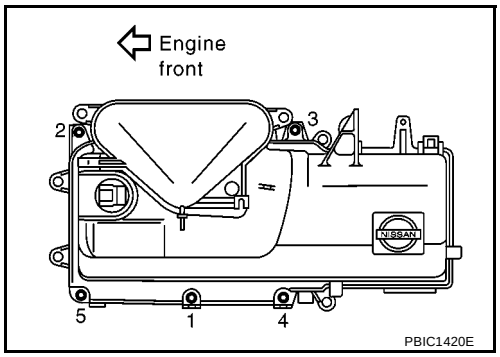
2. Assemble the air cleaner case (upper) and (lower).
   - Tighten bolts evenly in two steps in the order shown in figure.

   1st step

   : 1.9 - 2.2 N·m (0.20 - 0.22 kg-m, 17 - 19 in-lb)

   2nd step

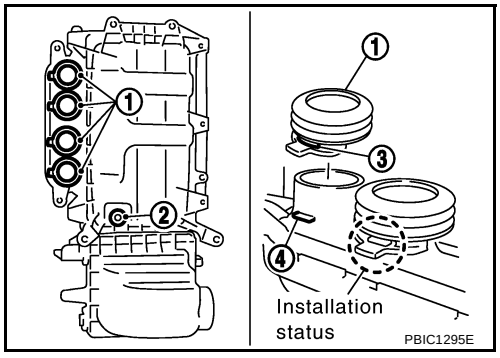
   : 3.8 - 4.4 N·m (0.40 - 0.44 kg-m, 35 - 38 in-lb)



3. Attach the air cleaner case assembly in the following order.

a. Attach the gasket (for the intake manifold (1) and the PCV path (2))
   - Attach for the intake manifold so that the case protrusion (4) fit into the cutout hole (3) on the side of the gasket.
   - Make sure foreign particles do not attach to the gasket or the sealing area.

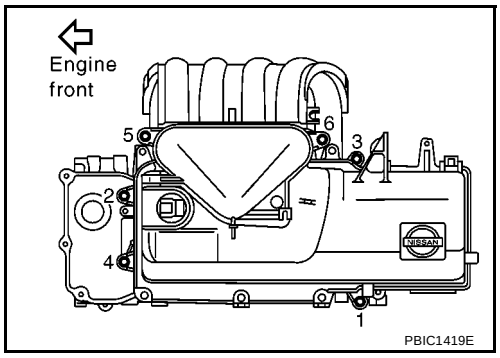
b. Insert the air cleaner case assembly into the intake manifold.
   - At the same time, insert the bottom path protrusions into the PCV path holes on the rocker cover.



CAUTION:
Insert straight, making sure the axis is lined up, to prevent the gaskets from being crooked or twisted.

c. Tighten bolts in the numerical order shown in figure.
   - Tighten bolts evenly in several steps.

CAUTION:
Tighten after making sure the positioning of bolts 5 and 6 is true.



4. Install air cleaner body and air cleaner filter. Refer to EM-19, "Changing Air Cleaner Filter" .
5. Attach air duct.
6. Attach EVAP canister purge volume control solenoid valve.
7. Attach the manifold absolute pressure sensor.
   - Make sure no foreign particles attach to the flange, O-ring, or attachment hole.
   - Tighten the mounting bolt after making sure it is fully inserted into the mounting hole.

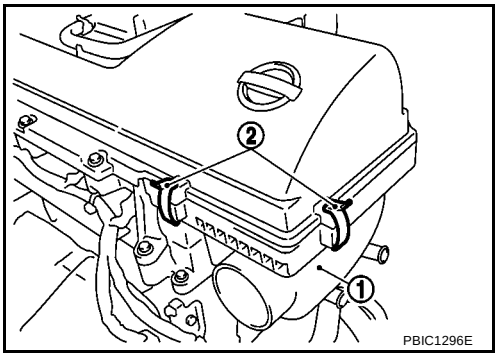
Changing Air Cleaner Filter

EBS00OEP

REMOVAL

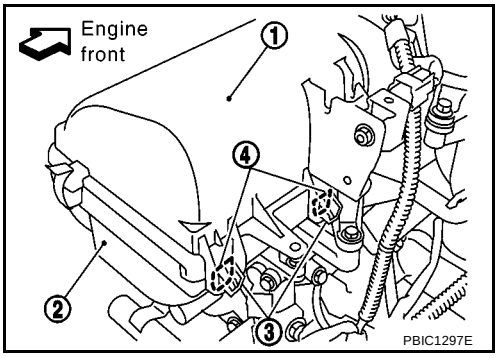
1. Remove air duct. Refer to EM-16, "REMOVAL" .
2. Remove clips (2) of air cleaner body (1).
3. After moving the air cleaner body downward, remove it by pulling it forward.
   - While pressing down the radiator upper hose, remove air cleaner body (1).
4. Remove air cleaner filter from the air cleaner body.

   NOTE:
   In some cases the air cleaner filter might remain in the air cleaner case (upper).



INSTALLATION

1. Set the air cleaner filter on the air cleaner case (upper) (1).
2. Insert the two projections (3) on the air cleaner body (2) into the two notch holes (4) on the rear of the air cleaner case (upper) (1), then lift up and fasten with the clip.
3. Attach air duct.

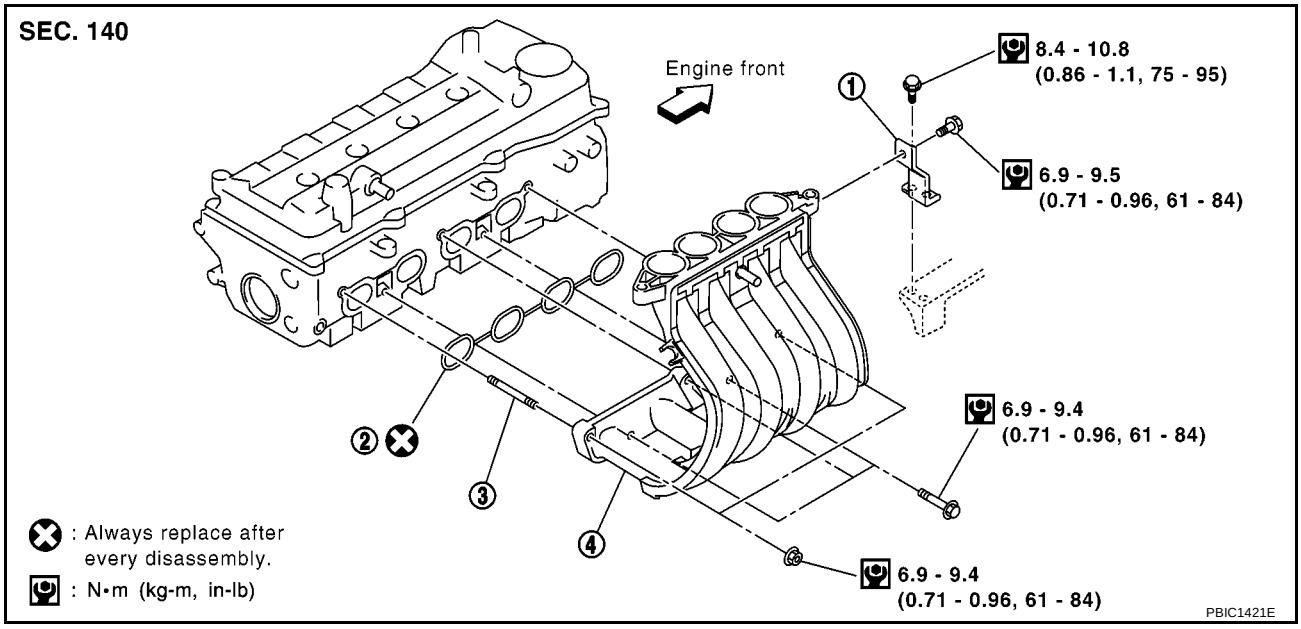


INTAKE MANIFOLD

PFP:14003

Removal and Installation

EBS00OEQ

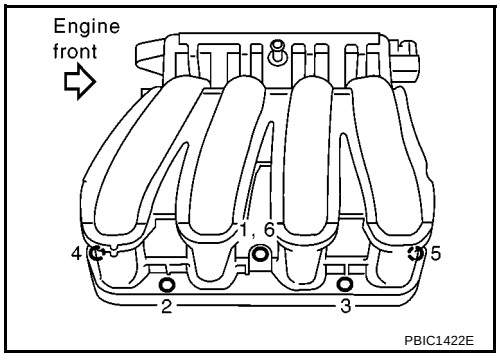


1. Support bracket
2. Gasket
3. Stud bolt
4. Intake manifold

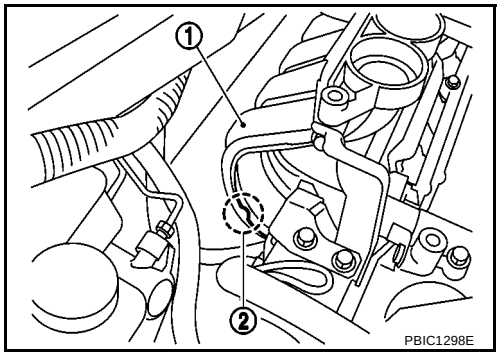
REMOVAL

1. Remove air duct and air cleaner case assembly. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
2. Remove the PCV hose (between the intake manifold and the rocker cover) from the intake manifold side.
3. Remove the support bracket mounting bolt (No. 1 port upper engine front side)
4. Loosen nuts and bolts in the reverse of the order shown in the figure to remove the intake manifold.

CAUTION:
Disregard No. 6 shown in figure in the loosening order.



NOTE:
Removal and installation of No. 5 nut is made easier by inserting the tool into the recommended cutout part (2) on the No. 1 port (1). (The same applies to No. 4 nut)



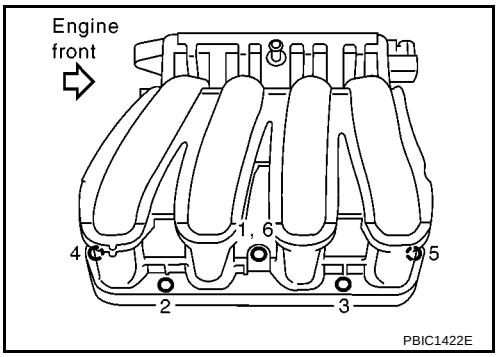
INSTALLATION

- Install in the reverse order of removal paying attention to the following.

Attachment of the Intake Manifold

- Check for damage or foreign material on the mounting surfaces.
- Tighten nuts and bolts in numerical order shown in figure.

  NOTE:
  No. 6 in the figure shows the 2nd tightening of No. 1 bolt.
- When installing support bracket, refer to EM-31, "INSTALLATION" .

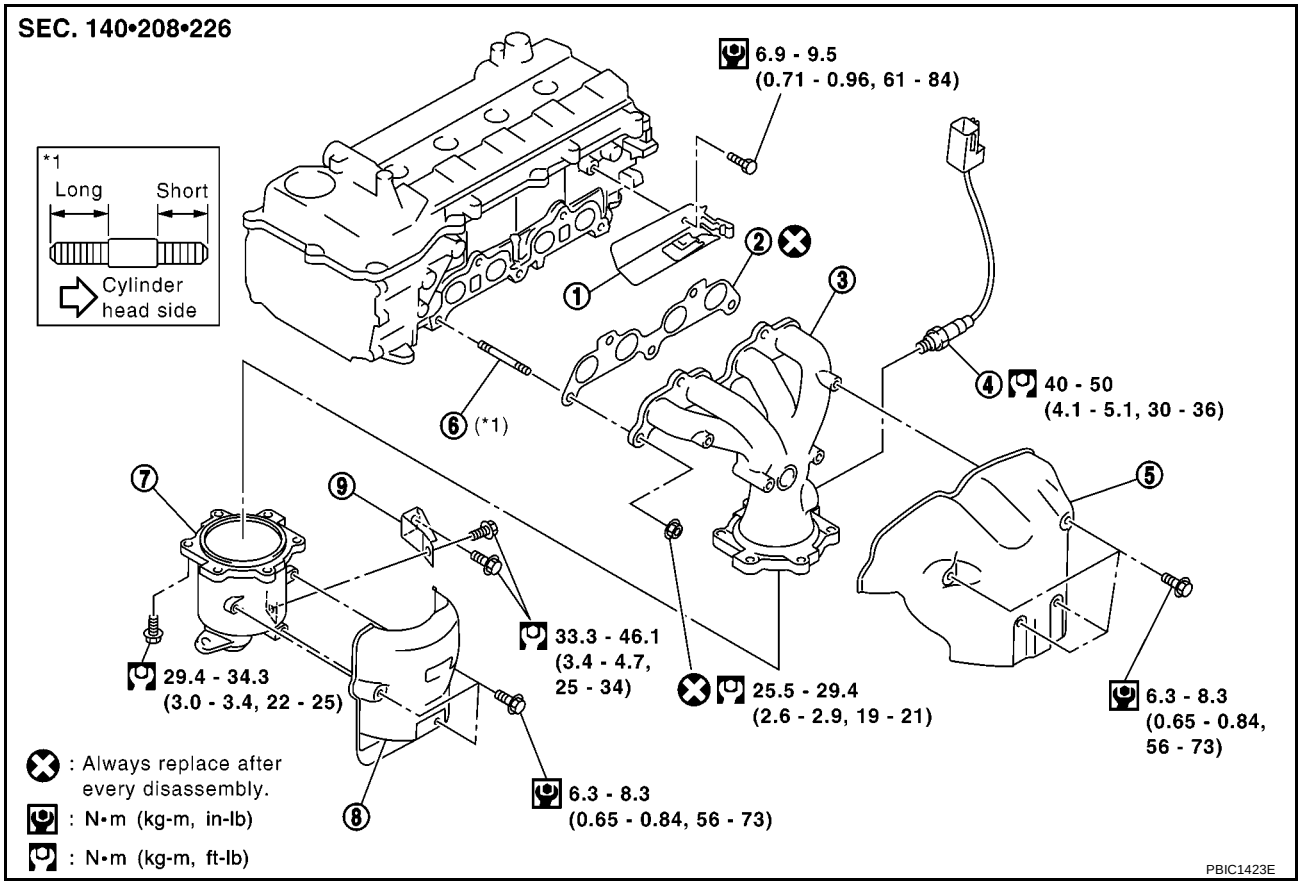


EXHAUST MANIFOLD AND THREE WAY CATALYST

PFP:14004

Removal and Installation

EBS00OI8



1. Bracket
2. Gasket
3. Exhaust manifold
4. Heated oxygen sensor 1
5. Exhaust manifold cover
6. Stud bolt
7. Three way catalyst (manifold)
8. Three way catalyst cover
9. Support

REMOVAL

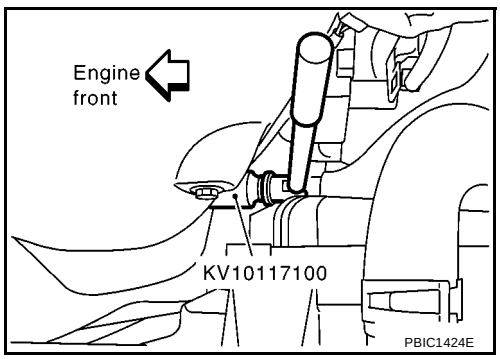
1. Remove air duct. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
2. Remove RH front fender protector.
3. Remove alternator and A/C compressor belt. Refer to EM-12, "DRIVE BELTS" .
4. Remove A/C compressor with piping connected, move A/C compressor to body side and secure it onto body with a rope.
5. Remove exhaust front tube connection at front. Refer to EX-3, "EXHAUST SYSTEM" .
6. Remove RH engine mount stay and alternator bracket.
7. Loosen the lower bolt and move the alternator to the front of the vehicle.
8. As needed, remove the heated oxygen sensor 1 in the following order.

   NOTE:
   Steps 2 to 7 above are not needed for heated oxygen sensor 1 removal.

a. Separate the harness connector and remove it from bracket.

b. Using heated oxygen sensor wrench (special service tool), remove heated oxygen sensor 1.

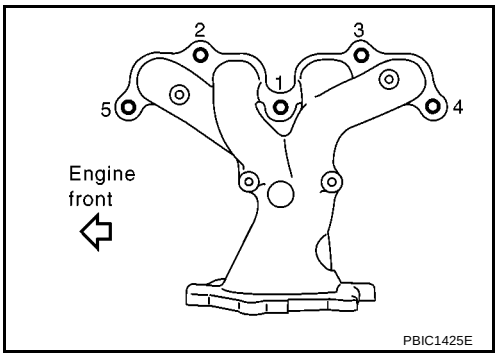
   CAUTION:
   - **Handle it carefully, avoid any chance of impact caused by dropping.**



- **Do not over torque the heated oxygen sensor. Doing so may cause damage to the heated oxygen sensor, resulting in the MI coming on.**

9. Remove exhaust manifold cover.
10. Remove the three way catalyst cover.
11. Loosen nuts and bolts in the reverse of the order shown in figure to remove the exhaust manifold and three way catalyst.

CAUTION:
Be careful not to damage the A/C piping.



12. Separate the exhaust manifold and three way catalyst.

CAUTION:
Avoid impacts to three way catalyst.

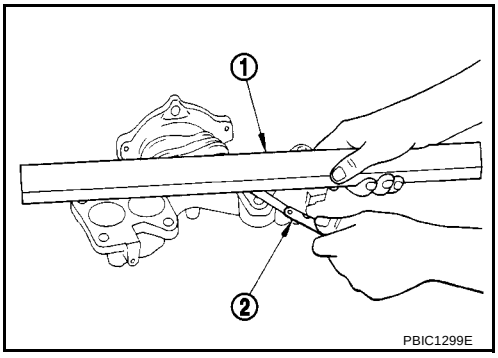
INSPECTION AFTER REMOVAL

Surface Distortion

- Using a reliable straightedge (1) and feeler gauge (2), check distortion of mounting surface on exhaust manifold.

Limit : 0.3 mm (0.012 in)

- If it exceeds the limit, replace the exhaust manifold.

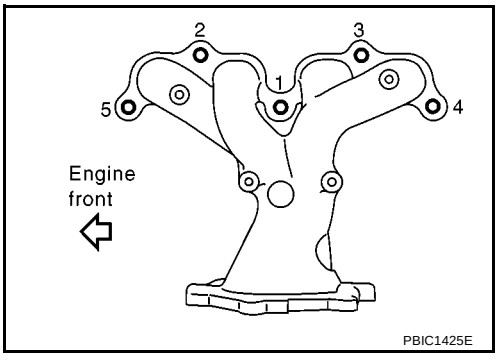


INSTALLATION

- Install in the reverse order of removal paying attention to the following.

Installation of Exhaust Manifold and Three Way Catalyst

- Check for damage or foreign material on the mounting surfaces.
- Tighten nuts in numerical order shown in figure.



Installation of Heated Oxygen Sensor 1

CAUTION:

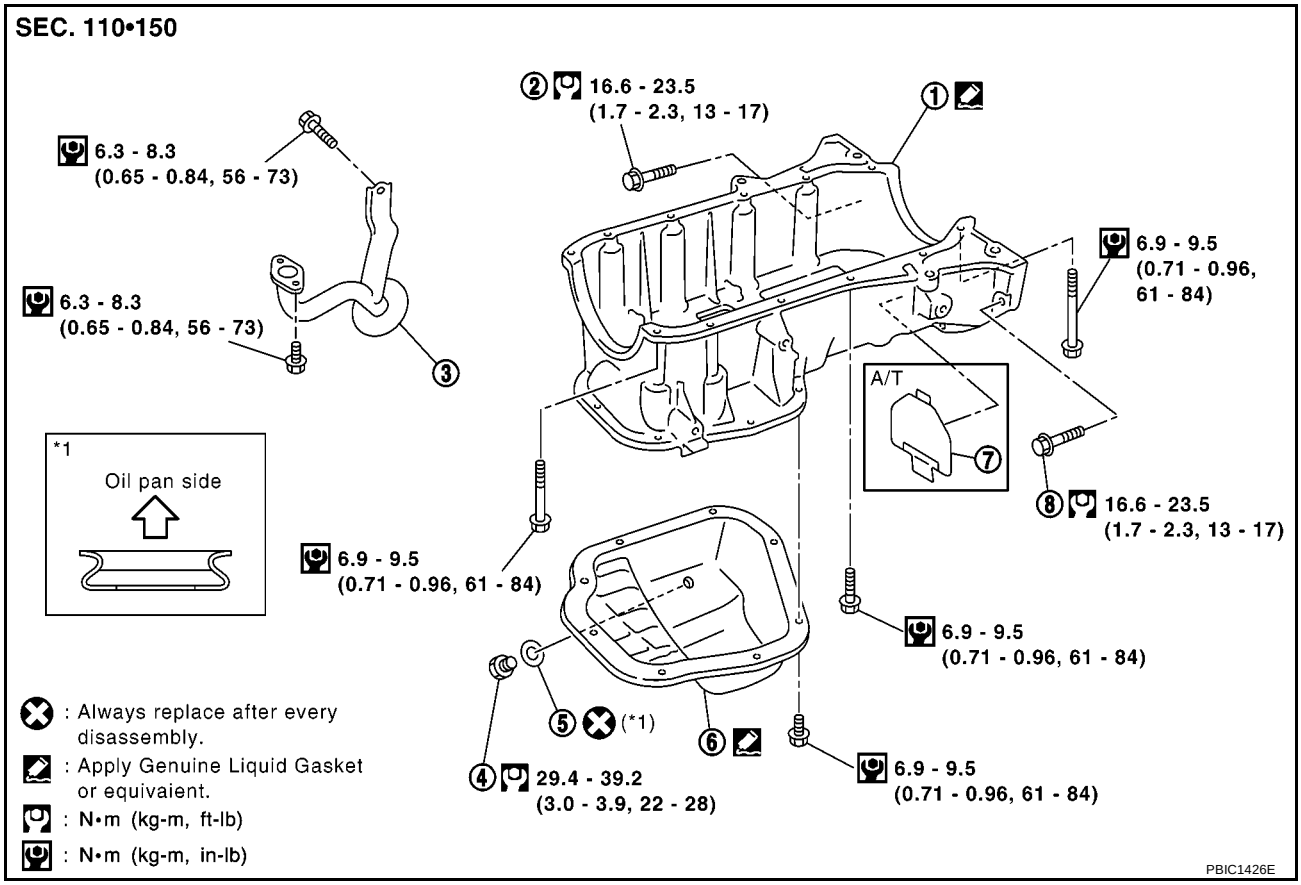
- **Do not over torque the heated oxygen sensor. Doing so may cause damage to the heated oxygen sensor, resulting in the MI coming on.**

OIL PAN AND OIL STRAINER

PFP:11110

Removal and Installation

EBS00OES



1. Oil pan (upper)
2. Transaxle connecting bolt
3. Oil strainer
4. Drain plug
5. Washer
6. Oil pan (lower)
7. Rear plate cover
8. Transaxle connecting bolt

REMOVAL

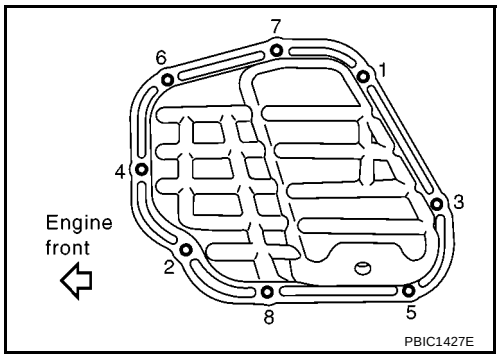
NOTE:

Installation and removal of manual transmission vehicle oil pan (upper) require removal of the transaxle.

1. Remove RH front fender protector.
2. Drain the engine oil.
3. Remove the oil pan (lower) in the following order.

a. Loosen bolts in the reverse of the order shown in figure.

b. Insert seal cutter (special service tool) between oil pan (upper) and oil pan (lower). Slide seal cutter by tapping on the side of the tool with a hammer. Remove oil pan (lower).



CAUTION:

Exercise care not to damage mating surface.

NOTE:

The following is the order for removing the oil pan (upper).

4. Remove the oil level gauge.
5. Remove drive belts. Refer to EM-12, "DRIVE BELTS" .
6. Remove the A/C compressor with piping connected and move the A/C compressor aside.

CAUTION:

Hang it with rope and temporarily tighten to body to avoid putting stress on air conditioner piping.

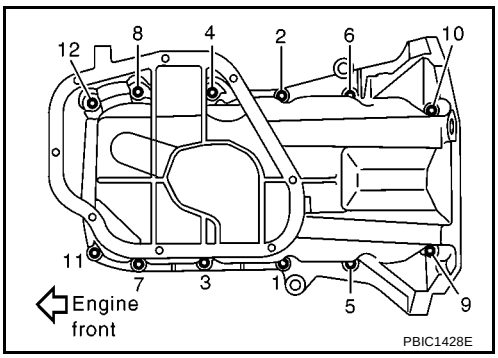
7. Remove the exhaust front tube. Refer to EX-3, "EXHAUST SYSTEM" .

8. Remove three way catalyst support. Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .
9. Remove the transaxle in the following order. (M/T models)

a. Mount engine slingers on cylinder head. Refer to EM-60, "Removal and Installation" .
b. Lift with a hoist and position engine.
c. Remove transaxle. Refer to EM-69, "Removal and Installation" .

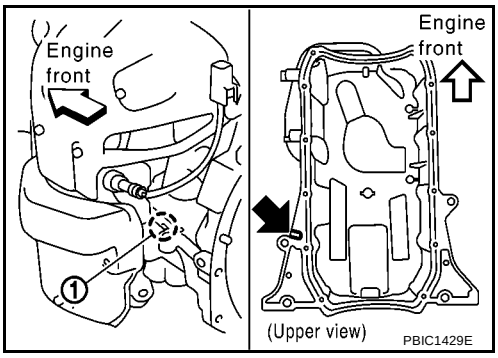
10. Remove oil pan (upper) with the following procedure.

a. Remove oil pan (upper) to transaxle connecting bolts (A/T models). Refer to AT-430, "REMOVAL AND INSTALLATION" .
b. Loosen oil pan (upper) mounting bolts in the reverse of the order shown in figure.



c. Insert a flathead offset screwdriver into the cutout (1) shown in figure and create a crack between the oil pan and cylinder block.
d. Insert seal cutter (special service tool) between oil pan (upper) and cylinder block. Slide seal cutter by tapping on the side of the tool with a hammer. Remove oil pan (upper).

CAUTION:
Exercise care not to damage mating surface.



11. Remove oil strainer.

INSTALLATION

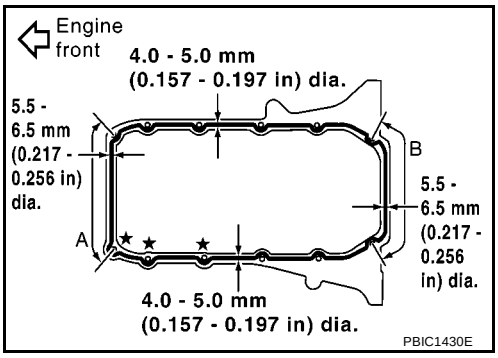
1. Install oil strainer.

NOTE:
Do not use O-ring, gasket, or other seal parts.

2. Attach the oil pan (upper) in the following order.

a. Apply the liquid gasket to the position shown in figure.
Use Genuine Liquid Gasket or equivalent.

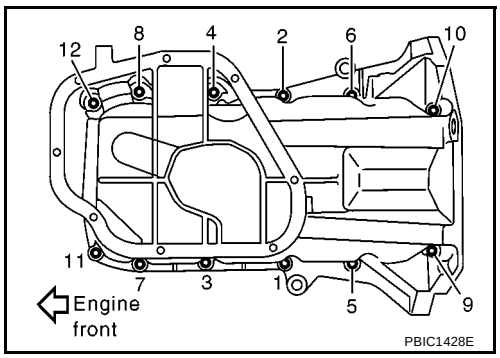
CAUTION:
- **For bolt holes with ★ marks (3 locations), apply liquid gasket outside the holes.**
- **Apply a bead of 5.5 to 6.5 mm (0.127 - 0.256 in) in diameter to area “A” and “B”.**



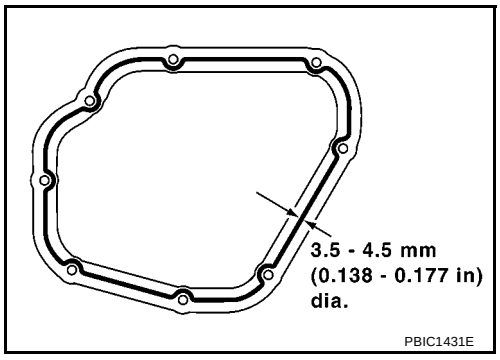
b. Tighten bolts in the numerical order shown in figure.

NOTE:
See below for mounting positions of bolts

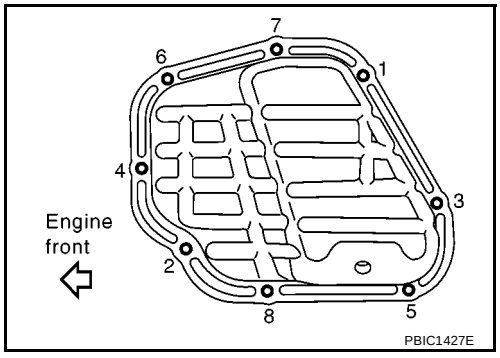
Under head 70 mm (2.76 in) : 4, 8, 12
Under head 90 mm (3.54 in) : 9,10
Under head 25 mm (0.98 in) : Other than the above



c. Tighten transaxle connecting bolts. (A/T models)
3. Install transaxle assembly. (M/T models)
4. Install oil pan (lower) in the following procedure:
a. Apply the liquid gasket to the position shown in figure.
Use Genuine Liquid Gasket or equivalent.



b. Tighten bolts in the numerical order shown in figure.



5. Install oil pan drain plug.
   - For washer installation direction, refer to components figure on EM-24, "Removal and Installation" .
6. Reinstall removed parts in reverse order of removal.

CAUTION:
Engine oil should be filled at least 30 minutes after the oil pan is installed.

INSPECTION AFTER INSTALLATION

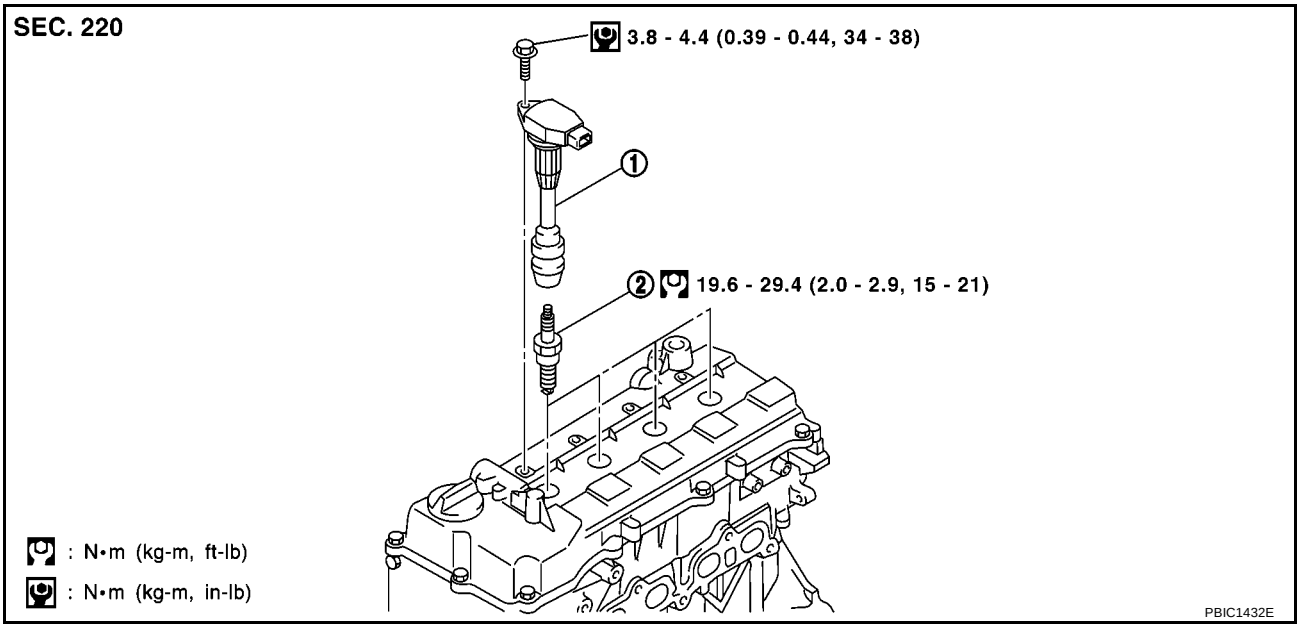
- Check engine oil level. Refer to LU-4, "ENGINE OIL" .
- Warm up engine and check the oil amount and no leakage of oil. Refer to LU-4, "ENGINE OIL" .

IGNITION COIL

PFP:22448

Removal and Installation

EBS00OET



1. Ignition coil
2. Spark plug

REMOVAL

1. Remove air duct and air cleaner case assembly. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
2. Disconnect harness connector from the ignition coil.
3. Remove ignition coil.

CAUTION:

- **Handle ignition coil with care. Avoid impacts.**
- **Do not disassemble.**

INSTALLATION

Install in the reverse order of removal.

SPARK PLUG (PLATINUM-TIPPED TYPE)

PFP:22401

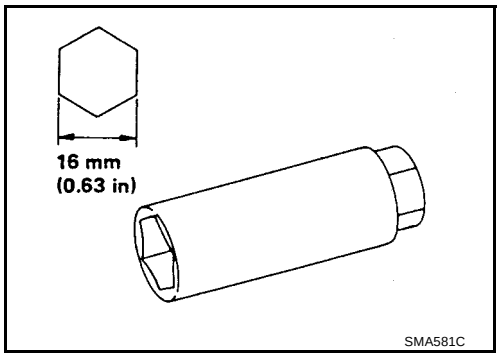
Removal and Installation

EBS00OEU

REMOVAL

1. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
2. Remove spark plugs with a spark plug wrench.

CAUTION:
Handle spark plug with care. Avoid impacts.



INSPECTION AFTER REMOVAL

- Use standard type spark plug for normal condition.
- The hot type spark plug is suitable when fouling occurs with the standard type spark plug under conditions such as:
  - Frequent engine starts
  - Low ambient temperatures
- The cold type spark plug is suitable when spark plug knock occurs with the standard type spark plug under conditions such as:
  - Extended highway driving
  - Frequent high engine revolution

Make	NGK	Champion
Standard type	LFR5AP-11	REC10PYC4
Hot type	LFR4AP-11	—
Cold type	LFR6AP-11	—

Gap (Nominal) : 1.1 mm (0.043 in)

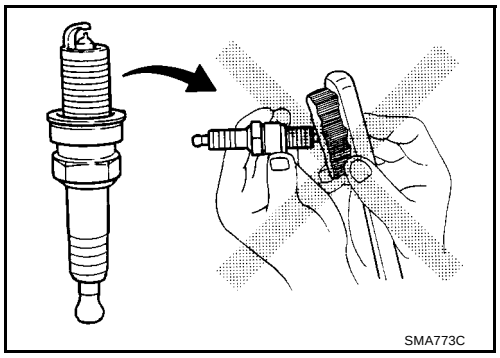
CAUTION:
- **Do not use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

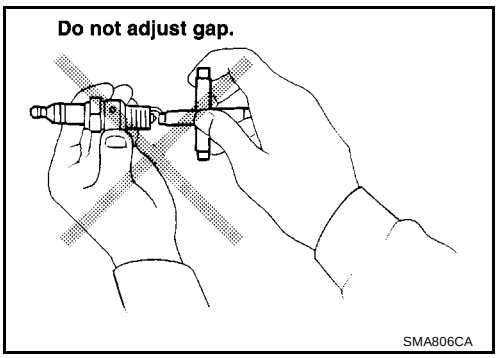
Less than 588 kPa (6 kg/cm^2 , 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



INSTALLATION

Install in the reverse order of removal.

Spark plug

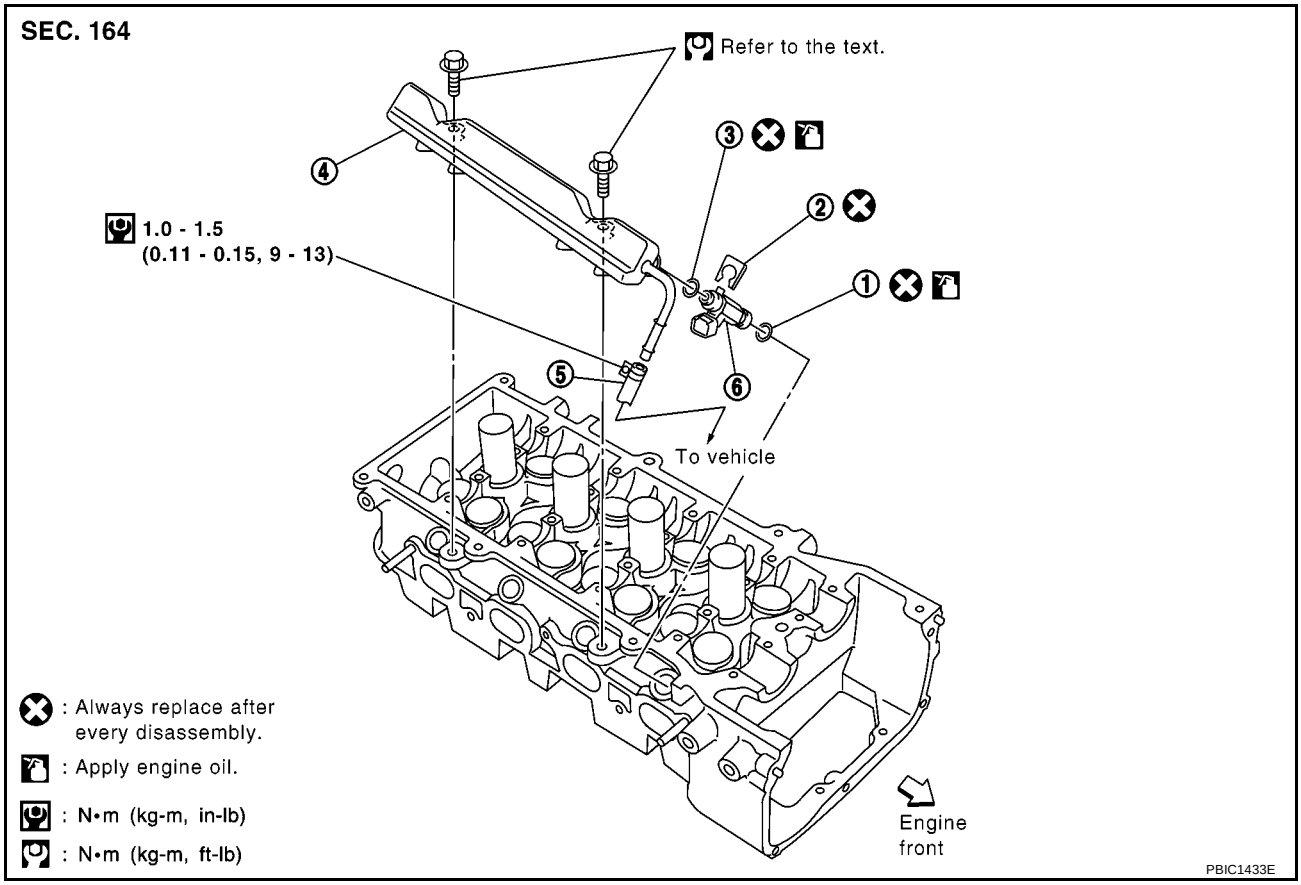
: 19.6 - 29.4 N·m (2.0 - 3.0 kg-m, 15 - 21 ft-lb)

FUEL INJECTOR AND FUEL TUBE

PFP:16600

Removal and Installation

EBS00OGG



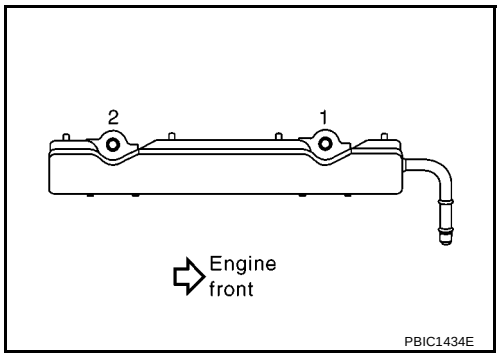
1. O-ring (brown)
2. Clip
3. O-ring (black)
4. Fuel tube
5. Fuel feed hose
6. Fuel injector

REMOVAL

1. Release fuel pressure. Refer to EC-44, "FUEL PRESSURE RELEASE" (WITH EURO-OBD), EC-505, "FUEL PRESSURE RELEASE" (WITHOUT EURO-OBD).
2. Remove air duct and air cleaner case assembly. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove intake manifold support bracket.
4. Remove the fuel hose on the side of the fuel tube.

   CAUTION:
   Attach a plug to the removed hose to prevent fuel leaks.
5. Separate the fuel injector harness and move to a position where it will not get in the way of work.
   - If it is stuck or otherwise difficult to remove, remove the fuel injector and fuel tube assembly from the cylinder head and separate fuel injector harness in a better position.
6. Loosen bolts in the reverse of the order shown in the figure and then remove the fuel injector and fuel tube assembly.

   CAUTION:
   - **Make sure the fuel injector nozzle does not touch the other parts.**
   - **Take out without tipping, as this will cause fuel to leak.**



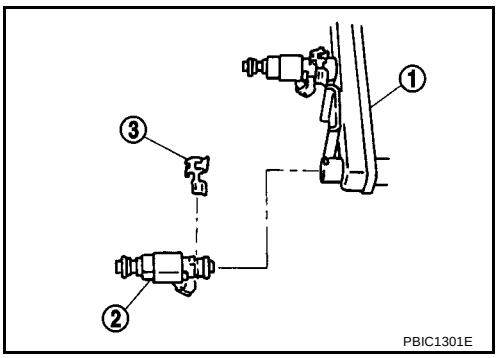
7. Remove the fuel injector (2) from the fuel tube (1) in the following order.

a. Open and pull out the clip (3).

b. Remove fuel injector from the fuel tube by pulling straight.

CAUTION:

- **Be careful not to damage the nozzle.**
- **Do not drop or impact the fuel injector.**
- **Do not disassemble or adjust fuel injector.**



INSTALLATION

1. Keep in mind the following points when attaching the O-ring to the fuel injector.

CAUTION:

- **The upper and lower O-rings are different, so use caution when attaching them.**

Fuel tube side	**: Black**
Nozzle side	**: Brown**

- **Handle O-ring with bare hands. Never wear gloves.**
- **Lubricate O-ring with engine oil.**
- **Do not clean O-ring with solvent.**
- **Make sure the O-ring and its mating part are free of foreign material.**
- **When installing the O-ring, be careful not to scratch it with tools or your fingernails. Also be careful not to twist or stretch O-ring. If O-ring is stretched while it is being attached, do not insert it into fuel tube immediately.**

2. Install the fuel injector onto the fuel tube in the following procedure:

a. Insert the clip (3) into the clip mounting groove (2) on the fuel injector (1).

- Insert clip cutout (5) into fuel injector protrusion (4).

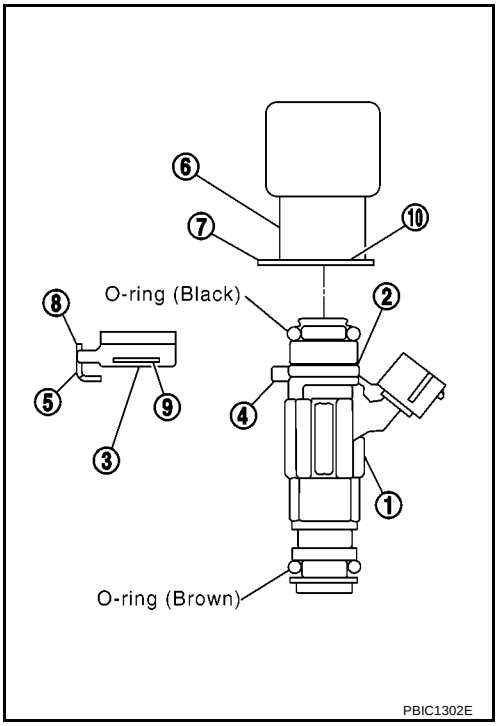
CAUTION:

- **Always replace clip with new one.**
- **Make sure the clip does not interfere with the O-ring. If it does, replace the O-ring.**

b. With the clip assembly as is, insert the fuel injector (1) into the fuel tube (6).

- Make sure the axis is lined up when inserting.
- Insert clip cutout (8) into fuel tube protrusion (7).
- Make sure the flange (10) on the fuel tube fits securely in the clip flange groove (9).

c. Make sure the fuel injector does not spin or come off.



3. Install fuel tube and injector assembly onto cylinder head.

CAUTION:
Make sure the injector nozzle does not touch the other parts.

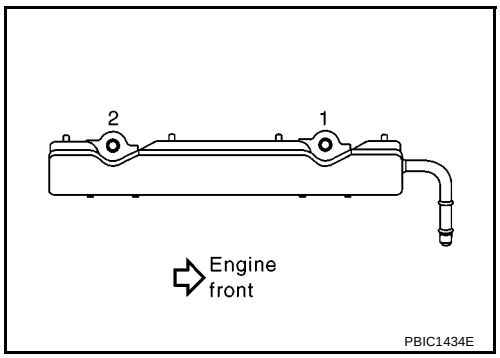
- Tighten bolts evenly in two steps in the order shown in figure.

1st step

: 11.8 - 13.8 N·m (1.2 - 1.4 kg-m, 9 - 10 ft-lb)

2ne step

: 20.8 - 28.2 N·m (2.1 - 2.9 kg-m, 16 - 20 ft-lb)



4. Connect fuel feed hose.·

CAUTION:
Securely tighten the hose clamp at a position where it does not get in the way of the bulge.

5. Install intake manifold support bracket.

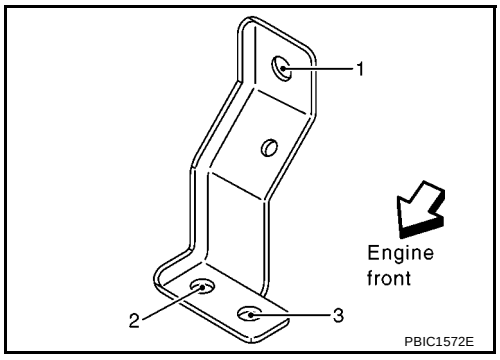
- Tighten mounting bolts in the following order.
  - Tighten bolts temporarily in numerical order shown in the figure.
  - Tighten bolts to the specification in numerical order shown in the figure.

Bolt 1

: 6.9 - 9.5 N·m (0.7 - 0.96 kg-m, 61 - 84 in-lb)

Bolts 2 and 3

: 8.4 - 10.8 N·m (0.86 - 1.1 kg-m, 75 - 95 in-lb)



6. Reinstall removed parts in reverse order of removal.

INSPECTION AFTER INSTALLATION

- Follow the procedure below to make sure there are no fuel leaks.

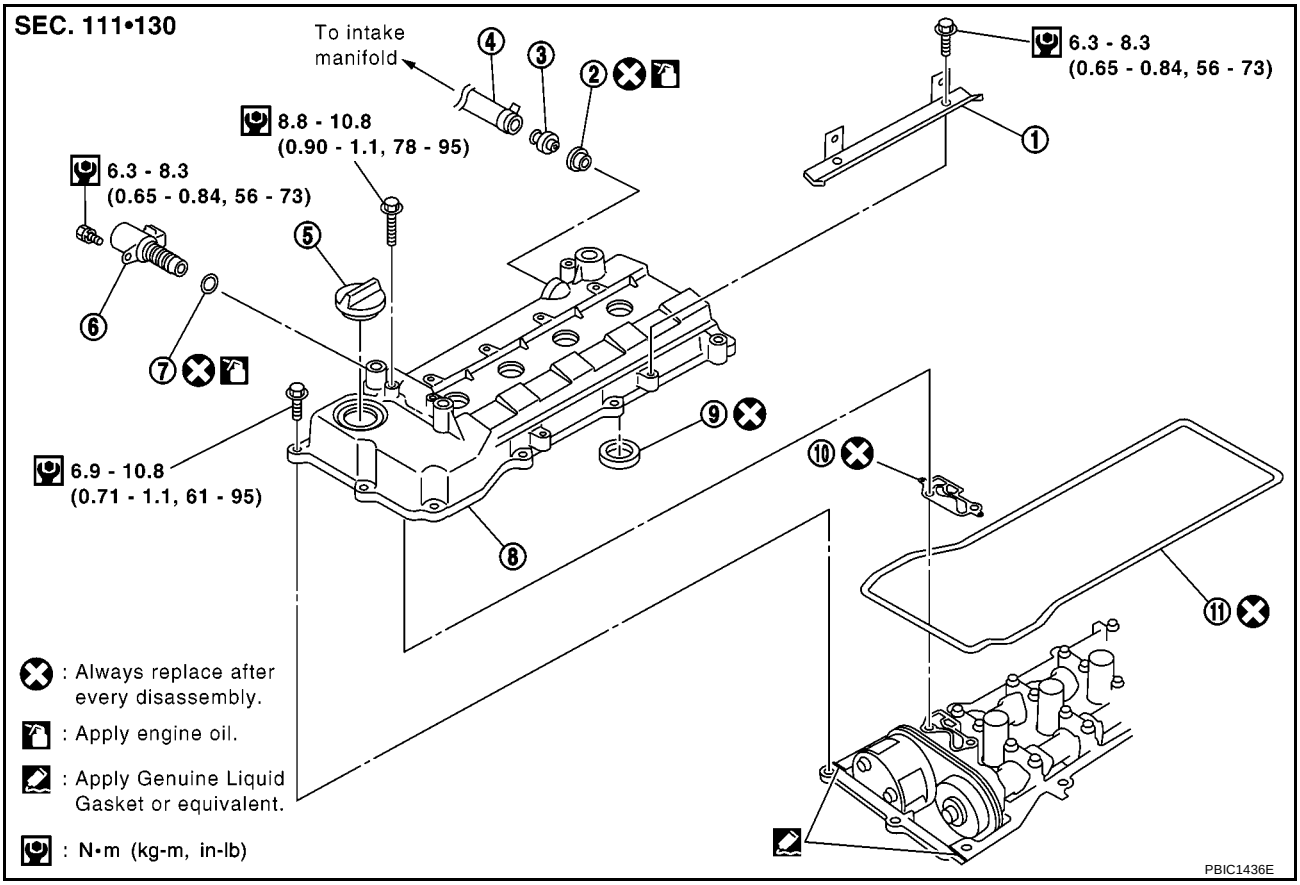
1. Turn the ignition switch to ON (do not start engine), and with fuel pressure applied in the fuel line, check to make sure there no fuel leaks from the connection.
2. Start the engine, and with the increased speed, check again to see if there are any fuel leaks from the connection.

ROCKER COVER

PFP:13264

Removal and Installation

EBS00OEX



1. Harness bracket	2. Grommet	3. PCV control valve
4. PCV hose	5. Oil filler cap	6. Intake valve timing control solenoid valve
7. O-ring	8. Rocker cover	9. Rocker cover oil seal
10. Gasket	11. Gasket	

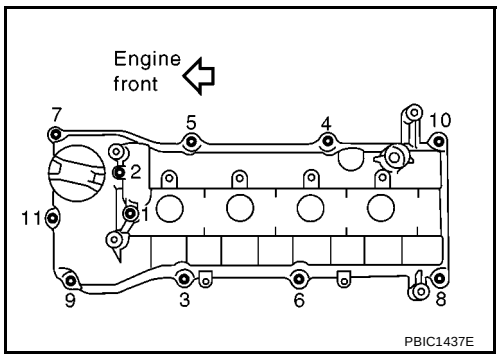
REMOVAL

1. Remove air duct and air cleaner case assembly. Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
2. Remove RH engine mount stay. Refer to EM-69, "Removal and Installation" .

   NOTE:
   It is not necessary to support the engine using a jack.
3. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
4. Remove ignition coil harness bracket.
5. Disconnect PCV hose and intake valve timing control sorenoid valve harness connector.
6. Remove the PCV control valve if necessary.
7. Remove the intake valve timing control solenoid valve if necessary.

   CAUTION:
   - **Handle intake valve timing control solenoid valve with care. Avoid impacts.**
   - **Do not disassemble.**

8. Loosen bolts in the reverse of the order shown in the figure to remove rocker cover.

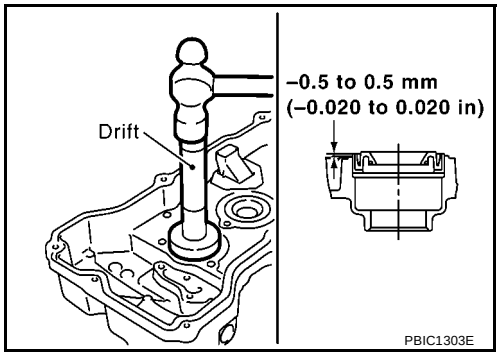


9. Remove the rocker cover oil seal using a screwdriver.

CAUTION:
Be careful not to damage the rocker cover.

INSTALLATION

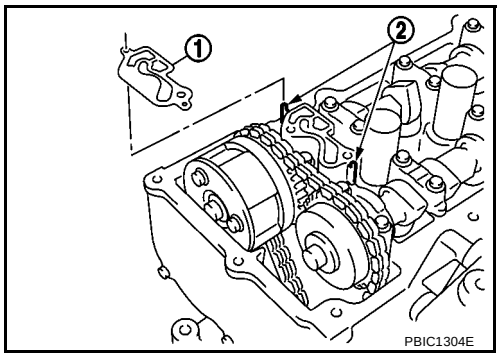
1. Install rocker cover oil seal.
   - Using drift with outer diameter 97 mm (3.82 in) and inner diameter 83 mm (3.27 in) to 88 mm (3.46 in), press oil seal in.
   - Press-fit the oil seal evenly to the mounting surface.



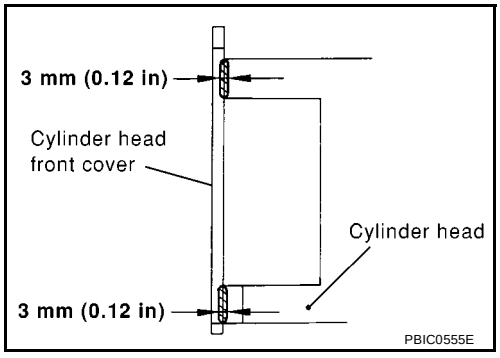
2. Install the rocker cover in the following procedure:

a. Install the gasket (1) to the No. 1 camshaft bracket upper surface.
   - Match up the positioning pins (2) and gasket holes in the direction of the shape of the camshaft bracket when attaching.

b. Install the gasket to the rocker cover mounting groove.



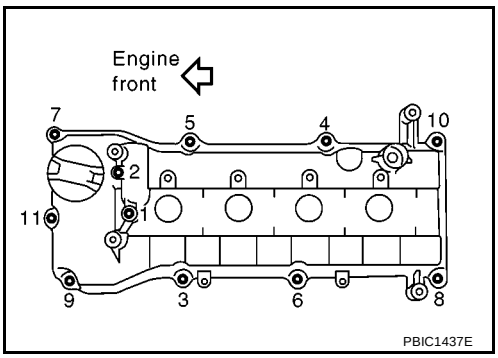
c. Apply the liquid gasket to the position shown in figure.
Use Genuine Liquid Gasket or equivalent.



d. Tighten bolts evenly in two steps in the order shown in the figure, to the specified torque.
   - See below for mounting positions of bolts

   Under head 45 mm (1.77 in) : 1, 2 (inside bolts)

   Under head 20 mm (0.79 in) : Other than above (outside bolts)



3. Install intake valve timing control solenoid valve.
   - Make sure no foreign particles attach to the flange, O-ring, or attachment hole.
   - Tighten the mounting bolt after making sure it is fully inserted into the mounting hole.
4. Install PCV control valve.
   - Insert until the flange is flush with the grommet.
5. Reinstall removed parts in reverse order of removal.

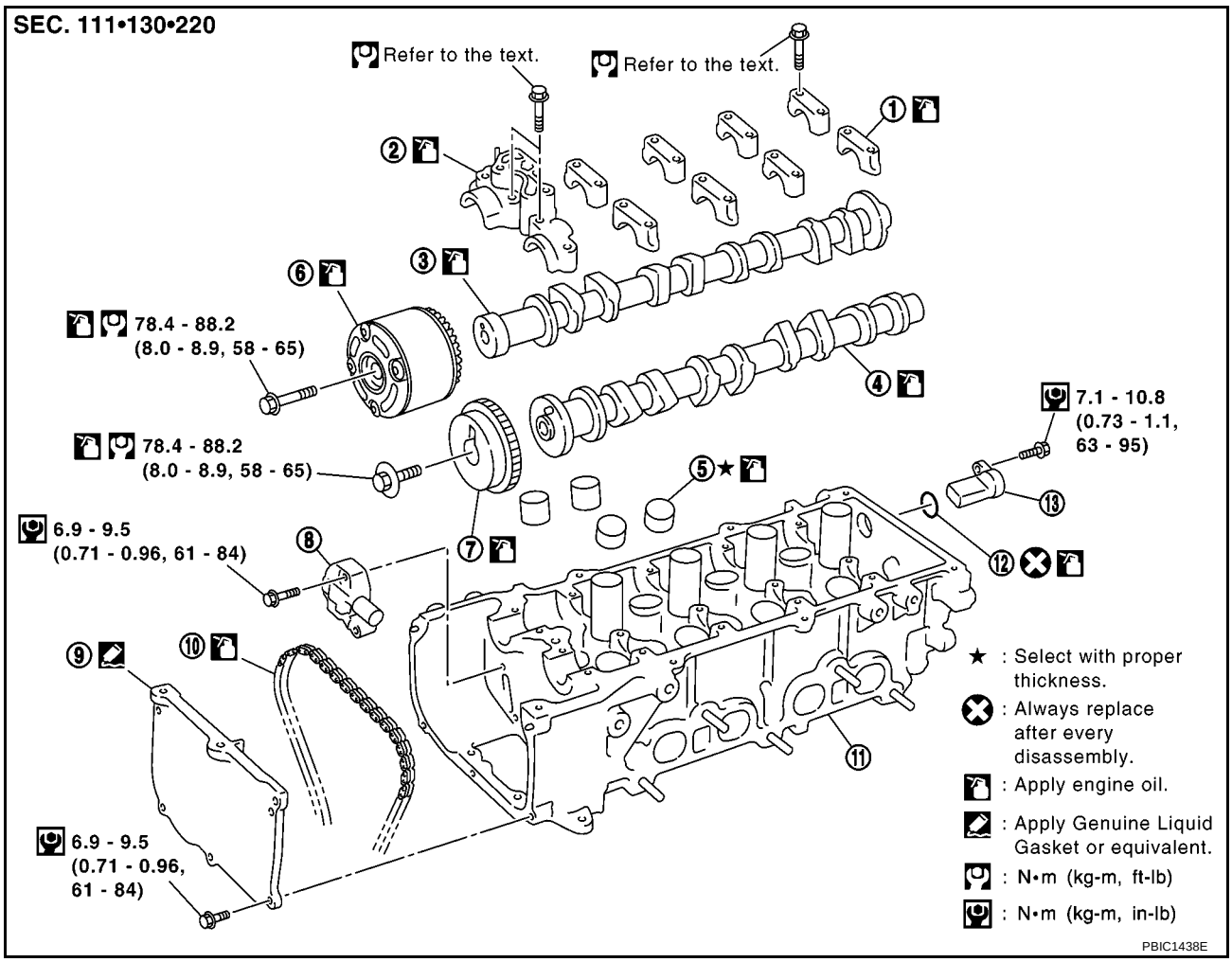
CAMSHAFT

PFP:13001

Removal and Installation

SMA for VIN >SJN**AK12U1133450

EBS00OEY



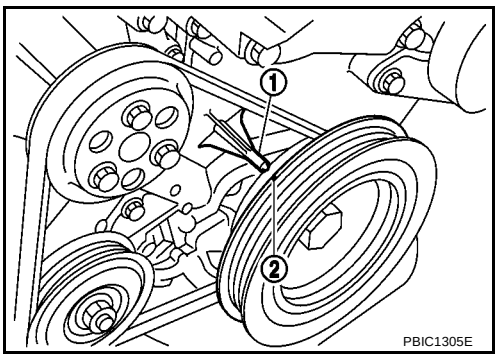
1. Camshaft bracket (No. 2 - 5)
2. Camshaft bracket (No. 1)
3. Camshaft (intake)
4. Camshaft (exhaust)
5. Valve lifter
6. Camshaft sprocket (intake)
7. Camshaft sprocket (exhaust)
8. Chain tensioner
9. Cylinder head front cover
10. Timing chain
11. Cylinder head
12. O-ring
13. Camshaft position sensor (PHASE)

REMOVAL

1. Remove RH front fender protector.
2. Secure the engine position using one of the following methods. Remove RH engine mount stay and engine mount bracket (upper). Refer to EM-69, "Removal and Installation" .
   - Mount engine slingers and hook with hoist. Refer to EM-69, "Removal and Installation" .
   - Support the oil pan bottom with a jack stand, etc.
3. Remove rocker cover. Refer to EM-33, "ROCKER COVER" .
4. Remove the camshaft position sensor (PHASE) from the back of the cylinder head if necessary.

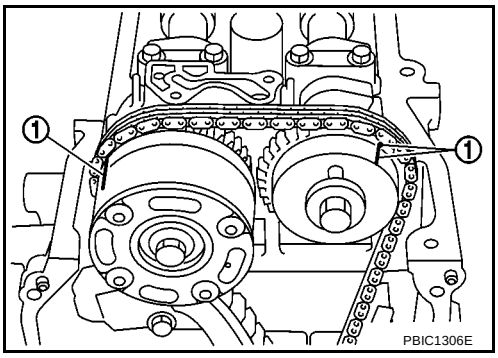
   CAUTION:
   - **Handle camshaft position sensor (PHASE) with care. Avoid impacts.**
   - **The tip of the sensor is magnetic, so do not let metal dust get on it or place it next to objects which can be affected by magnets.**
5. Remove RH headlamp. Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" .
6. Remove the cylinder head front cover.
7. Following the procedure below, place cylinder No. 1 at TDC of its compression stroke

a. Turn the crankshaft pulley clockwise as seen from the engine front, and match up the crankshaft pulley TDC mating mark (no color) (2) with the timing indicator (1) on the front cover.



b. Confirm mating marks (1) stamped on intake and exhaust sprockets are located as shown.
   - If there is no position mark at the position in the figure, turn the crankshaft pulley once more to position them as in the figure.

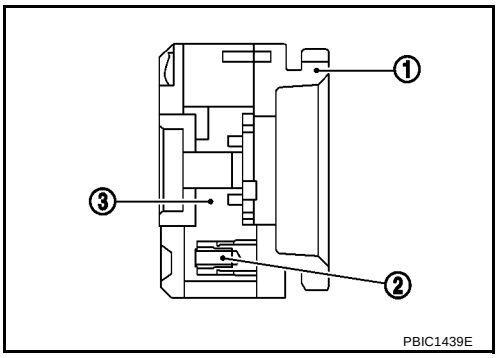
c. Make sure mating marks on intake and exhaust camshaft sprockets are located as shown in the figure, then paint mating marks on the timing chain links.



8. Make sure the intake camshaft sprocket is in the most advanced position.

CAUTION:
Installation and removal of the intake camshaft sprocket must be done in the most advanced position for the following reasons, so make sure you follow the procedure exactly.

- **The sprocket (1) and vane (camshaft coupling) (3) are designed to spin and move within the range of a certain angle.**
- **With the engine stopped the vane (3) is in the most retarded position. It will not spin because it is locked to the sprocket side by the internal lock pin (2).**
- **If the camshaft sprocket mounting bolts are turned in the situation described above (the most retarded position), the lock pin (2) will become damaged and cause malfunctions because of the increased horizontal load (cutting force) on the lock pin (2).**

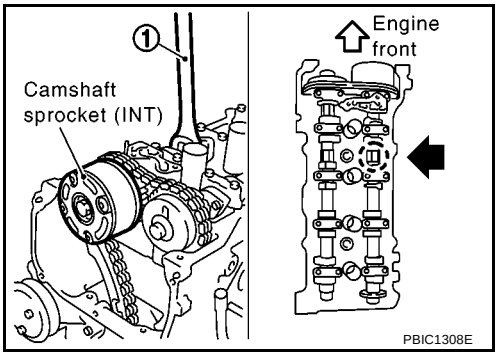


- Put the intake camshaft sprocket in the most advance position in the following steps.

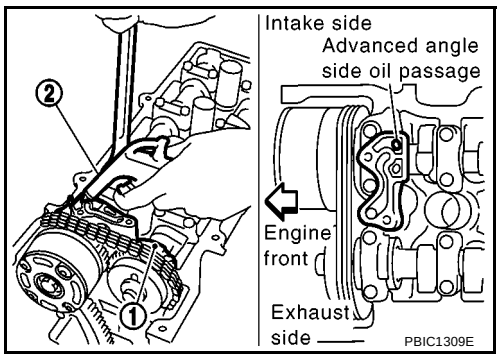
CAUTION:
The chain tensioner must not be removed before doing this step.

NOTE:
The spinning direction in the following description is as seen from the engine front.

a. Immobilize the hexagonal part of the camshaft with a wrench (1) to prevent the intake camshaft from moving.



b. Apply air pressure with an air gun (2) to the advanced angle side oil passage of the intake valve timing control on the top surface of the No. 1 camshaft bracket (1).



Compression pressure

: 300 kPa (3.00 bar, 3 kg/cm^2 , 43.5 psi) or more

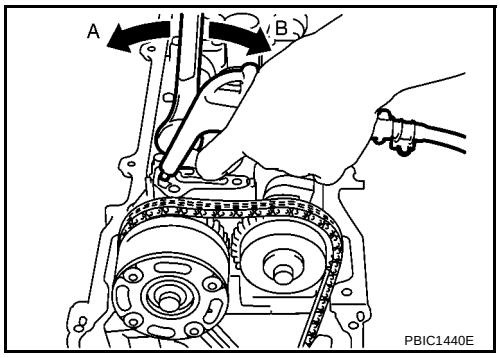
NOTE:
The air pressure is used to move the lock pin into the disengage position.

- Keep applying air pressure until step “e” is completed.

CAUTION:

- **Be sure not to damage the oil passage with the tip of the air gun.**
- **Wipe all the oil off on the top surface of the No. 1 camshaft bracket to prevent oil from being blown with the air, and the area around the air gun should be covered with a rag when applying air pressure. Eye protection should be worn as needed.**

c. Turn the intake camshaft slowly counter-clockwise in direction A (towards the intake manifold).



- Keep the air pressure on.

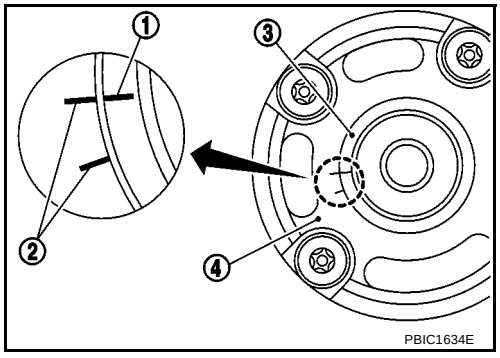
CAUTION:
Also be sure the wrench immobilizing the camshaft does not come loose.

d. While doing the above, once you hear a click (the sound of the internal lock pin disengaging) from inside the intake camshaft sprocket, start turning the intake camshaft in the opposite direction, direction B (clockwise: towards the exhaust manifold) and to the most advanced angle position.

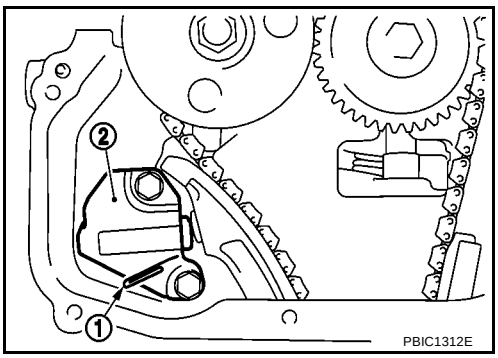
- Keep the air pressure on.
- If there is no click, as soon as the vane (camshaft coupling) starts moving independently of the camshaft sprocket, the lock pin has become disengaged.
- If the lock pin does not become disengaged, shake the wrench immobilizing the camshaft slightly.
- If this still does not help in disengaging the lock pin, tap the intake camshaft front very lightly with a plastic hammer.

e. Once the vane starts to spin and then the camshaft sprocket starts to spin with the camshaft, it has reached the most advanced position, so stop.

- Make sure the most advanced position locating intake valve timing control advance mark (1) of vane (3) and alignment mark (2) of sprocket (4) as shown in the figure.



9. Attach the stopper pin (1) such as a paper clip to secure the plunger in the full compressed position and remove the chain tensioner (2).

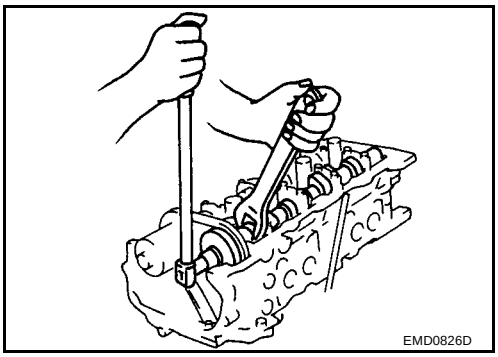


10. Keeping the wrench on the camshaft hexagonal part, loosen the mounting bolts and remove the intake and exhaust camshaft sprockets.

CAUTION:

- **Make sure the tools do not come in contact with the A/C piping.**
- **Do not loosen mounting bolts with securing anything other than the camshaft hexagonal part or with tensioning the timing chain.**

NOTE:
With the front cover attached, the timing chain and crankshaft sprocket will not come off, so there is no need to take steps to maintain the timing chain tension.



- The intake camshaft sprocket should be handled with the following precautions in mind.

CAUTION:

- **When removing intake camshaft sprocket, using adhesive tape or equivalent, prevent vane from rotating so that lock pin will not rejoin in the most retarded position.**
- **Handle it carefully, and avoid any chance of impact caused by dropping.**
- **Do not disassemble. (Do not loosen the four front bolts.)**

NOTE:
While removing the intake camshaft sprocket, if the lock pin has been rejoined in the most retarded position, do the following to restore it.

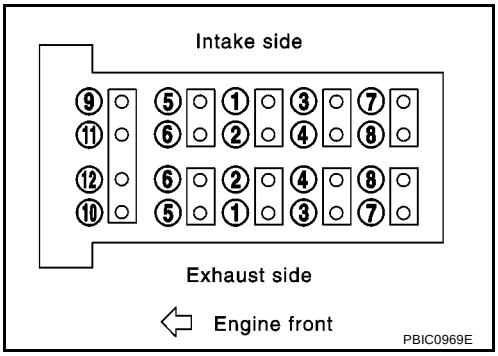
a. Reinstall the intake camshaft sprocket to the intake camshaft and tighten the mounting bolts enough to prevent air leaking out when the air pressure is applied later.

CAUTION:
To prevent internal lock pin from damaging, keep the torque on the mounting bolts to the minimum required to prevent air from escaping.

b. Apply the air pressure, disengage the lock pin following step 8, and turn the vane to the most advanced position. (The timing chain need not be attached for this step.)

c. Remove the intake camshaft sprocket from camshaft.

11. Remove camshaft brackets.
    - Loosen bolts in several steps in reverse order shown in the figure.



12. Remove camshaft.

CAUTION:
Do not deform or damage intake camshaft rear end signal plate.

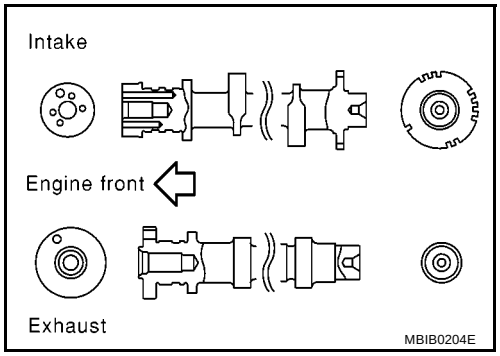
13. Remove valve lifter.
    - Identify installation position of each valve. Arrange removed valve lifters so they cannot be mixed up.

INSTALLATION

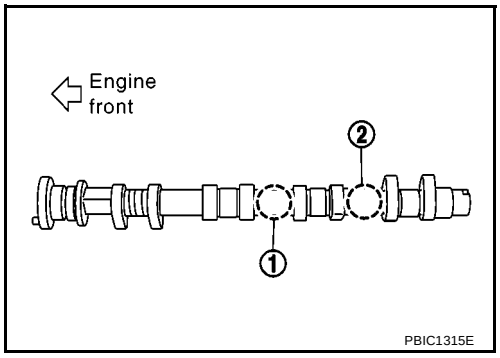
1. Install valve lifter.

- Install it in its original positions.

2. Install camshaft.
   - You can distinguish between the intake and the exhaust by looking at the different shapes of the front and rear ends of the camshaft.

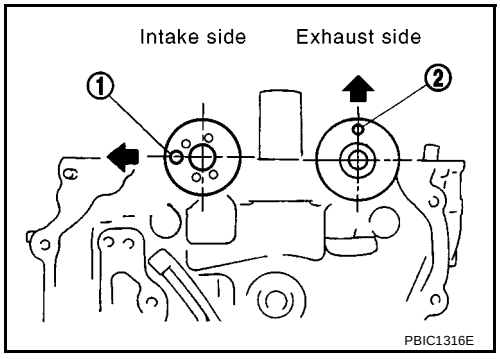


NOTE:
- Paint distinguishing the applicable engine (1) can be found between the cams for cylinders No. 2 to 3.
- Paint distinguishing the applicable engine (2) can be found between the cams for cylinders No. 3 to 4.(CR12DE, CR14DE)

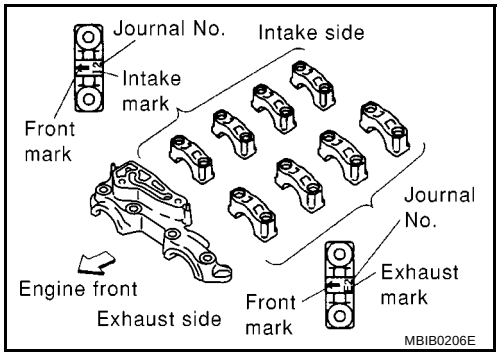


Paint distinguishing the applicable engine		(1)	(2)
CR10DE	INT	Green	—
	EXH	White	—
CR12DE, CR14DE	INT	Green	Green
	EXH	Red	Red

- Install the camshaft front ends dowel pin hole (1) and dowel pin (2) so that they are positioned as shown in the figure.



3. Install camshaft brackets.
   - Completely remove any foreign material on bottom surfaces of camshaft brackets and top surface of cylinder head.
   - Referring to the marks on top of the camshaft bracket, install so that it is in the same position and facing the same direction as when removed.



4. Tighten camshaft bracket bolts in the following order.

a. Bolt sizes vary with installation position. Refer to the following when installing bolts.

Bolt color

1 - 10 : Black

11, 12 : Gold

b. First tighten bolts 9 through 12, then tighten bolts 1 through 8 in numerical order.

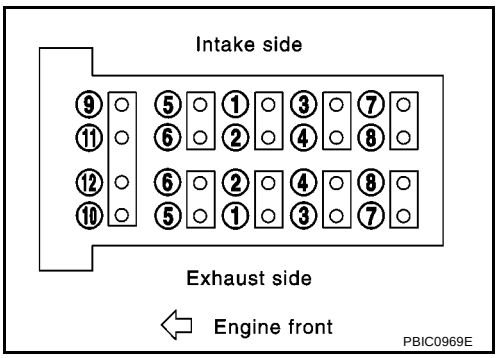
: 2.0 N·m (0.2 kg-m, 18 in-lb)

c. Tighten all bolts in numerical order shown in the figure.

: 5.9 N·m (0.6 kg-m, 52 in-lb)

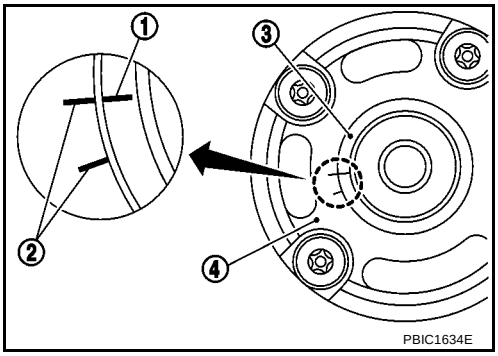
d. Retighten all bolts in numerical order shown in the figure.

: 9.0 - 11.8 N·m (0.92 - 1.2 kg-m, 80 - 104 in-lb)



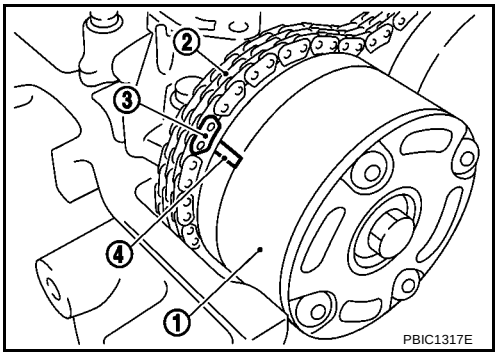
5. Install the intake camshaft sprocket in the following procedure:

- Make sure the most advanced position checking intake valve timing control advance mark (1) of vane (3) and alignment mark (2) of sprocket (4) are located as shown in the figure.

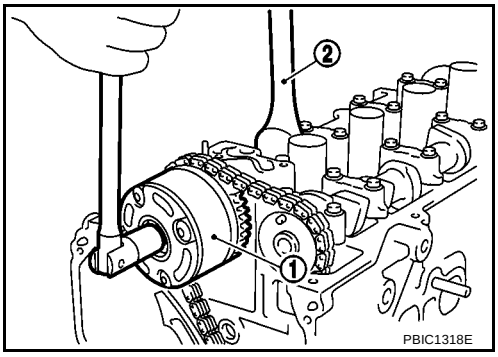


a. Install timing chain (2) by aligning its mating mark (3) (marked when timing chain is removed) with mark (4) on camshaft sprocket (1).

- Install by aligning the dowel pin on the back of the camshaft sprocket with dowel pin hole on the camshaft.



b. Keeping the camshaft hexagonal part still with the wrench (2), tighten the mounting bolt for the intake camshaft sprocket (1).



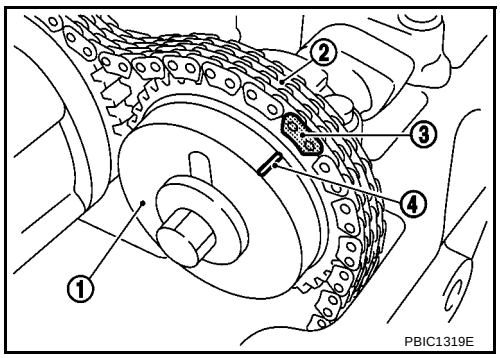
c. Remove adhesive tape or equivalent from camshaft sprocket.

6. Install the exhaust camshaft sprocket (1) in the following procedure:

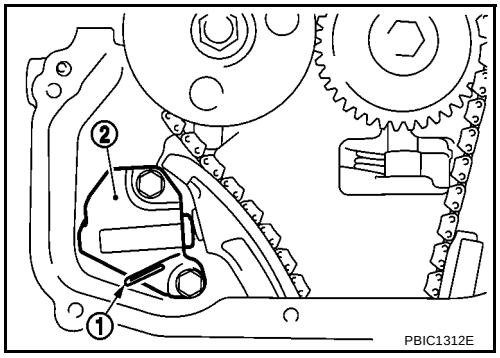
a. Install timing chain (2) by aligning its mating mark (3) (marked when timing chain is removed) with mark (4) on camshaft sprocket (1).
   - Install by aligning the dowel pin groove of the sprocket with dowel pin on the camshaft.

b. Keeping the camshaft hexagonal part still with the wrench, tighten the mounting bolt for the exhaust camshaft sprocket.

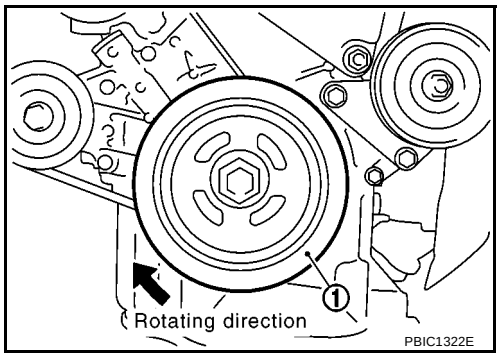
c. Make sure the markings for the intake and the exhaust camshaft sprockets and the timing chain are all lined up.



7. Install chain tensioner (2).
   - Install the stopper pin (1) with plunger secured.
   - After installation, remove the stopper pin (1) and release the plunger.
   - Make sure again that mating marks on the intake and exhaust camshaft sprockets and mating marks on timing chain are aligned.



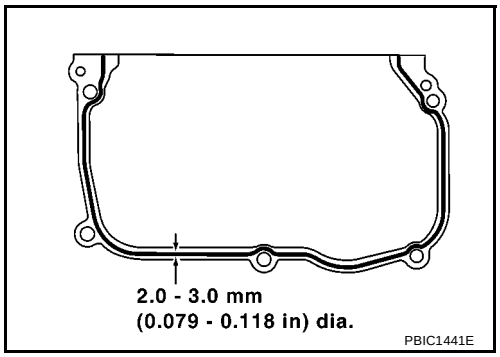
8. Turn the crankshaft pulley (1) slowly clockwise to return the intake camshaft sprocket to the most retarded position.



   - When first turning the crankshaft the intake camshaft sprocket will turn. Once it is turned more, and the vane (camshaft) also turns, then it has reached the most retarded position.
   - After spinning the crankshaft slightly in a counterclockwise direction, you can make sure the lock pin has joined by seeing if the vane and the sprocket move together.

9. Install the cylinder head front cover.
   - Evenly apply the liquid gasket to the position shown in figure. Use Genuine Liquid Gasket or equivalent.
   - Install so that the cylinder head front cover matches up with the dowel pin on the cylinder head side.

10. Install camshaft position sensor (PHASE).
   - Make sure no foreign particles attach to the flange, O-ring, or attachment hole.
   - Tighten the mounting bolt after making sure it is fully inserted into the mounting hole.



11. Inspect and adjust valve clearance. Refer to EM-45, "Valve Clearance" .

12. Reinstall removed parts in reverse order of removal.

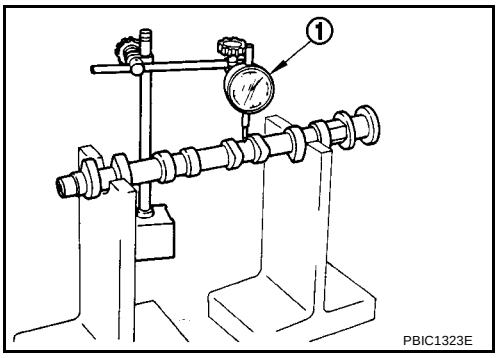
INSPECTION AFTER REMOVAL

Camshaft Runout

- Put V block on precise flat bed, and support No. 2 and No. 5 journal of camshaft.

  CAUTION:
  Do not support journal No. 1 (on the side of the camshaft sprocket) because it has a different diameter from the other four locations.
- Set a dial gauge (1) vertically onto journal No. 3.
- Rotate the camshaft in one direction by hand and read indication on the gauge. (Total indication reading)

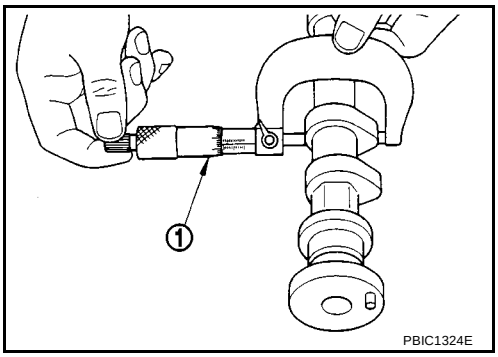
  Limit : 0.04 mm (0.0016 in) or less
- If exceeds the limit, replace the camshaft.



Camshaft Cam Height

- Measure with a micrometer (1).

  Standard
  CR10DE
  Intake : 39.155 - 39.345 mm (1.5415 - 1.5490 in)
  Exhaust : 39.155 - 39.345 mm (1.5415 - 1.5490 in)
  CR12DE, CR14DE
  Intake : 40.359 - 40.549 mm (1.5889 - 1.5964 in)
  Exhaust : 39.743 - 39.933 mm (1.5647 - 1.5722 in)
- If it exceeds the standard, replace the camshaft.

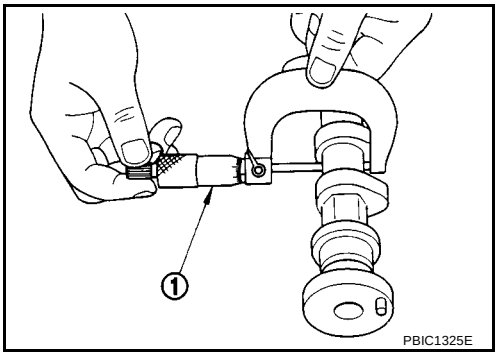


Camshaft Journal Clearance

Outer Diameter of Camshaft Journal

- Measure with a micrometer (1).

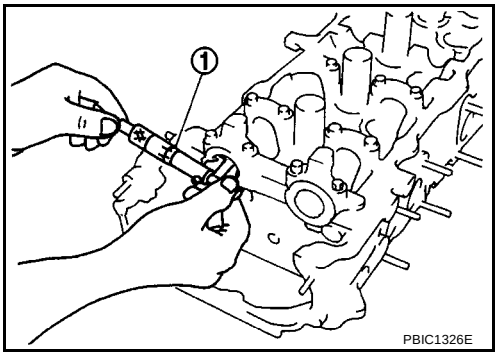
  Standard
  No. 1
  : 27.935 - 27.955 mm (1.0998 - 1.1006 in)
  No. 2 to No. 5
  : 23.450 - 23.470 mm (0.9232 - 0.9240 in)



Inner Diameter of Camshaft Journal

- Tighten camshaft bracket bolts to the specified torque.
- Using an inside micrometer (1), measure inner diameter of the camshaft bracket.

  Standard
  No. 1
  : 28.000 - 28.021 mm (1.1024 - 1.1032 in)
  No. 2 to No. 5
  : 23.500 - 23.525 mm (0.9252 - 0.9262 in)



Calculation of Camshaft Journal Clearance
(Journal clearance) = (inner diameter of camshaft bracket) - (outer diameter of camshaft journal).

Standard

No. 1

: 0.045 - 0.086 mm (0.0018 - 0.0034 in)

No. 2 to No. 5

: 0.030 - 0.071 mm (0.0012 - 0.0028 in)

- If clearance exceeded the standard, replace the camshaft and/or the cylinder head. Refer to the standard values for each individual part.

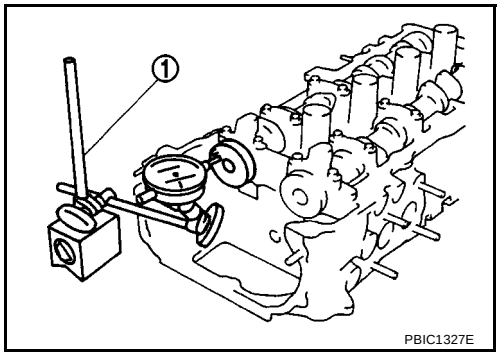
NOTE:
Since the camshaft brackets and the cylinder head are machined together, replacement must be done using the cylinder head assembly.

Camshaft End Play

- Set a dial gauge (1) to the camshaft front end in thrust direction. Move the camshaft back and forth (axially) and read indication on the gauge.

Standard : 0.070 - 0.143 mm (0.0028 - 0.0056 in)

- When out of the standard, replace with new camshaft and measure again.
- When out of the standard again, replace with new cylinder head.



Camshaft Sprocket Runout

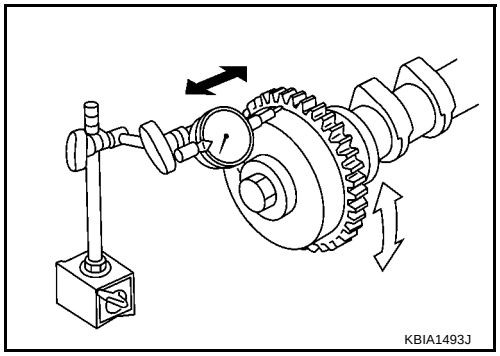
- Put V block on precise flat bed, and support No. 2 and No. 5 journal of camshaft.
- Using a dial gauge, measure camshaft sprocket runout.

Limit

Intake : 0.20 mm (0.0079 in)

Exhaust : 0.15 mm (0.0059 in)

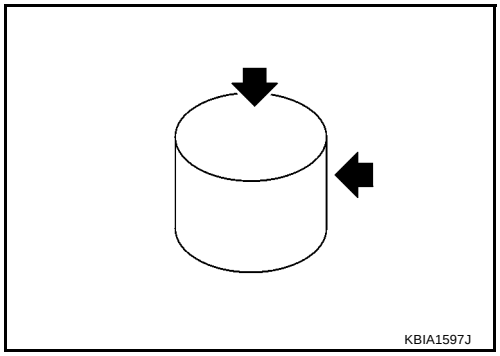
- If it exceeds the limit, replace camshaft sprocket.



Valve Lifter

Check for cracks and wear on valve lifter surface.

- If anything above is found, replace valve lifter.

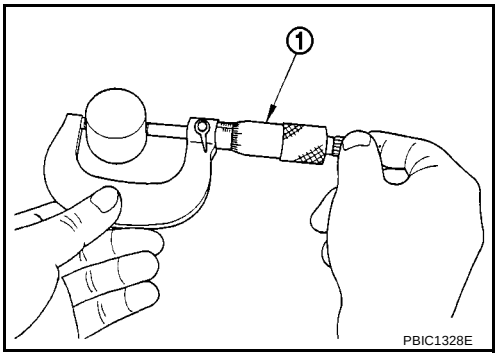


Valve Lifter Clearance

Outer Diameter of Valve Lifter

- Measure with a micrometer (1).

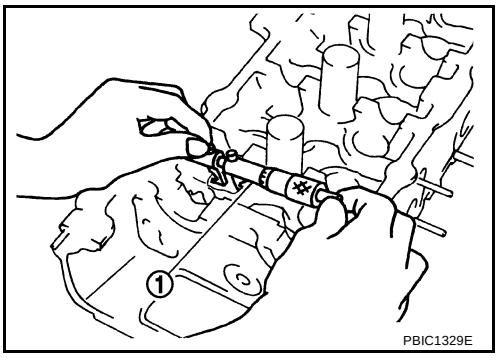
Standard : 29.960 - 29.975 mm(1.1795 - 1.1801 in) dia.



Valve Lifter Hole Diameter

- Using an inside micrometer (1), measure the valve lifter hole diameter in cylinder head.

Standard : 30.000 - 30.021 mm (1.1811 - 1.1819 in) dia.



Calculation of valve lifter clearance
(Valve lifter clearance) = (valve lifter hole diameter) - (outer diameter of valve lifter)

Standard : 0.025 - 0.061 mm (0.0010 - 0.0024 in)

- If clearance exceeded the standard, replace either one or both of valve lifter and cylinder head. Refer to the standard values for valve lifter outer diameter and hole diameter.

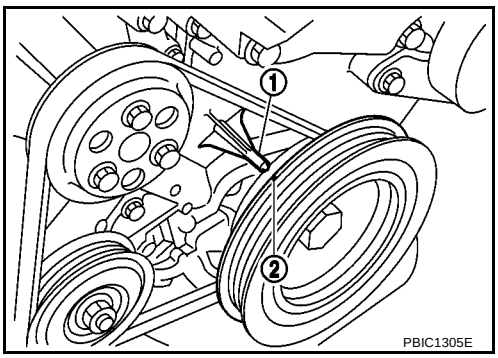
Valve Clearance

EBS00OEZ

INSPECTION

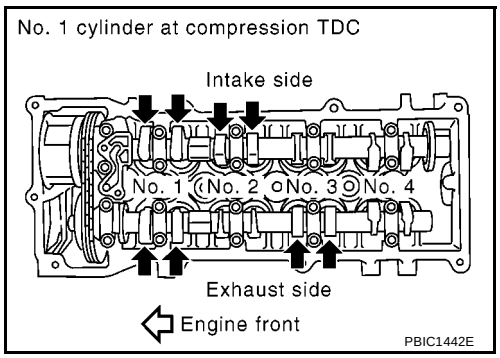
- Whenever the camshaft and valve related parts are removed and installed or replaced, or symptoms due to changes in valve clearance as a result of aging (poor starting, rough idle, unusual noise) are obvious, check valve clearance with the following procedure:

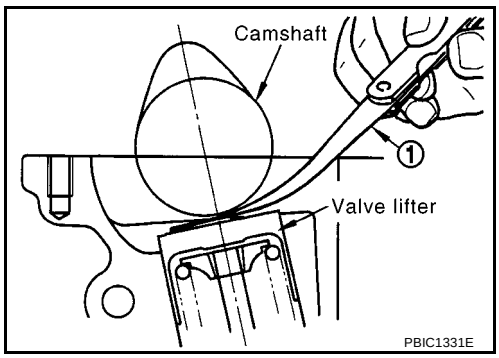
1. Warm up engine and stop it.
2. Remove the following parts.
   - RH front fender protector
   - Rocker cover; Refer to EM-33, "ROCKER COVER" .
3. Turn the crankshaft pulley clockwise as seen from the engine front, and match up the crankshaft pulley TDC mating mark (no color) (2) with the timing indicator (1) on the front cover.
4. When doing this, make sure both the intake and exhaust cam noses on cylinder No. 1 are facing outwards. (No. 1 cylinder at TDC of its compression stroke)
   - If they are not facing out, turn the crankshaft pulley further. It is OK to do step 6 first (checking when No. 4 cylinder at TDC of its compression stroke).



5. Referring to the figure, measure valve clearances of valves with × in table below using a feeler gauge (1).

Cylinder		No. 1	No. 2	No. 3	No. 4
No. 1 cylinder at TDC of its compression stroke.	INT	×	×		
	EXH	×		×	



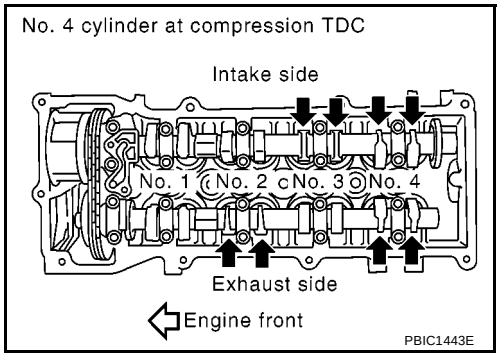


Valve clearance standard:

Hot	**Intake**	**: 0.314 - 0.426 mm (0.012 - 0.017 in)**
	Exhaust	**: 0.338 - 0.462 mm (0.013 - 0.018 in)**
Cold*	**Intake**	**: 0.29 - 0.37 mm (0.011 - 0.015 in)**
	Exhaust	**: 0.32 - 0.40 mm (0.013 - 0.016 in)**

***: Approximately 20°C (68°F) (Reference data)**
When adjusted for cold engine, the standard values for warm engine must be checked to see if they are correct, too.

6. Rotate crankshaft by 360° clockwise (when viewed from font) to align No. 4 cylinder at TDC of its compression stroke.
7. Referring to the figure, measure valve clearances of valves with × in table below.



Cylinder		No. 1	No. 2	No. 3	No. 4
No. 4 cylinder at TDC of its compression stroke.	INT			×	×
	EXH		×		×

8. Adjustment of places outside range of standard values is done as follows.

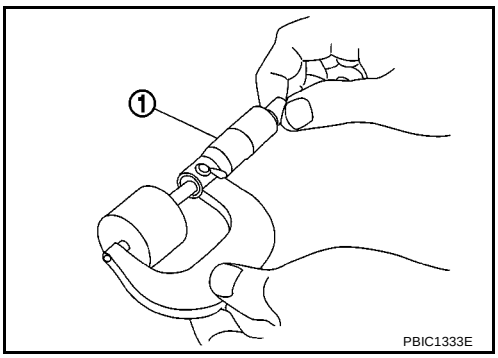
ADJUSTMENT

NOTE:

- The adjustment is made by selecting the thickness of the head of the valve lifter. (An adjuster shim is not used)
- The set thickness for the valve filter is measured at normal temperature, but any changes in dimension because of temperature differences maybe ignored. Accordingly, adjustment should use values for a warmed up engine (ready for inspection).

1. Remove camshaft. Refer to EM-36, "Removal and Installation" .
2. Remove the valve lifters for parts which are outside the range of standard values.

3. Using a micrometer (1), measure thickness of the removed valve lifter center part.



4. Measure the thickness of the valve lifter to be replaced using the following formula.

How to determine valve lifer thickness : $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

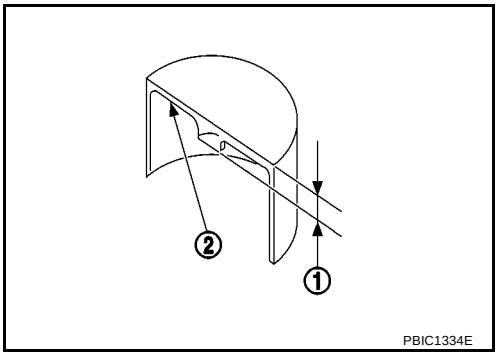
C_1 = Valve clearance measurement

C_2 = Standard valve clearance

Intake : 0.37 mm (0.015 in)

Exhaust : 0.40 mm (0.016 in)

- New valve lifter thickness (1) can be identified by stamp marks (2) on the reverse side (inside of cylindrical part).



Stamp mark	Valve lifter thickness
00	3.00 mm (0.1181 in)
02	3.02 mm (0.1189 in)
.	.
.	.
68	3.68 mm (0.1449 in)

- Valve lifter thickness settings: Thickness 3.00 - 3.68 mm (0.1181 - 0.1449 in) in 0.02 mm (0.0008 in) intervals and 35 types.

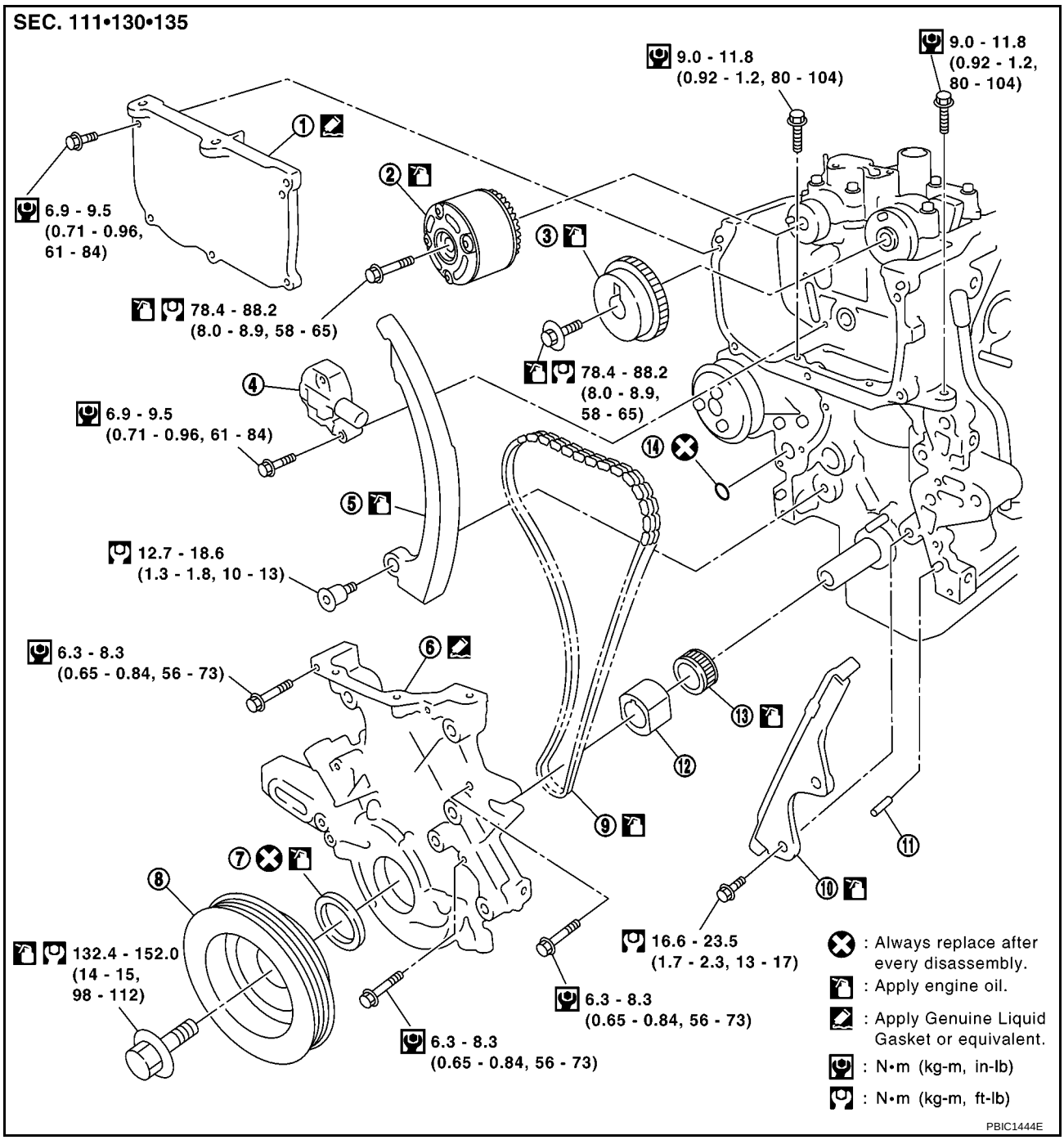
5. Install selected valve lifter.
6. Install camshaft. Refer to EM-36, "Removal and Installation" .
7. Manually turn crankshaft a few turns.
8. Make sure that the valve clearance is within the standard using the reference value when engine is cold.
9. After restoring, make sure the valve clearance is within the range of standard values with the engine warmed up.

TIMING CHAIN

PFP:13028

Removal and Installation

EBS00OF0



1. Cylinder head front cover
2. Camshaft sprocket (intake)
3. Camshaft sprocket (exhaust)
4. Chain tensioner
5. Slack guide
6. Front cover
7. Front oil seal
8. Crankshaft pulley
9. Timing chain
10. Tension guide
11. Dowel pin
12. Oil pump drive spacer
13. Crankshaft sprocket
14. O-ring

REMOVAL

Operation Description

M/T models

1.Remove engine and transaxle assembly from the vehicle. Refer to EM-69, "Removal and Installation" .

2.Separate engine from transaxle. Refer to EM-69, "Removal and Installation" .

3.Remove parts remaining in step 3 and proceed to step 5.

A/T models

: Start from step 1 with the engine mounted in the vehicle.

NOTE:

The reason for doing work with the engine by itself for M/T models is stated below.

- It is necessary to remove the transaxle when removing and installing the oil pan (upper).
- For this reason, the entirety of the supporting engine mount disappears when removing and installing the front cover.

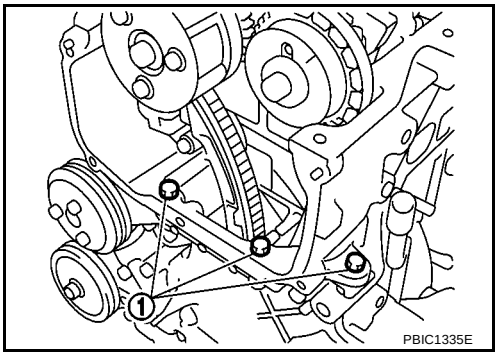
1. Remove RH front wheel and RH front fender protector.
2. Drain the engine oil.
3. Remove the following parts.
   - Drive belts and drive belt idler pulleys; Refer to EM-12, "DRIVE BELTS" .
   - Rocker cover; Refer to EM-33, "ROCKER COVER" .
   - Exhaust front tube; Refer to EX-3, "EXHAUST SYSTEM" .
   - Starter motor; Refer to SC-39, "STARTING SYSTEM" .
   - Oil pan (lower and upper) and oil strainer; Refer to EM-24, "OIL PAN AND OIL STRAINER" .
   - RH headlamp; Refer to LT-6, "HEADLAMP -CONVENTIONAL TYPE-" .
4. Using the following procedure, remove the RH engine mount stay and the RH engine mount brackets (upper and lower).

a. The engine should be immobilized using any one of the following methods.
   - Mount engine slingers and hook with hoist. Refer to EM-69, "Removal and Installation" .
   - Support the transaxle bottom with a jack stand, etc.

   CAUTION:
   Make sure the transaxle is not scratched while the bottom is being supported.

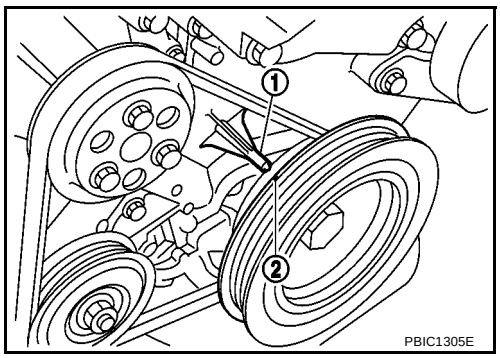
b. Remove RH engine mount stay and RH engine mount bracket (upper and lower). Refer to EM-69, "Removal and Installation" .

5. Remove alternator. Refer to SC-15, "CHARGING SYSTEM" .
6. Remove cylinder head front cover. Refer to EM-36, "CAMSHAFT" .
7. Remove the cylinder head auxiliary bolts (1).



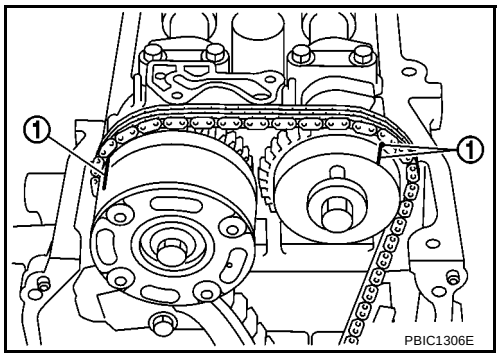
8. Set No. 1 cylinder at TDC on its compression stroke.

a. Turn the crankshaft pulley clockwise as seen from the engine front, and match up the crankshaft pulley TDC mating mark (no color) (2) with the timing indicator (1) on the front cover.



b. Confirm mating marks (1) stamped on intake and exhaust sprockets are rotated as shown.

- If there is no position mark in the figure, turn the crankshaft pulley once more to position them as in the figure.



9. Remove the crankshaft pulley in the following order.

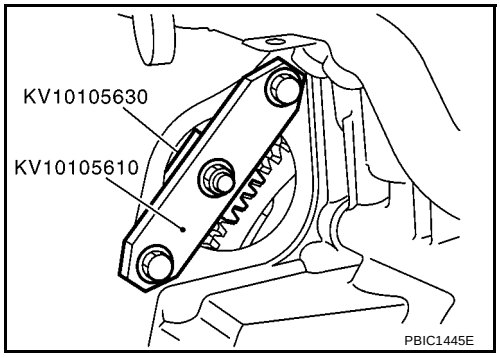
a. Using the starter motor mounting hole, attach a ring gear stopper (special service tool) and secure the crankshaft.

- You can also secure the crankshaft counterweight using hammer handle, etc., after removing the oil pan (upper). Make sure no foreign matter gets inside the engine.

b. Loosen crankshaft bolt and pull it out.

CAUTION:

Do not remove the mounting bolts as they will be used as a supporting point for the pulley puller.

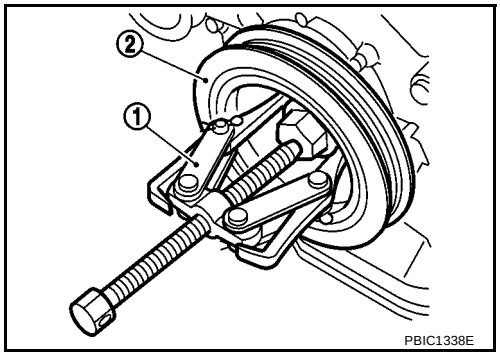


c. Place the crankshaft pulley puller (1) tab on the crank pulley hole, and pull the crankshaft pulley (2) through.

CAUTION:

Do not put the pulley tab on the crank pulley wide-diameter pulley, as this will damage the internal dampers.

10. Remove the idler pulley bracket assembly for drive belts from the front cover. Refer to EM-12, "DRIVE BELTS" .



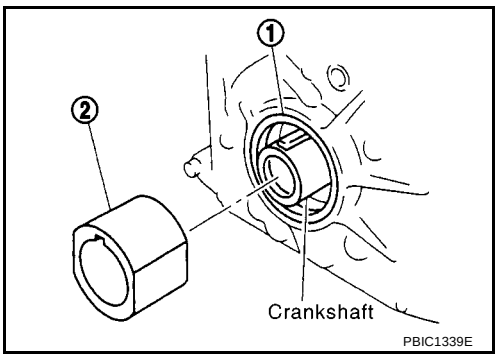
11. Remove the front cover in the following order.

a. To give more freedom to the front cover position during installation and removal, pull out the oil pump drive spacer (2) over the front oil seal (1).

- Pull out straight, using long nosed pliers or two screwdrivers, etc.

CAUTION:

Be careful not to damage oil pump drive spacer surface.

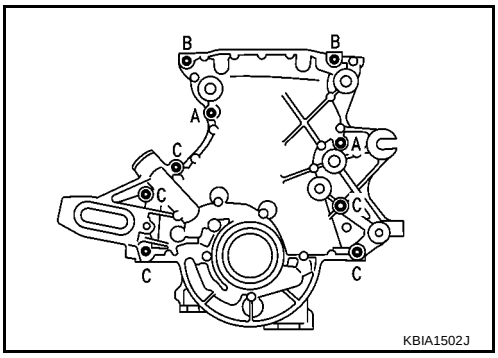


b. Remove front cover carefully.

- Remove bolts A to C shown in the figure.

CAUTION:

- **To prevent the front of the cylinder head gasket from getting bent or damaged, remove so that it comes apart cleanly from the front cover top and the gasket bottom.**
- **Replace the cylinder head gasket with a new one if it is damaged.**



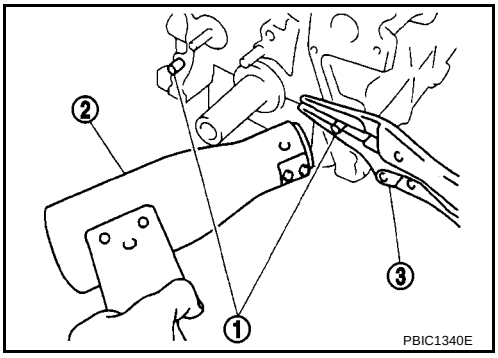
c. Remove O-ring from the cylinder block.

12. Remove the front cover dowel pins (1) from the cylinder block.

- After warming with an industrial drier (2), use locking pliers (3) to pull out the dowel pins.

NOTE:

This step is in preparation for installing the front cover. If the timing chain is to be removed, it can be done later.



13. Remove the front oil seal from the front cover.

- Insert a screwdriver behind the oil seal and pull up to remove.

14. Secure the intake camshaft sprocket in the most advanced position. Refer to EM-36, "CAMSHAFT" .

NOTE:

The following steps are for removing the timing chain and other related parts.

15. Remove chain tensioner. Refer to EM-36, "CAMSHAFT" .

16. Remove camshaft sprocket. Refer to EM-36, "CAMSHAFT" .

NOTE:

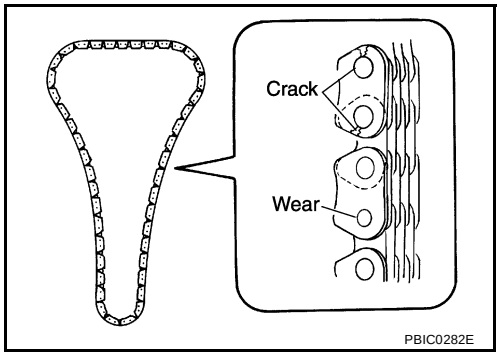
No markings are needed between the camshaft sprocket and timing chain.

17. Remove timing chain, the timing chain slack guide, and the tension guide.

18. Remove the crankshaft sprocket.

INSPECTION AFTER REMOVAL

Make sure there are no noticeable cracks or wear on the timing chain, and replace if there are.



INSTALLATION

CAUTION:

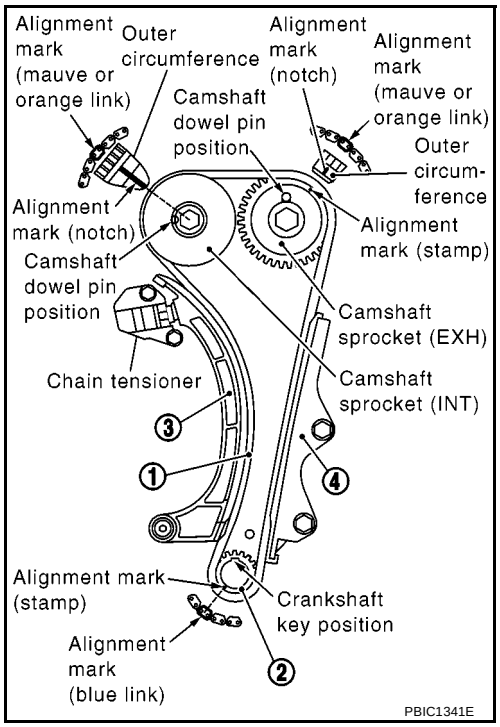
- **Completely remove liquid gasket attached to mounting surfaces using a scraper, and clean off with white gasoline.**
- **After installation, wipe off any extra liquid gasket.**

1. Install the timing chain and related parts in the following steps.
   - See the figure for positions sprockets, timing chain (1), and installation of other parts.
   - Attach each sprocket with its mating mark towards the engine front.

a. Install timing chain and crankshaft sprocket (2).
   - You can make sure the No. 1 cylinder is at the TDC of its compression stroke by checking if the crankshaft key is straight up.
   - Place the timing chain on the front of the camshaft to make sure it does not fall.

b. Install timing chain slack guide (3) and the tension guide (4).

c. Install camshaft sprockets. Refer to EM-36, "CAMSHAFT" .
   - Align the mating marks on camshaft sprocket and timing chain here.



d. Install chain tensioner. Refer to EM-36, "CAMSHAFT" .

e. Check again to make sure all the mating marks are in place.

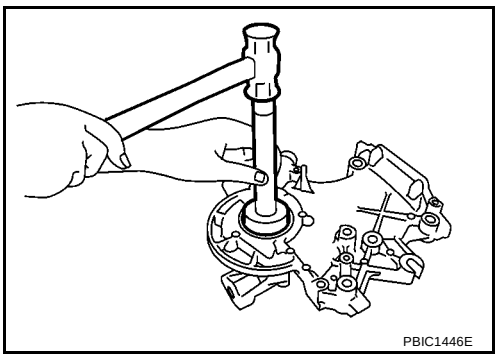
f. Temporarily install the oil pump drive spacer, the crankshaft pulley, and the crankshaft pulley bolt, and make it so that the crankshaft can be turned.

g. Turn the crankshaft clockwise viewing from engine front. Place intake side camshaft in the most retarded position. Refer to EM-36, "CAMSHAFT" .

h. Turn the crankshaft a few more times clockwise and make sure nothing is wrong with it.

i. Remove the parts installed in step f.

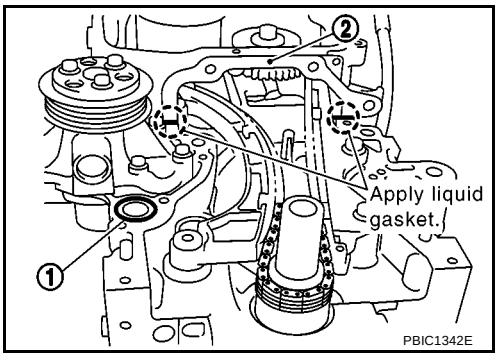
2. Install front oil seal to front cover.
   - Make sure the oil seal lettering is towards the engine front.
   - Using suitable drift, press oil seal in until it is flush with end surface of mounting position.
   - Do this without damaging the outer diameter of the oil seal.



3. Install the front cover with the following procedure:

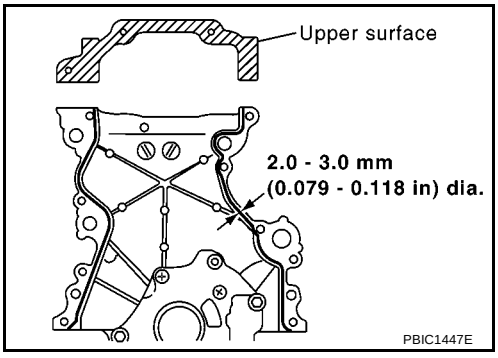
a. Install O-ring (1) to the cylinder block.

b. Apply liquid gasket to the contact area between the bottom of the cylinder head gasket (2) and the cylinder block (two places in the figure) using a screwdriver.
Use Genuine Liquid Gasket or equivalent.



c. Evenly apply the liquid gasket to the back of the front cover as per the position in the figure.

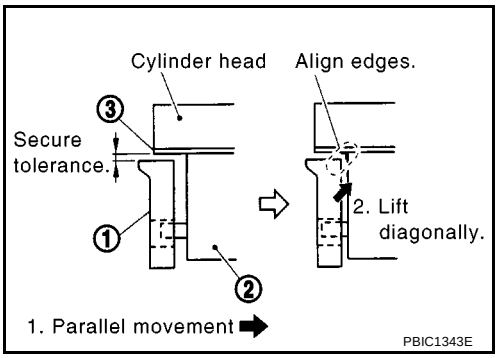
d. Apply a thin, even layer of liquid gasket to the entire upper surface of the front cover.
Use Genuine Liquid Gasket or equivalent.



e. With the inner rotor internal diameter part of the oil pump resting on the top of the crankshaft [with a space between the top of the front cover and the bottom of the cylinder head gasket (3)], bring the front cover (1) as close as possible to the cylinder block. (To the left in the figure)

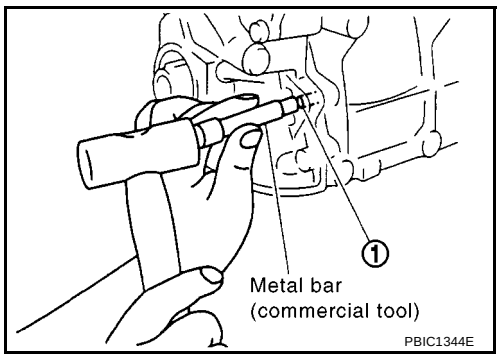
f. To make sure the front cover comes into contact with the cylinder head gasket (3) bottom and the cylinder block (2) front at the same time, lift it diagonally and set it in the mounting position. (To the right in the figure)

CAUTION:
- **Be careful not to damage the cylinder head gasket (3).**
- **Attach using caution not to let the liquid gasket get cut off by getting attached to unnecessary parts.**



g. Temporarily secure the front cover so it does not move using several bolts.

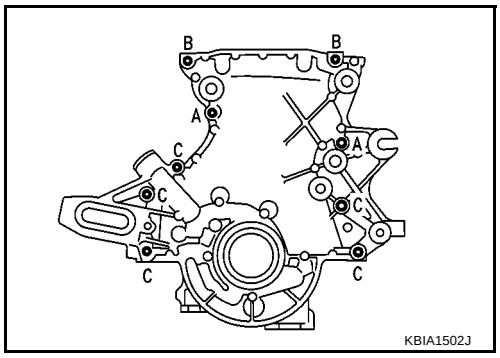
h. Press fit dowel pins (1) to the cylinder block through the front cover.



i. Temporarily tighten the front cover bolts.
- A [Under head length: 25 mm (0.98 in)], B [Under head length: 40 mm (1.57 in)], C [Under head length: 50 mm (1.97 in)]

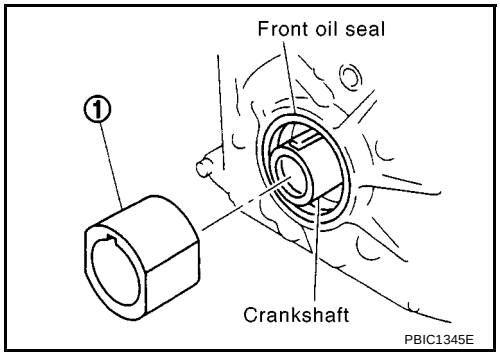
j. Temporarily tighten the cylinder head auxiliary bolts.

k. Tighten front cover bolts and the cylinder head auxiliary bolts to the specified torque.



4. Install oil pump drive spacer (1).
- When installing, align with flat face of oil pump inner rotor.
- If they are not aligned properly, turn the inner rotor with a screwdriver until they do.

CAUTION:
Be careful not to damage the oil seal lip.

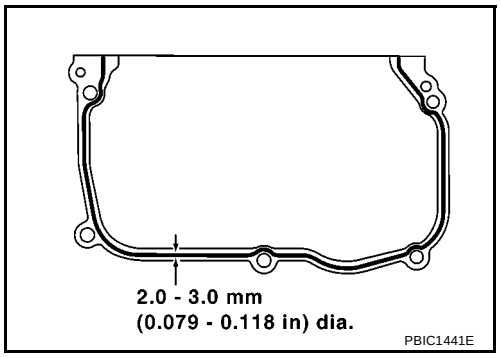


5. Install the drive belt idler pulley bracket assembly. Refer to EM-12, "DRIVE BELTS" .
6. Install crankshaft pulley.
- When installing, make sure the front oil seal lip does not fold back and the garter spring of oil seal lip does not fall.
- Secure the crankshaft as in “REMOVAL” and tighten the bolts.

CAUTION:
The bolt seats have a special lubricant applied in order to stabilize torque, so do not wipe off or apply oil.

7. Install the cylinder head front cover.
- Evenly apply the liquid gasket to the position shown in figure. Use Genuine Liquid Gasket or equivalent

8. Install RH engine mount bracket and RH engine mount stay. Refer toEM-69, "Removal and Installation" .
9. Reinstall removed parts in reverse order of removal.



INSPECTION AFTER INSTALLATION

- In order to allow liquid gasket to be cured, perform inspection at least 30 minutes after the last step in which parts sealed with liquid gasket are installed.
- With engine warmed up, check each part for engine oil leakage.

OIL SEAL

PFP:12279

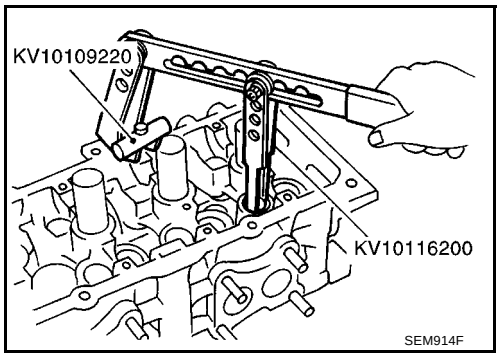
Removal and Installation of Valve Oil Seal

EBS00OF1

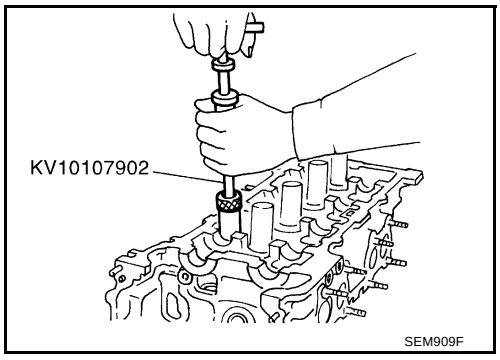
REMOVAL

1. Remove camshaft. Refer to EM-36, "CAMSHAFT" .
2. Remove valve lifter. Refer to EM-36, "CAMSHAFT" .
3. Turn the crankshaft, put the cylinder to have the oil seal removed in the TDC position to prevent the valve from falling into the cylinder.

   CAUTION:
   When rotating the crankshaft, make sure the timing chain does not get caught in the front cover.
4. Using a valve spring compressor (special service tool), remove the valve collet, valve spring retainer, and valve spring.

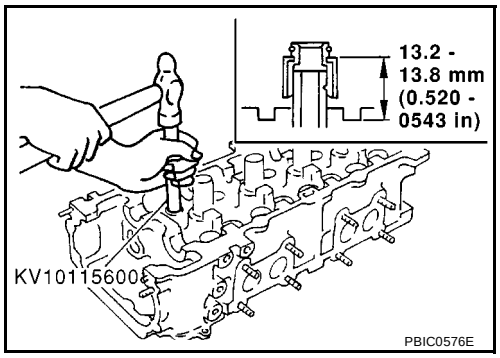


5. Using a valve oil seal puller (special service tool), remove the valve oil seal.



INSTALLATION

1. Apply engine oil to the new valve oil seal joint and seal lip.
2. Using a valve oil seal drift (special service tool), press fit the valve oil seal to the height shown in the figure.
3. Reinstall removed parts in reverse order of removal.



Removal and Installation of Front Oil Seal

EBS00OF2

REMOVAL

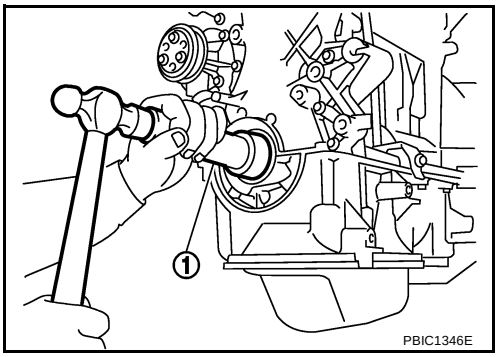
1. Remove the following parts.
   - RH front fender protector
   - Drive belt; Refer to EM-12, "DRIVE BELTS" .
   - Crankshaft pulley; Refer to EM-48, "TIMING CHAIN" .
2. Using a screwdriver, remove the front oil seal.

   CAUTION:
   Be careful not to damage the front cover or the crankshaft.

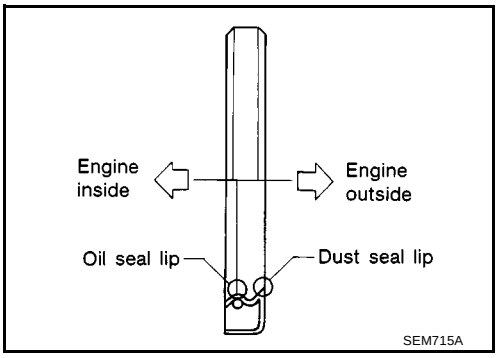
INSTALLATION

1. Apply engine oil to the new front oil seal joint and seal lip.
2. Using a suitable drift (1), press fit until the front end of front oil seal is level with the mounting surface.
   - Suitable drift (1) : outer diameter 50 mm (1.97 in), inner diameter 44 mm (1.73 in).

   CAUTION:
   - **Be careful not to damage the front cover or the crankshaft.**
   - **Press in straight, making sure the oil seal does not curl or tilt.**



   - See the figure for the direction the front oil seal should be fitted.



3. Reinstall removed parts in reverse order of removal.

Removal and Installation of Rear Oil Seal

EBS00OF3

REMOVAL

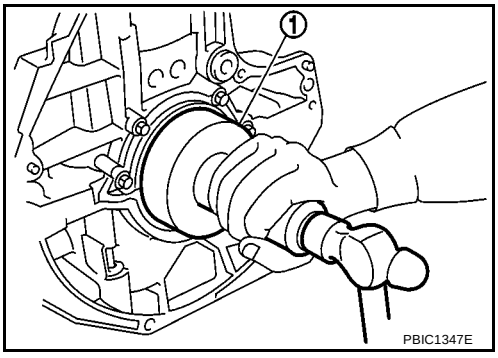
1. Remove transaxle assembly.
   - M/T: Refer to MT-7, "REMOVAL AND INSTALLATION" .
   - A/T: Refer to AT-430, "REMOVAL AND INSTALLATION" .
2. Remove clutch cover and clutch disc. (M/T models) Refer to CL-10, "CLUTCH DISC, CLUTCH COVER AND FLYWHEEL" .
3. Remove flywheel (M/T models), drive plate and adopter (A/T models). Refer to EM-73, "CYLINDER BLOCK" .
4. Using a screwdriver, remove the rear oil seal.

   CAUTION:
   Be careful not to damage the mounting surface.

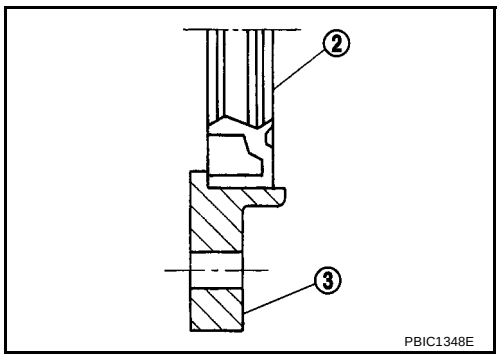
INSTALLATION

1. Using a suitable drift (1), press fit until the rear end of front oil seal is level with the mounting surface.
   - Suitable drift (1): outer diameter 102 mm (4.02 in), inner diameter 90 mm (3.54 in).

   CAUTION:
   - **Do not touch the grease applied to the oil seal lip.**
   - **Be careful not to damage the rear oil seal retainer or the crankshaft.**
   - **Press in straight, making sure the oil seal does not curl or tilt.**



- **Press rear oil seal (2) into rear oil seal retainer (3) so that it does not project from the end.**



2. Reinstall removed parts in reverse order of removal.

CYLINDER HEAD

PFP:11041

On Vehicle Inspection

EBS00OF4

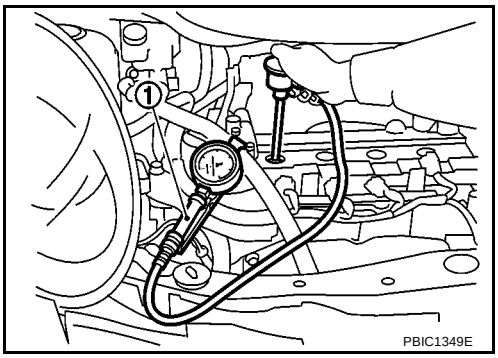
COMPRESSION PRESSURE INSPECTION

1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure with the following procedure.

a. Remove rear seat assembly.
b. Open the inspection hole cover.
c. Disconnect fuel level sensor unit, fuel filter, and fuel pump assembly connector, and start engine. Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .
d. After you stop the engine, crank it two or three times to consume the fuel in the pipes.

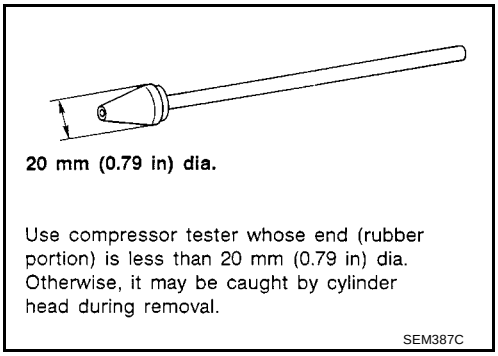
CAUTION:
After release the fuel pressure and until the compression pressure inspection, leave the harness connector off.

3. Remove ignition coil and spark plug from all the cylinders. Refer to EM-27, "IGNITION COIL" and EM-28, "SPARK PLUG (PLATINUM-TIPPED TYPE)" .
4. Attach a engine tachometer (not required in use of CONSULT-II).
5. Install compression tester (1) with adapter onto spark plug hole.



- Use compression tester whose picking up end inserted to spark plug hole is smaller than 20 mm (0.79 in) in diameter. Otherwise, it may be caught by cylinder head during removal.

6. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and engine rpm. Perform these steps to check each cylinder.



[kPa (bar, kg/cm^2 , psi)/350rpm]

Engine type	CR10DE	CR12DE, CR14DE
Standard	1,432 (14.32, 14.6, 208)	1,383 (13.83, 14.1, 201)
Minimum	1,236 (12.36, 12.6, 179)	1,187 (11.87, 12.1, 172)
Difference limit among cylinders	98 (0.98, 1.0, 14)	98 (0.98, 1.0, 14)

CAUTION:
Always use a fully charged battery to obtain specified engine speed.

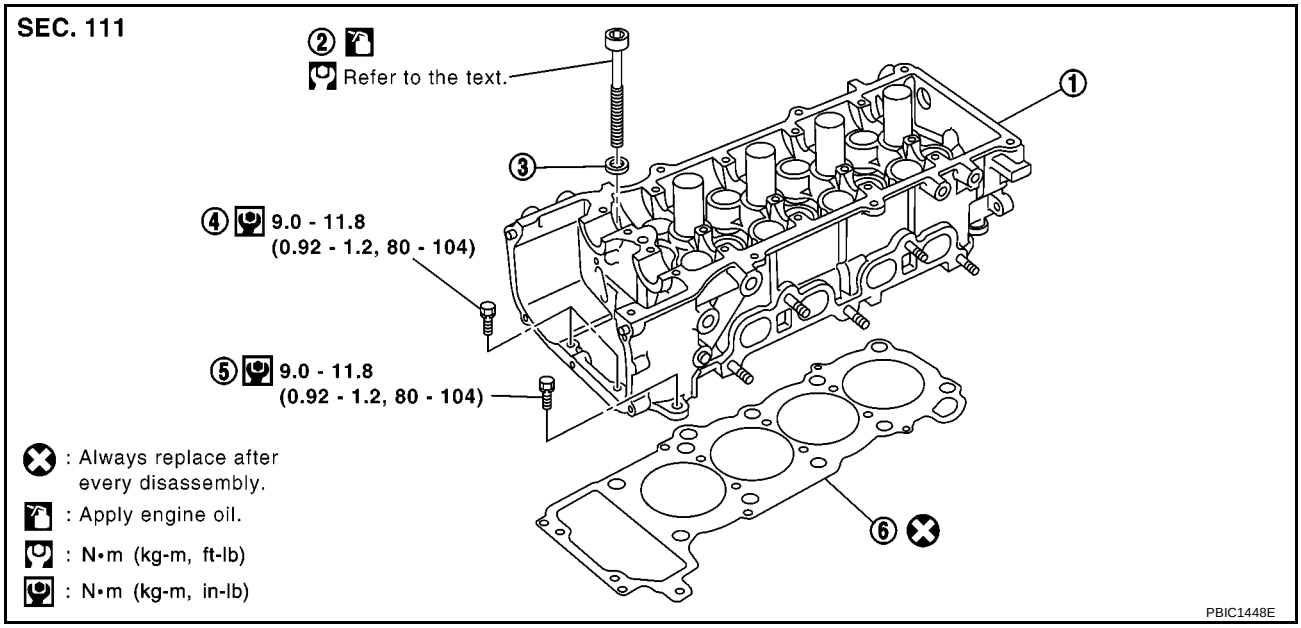
- If the engine speed is out of specified range, check battery liquid for proper gravity. Check engine speed again with normal battery gravity.
- If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (Valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure compression pressure again.
- If some cylinders have low compression pressure, pour small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, the piston rings may be worn out or damaged. Check the piston rings and replace if necessary.

- If the compression pressure remains at low level despite the addition of engine oil, the valves may be malfunctioning. Check the valves for damage. Replace the valve or valve seat accordingly.
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, the gasket is leaking. In such a case, replace the cylinder head gasket.

7. After inspection, install removed parts in reverse order of removal.

Removal and Installation

EBS00OF5



1. Cylinder head assembly
2. Cylinder head bolt
3. Washer
4. Cylinder head auxiliary bolt
5. Cylinder head auxiliary bolt
6. Gasket

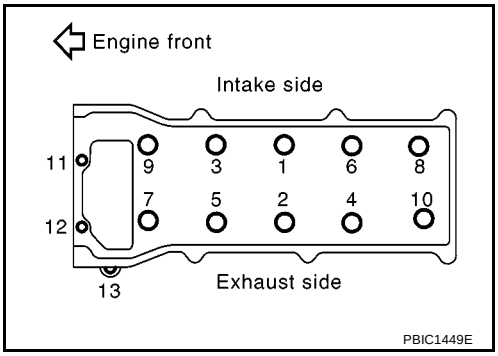
REMOVAL

1. Release the fuel pressure. Refer to EC-44, "FUEL PRESSURE RELEASE" (WITH EURO-OBD), EC-505, "FUEL PRESSURE RELEASE" (WITHOUT EURO-OBD).
2. Drain engine coolant. Refer to CO-8, "ENGINE COOLANT" .
3. Remove the following components and related parts.
   - RH front fender protector
   - Alternator and A/C compressor drive belt; Refer to EM-12, "DRIVE BELTS" .
   - Air duct and air cleaner case assembly; Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
   - Intake manifold; Refer to EM-20, "INTAKE MANIFOLD" .
   - Fuel injector and fuel tube assembly; Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   - Radiator upper hose and lower hose; Refer to CO-11, "RADIATOR" .
   - Alternator and alternator bracket; Refer to SC-15, "CHARGING SYSTEM" .
   - Exhaust manifold and three way catalyst assembly; Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .
   - Ignition coil; Refer to EM-27, "IGNITION COIL" .
   - Rocker cover; Refer to EM-33, "ROCKER COVER" .
   - Camshaft; Refer to EM-36, "CAMSHAFT" .

     CAUTION:
     For the method for maintaining engine position, select the method which supports the bottom of the oil pan.
   - Heated oxygen sensor harness bracket; Refer to EM-22, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .
   - Water outlet, thermostat, engine coolant temperature sensor and heater pipe; Refer to CO-23, "THERMOSTAT" .

- Water suction pipe mounting bolt; Refer to CO-21, "WATER PUMP" .

4. Loosen bolts in the reverse order shown in the figure and then remove the cylinder head assembly.
5. Remove cylinder head gasket.



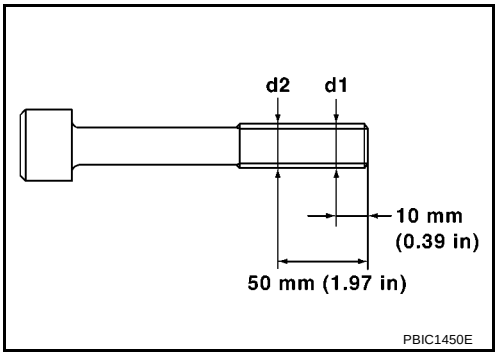
INSPECTION AFTER REMOVAL

Cylinder Head Bolt Outer Diameter

- Cylinder head bolts are tightened by plastic zone tightening method. Whenever the size difference between d1 and d2 exceeds the limit, replace them with new one.

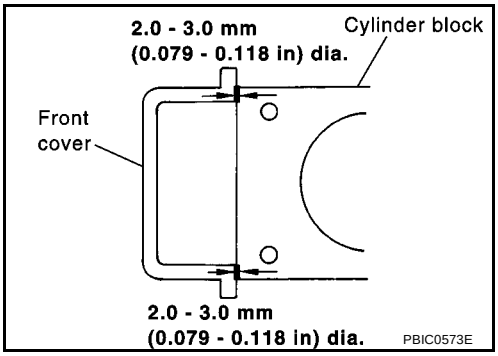
  Limit (d1 - d2) : 0.12 mm (0.0047 in)

- If reduction of outer diameter appears in a position other than d2, use it as d2 point.



INSTALLATION

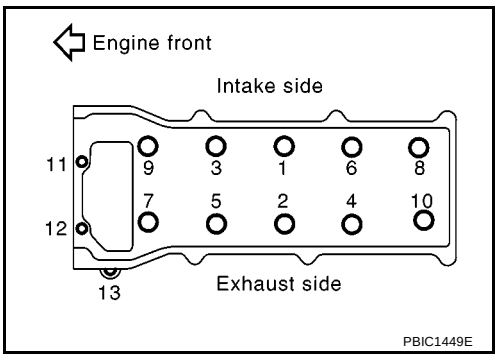
1. Evenly apply the liquid gasket to the position in the figure and then install the cylinder head gasket.
   Use Genuine Liquid Gasket or equivalent.



2. Attach the cylinder head assembly and then tighten bolts 1 to 10 in the order shown in the figure.

   CAUTION:
   For step c, loosen them in reverse of the order in the figure.

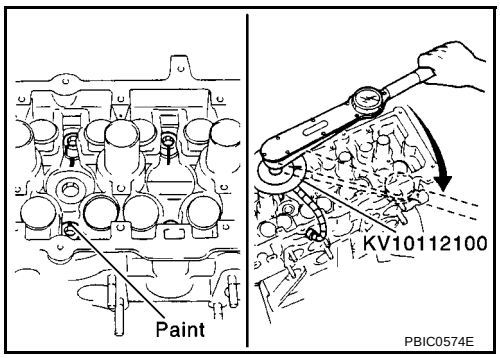
   NOTE:
   Bolts 11 to 13 should be tightened in step 3 after tightening bolts 1 to 10.



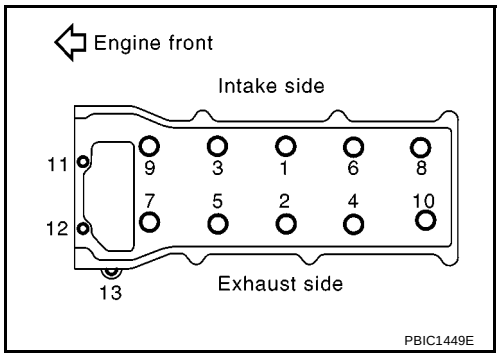
a. Apply new engine oil to threads and seat surfaces of bolts.
b. Tighten at 61.7 - 71.7 N·m (6.3 - 7.3 kg-m, 46 - 52 ft-lb).
c. Loosen completely to 0 N·m (0 kg-m).
d. Tighten at 22.5 - 32.5 N·m (2.3 - 3.3 kg-m, 17 - 23 ft-lb).
e. Tighten with 90 - 95 degrees clockwise [Target: 90 degrees]. (Angle tightening)

   CAUTION:
   Check and confirm the tightening angle by using angle wrench (special service tool). Avoid judgment by visual inspection without the tool.

- Check tightening angle indicated on the angle wrench indicator plate.



3. Tighten auxiliary bolts (11 to 13) in the numerical order shown in the figure.

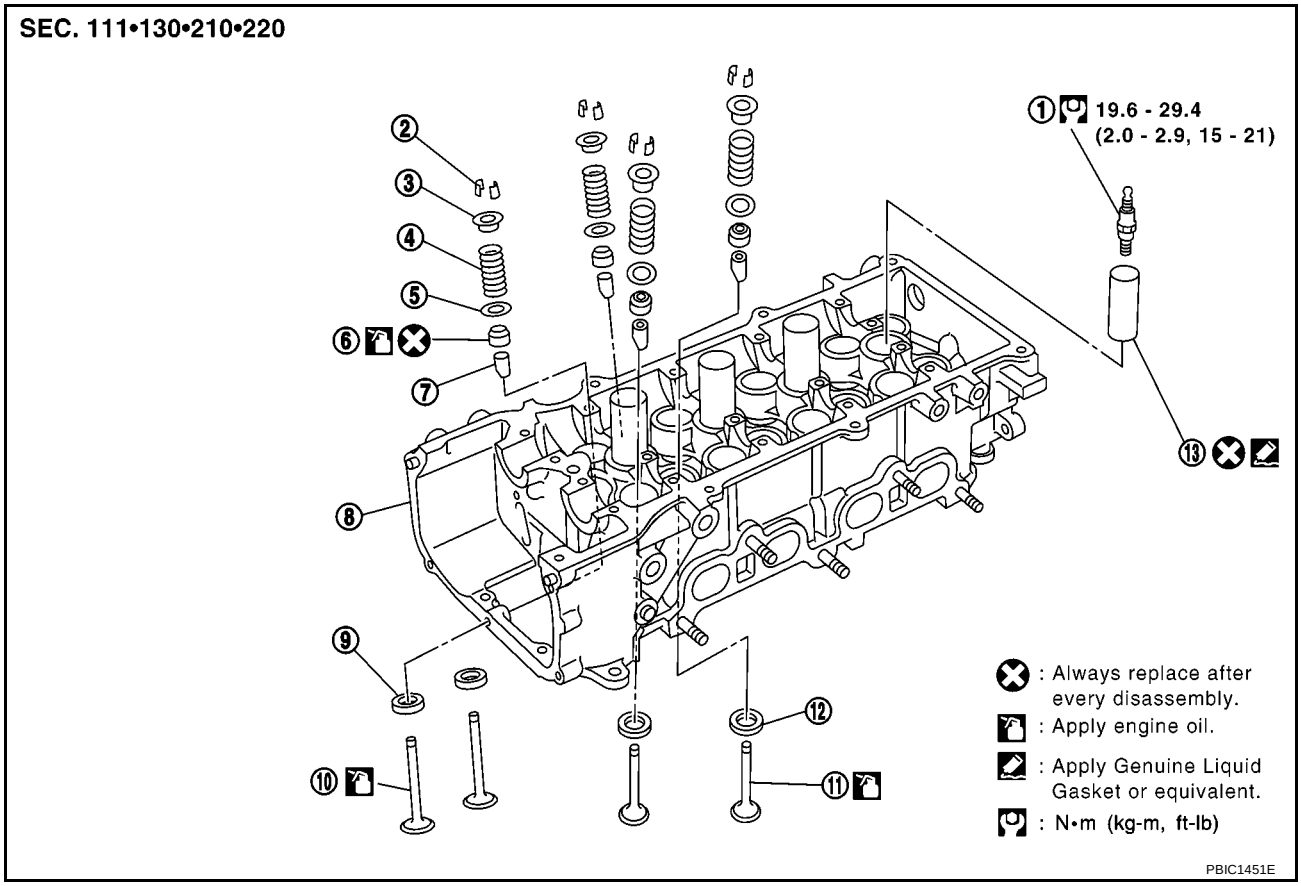


4. Reinstall removed parts in reverse order of removal.

Disassembly and Assembly

EBS00OF6

SEC. 111•130•210•220



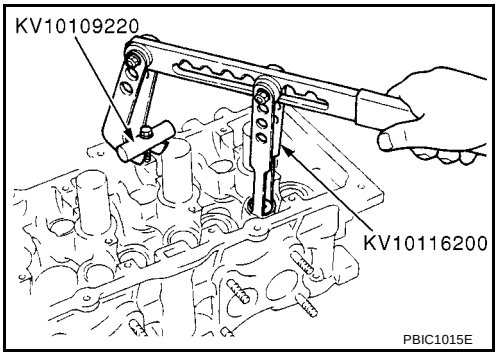
1. Spark plug
2. Valve collet
3. Valve spring retainer
4. Valve spring
5. Valve spring seat
6. Valve oil seal
7. Valve guide
8. Cylinder head
9. Valve seat (INT)

10. Valve (INT)
11. Valve (EXH)
12. Valve seat (EXH)
13. Spark plug tube

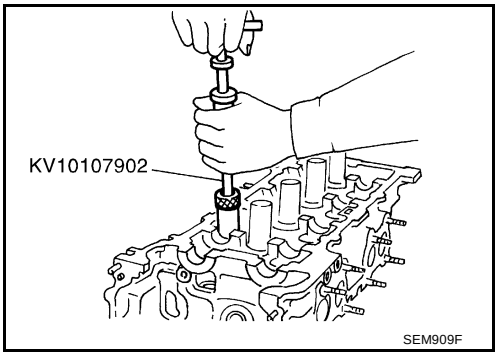
DISASSEMBLY

1. Remove spark plugs with a spark plug wrench.
2. Remove valve lifter.
   - Mark position on valve lifter for assembly.
3. Remove valve collet.
   - Compress the valve spring with a valve spring compressor (special service tool). Remove valve collet with a magnetic driver.

   CAUTION:
   When working, take care not to damage valve lifter holes.



4. Remove valve spring retainer and valve spring.
5. Push the valve stem toward the combustion chamber side and remove the valve.
   - Before removal, check valve guide clearance. Refer to EM-65, "Valve Guide Clearance" .
   - Mark position on valve for assembly.
6. Remove valve oil seal.
   - Use valve oil seal puller (special service tool).

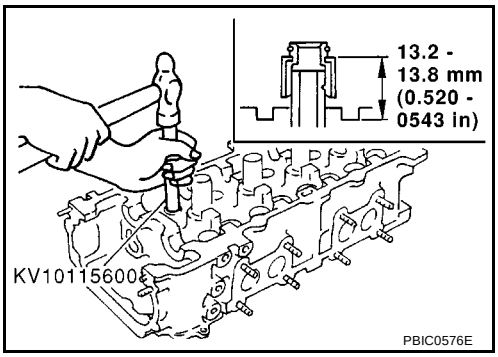


7. Remove valve spring seat.
8. When valve seat replacement is necessary, refer to EM-66, "Replacement of Valve Seat" .
9. When valve guide replacement is necessary, refer to EM-65, "Valve Guide Replacement" .
10. Remove spark plug tube, as necessary.
    - Using a pair of pliers, pull spark plug tube out of cylinder head.

    CAUTION:
    - **Take care not to damage cylinder head.**
    - **Once removed, a spark plug tube will be deformed and cannot be reused. Do not remove it unless absolutely necessary.**

ASSEMBLY

1. Install valve guide. Refer to EM-65, "Valve Guide Replacement" .
2. Install valve seat. Refer to EM-66, "Replacement of Valve Seat" .
3. Install valve oil seal.
   - Using a valve oil seal drift (special service tool), install to the dimensions specified in the figure.

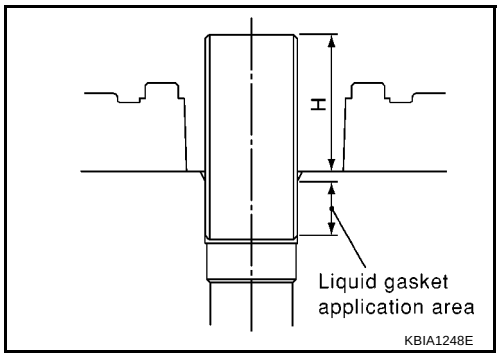


4. Install valve spring seat.
5. Install valve.
   - Valves of larger diameter are for intake side.
6. Install valve spring.
7. Install valve spring retainer.
8. Install valve collet.
   - Use a valve spring compressor (special service tool) to compress the valve spring, then install collet with a magnetic finger.

- After installing valve component parts, tap valve stem tip with a plastic hammer to assure a proper fit.

9. Install valve lifter.
   - Install it in its original positions.
10. Install spark plug tube.
   - Press-fit into cylinder head in the following order.

a. Remove the old liquid gasket which has become attached to the cylinder head mounting hole.
b. Apply the liquid gasket to the area around the spark plug tube press-fit.
   - Use Genuine Liquid Gasket or equivalent.
c. Using a drift, press-fit spark plug tube so that its height “H” is as specified in the figure.



Standard press-fit height “H”

: 41.0 - 42.0 mm (1.614 - 1.654 in)

CAUTION:
- **Press-fit, making sure not to deform the spark plug tube.**
- **After press-fitting, wipe off liquid gasket protruding onto cylinder head upper face.**

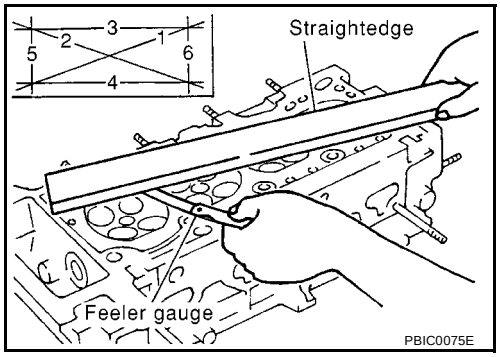
11. Install spark plug.
   - Use a spark plug wrench.

INSPECTION AFTER DISASSEMBLY

Cylinder Head Distortion

1. Using a scraper, wipe off oil, scale, gasket, sealant, and carbon deposits from surface of cylinder head.

   CAUTION:
   Do not allow gasket fragments to enter oil or engine coolant passages.
2. Check flatness of the cylinder head lower surface. Measure distortion in six directions shown in figure, at several points in each direction.

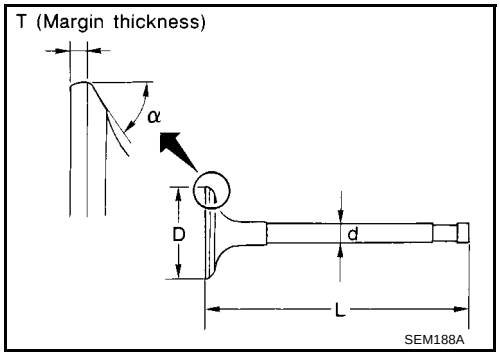


Limit : 0.1 mm (0.004 in)

- if it exceeds the limit, replace the cylinder head.

Valve Dimensions

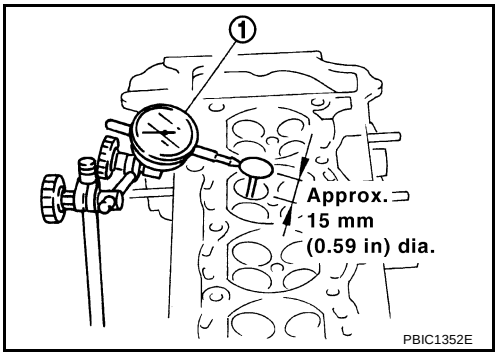
- Check dimensions of each valve. For dimensions, refer to EM-95, "VALVE" .
- If dimensions are out of the standard, replace valve.



Valve Guide Clearance

Check valve guide clearance before removing the valve guide.

1. Make sure valve stem diameter is within the standard.
2. Push the valve out toward combustion chamber for approximately 15 mm (0.59 in). Measure runout while pushing the valve toward the dial gauge (1).
3. The half of the dial gauge reading is the valve guide clearance.



Standard

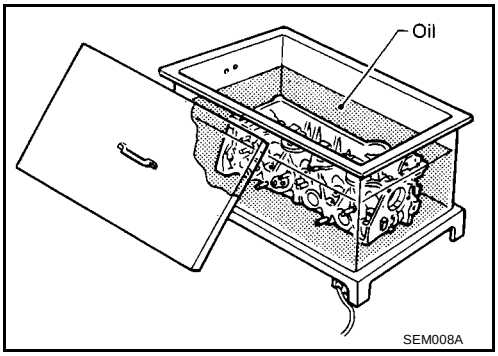
Intake : 0.020 - 0.053 mm (0.0008 - 0.0021 in)

Exhaust : 0.040 - 0.073 mm (0.0016 - 0.0029 in)

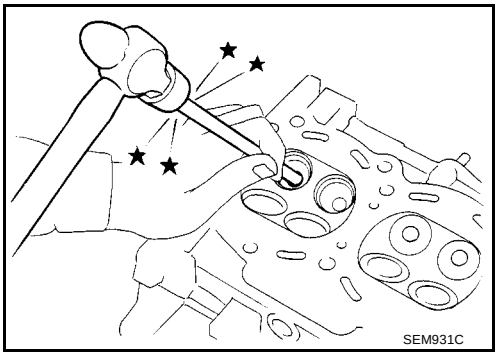
Valve Guide Replacement

When valve guide is removed, replace with oversized [0.2 mm (0.008 in)] valve guide.

1. To remove valve guide, heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



2. Drive out valve guide with a press [under a 20 kN (2 ton, 2.2 US ton, 2.0 lmp ton) pressure] or hammer and suitable tool.

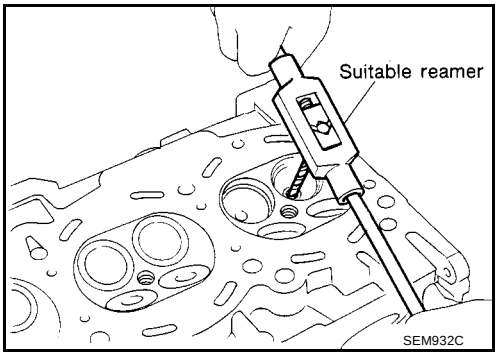


3. Ream cylinder head valve guide hole.

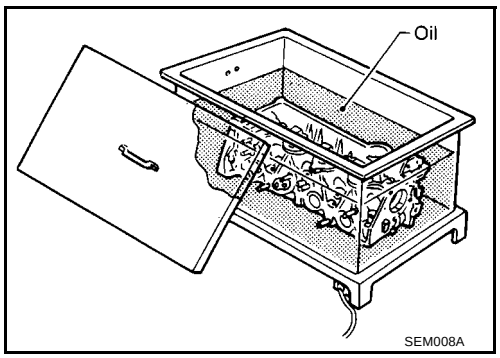
Valve guide hole diameter (for service parts):

Intake and exhaust

: 9.685 - 9.696 mm (0.3813 - 0.3817 in) dia.

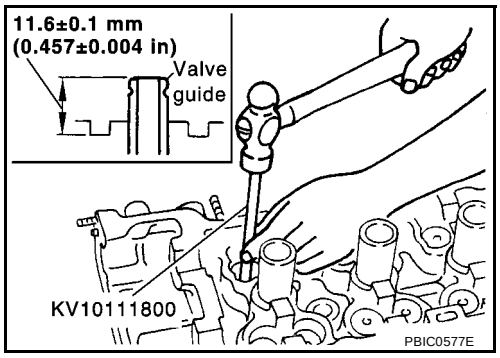


4. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



5. Press valve guide from camshaft side to dimensions as in illustration.

CAUTION:
Cylinder head contains heat. When working, wear protective equipment to avoid getting burned.

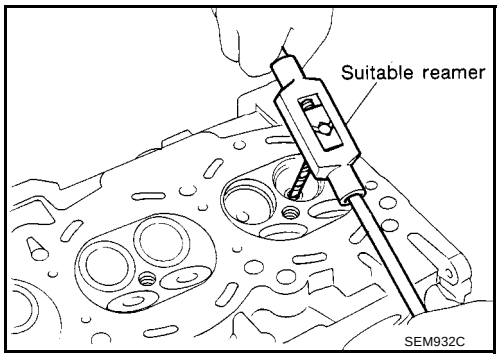


6. Using valve guide reamer, apply reamer finish to valve guide.

Standard

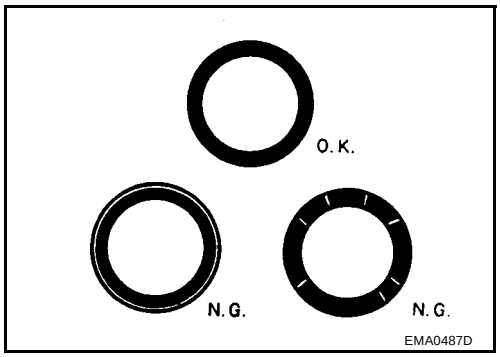
Intake and exhaust

: 5.500 - 5.518 mm (0.2165 - 0.2172 in) dia.



Valve Seat Contact

- After confirming that the dimensions of valve guides and valves are within specifications, perform this procedure.
- Apply prussian blue (or white lead) onto contacting surface of valve seat to check the condition of the valve contact on the surface.
- Check if the contact area band is continuous all around the circumference.
- If not, grind to adjust valve fitting and check again. If the contacting surface still has N.G conditions even after the re-check, replace valve seat.



Replacement of Valve Seat

When valve seat is removed, replace with oversized [0.5 mm (0.020 in)] valve seat.

1. Bore out old seat until it collapses. Boring should not continue beyond the bottom face of the seat recess in cylinder head. Set the machine depth stop to ensure this.

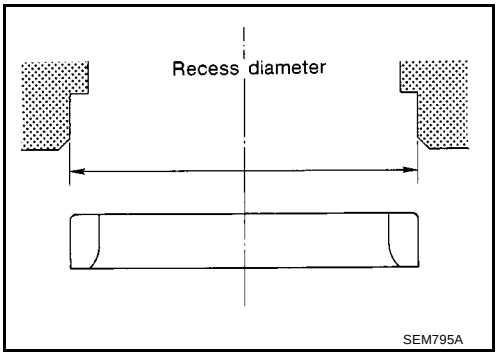
2. Ream cylinder head recess diameter for service valve seat.

Oversize [0.5 mm (0.020 in)]:

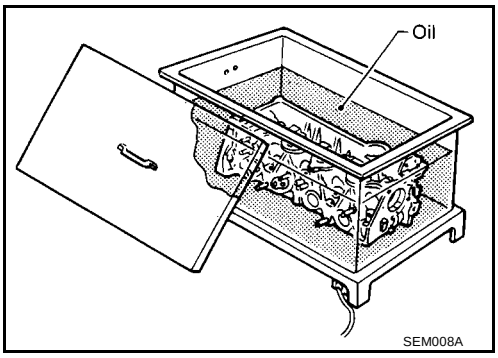
Intake: 29.000 - 29.016 mm (1.1417 - 1.1424 in)

Exhaust: 24.000 - 24.016 mm (0.9449 - 0.9455 in)

- Be sure to ream in circles concentric to the valve guide center.
- This will enable valve seat to fit correctly.



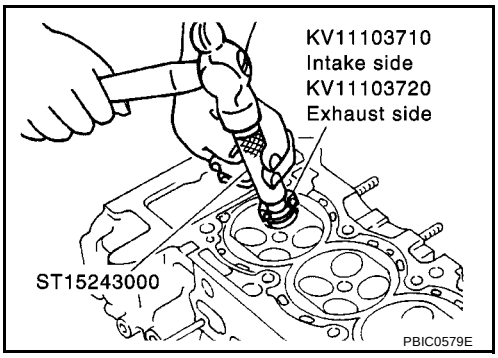
3. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



4. Provide valve seats cooled well with dry ice. Force fit valve seat into cylinder head.

CAUTION:

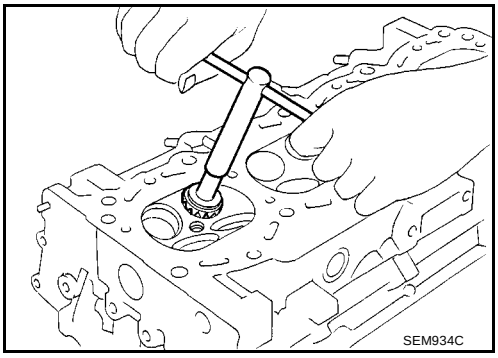
- **Avoid directly to touching cold valve seats.**
- **Cylinder head contains heat. When working, wear protective equipment to avoid getting burned.**



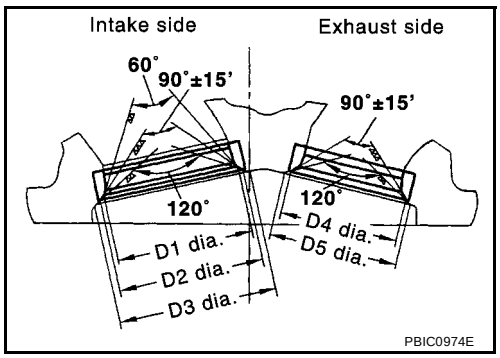
5. Using valve seat cutter set (commercial service tool) or valve seat grinder, finish the seat to the specified dimensions.

CAUTION:

When using valve seat cutter, firmly grip the cutter handle with both hands. Then, press on the contacting surface all around the circumference to cut in a single drive. Improper pressure on with the cutter or cutting many different times may result in stage valve seat.



Grind to obtain the dimensions indicated in figure.



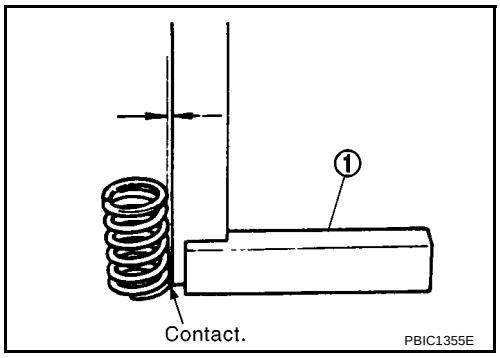
Standard:

D1 dia. : 25.4 mm (1.000 in)
D2 dia. : 27.0 - 27.2 mm (1.062 - 1.070 in)
D3 dia. : 28.7 - 28.9 mm (1.129 - 1.137 in)
D4 dia. : 22.0 - 22.2 mm (0.866 - 0.874 in)
D5 dia. : 23.7 - 23.9 mm (0.933 - 0.940 in)

6. Using compound, grind to adjust valve fitting.
7. Check again for normal contact.

Valve Spring Squareness

Set try square (1) along the side of valve spring and rotate the spring. Measure the maximum clearance between the top face of spring and try square (1).

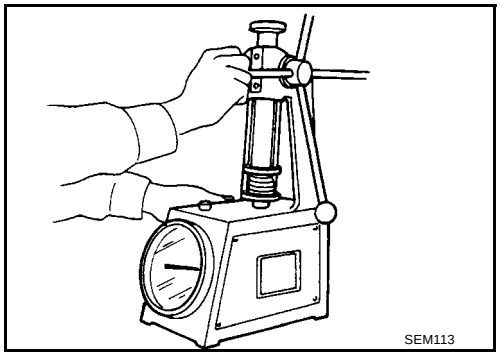


Limit : 1.6 mm (0.063 in)

- if exceeds the limit, replace the valve spring.

Valve Spring Dimensions and Valve Spring Pressure Load

- Check valve spring pressure load at specified spring height.



Standard

Free height	**:**	**53.3 mm (2.098 in)**
Installation height	**:**	**32.82 mm (1.2921 in)**
Installation load	**:**	**149 - 165 N (15.2 - 16.8 kg, 33.5 - 37 lb)**
Height during valve open	**:**	**24.73 mm (0.9736 in)**
Load with valve open	**:**	**228 - 250 N (23.3 - 25.5 kg, 51.3 - 56.2 lb)**

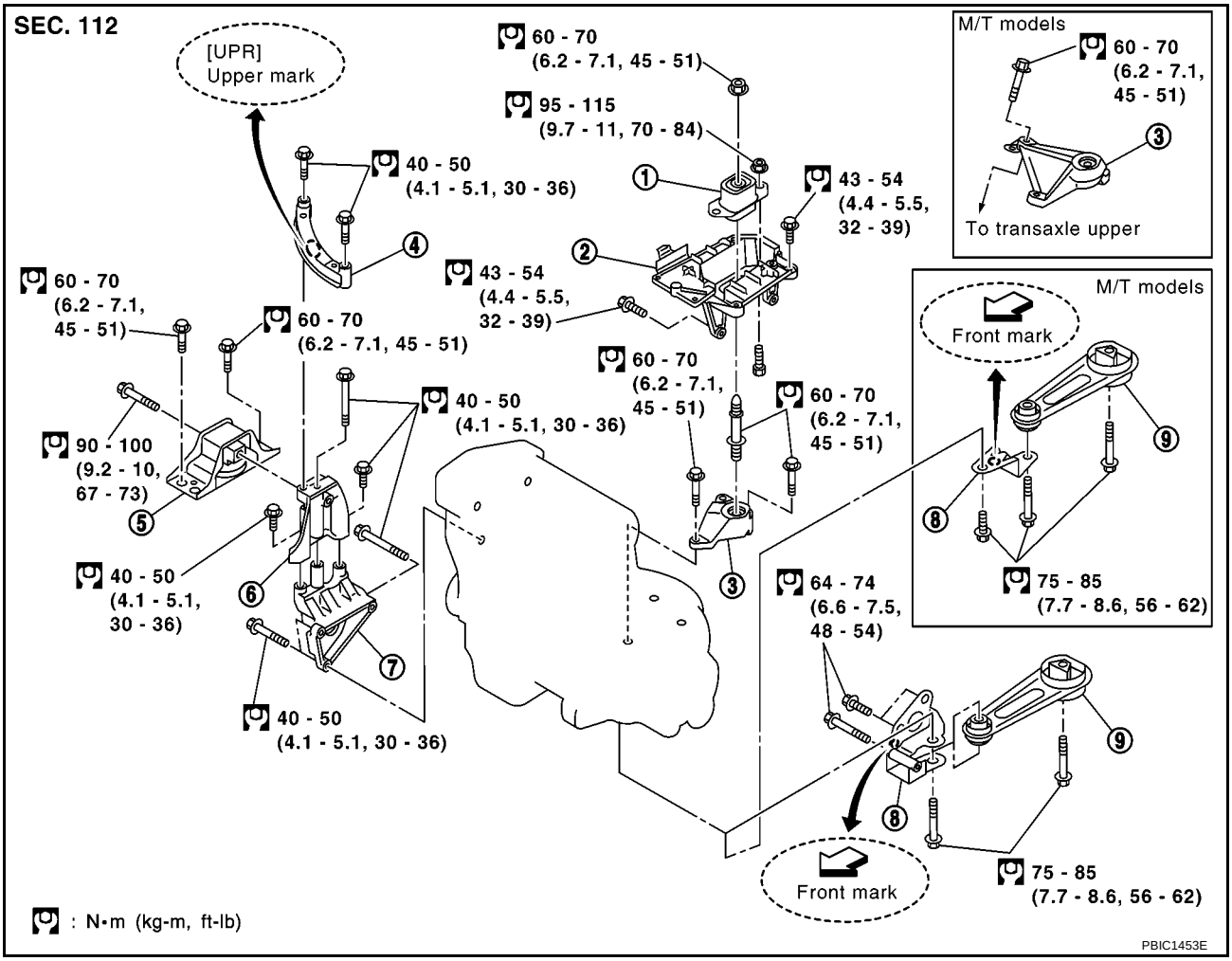
- If the dimensions exceed the standard, replace the valve spring.

ENGINE ASSEMBLY

PFP:10001

Removal and Installation

EBS00OF7



1. LH engine mount insulator	2. LH engine mount bracket (vehicle side)	3. LH engine mount bracket (transaxle side)
4. RH engine mount stay (The shape may not be the same as figure)	5. RH engine mount insulator	6. RH engine mount bracket (upper)
7. RH engine mount bracket (lower)	8. Rear engine mount bracket	9. Rear torque rod

WARNING:

- **Situate vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **For engines not equipped with engine slingers, attach proper slingers and bolts described in PARTS CATALOG.**

CAUTION:

- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and engine coolant are cool enough.**
- **If items or work required are not covered by the engine main body section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-38, "Garage Jack and Safety Stand" .**

REMOVAL

Description of work

Remove engine and transaxle assembly from vehicle, and separate engine and transaxle.

Preparation

1. When engine can be hoisted, remove engine hood.
2. Release fuel pressure. Refer to EC-44, "FUEL PRESSURE RELEASE" (WITH EURO-OBD), EC-505, "FUEL PRESSURE RELEASE" (WITHOUT EURO-OBD).
3. Drain engine coolant. Refer to CO-8, "ENGINE COOLANT" .
4. Remove the following parts.
   - RH and LH front wheel
   - RH and LH front fender protector
   - Exhaust front tube; Refer to EX-3, "EXHAUST SYSTEM" .
   - Drive belt; Refer toEM-12, "DRIVE BELTS" .
   - Air duct; Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
   - Battery
   - Radiator; Refer to CO-11, "RADIATOR" .

Engine room LH

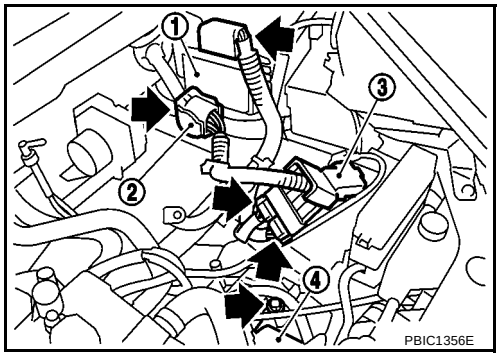
5. Disconnect the harness connectors and terminals from the following parts.

   NOTE:
   Figure shows A/T models. The position of the ground wire on the transaxle side is different for M/T models.

   - Remove the ECM (1) from the bracket and disconnect the two harness connectors.

   CAUTION:
   Avoid impacts to ECM.

   - Disconnect the intermediate connector (2) for the main harness between the vehicle and the engine room below the ECM.
   - Disconnect the harness connectors on the battery positive terminal (3).
   - Disconnect the ground wire on the transaxle (4) side.



6. Disconnect heater hose. Plug the hose immediately to prevent engine coolant from draining.
7. Disconnect the shift cable and the control cable (M/T models) or control cable (A/T models) from the transaxle.
   - M/T: Refer to MT-12, "CONTROL LINKAGE" .
   - A/T: Refer to AT-418, "A/T SHIFT LOCK SYSTEM" .
8. Disconnect the clutch tube from the transaxle side and temporarily fasten to vehicle. (M/T models)
   - Install the plug to prevent the clutch fluid from leaking.
9. Remove the crankshaft position sensor (POS) from the transaxle.

   CAUTION:
   Handle it carefully, avoid any chance of impact caused by dropping.

Engine room front and RH

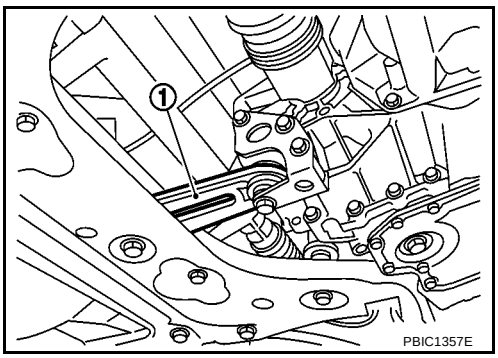
10. Remove the ground wire between the alternator bracket and the vehicle.
11. Remove RH engine mount stay, alternator bracket, and alternator.
12. Remove A/C compressor from engine with piping connected, and temporarily install it to vehicle with rope to avoid putting stress on air conditioner pipes.
13. Remove fuel tube protector. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
14. Disconnect fuel hose. Plug the hose immediately to prevent fuel from draining.

Vehicle underbody

15. Remove the ABS wheel sensor from the steering knuckle.

16. Remove brake caliper from steering knuckle. Temporarily fix on vehicle side with rope or so to avoid putting stress on brake hose. Refer to BR-21, "FRONT DISC BRAKE" .
17. Remove RH and LH drive shafts. Refer to FAX-10, "FRONT DRIVE SHAFT" .
18. Remove rear torque rod (1).

NOTE:
Figure shows A/T models. The shape of the bracket on the transaxle side is different for M/T models.



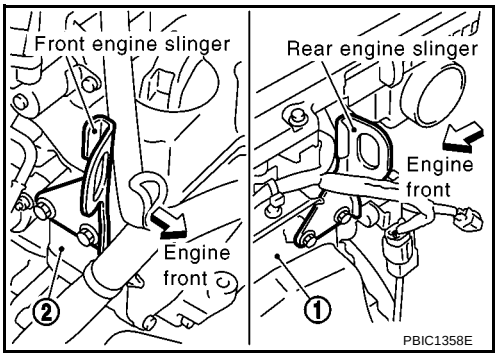
Removal

19. Install engine slinger to cylinder head front left side (1) and rear right side (2) and support the engine position with a hoist.

NOTE:
Front side and rear side engine slinger are common parts.

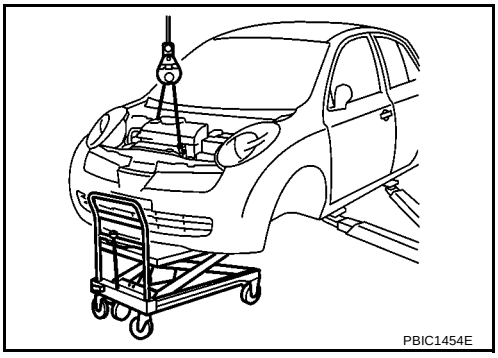
: 16.6 - 23.5 N·m (1.7 - 2.3 kg-m, 13 - 17 in)

- For front side, remove harness bracket under fuel tube protector and mount by using harness bracket mounting hole. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .

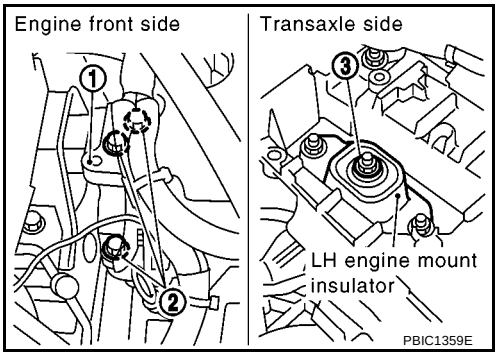


20. Lift to a height sufficient to allow easy work, support the bottom of the engine with either a manual lift table caddy (commercial service tool) or two suitable jacks, and adjust the tension of the hoist.

CAUTION:
- **Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.**
- **Make sure the hanging chain or hanging hook does not come into contact with the A/C piping or the vehicle (cowl top). Also make sure they do not get in the way by moving while the work is being done.**



21. Remove the RH engine mount bracket (upper) (1) mounting bolts (2).
22. Remove the LH engine mount bolt-securing nut (3).



23. Carefully lower the manual lift table caddy or suitable jack, (or carefully raise the lift), and remove the engine and transaxle assembly from the vehicle.
- If you are going to lower the engine side, do this in tandem with the hoist.

CAUTION:
- **This should be done making sure it does not come in contact with the vehicle.**
- **Check that all connection points have been disconnected.**

- **Make sure the hanging chain or hanging hook does not come into contact with the A/C piping or the vehicle (cowl top).**
- **During engine and transaxle assembly removal, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
- **If necessary, support the rear side of the vehicle with jack to prevent it from falling off.**

Separation Work

- On level ground, separate engine and transaxle with the following procedure:

CAUTION:
During the operation, securely support the engine by placing a piece of wood under the engine oil pan, transaxle oil pan, and suspension member, and suspend the engine slingers by hoist.

24. Remove the starter motor. Refer to SC-39, "STARTING SYSTEM" .
25. Separate the engine and the transaxle.
    - M/T: Refer to MT-7, "REMOVAL AND INSTALLATION" .
    - A/T: Refer to AT-430, "REMOVAL AND INSTALLATION" .

INSTALLATION

Install in the reverse order of removal while being careful of the following.

- Do not allow the engine mount insulator to be damaged and be careful no oil gets on it.
- For a part with a specified installation orientation, refer to component figure in EM-69, "Removal and Installation" .
- Make sure all mount insulators are seated properly, then tighten nuts and bolts.

INSPECTION AFTER INSTALLATION

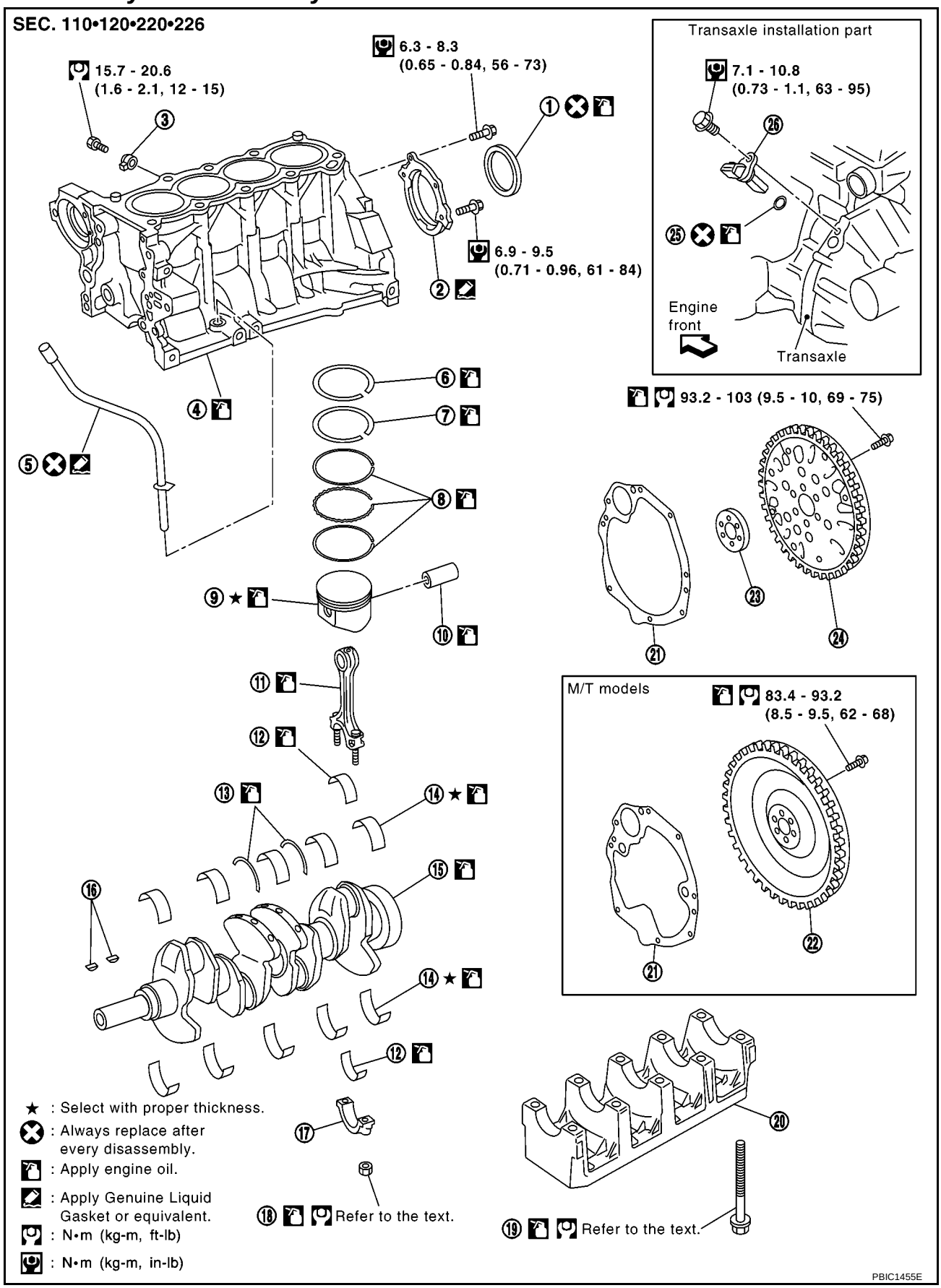
- Before starting engine, check the levels of engine coolant, lubrications and working oils. If less than required quantity, fill to the specified level.
- Use procedure below to check for fuel leakage.
  - Turn ignition switch ON (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
  - Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of engine coolant, lubricants, working oil, fuel and exhaust gas.
- Bleed air from passages in pipes and tubes of applicable lines, such as in cooling system.
- After cooling down engine, again check amounts of engine coolant, lubricants, oil, and fluid. Refill to specified level, if necessary.

CYLINDER BLOCK

PFP:11010

Disassembly and Assembly

EBS00OGH



1. Rear oil seal
2. Rear oil seal retainer
3. Knock sensor
4. Cylinder block
5. Oil level gauge guide
6. Top ring
7. Second ring
8. Oil ring
9. Piston
10. Piston pin
11. Connecting rod
12. Connecting rod bearing
13. Thrust bearing
14. Main bearing
15. Crankshaft
16. Key
17. Connecting rod cap
18. Connecting rod nut
19. Main bearing cap bolt
20. Main bearing cap
21. Rear plate
22. Flywheel (M/T models)
23. Adapter (A/T models)
24. Drive plate (A/T models)
25. O-ring
26. Crankshaft position sensor (POS)

DISASSEMBLY

1. Remove engine and transaxle assembly from the vehicle and separate transaxle from the vehicle. Refer to EM-69, "Removal and Installation" .
2. Install engine to engine stand in the following procedure.

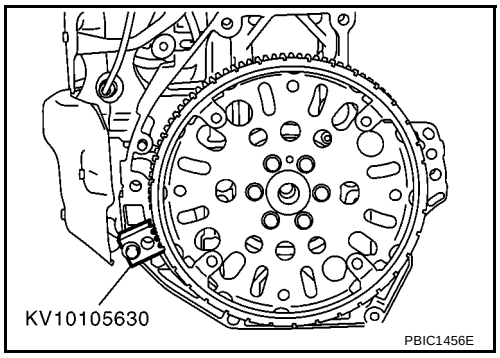
   NOTE:
   We will use as an example the engine stand (commercial service tool) specified to support the cylinder block rear (transaxle mounting surface).

a. Remove clutch cover and clutch disc. (M/T models) Refer to CL-10, "CLUTCH DISC, CLUTCH COVER AND FLYWHEEL" .

b. Remove the flywheel (M/T models), the drive plate and the adapter (A/T models).

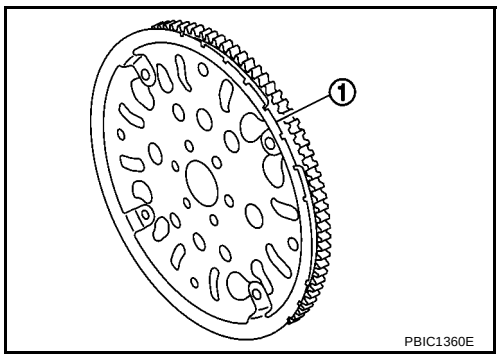
- Using a ring gear stopper (special service tool), secure the crankshaft, loosen the bolts diagonally and remove.

  NOTE:
  Figure shows the drive plate.



CAUTION:
Make sure signal plate (1) are not damaged or deformed.

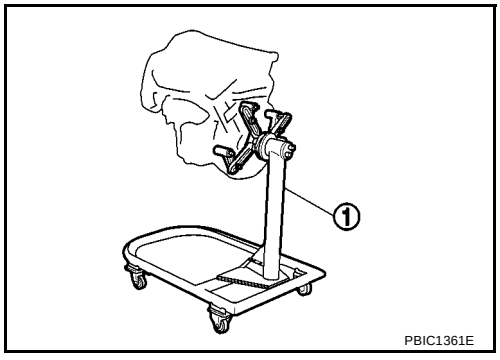
NOTE:
Figure shows the drive plate.



c. Remove rear plate.

d. Lift engine using a hoist and mount it on an engine stand (1).

- For installation of engine slingers, refer to EM-69, "Removal and Installation" .

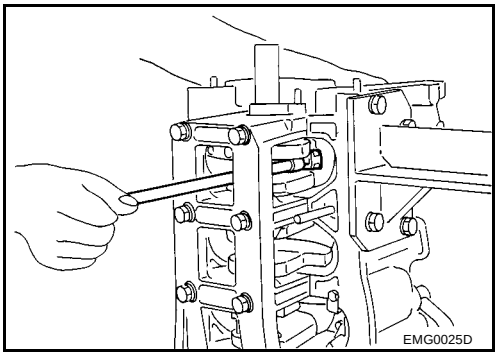


3. Drain engine oil and engine coolant from engine.
4. Remove following components and related parts.
   - Air cleaner case assembly; Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
   - Intake manifold; Refer to EM-20, "INTAKE MANIFOLD" .
   - Fuel injector and fuel tube assembly; Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   - Ignition coil; Refer to EM-27, "IGNITION COIL" .
   - Rocker cover; Refer to EM-33, "ROCKER COVER" .
   - Oil pan and oil strainer; Refer to EM-24, "OIL PAN AND OIL STRAINER" .
   - Front cover and timing chain; Refer to EM-48, "TIMING CHAIN" .
   - Camshaft; Refer to EM-36, "CAMSHAFT" .
   - Cylinder head assembly; Refer to EM-59, "CYLINDER HEAD" .
   - Oil filter; Refer to LU-6, "OIL FILTER" .
   - Oil pressure switch; Refer to LU-4, "OIL PRESSURE CHECK" .
5. Remove knock sensor.

   CAUTION:
   Avoid impact such as a dropping.
6. Remove oil level gauge guide, if necessary.

   CAUTION:
   Once removed, it cannot be reused. Do not remove it unless absolutely necessary.
7. Remove rear oil seal retainer.
   - Remove by inserting a screwdriver between main bearing cap and rear oil seal retainer.
8. Remove rear oil seal from rear oil seal retainer.
   - Remove by driving it out using a screwdriver.

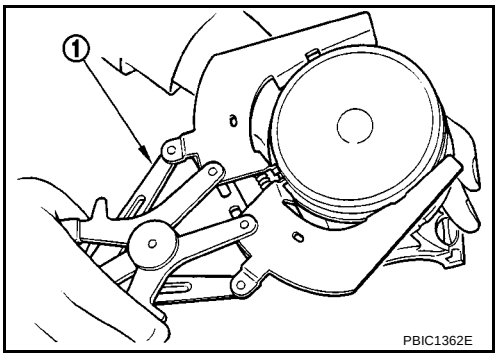
   CAUTION:
   Make sure the rear oil seal retainer is not damaged.
9. Remove piston and connecting rod assembly.
   - Before removing connecting rod, check connecting rod side clearance. Refer to EM-85, "CONNECTING ROD SIDE CLEARANCE" .



a. Position the crankshaft pin corresponding to the connecting rod to be removal onto the bottom dead center.
b. Remove connecting rod cap.
c. Push the piston and connecting rod assembly out toward cylinder head side with handle of a hammer.
10. Remove connecting rod bearings from connecting rod and connecting rod cap.

    CAUTION:
    When removing, check each part, and arrange them in a way that prevents mixing them up.
11. Remove piston rings from piston.
    - Use piston ring expander (1).

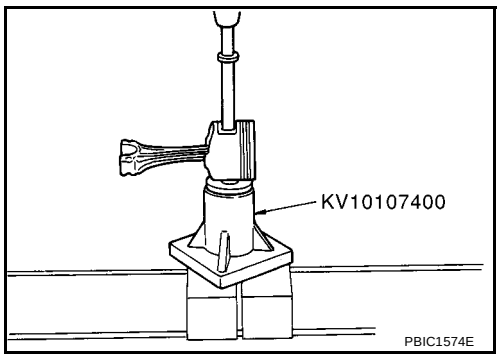
    CAUTION:
    - **Be careful not to damage piston.**
    - **Do not expand piston rings excessively. It can damage piston rings.**
    - Before removal of piston ring, check piston ring side clearance. Refer to EM-85, "PISTON RING SIDE CLEARANCE" .



12. Remove piston from connecting rod.
    - Use a piston pin press stand and a press to remove the piston pin.

    NOTE:
    The joint between the connecting rod and the piston pin is a press fit.

    CAUTION:
    Be careful not to damage the piston and connecting rod.



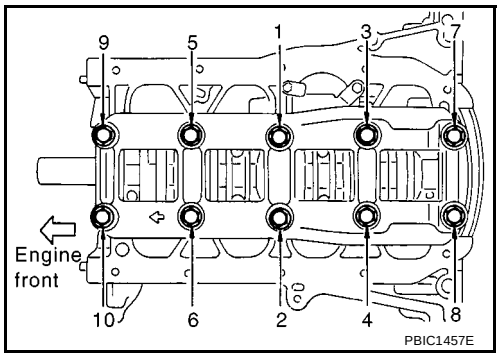
13. Remove the main bearing cap in the following order.

a. Loosen and remove bolts in several steps in reverse of the numerical order shown in figure.
    - Before loosening main bearing cap bolts, measure the crankshaft side clearance. Refer to EM-84, "CRANKSHAFT SIDE CLEARANCE" .

b. Tapping lightly with a plastic hammer, remove the main bearing cap.

14. Remove crankshaft.

15. Remove main bearing and thrust bearing from cylinder block and main bearing cap.

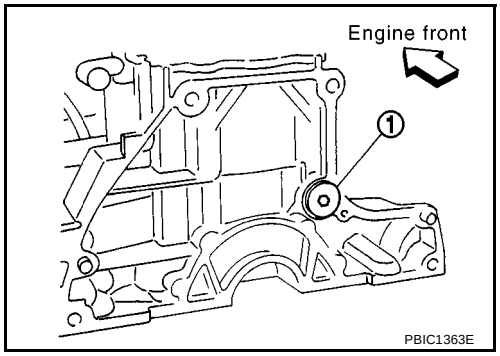


CAUTION:
Identify installation position of each part. Arrange removed parts so as not to mix them up.

ASSEMBLY

1. Thoroughly clean engine coolant and oil passages in cylinder block, as well as inside of crank case and cylinder bores, with compressed air.
2. If the plug (1) in figure is removed, apply liquid gasket to the plug screw.
   Use Genuine Liquid Gasket or equivalent.
   - Do not reuse washer. Replace it with a new washer.
   - Tighten to the specified torque.

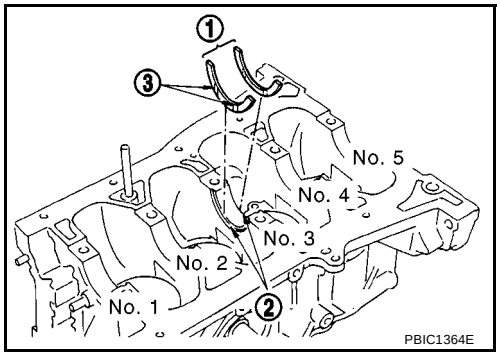
     : 58.8 - 68.6 N·m (6.0 - 6.9 kg-m, 44 - 50 ft-lb)



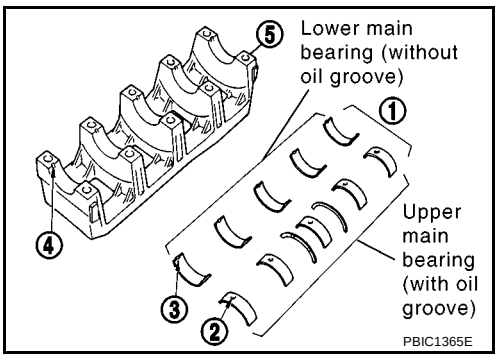
3. Install main bearings and thrust bearings.

a. Clean bearing mounting surfaces on cylinder block and main bearing cap to remove any foreign material, dust, and oil on them.

b. Install thrust bearings (1) on both sides of cylinder block No. 3 housing (2).
   - Install thrust bearing with its oil groove (3) facing crankshaft arm side (outer side).



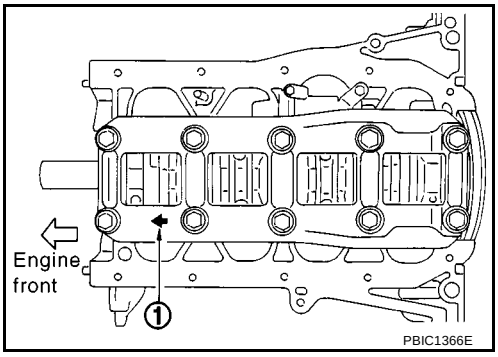
c. Install main bearing (1) in paying attention to the direction.
- Install main bearing with oil groove and oil hole (2) to cylinder block, and the one without oil groove and oil hole to main bearing cap (5).
- Before installing the main bearing, lubricate bearing surface (inside) with new engine oil. Do not apply engine oil to back surface, but thoroughly clean it.
- When installing, align the bearing stopper (3) to the notch (4).
- Make sure that oil holes in cylinder block and main bearing are aligned.



4. Install crankshaft to cylinder block.
- Rotate crankshaft by hand and make sure it turns smoothly.

5. Install main bearing cap.
- Install main bearing cap with its front mark (1) facing front of engine.

NOTE:
Since it is machined together with the cylinder block, it cannot be replaced on its own.

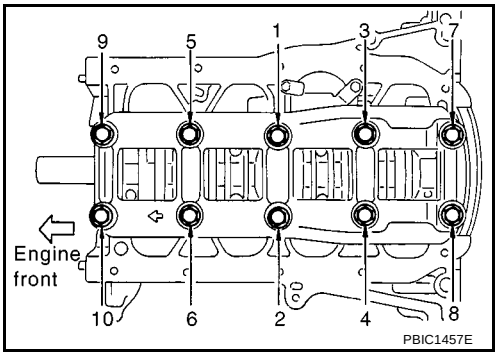


6. Tighten main bearing cap bolts in numerical order shown in figure with the following steps.

a. Lubricate threads and seat surface of each bolt with new engine oil.

b. Tighten it to 24.5 - 30.3 N·m (2.5 - 3.0 kg-m, 18 - 22 ft-lb).

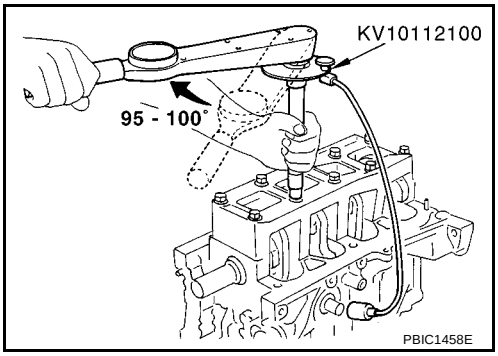
c. Tighten with 95 - 100 degrees clockwise [Target: 95 degrees].(Angle tightening)



- Use an angle wrench (special service tool) to check tightening angle.

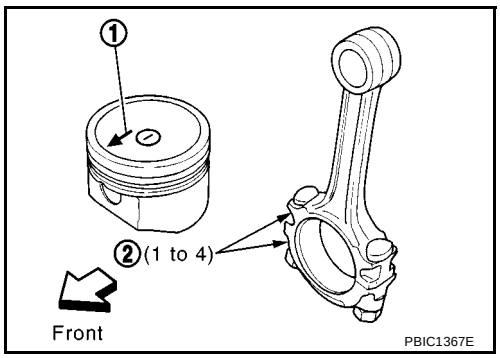
CAUTION:
Check tightening angle with an angle wrench. Do not visually check the tightening angle.

- After tightening main bearing cap bolts, rotate crankshaft by hand and make sure that it turns smoothly.
- Check crankshaft side clearance. Refer to EM-84, "CRANKSHAFT SIDE CLEARANCE" .



7. Install the piston onto the connecting rod in the following procedure:

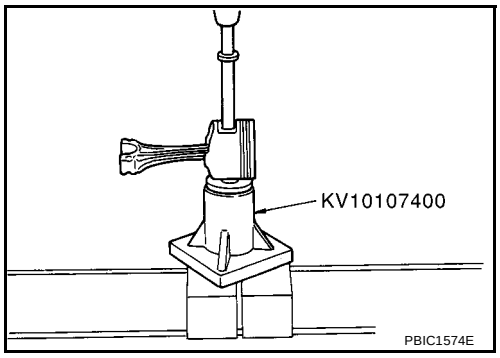
a. Set so that the piston front mark (1) on the piston head and the connecting rod cylinder number (2) engraving are in the position shown in figure.



b. Press fit the piston pin using the piston pin press stand (special service tool).

NOTE:
The joint between the connecting rod and the piston pin is a press fit.

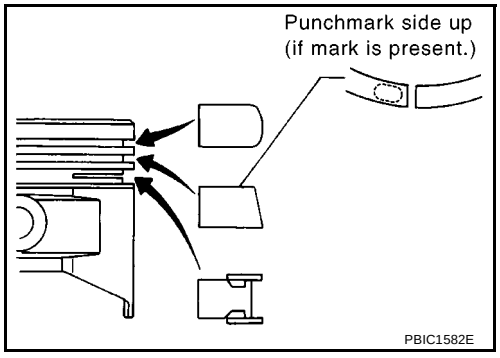
- After finishing work, make sure the piston moves freely.



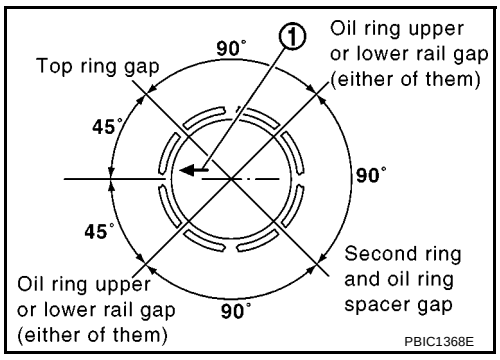
8. Install piston rings with piston ring expander as shown in the figure.

CAUTION:

- **Be careful not to damage piston.**
- **Make sure the piston ring does not spread out too much and break.**

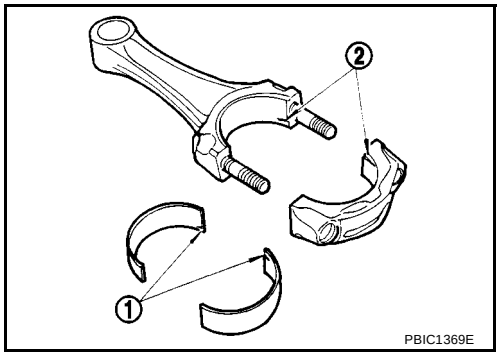


- Against the piston front mark (1), position end gaps of each piston ring as shown in figure.
- Install top ring and second ring with stamp mark side facing up.

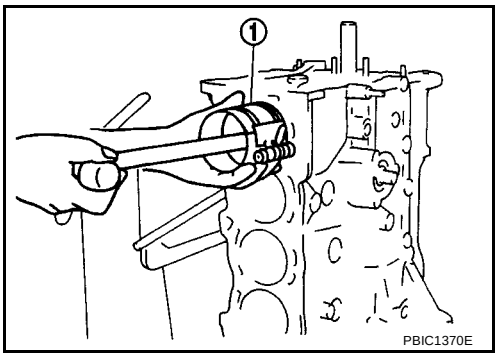


9. Install connecting rod bearing to connecting rod and connecting rod cap.

- When installing connecting rod bearing, lubricate bearing surface (inside) with new engine oil. Do not apply engine oil to back surface, but thoroughly clean it.
- Install connecting rod bearing by aligning the stopper protrusion (1) with notch (2) on connecting rod.

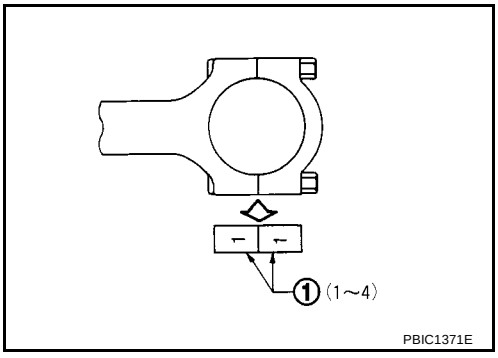


10. Install piston and connecting rod assembly to crankshaft.
    - Position the crankshaft pin corresponding to the connecting rod to be removal onto the bottom dead center.
    - Apply enough engine oil to cylinder bore, piston and crankshaft pin.
    - Install connecting rod to cylinder position corresponding to cylinder No. stamped on it.
    - Using a piston ring compressor (special service tool) (1), install piston so that piston grade number on piston head faces toward engine front.



CAUTION:
Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.

11. Install connecting rod cap.
    - Be sure that cylinder No. (1) on connecting rod and connecting rod cap match.

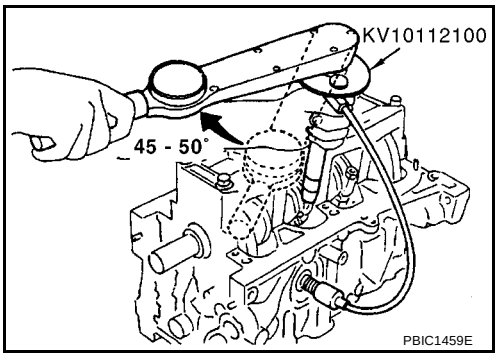


12. Tighten connecting rod nuts in following steps.

a. Lubricate threads and seat surface of connecting rod nuts and bolts with new engine oil.

b. Tighten at 13.7 - 15.7 N·m (1.4 - 1.6 kg-m, 10.1 - 11.5 ft-lb).

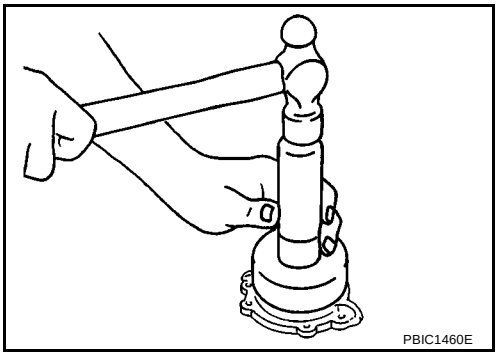
c. Tighten with 45 - 50 degrees clockwise [Target: 45 degrees]. (Angle tightening)



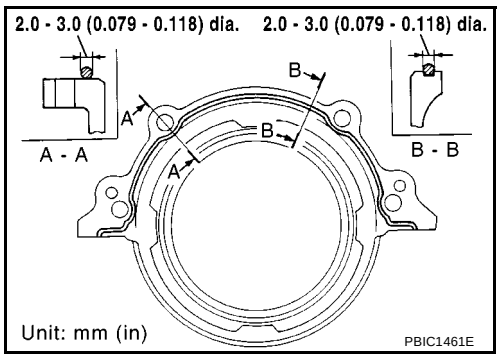
CAUTION:
Check tightening angle with an angle wrench (special service tool). Do not visually check the tightening angle.

- After the nuts were tightened, rotate crankshaft by hand and make sure that it turns smoothly.
- Check connecting rod side clearance. Refer to EM-85, "CONNECTING ROD SIDE CLEARANCE" .

13. Install rear oil seal.
    - Make sure the area surrounding the oil seal is not damaged, and use an oil seal drift to press fit.
    - Press fit until the end of rear oil seal is level with the edges of the retainer.

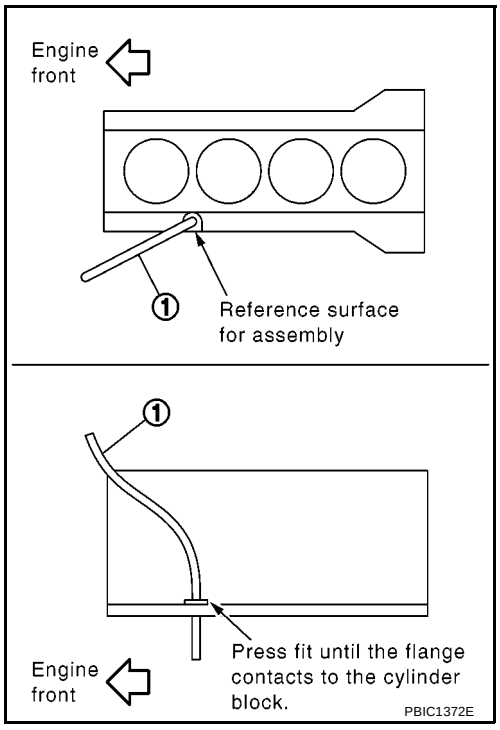


14. Install rear oil seal retainer.
    - Evenly apply the liquid gasket to the position shown in figure. Use Genuine Liquid Gasket or equivalent.
    - Install so that it matches up with the dowel pin on the cylinder block side.



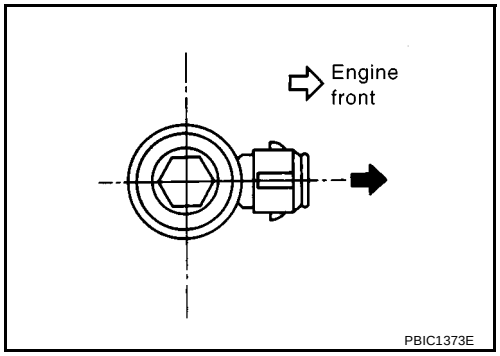
15. Install oil level gauge guide (1).
    - Press fit the oil level gauge guide (1) into the cylinder block with the assembly reference surface on the plate set as shown in the figure.
    - Apply sealant to the press fit areas.

    CAUTION:
    Replace used oil level gauges with new ones.



16. Install knock sensor.
    - Install connector so that it is positioned towards the engine front.

    CAUTION:
    - **Handle it carefully to avoid impact. If any impact is applied, replace it with new one.**
    - **Confirm no foreign material adhere to cylinder block and knock sensor mounting surfaces.**
    - **Be sure to use specified bolts.**
    - **Do not hold connector when tightening bolts.**
    - **Make sure installed sensor connector is away from contact with other parts.**

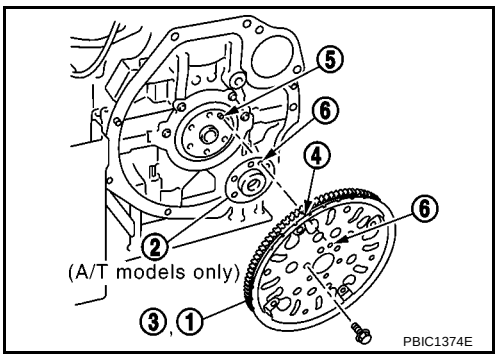


17. For the following, install the parts disassembled in step 4 in the reverse order.
18. Secure the position of the engine with the hoist, remove the bolts, and lower from the engine stand.
19. Install rear plate.

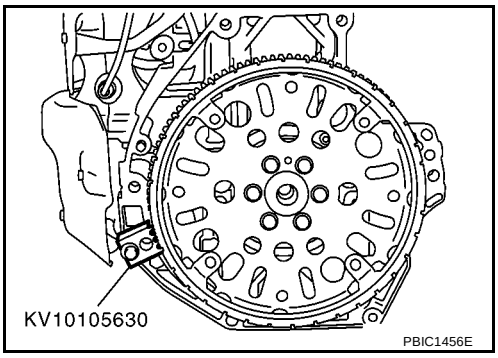
20. Install the flywheel (M/T models) (1), the adapter (A/T models) (2), and the drive plate (A/T models) (3).
    - Install so that signal plate (4) is towards the back of the engine.
    - Install by aligning the dowel pin hole (6) with the dowel pin (5) on the back of the crankshaft.

    NOTE:
    Figure shows A/T models.

    CAUTION:
    Make sure signal plate (4) are not damaged or deformed.



    - Using a ring gear stopper (special service tool), secure the crankshaft, and tighten the bolts diagonally.



21. Reinstall removed parts remained in reverse order of removal.

How to Select Piston and Bearing

EBS00OGI

DESCRIPTION

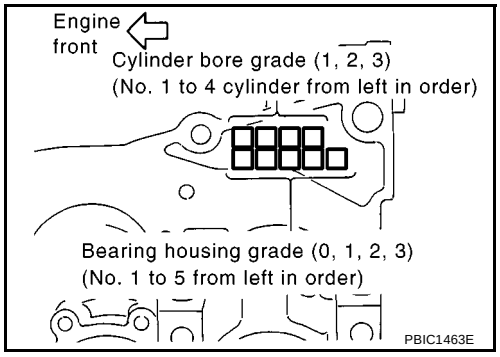
Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (Bearing thickness)	Determined by cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal).
Between cylinder block and piston	Piston and piston pin assembly Note: Piston and piston pin are a set. They make up one part as an assembly.	Piston grade (Piston outer diameter)	Piston grade = cylinder bore grade (inner diameter of bore)

- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, refer to the text.

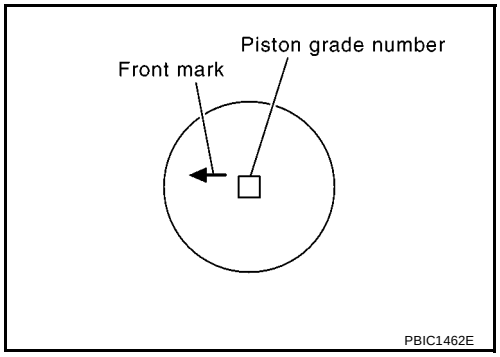
HOW TO SELECT PISTON

When New Cylinder Block is Used

- Check cylinder bore grade (1, 2, or 3) on cylinder block bottom rear surface and select piston of the same grade.



NOTE:
The piston head shape varies from engine to engine, as do their positions shown in figure.



When Cylinder Block is Reused

1. Measure cylinder bore inner diameter.
2. Determine the bore grade by comparing the measurement with the values under the cylinder bore inner diameter of the “Piston Selection Table”.
3. Select the piston of the same grade.

Piston selection Table

CR10DE,CR12DE

Unit: mm (in)

Grade	1	2	3
Inner diameter of cylinder bore	71.000 - 71.010 (2.7953 - 2.7957)	71.010 - 71.020 (2.7957 - 2.7961)	71.020 - 71.030 (2.7961 - 2.7965)
Outer diameter of piston	70.980 - 70.990 (2.7945 - 2.7949)	70.990 - 71.000 (2.7949 - 2.7953)	71.000 - 71.010 (2.7953 - 2.7957)

CR14DE

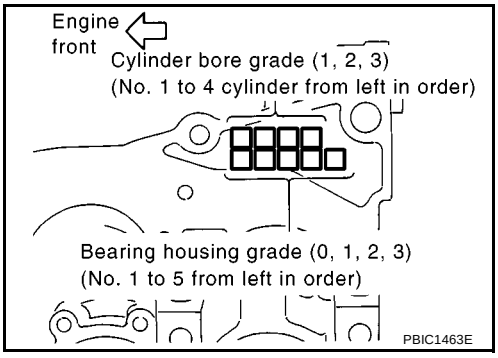
Unit: mm (in)

Grade	1	2	3
Inner diameter of cylinder bore	73.000 - 73.010 (2.8740 - 2.8744)	73.010 - 73.020 (2.8744 - 2.8748)	73.020 - 73.030 (2.8748 - 2.8752)
Outer diameter of piston	72.980 - 72.990 (2.8732 - 2.8736)	72.990 - 73.000 (2.8736 - 2.8740)	73.000 - 73.010 (2.8740 - 2.8744)

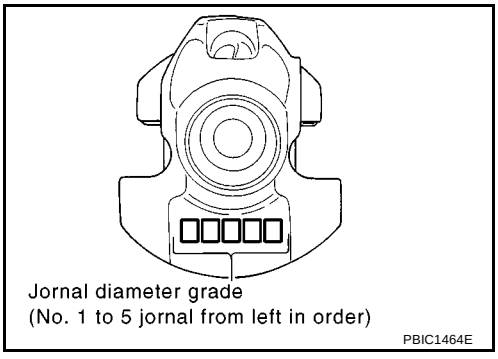
HOW TO SELECT MAIN BEARING

When New Cylinder Block and Crankshaft are Used

1. “Main Bearing Selection Table” rows correspond to bearing housing grade (0, 1, 2, or 3) on cylinder block bottom rear surface.



2. Apply journal diameter grade (0, 1, 2, or 3) stamped on crankshaft front side to column in “Main Bearing Selection Table”.
3. Select main bearing (STD 1 to 7) at the point where selected row and column meet in the following selection table.



When Cylinder Block and Crankshaft are Reused

1. Measure inner diameter of cylinder block main bearing housing and outer diameter of crankshaft journal.
2. Find measured dimension in “Cylinder block bearing housing inner diameter” row of “Main Bearing Selection Table”.
3. Find the measured dimension in “Crankshaft main journal diameter” column in the following selection table.
4. Select main bearing (STD 1 to 7) at the point where selected row and column meet in the following selection table.

Main bearing Selection Table

Units: mm (in)

Cylinder block main bearing housing inner diameter		-	49.004/49.000 (1.9293/1.9291)	49.008/49.004 (1.9294/1.9293)	49.012/49.008 (1.9296/1.9294)	49.016/49.012 (1.9298/1.9296)
Crankshaft journal diameter	Grade (stamped)	-	0	1	2	3
44.970/44.966 (1.7705/1.7703)	0	● Bearing grade No. ● Bearing thickness ● Identification color	STD1 2.002/2.006 (0.0788/0.0790) Red	STD 2 2.004/2.008 (0.0789/0.0791) Green	STD 3 2.006/2.010 (0.0790/0.0791) Yellow	STD 4 2.008/2.012 (0.0791/0.0792) Blue
44.966/44.962 (1.7703/1.7702)	1	● Bearing grade No. ● Bearing thickness ● Identification color	STD 2 2.004/2.008 (0.0789/0.0791) Green	STD 3 2.006/2.010 (0.0790/0.0791) Yellow	STD 4 2.008/2.012 (0.0791/0.0792) Blue	STD 5 2.010/2.014 (0.0791/0.0793) Pink
44.962/44.958 (1.7702/1.7700)	2	● Bearing grade No. ● Bearing thickness ● Identification color	STD 3 2.006/2.010 (0.0790/0.0791) Yellow	STD 4 2.008/2.012 (0.0791/0.0792) Blue	STD 5 2.010/2.014 (0.0791/0.0793) Pink	STD 6 2.012/2.016 (0.0792/0.0794) White
44.958/44.954 (1.7700/1.7698)	3	● Bearing grade No. ● Bearing thickness ● Identification color	STD 4 2.008/2.012 (0.0791/0.0792) Blue	STD 5 2.010/2.014 (0.0791/0.0793) Pink	STD 6 2.012/2.016 (0.0792/0.0794) White	STD 7 2.014/2.018 (0.0793/0.0794) Blue/yellow

Undersize Bearing Usage Guide

- If specified oil clearance cannot be obtained by standard size main bearing, use undersize (US) bearing.
- When using undersize bearing, install it, measure bearing inner diameter, and grind journal to obtain specified oil clearance.

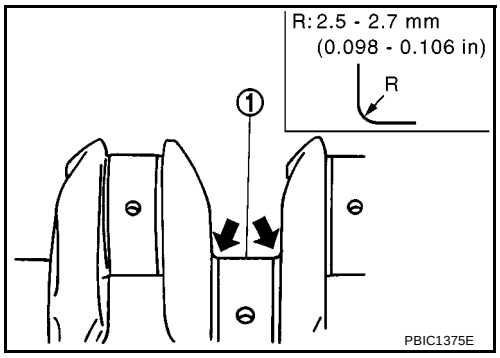
Bearing undersize table

Unit: mm (in)

Size	Thickness
US 0.25 (0.0098)	2.123 - 2.131 (0.836 - 0.839)

CAUTION:

Keep fillet R when grinding crankshaft journal (1) in order to use undersize bearing (All journals).



Inspection After Disassembly

EBS00OGJ

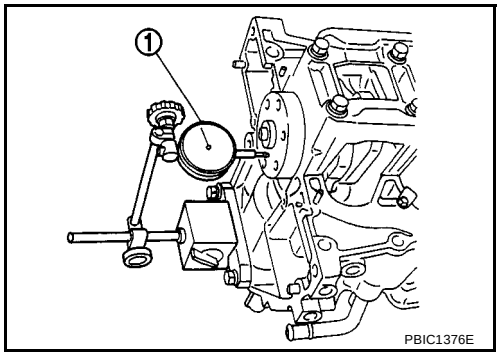
CRANKSHAFT SIDE CLEARANCE

- Using a dial gauge (1), measure the clearance between the thrust bearings and the crankshaft arm when the crankshaft is moved fully forward or backward.

  Standard : 0.060 - 0.260 mm (0.0024 - 0.0102 in)

  Limit : 0.3 mm (0.012 in)

- If the measured value exceeds the limit, replace the thrust bearings, and measure again. If it still exceeds the limit, replace the crankshaft also.

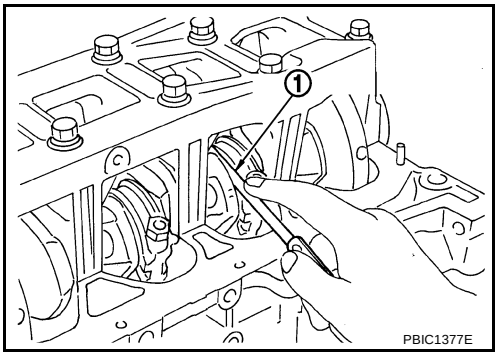


CONNECTING ROD SIDE CLEARANCE

- Measure side clearance between connecting rod and crankshaft arm with feeler gauge (1).

Standard : 0.050 - 0.420 mm (0.0020 - 0.0165 in)
Repair limit : 0.5 mm (0.0197 in)

- If the measured value exceeds the limit, replace the connecting rod, and measure again. If it still exceeds the limit, replace the crankshaft also.

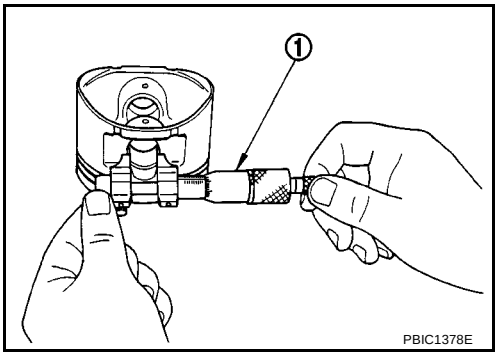


PISTON AND PISTON PIN CLEARANCE

Inner Diameter of Piston Pin

- Measure the inner diameter of piston pin bore with an inside micrometer (1).

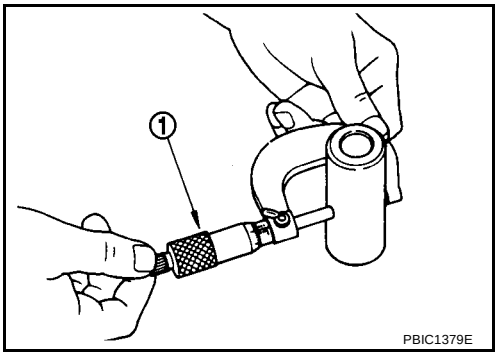
Standard : 18.008 - 18.012 mm (0.7090 - 0.7091 in)



Outer Diameter of Piston Pin

- Using a micrometer (1), measure piston pin outer diameter.

Standard : 17.996 - 18.000 mm (0.7085 - 0.7087 in)



Piston and Piston pin Clearance

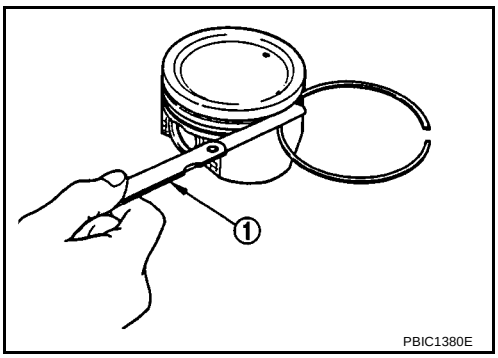
(Piston pin clearance) = (Piston pin bore diameter) – (Outer diameter of piston pin)

Standard : 0.008 - 0.016 mm (0.0003 - 0.0006 in)

- If clearance exceeds the standard, replace piston and piston pin assembly.
- When replacing piston and piston pin assembly, refer to EM-82, "HOW TO SELECT PISTON"

PISTON RING SIDE CLEARANCE

- Measure side clearance of piston ring and piston ring groove with feeler gauge (1).



Standard:

Top ring	**: 0.040 - 0.080 mm (0.0016 - 0.0031 in)**
2nd ring	**: 0.025 - 0.070 mm (0.0010 - 0.0028 in)**
Oil ring	**: 0.030 - 0.140 mm (0.0021 - 0.0055 in)**

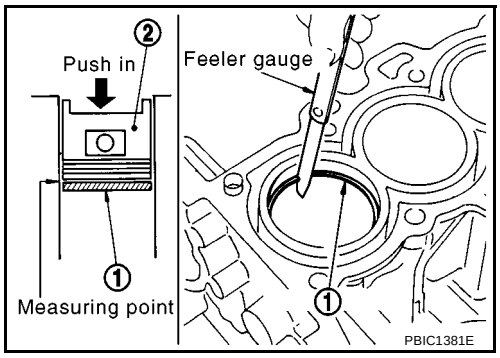
Limit:

Top ring	**: 0.11 mm (0.0043 in)**
2nd ring	**: 0.1 mm (0.0039 in)**

- If out of specification, replace piston and/or piston ring assembly.

PISTON RING END GAP

- Check if inner diameter of cylinder bore is within specification. Refer to EM-88, "PISTON TO CYLINDER BORE CLEARANCE" .
- Insert piston ring (1) until middle of cylinder with piston (2), and measure gap.



Standard:

Top ring	**: 0.18 - 0.33 mm (0.0071 - 0.0130 in)**
2nd ring	**: 0.50 - 0.65 mm (0.0197 - 0.0256 in)**
Oil ring	**: 0.20 - 0.70 mm (0.0079 - 0.0276 in)**

Limit:

Top ring	**: 0.57 mm (0.0224 in)**
2nd ring	**: 0.85 mm (0.0335 in)**
Oil ring	**: 0.96 mm (0.0378 in)**

- If out of specification, replace piston ring. If gap still exceeds the limit even with a new ring, re-bore cylinder and use oversized piston and piston ring.

CONNECTING ROD BEND AND TORSION

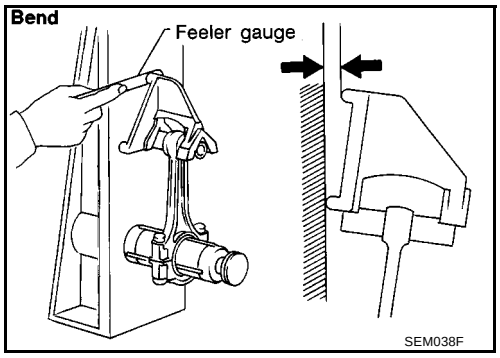
- Check connecting rod bend and torsion with a connecting rod aligner.

Bend:

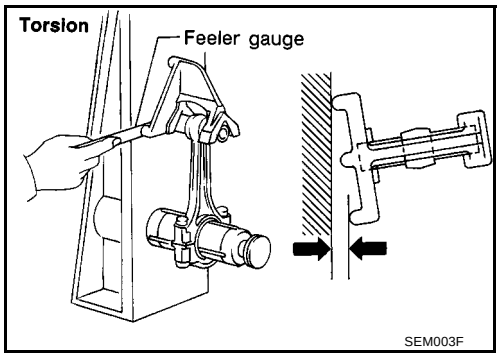
Limit : 0.15 mm (0.0059 in) per 100 mm (3.94 in) length

Torsion:

Limit : 0.30 mm (0.0118 in) per 100 mm (3.94 in) length



- If it exceeds the limit, replace connecting rod assembly.

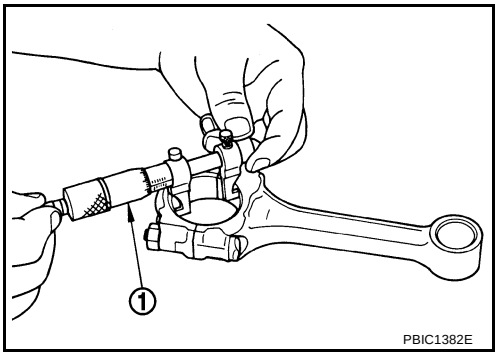


CONNECTING ROD BEARING HOUSING DIAMETER (BIG END)

- Install the connecting rod cap without the connecting rod bearing installed. After tightening the connecting rod bolt to the specified torque, measure the connecting rod big end inner diameter using an inside micrometer (1). Refer to EM-76, "ASSEMBLY" for the tightening procedure.

Standard : 43.000 - 43.013 mm (1.6929 - 1.6934 in) dia.

- If it exceeds the standard, replace the connecting rod.

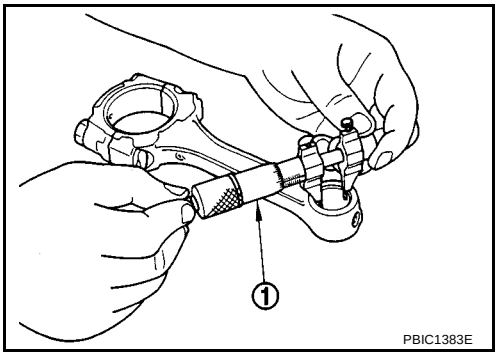


CONNECTING ROD BUSHING OIL CLEARANCE DIAMETER (SMALL END)

Inner Diameter of Connecting Rod Bushing (Small End)

- Using an inside micrometer (1), measure inner diameter of bushing.

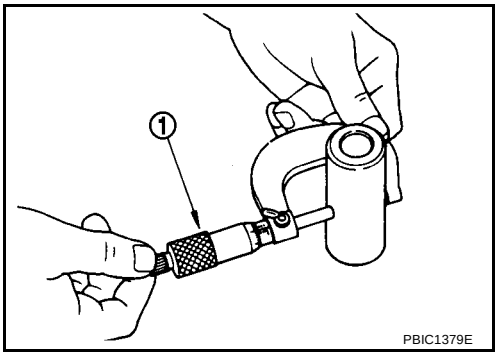
Standard : 17.962 - 17.978 mm (0.7072 - 0.7078 in) dia.



Outer Diameter of Piston Pin

- Using a micrometer (1), measure piston pin outer diameter.

Standard : 17.996 - 18.000 mm (0.7996 - 0.7087 in) dia.



Connecting Rod Bushing Oil Clearance (Small End)

(Connecting rod small end oil clearance) = (Inner diameter of connecting rod small end) – (Outer diameter of piston pin)

Standard : –0.018 - –0.038 mm (–0.0007 - –0.0015 in)

- If the measured value exceeds the standard, replace the connecting rod assembly and/or piston and piston pin assembly.
- If replacing the piston and piston pin assembly, refer to EM-82, "HOW TO SELECT PISTON" .

CYLINDER BLOCK DISTORTION

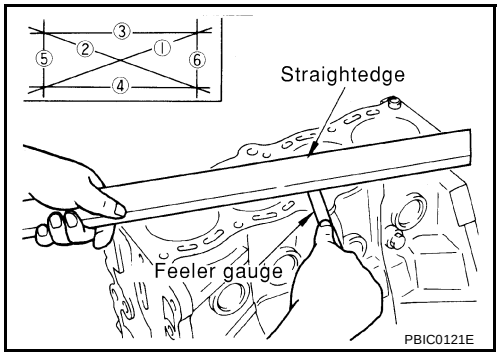
- Using a scraper, remove gasket on the cylinder block surface, and also remove oil, scale, carbon, or other contamination.

  CAUTION:
  Be careful not to allow gasket flakes to enter the oil or coolant passages.

- Measure the distortion on the block upper face at some different points in 6 directions.

  Limit : 0.1 mm (0.004 in)

- If out of the distortion limit, replace the cylinder block.



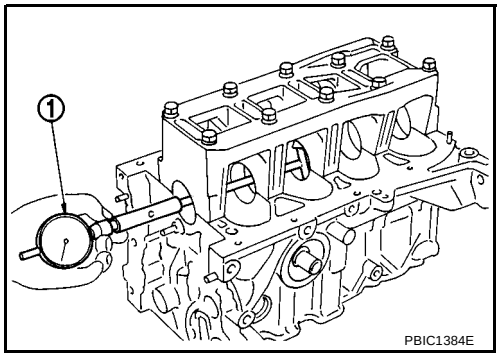
INNER DIAMETER OF MAIN BEARING HOUSING

- Install the main bearing cap with the main bearings removed, and tighten the mounting bolts to the specified torque. Refer to EM-76, "ASSEMBLY" for the tightening procedure.
- Using a bore gauge (1), measure the inner diameter of the main bearing housing.

  Standard : 49.000 - 49.016 mm (1.9291 - 1.9298 in) dia.

- If out of specification, replace cylinder block and main bearing cap as an assembly.

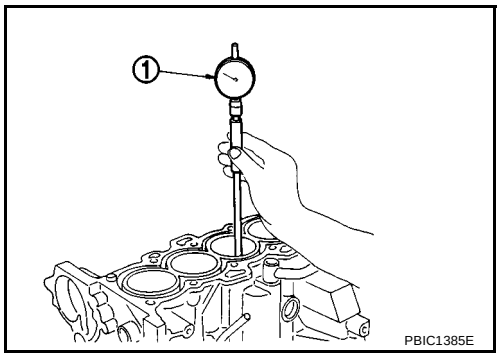
  NOTE:
  Cylinder block cannot be replaced as a single part because it is machined together with main bearing cap.



PISTON TO CYLINDER BORE CLEARANCE

Inner Diameter of Cylinder Bore

- Using a bore gauge (1), measure cylinder bore for wear, out-of-round and taper at 6 different points on each cylinder. (X and Y directions at A, B and C) (Y is in longitudinal direction of engine)



Standard inner diameter:

CR10DE, CR12DE : 71.000 - 71.030 mm (2.7953 - 2.7965 in) dia.

CR14DE : 73.000 - 73.030 mm (2.8740 - 2.8744 in) dia.

Wear limit:

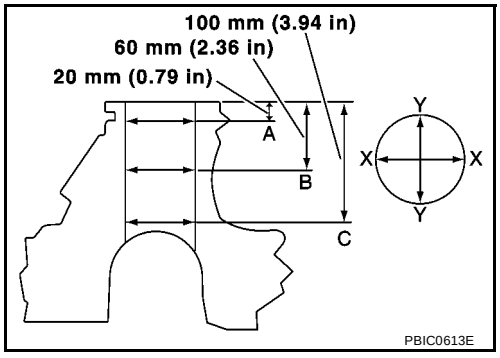
0.2 mm (0.008 in)

Out-of-round (Difference between X and Y):

0.015 mm (0.0006 in)

Taper limit (Difference between A and C):

0.01 mm (0.0004 in)



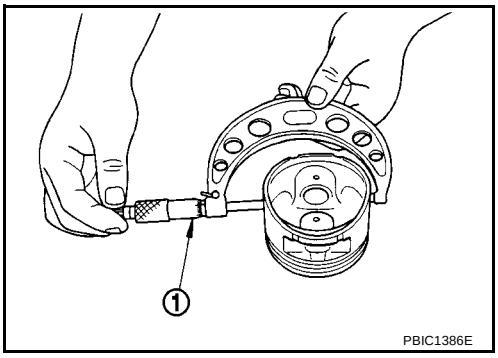
- If the measured value exceeds the limit, or if there are scratches and/or seizure on the cylinder inner wall, hone or rebore the inner wall.

- An oversize piston is provided. When using an oversize piston, rebore the cylinder so that the clearance of the piston-to-cylinder bore satisfies the standard.
- When using an oversize piston, use it for all cylinders with oversize piston rings.

Oversize (OS) : 0.2 mm (0.008 in)

Outer Diameter of piston

- Measure piston skirt outer diameter using micrometer (1).



Measurement point (Distance from the top)
CR10DE : 37.3 mm (1.469 in)
CR12DE : 34.3 mm (1.350 in)
CR14DE : 32.3 mm (1.272 in)
Standard
CR10DE : 70.980 - 71.010 mm (2.7945 - 2.7949 in) dia.
CR12DE : 70.980 - 71.010 mm (2.7949 - 2.7953 in) dia.
CR14DE : 72.980 - 73.010 mm (2.7953 - 2.7957 in) dia.

Piston to Cylinder Bore Clearance

- Calculate by outer diameter of piston skirt and inner diameter of cylinder (direction X, position B).
(Clearance) = (Inner diameter of cylinder) – (Outer diameter of piston skirt).

Standard : 0.010 - 0.030 mm (0.0004 - 0.0012 in)

- If clearance exceeds the standard, replace piston and piston pin assembly. Refer to EM-82, "HOW TO SELECT PISTON" .

Reboring Cylinder Bore

1. Cylinder bore size is determined by adding piston-to-cylinder bore clearance to piston diameter “A”.

Rebored size calculation: D = A + B - C
where,
D: Bored diameter
A: Piston diameter as measured
B: Piston - to - cylinder bore clearance (standard value)
C: Honing allowance 0.02 mm (0.0008 in)

2. Install main bearing caps, and tighten to the specified torque. Otherwise, cylinder bores may be distorted in final assembly.
3. Cut cylinder bores.

- When any cylinder needs boring, all other cylinders must also be bored.
- Do not cut too much out of cylinder bore at a time. Cut only 0.05 mm (0.0020 in) or so in diameter at a time.

4. Hone cylinders to obtain specified piston-to-cylinder bore clearance.
5. Measure finished cylinder bore for out-of-round and taper.

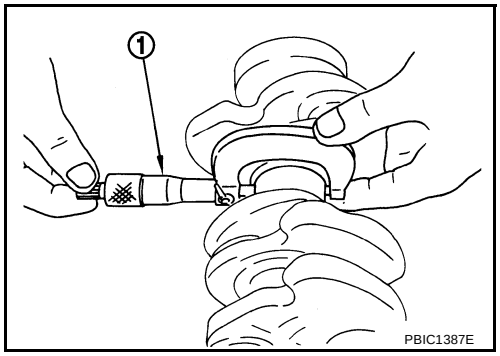
- Measurement should be done after cylinder bore cools down.

OUTER DIAMETER OF CRANKSHAFT JOURNAL

- Using a micrometer (1), measure outer diameter of crankshaft journals.

  Standard : 44.954 - 44.970 mm (1.7698 - 1.7705 in) dia.

- If it is out of the standard, measure the main bearing oil clearance. Then use the undersize bearing. Refer to EM-91, "OIL CLEARANCE OF MAIN BEARING" .



OUTER DIAMETER OF CRANKSHAFT PIN

- Using a micrometer, measure outer diameter of crankshaft pin.

  Standard : 39.961 - 39.974 mm (1.5733 - 1.5738 in) dia.

- If it is out of the standard, measure the connecting rod bearing oil clearance. Then use the undersize bearing. Refer to EM-91, "OIL CLEARANCE OF CONNECTING ROD BEARING" .

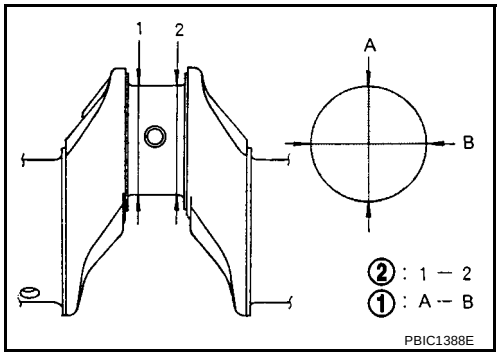
OUT-OF-ROUND AND TEPER OF CRANKSHAFT

- Using a micrometer, measure the dimensions at 4 different points shown in the figure on each journal and pin.
- Out-of-round (1) is indicated by the difference in dimensions between 1 and 2 at A and B.
- Taper (2) is indicated by the difference in dimension between A and B at 1 and 2.

  Limit:

  Out-of-round (X – Y) : 0.005 mm (0.0002 in)

  Taper (1 – 2) : 0.005 mm (0.0002 in)



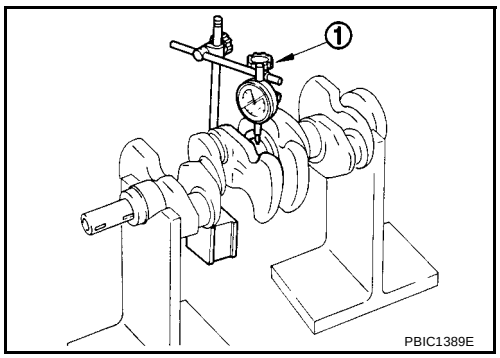
- If the measured value exceeds the limit, correct or replace the crankshaft.
- If corrected, measure the bearing oil clearance of the corrected journal or pin. Then select the main bearing or connecting rod bearing. Refer to EM-91, "OIL CLEARANCE OF MAIN BEARING" or EM-91, "OIL CLEARANCE OF CONNECTING ROD BEARING" .

CRANKSHAFT RUNOUT

- Place a V-block on a precise flat table to support the journals on the both end of the crankshaft.
- Place a dial gauge (1) straight up on the No. 3 journal.
- Rotate crankshaft and read indication on the gauge. (Total indicator reading)

  Limit : 0.05 mm (0.002 in)

- If it exceeds the limit, replace the crankshaft.

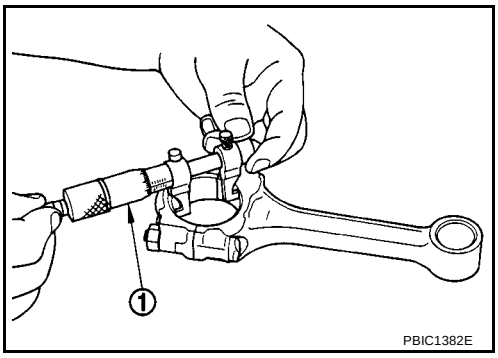


OIL CLEARANCE OF CONNECTING ROD BEARING

Method of Measurement

- Install the connecting rod bearings to the connecting rod and the cap, and tighten the connecting rod nuts to the specified torque. Using a inside micrometer (1) measure the inner diameter of connecting rod bearing. Refer to EM-76, "ASSEMBLY" for the tightening procedure.
  (Oil clearance) = (Inner diameter of connecting rod bearing) – (Outer diameter of crankshaft pin)

  Standard : 0.010 - 0.044 mm (0.0004 - 0.0017 in)
  Limit : 0.064 mm (0.0025 in)

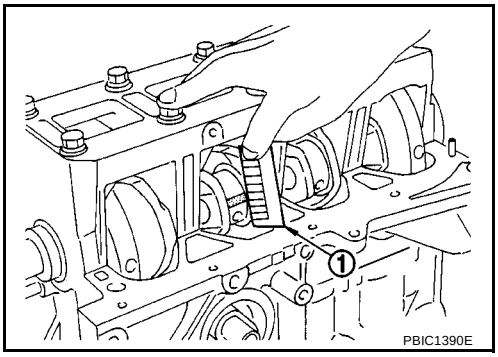


- When exceeding limit, use undersize bearing so that oil clearance remains within the standard value. Refer to EM-91, "Undersize Bearing Usage Guide" .

Method of Using Plastigage

- Remove oil and dust on the crankshaft pin and the surfaces of each bearing completely.
- Cut a plastigage (1) slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install the connecting rod bearings to the connecting rod cap, and tighten the connecting rod nuts to the specified torque. Refer to EM-76, "ASSEMBLY" for the tightening procedure.

  CAUTION:
  Never rotate crankshaft while Plastigage is in place.
- Remove the connecting rod cap and bearings, and using the scale on the plastigage bag, measure the plastigage width.



NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method of Measurement”.

Undersize Bearing Usage Guide

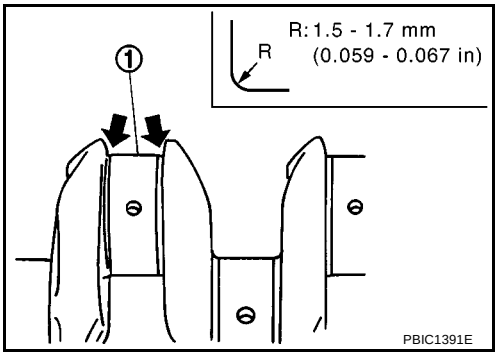
- If specified oil clearance cannot be obtained by standard size connecting rod bearing, use undersize (US) bearing.
- When using undersize bearing, install it, measure bearing inner diameter, and grind crankshaft pin to obtain specified oil clearance.

Bearing undersize table

Unit: mm (in)

Size	Thickness
STD (Reference)	1.504 - 1.508 (0.0529 - 0.0594)
US 0.25 (0.0098)	1.627 - 1.635 (0.0641 - 0.0644)

CAUTION:
Keep fillet R when grinding crankshaft pin (1) in order to use undersize bearing (All crankshaft pin).



OIL CLEARANCE OF MAIN BEARING

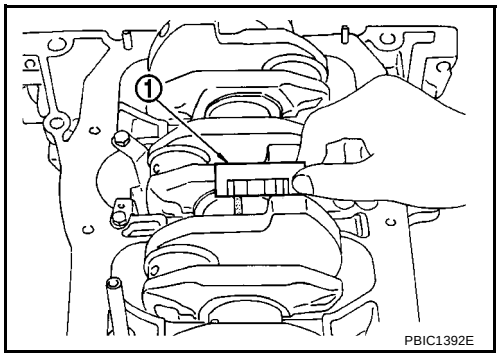
Method of Measurement

- Install the main bearings to the cylinder block and bearing cap. Measure the main bearing inner diameter with the bearing cap bolt tightened with main bearing cap to the specified torque. Refer to EM-76, "ASSEMBLY" for the tightening procedure.
  (Oil clearance) = (Inner diameter of main bearing) – (Outer diameter of crankshaft journal)

  Standard : 0.018 - 0.034 mm (0.0007 - 0.0013 in)
  Limit : 0.05 mm (0.002 in)

- If the measured value exceeds the limit, select main bearings (including the undersize) referring to the main bearing inner diameter and crankshaft journal outer diameter, so that the oil clearance satisfies the standard. Refer to EM-83, "HOW TO SELECT MAIN BEARING" .

Method of Using Plastigage

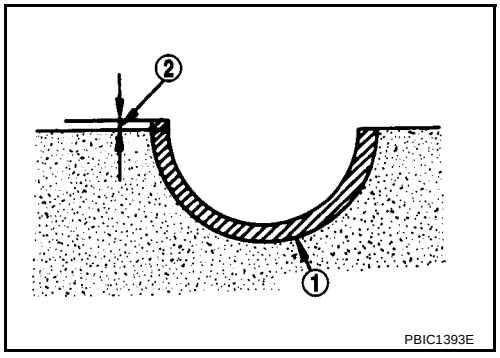


- Remove oil and dust on the crankshaft journal and the surfaces of each bearing completely.
- Cut a plastigage (1) slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Tighten the main bearing bolts with main bearing cap to the specified torque. Refer to EM-76, "ASSEMBLY" for the tightening procedure.

  CAUTION:
  Never rotate crankshaft while Plastigage is in place.
- Remove the bearing cap and bearings, and using the scale on the plastigage bag, measure the plastigage width.

NOTE:
The procedure when the measured value exceeds the limit is same as that described in the “Method of Measurement”.

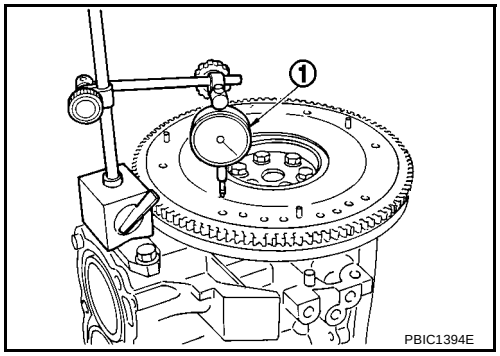
CRUSH HEIGHT OF MAIN BEARING OR CONNECTING ROD BEARING



- When the bearing cap is removed after being tightened to the specified torque with main bearings or connecting rod bearings (1) installed, the tip end of bearing must protrude. Refer to EM-76, "ASSEMBLY" for the tightening procedure.

  Standard : There must be crush height (2).
- If the standard is not met, replace main bearings or connecting bearings.

FLYWHEEL RUNOUT



- The runout of the clutch contact surface of the flywheel should be measured using a dial gauge (1). (Total indicator reading)

  Flywheel (M/T models)
  Limit : 0.15 mm (0.0059 in)

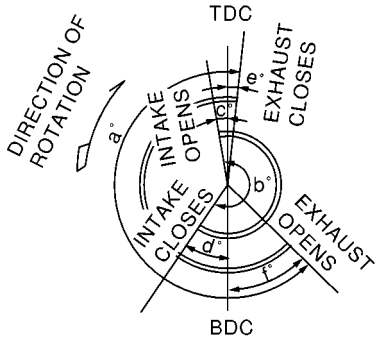
SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00OGK

GENERAL SPECIFICATIONS

Engine		CR10DE	CR12DE	CR14DE
Cylinder arrangement		4, in-line		
Displacement	cm^3 (cu in)	977 (59.62)	1,240 (75.66)	1,386 (84.57)
Bore and stroke	mm (in)	71.0 x 63.0 (2.795 x 2.480)	71.0 x 78.3 (2.795 x 3.083)	73.0 x 82.8 (2.874 x 3.260)
Valve arrangement		DOHC		
Firing order		1-3-4-2		
Number of piston rings	Compression	2		
	Oil	1		
Number of main bearings		5		
Compression ratio		10.2	9.9	
Compression pressure kPa (bar, kg/cm^2 , psi) / 350 rpm	Standard	1,432 (14.32, 14.6, 208)	1,383 (13.83, 14.1, 201)	
	Minimum	1,236 (12.36, 12.6, 179)	1,187 (11.87, 12.1, 172)	
	Differential limit between cylinders	98 (0.98, 1.0, 14)		
Valve timing (Intake valve timing control - OFF)				

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Unit: degree

	a	b	c	d	e	f
CR10DE	208	208	– 17	45	4	24
CR12DE, CR14DE	216	224	– 11	55	4	32

INTAKE MANIFOLD AND EXHAUST MANIFOLD

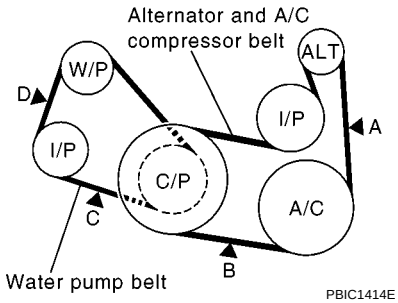
Unit: mm (in)

	Limit
Surface distortion	0.3 (0.012)

DRIVE BELTS

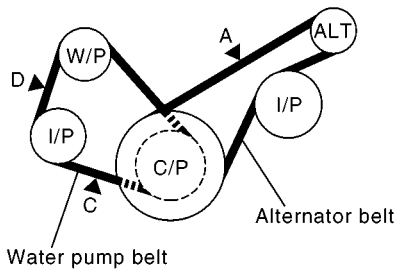
Location	Tension [N (kg, lb)]			Deflection [mm (in)] [When pressed by force of 98.1N (10 kg, 22lb)]			
	New	At adjustment	Limit	Measuring point	New belt	At adjust-ment	Limit
Alternator and A/C compressor belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	6.6 - 7.8 (0.260 - 0.307)	7.3 - 8.5 (0.287 - 0.335)	13.8 (0.543)
				B	5.6 - 6.6 (0.220 - 0.260)	7.1 - 8.3 (0.280 - 0.327)	11.9 (0.469)
Alternator belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	3.1 - 4.1 (0.122 - 0.161)	9.8 - 10.6 (0.386 - 0.417)	13.8 (0.543)
Water pump belt	446 - 534 (45.5 - 54.5, 100.3 - 120.0)	348 - 436 (35.5 - 44.5, 78.2 - 98.0)	137 (14, 30.9)	C	6.7 - 7.3 (0.264 - 0.287)	7.6 - 8.6 (0.299 - 0.339)	12.4 (0.448)
				D	4.7 - 5.6 (0.185 - 0.220)	7.0 - 7.7 (0.276 - 0.303)	8.6 (0.339)

With A/C compressor



PBIC1414E

Without A/C compressor



PBIC1415E

SPARK PLUG

Make	NGK	Champion
Standard type	LFR5AP-11	REC10PYC4
Hot type	LFR4AP-11	—
Cold type	LFR6AP-11	—
Gap (nominal)	1.1 mm (0.043 in)	

CYLINDER HEAD

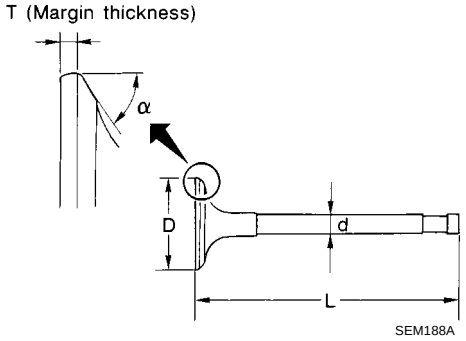
Unit: mm (in)

	Limit
Cylinder head distortion	0.1 (0.004)
Height	121.2 (4.77)

VALVE

Valve Dimensions

Unit: mm (in)



		Standard
Valve head diameter “D”	Intake	27.4 - 27.6 (1.079 - 1.087)
	Exhaust	22.4 - 22.6 (0.882 - 0.890)
Valve length “L”	Intake	97.85 (3.8524)
	Exhaust	97.92 (3.8551)
Valve stem diameter “d”	Intake	5.465 - 5.480 (0.2152 - 0.2157)
	Exhaust	5.445 - 5.460 (0.2144 - 0.2150)
Valve seat angle “α”		45°15′ - 45°45′
Valve margin “T”		1.05 - 1.35 (0.0413 - 0.0531)

Valve Clearance

Unit: mm (in)

	Hot	Cold* (reference data)
Intake	0.314 - 0.426 (0.012 - 0.017)	0.29 - 0.37 (0.011 - 0.015)
Exhaust	0.338 - 0.462 (0.013 - 0.018)	0.32 - 0.40 (0.013 - 0.016)

*: At a temperature of approximately 20°C (68°F)

Valve Guide

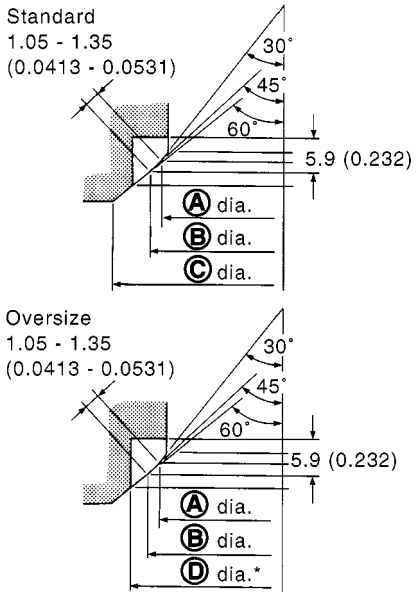
Unit: mm (in)

Engine Models		CR10DE, CR12DE, CR14DE			
		Intake		Exhaust	
		Standard	Service	Standard	Service
Valve guide	Outer diameter	9.522 - 9.534 (0.3749 - 0.3754)	9.723 - 9.734 (0.3828 - 0.3832)	9.522 - 9.534 (0.3749 - 0.3754)	9.723 - 9.734 (0.3828 - 0.3832)
	Inner diameter (Finished size)	5.500 - 5.518 (0.2165 - 0.2172)		5.500 - 5.518 (0.2165 - 0.2172)	
Cylinder head valve guide hole diameter		9.475 - 9.496 (0.3730 - 0.3739)	9.685 - 9.696 (0.3813 - 0.3817)	9.475 - 9.496 (0.3730 - 0.3739)	9.685 - 9.696 (0.3813 - 0.3817)
Interference fit of valve guide		0.026 - 0.059 (0.0010 - 0.0023)	0.027 - 0.049 (0.0011 - 0.0019)	0.026 - 0.059 (0.0010 - 0.0023)	0.027 - 0.049 (0.0011 - 0.0019)
Stem to guide clearance		0.020 - 0.053 (0.0008 - 0.0021)		0.040 - 0.073 (0.0016 - 0.0029)	
Valve deflection limit (Dial gauge reading)		0.2 (0.0079)		0.2 (0.0079)	

Valve Seat

Unit: mm (in)

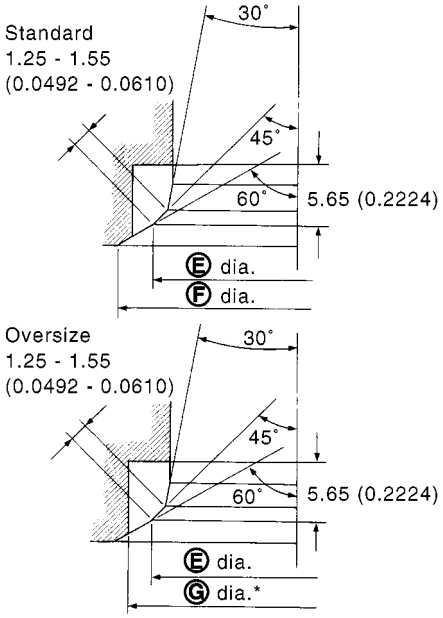
INTAKE



* Cylinder head machining data

MBIB1127E

EXHAUST



* Cylinder head machining data

MBIB1128E

Dia.	CR10DE, CR12DE, CR14DE
A	25.4 (1.00)
B	27.0 - 27.2 (1.062 - 1.070)
C	28.7 - 28.9 (1.129 - 1.137)
D	29.000 - 29.016 (1.1417 - 1.1424)
E	22.0 - 22.2 (0.866 - 0.874)
F	23.7 - 23.9 (0.933 - 0.940)
G	24.000 - 24.016 (0.9449 - 0.9455)

Valve Spring

Free height		mm (in)	53.3 (2.098)
Pressure load N (kg, lb) at height mm (in)	Standard	Installation	149 - 165 N (15.2 - 16.8, 33.5 - 37.1) at 32.82 (1.2921)
		Valve open	228 - 250 N (23.3 - 25.5, 51.3 - 56.2) at 24.73 (0.9736)
Out-of-square mm (in)	Limit		Less than 1.6 (0.063)

Valve Lifter

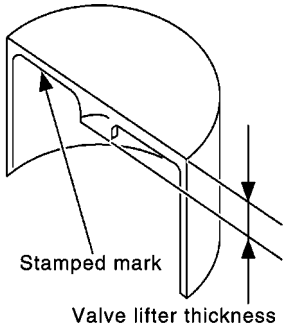
Unit: mm (in)

	Standard
Valve lifter outer diameter	29.960 - 29.975 (1.1795 - 1.1801)
Valve lifter hole inner diameter	30.000 - 30.021 (1.1811 - 1.1819)
Clearance between valve lifter and valve lifter hole	0.025 - 0.061 (0.0010 - 0.0024)

Available Valve Lifter

Thickness mm (in)	Identification Mark
3.000 (0.1181)	00
3.020 (0.1189)	02
3.040 (0.1197)	04

Thickness mm (in)	Identification Mark
3.060 (0.1205)	06
3.080 (0.1213)	08
3.100 (0.1220)	10
3.120 (0.1228)	12
3.140 (0.1236)	14
3.160 (0.1244)	16
3.180 (0.1252)	18
3.200 (0.1260)	20
3.220 (0.1268)	22
3.240 (0.1276)	24
3.260 (0.1283)	26
3.280 (0.1291)	28
3.300 (0.1299)	30
3.320 (0.1307)	32
3.340 (0.1315)	34
3.360 (0.1323)	36
3.380 (0.1323)	38
3.400 (0.1339)	40
3.420 (0.1346)	42
3.440 (0.1354)	44
3.460 (0.1362)	46
3.480 (0.1370)	48
3.500 (0.1378)	50
3.520 (0.1386)	52
3.540 (0.1394)	54
3.560 (0.1402)	56
3.580 (0.1409)	58
3.600 (0.1417)	60
3.620 (0.1425)	62
3.640 (0.1433)	64
3.660 (0.1441)	66
3.680 (0.1449)	68

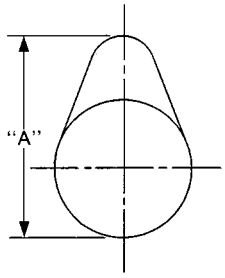


PBIC1077E

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

	Standard
Camshaft runout [TIR*]	0.04 (0.0016)



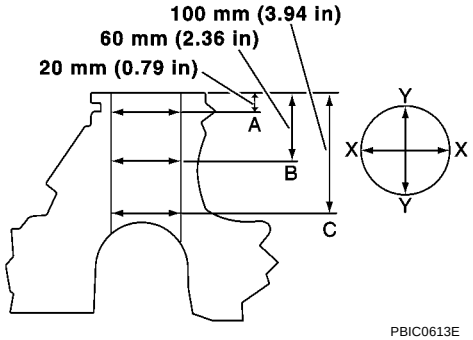
SEM671

		CR10DE	CR12DE, CR14DE
		Standard	
Cam height "A"	Intake	39.155 - 39.345 (1.5415 - 1.5490)	40.359 - 40.549 (1.5889 - 1.5964)
	Exhaust	39.155 - 39.345 (1.5415 - 1.5490)	39.743 - 39.933 (1.5647 - 1.5722)
Outer diameter of camshaft journal	No. 1 journal	27.935 - 27.955 (1.0998 - 1.1006)	
	No. 2 to No. 5 journals	23.450 - 23.470 (0.9232 - 0.9240)	
Inner diameter of camshaft bracket	No. 1 journal	28.000 - 28.021 (1.1024 - 1.1032)	
	No. 2 to No. 5 journals	23.500 - 23.525 (0.9252 - 0.9262)	
Camshaft journal clearance	No. 1 journal	0.045 - 0.086 (0.0018 - 0.0034)	
	No. 2 to No. 5 journals	0.030 - 0.071 (0.0012 - 0.0028)	
Camshaft end play		0.070 - 0.143 (0.0028 - 0.0056)	

*: Total indicator reading

CYLINDER BLOCK

Unit: mm (in)



PBIC0613E

	CR10DE, CR12DE	CR14DE	Limit
	Standard		
Surface flatness	—		0.1 (0.004)
Height "H" (nominal)	189 (8.4232 - 8.4271)		—

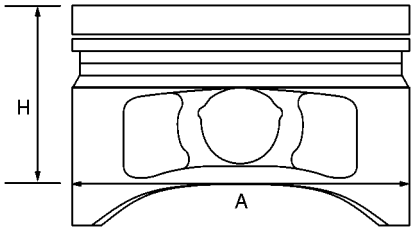
Cylinder bore inner diameter	Grade No. 1	71.000 - 71.010 (2.7953 - 2.7957)	73.000 - 73.010 (2.8740 - 2.8744)	0.2 (0.008)*
	Grade No. 2	71.010 - 71.020 (2.7957 - 2.7961)	73.010 - 73.020 (2.8744 - 2.8748)	
	Grade No. 3	71.020 - 71.030 (2.7961 - 2.7965)	73.020 - 73.030 (2.8748 - 2.8752)	
Out-of-round (Difference between X and Y)		—		0.015 (0.0006)
Taper (Difference between A and C)		—		0.01 (0.0004)
Difference in inner diameter between cylinders		0.05 (0.0020)		0.2 (0.008)
Main bearing housing inner diameter	Grade 0	49.000 - 49.004 (1.9291 - 1.9293)		—
	Grade 1	49.004 - 49.008 (1.9293 - 1.9294)		—
	Grade 2	49.008 - 49.012 (1.9294 - 1.9296)		—
	Grade 3	49.012 - 49.016 (1.9296 - 1.9298)		—

*: Cylinder bore wear

PISTON, PISTON RING AND PISTON PIN

Available Piston

Unit: mm (in)



PBIC0188E

		CR10DE	CR12DE	CR14DE
		Standard		
Piston skirt diameter “A”	Grade No. 1	70.980 - 70.990 (2.7945 - 2.7949)	70.980 - 70.990 (2.7945 - 2.7949)	72.980 - 72.990 (2.8732 - 2.8736)
	Grade No. 2	70.990 - 71.000 (2.7949 - 2.7953)	70.990 - 71.000 (2.7949 - 2.7953)	72.990 - 73.000 (2.8736 - 2.8740)
	Grade No. 3	71.000 - 71.010 (2.7953 - 2.7957)	71.000 - 71.010 (2.7953 - 2.7957)	73.000 - 73.010 (2.8740 - 2.8744)
0.2 (0.002) oversize (service)		71.180 - 71.210 (2.8024 - 2.8035)	71.180 - 71.210 (2.8024 - 2.8035)	73.180 - 73.210 (2.8811 - 2.8823)
“H” dimension		37.3 (1.469)	34.3 (1.350)	32.3 (1.272)
Piston pin hole inner diameter		18.008 - 18.012 (0.7090 - 0.7091)		
Piston to cylinder bore clearance		0.010 - 0.030 (0.0004 - 0.0012)		

Piston Ring

Unit: mm (in)

		Standard	Limit
Side clearance	Top	0.040 - 0.080 (0.0016 - 0.0031)	0.110 (0.0043)
	2nd	0.025 - 0.070 (0.0010 - 0.0028)	0.1 (0.0039)
	Oil ring	0.030 - 0.140 (0.0021 - 0.0055)	—
End gap	Top	0.18 - 0.33 (0.0071 - 0.0130)	0.57 (0.0224)
	2nd	0.50 - 0.65 (0.0197 - 0.0256)	0.85 (0.0335)
	Oil (rail ring)	0.20 - 0.70 (0.0079 - 0.0276)	0.96 (0.0378)

Piston Pin

Unit: mm (in)

Piston pin outer diameter	Standard	17.996 - 18.000 (0.7085 - 0.7087)
Piston pin to piston clearance	Standard	0.008 - 0.016 (0.0003 - 0.0006)
Piston pin to connecting rod bushing clearance	Standard	–0.018 - –0.038 (–0.0007 - –0.0015)

CONNECTING ROD

Unit: mm (in)

		CR10DE	CR12DE, CR14DE
Center distance		120.70 - 120.80 (4.752 - 4.756)	129.45 - 129.55 (5.096 - 5.100)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)	
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)	

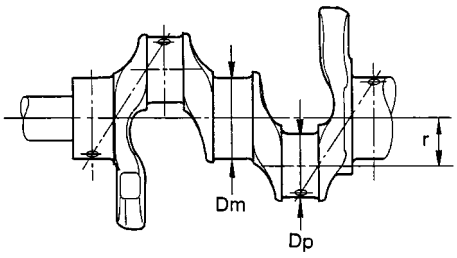
Connecting rod bushing inner diameter* (small end)	Standard	17.962 -17.978 (0.7072 - 0.7078)
Connecting rod big end inner diameter	Standard	43.000 - 43.013 (1.6929 - 1.6934)
Side clearance	Standard	0.050 - 0.420 (0.0020 - 0.0165)
	Limit	0.5 (0.0197)

*: After installing in connecting rod

CRANKSHAFT

Unit: mm (in)

Main journal dia. “Dm”	Grade No. 0	44.966 - 44.970 (1.7703 - 1.7705)
	Grade No. 1	44.962 - 44.966 (1.7702 - 1.7703)
	Grade No. 2	44.958 - 44.962 (1.7700 - 1.7702)
	Grade No. 3	44.954 - 44.958 (1.7698 - 1.7700)
Pin dia. “Dp”	Standard	39.961 - 39.974 (1.5733 - 1.5738)
Out-of-round (X – Y)	Limit	0.005 (0.0002)
Taper (A – B)	Limit	0.005 (0.0002)
Runout [TIR*]	Limit	0.05 (0.0020)
Side clearance	Standard	0.060 - 0.260 (0.0024 - 0.0102)
	Limit	0.3 (0.012)



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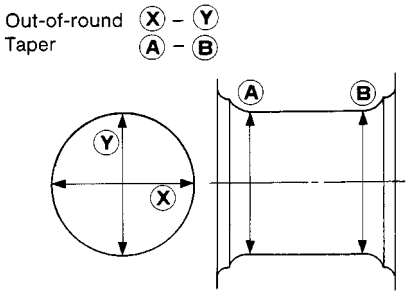


SEM715

*: Total indicator reading

MAIN BEARING

Standard size

Unit: mm (in)

Grade No.	Thickness	Identification color
STD1	2.002 - 2.006 (0.0788 - 0.0790)	Red
STD2	2.004 - 2.008 (0.0789 - 0.0791)	Green
STD3	2.006 - 2.010 (0.0790 - 0.0791)	Yellow
STD4	2.008 - 2.012 (0.0791 - 0.0792)	Blue
STD5	2.010 - 2.014 (0.0791 - 0.0793)	Pink
STD6	2.012 - 2.016 (0.0792 - 0.0794)	White
STD7	2.014 - 2.018 (0.0793 - 0.0794)	Blue/yellow

Undersize

Unit: mm (in)

Grade	Thickness
US 0.25 (0.0098)	2.123 - 2.131 (0.836 - 0.839)

Bearing Clearance

Unit: mm (in)

Main bearing clearance	Standard	0.018 - 0.034 (0.0007 - 0.0013)
	Limit	0.05 (0.002)

CONNECTING ROD BEARING

Standard Size

Unit: mm (in)

Grade	Thickness
Standard	1.504 - 1.508 (0.0529 - 0.0594)

Undersize

Unit: mm (in)

Grade	Thickness
US 0.25 (0.0098)	1.627 - 1.635 (0.0641 - 0.0644)

Bearing Clearance

Unit: mm (in)

Connecting rod bearing clearance	Standard	0.010 - 0.044 (0.0004 - 0.0017)
	Limit	0.064 (0.0025)

MISCELLANEOUS COMPONENTS

Unit: mm (in)

Flywheel runout [TIR*]	Limit		0.15 (0.0059)
Camshaft sprocket runout [TIR*]	Limit	Intake	0.20 (0.0079)
		Exhaust	0.15 (0.0059)

*: Total indicator reading

Tightening Torque

EBS00OHQ

*1: Parts to be tightened in particular orders
1)-: Order of tightening when tightening two or more steps separately.

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*2

	Idler pulley locknut (for water pump belt)			24.5 - 31.4 (2.5 - 3.2, 18 - 23)
	Idler pulley locknut (for alternator and A/C compressor belt)			24.5 - 31.4 (2.5 - 3.2, 18 - 23)
	Idler pulley bracket (for alternator and A/C compressor belt)			16.6 - 23.5 (1.7 - 2.4, 13 - 17)
	Manifold absolute pressure sensor			1.2 - 1.7 (0.12 - 0.17, 11 - 15)*2
*1	Air cleaner case (upper) to (lower)		1) 2)	1.9 - 2.2 (0.20 - 0.22, 17 - 19)*2 3.8 - 4.4 (0.40 - 0.44, 35 - 38)*2
*1	Air cleaner case assembly			5.4 - 7.3 (0.55 - 0.74, 48 - 64)*2
	Electronic throttle control actuator			7.2 - 9.6 (0.73 - 0.99, 64 - 86)*2
	EVAP canister purge volume control solenoid valve			4.3 - 5.8 (0.44 - 0.59, 38 - 51)*2
*1	Intake manifold			6.9 - 9.4 (0.71 - 0.96, 61 - 84)*2
	Support bracket	M6 × 15 mm (0.59 in)		6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
		M6 × 12 mm (0.47 in)		8.4 - 10.8 (0.86 - 1.1, 75 - 95)*2
*1	Fuel injector and fuel tube assembly		1) 2)	11.8 - 13.8 (1.2 - 1.4, 9 - 10) 20.8 - 28.2 (2.1 - 2.9, 16 - 20)
	Clamp for fuel feed hose			1.0 - 1.5 (0.10 - 0.15, 9- 13)*2
*1	Exhaust manifold			25.5 - 29.4 (2.6 - 2.9, 19 - 21)
	Exhaust manifold cover			6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
	Heated oxygen sensor 1			40 - 50 (4.1 - 5.1, 30 - 36)
	Heated oxygen sensor harness bracket			6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
	Three way catalyst (under exhaust manifold)			29.4 - 34.3 (3.0 - 3.4, 22 - 25)
	Three way catalyst support			33.3 - 46.1 (3.4 - 4.7, 25 - 34)
	Three way catalyst cover			6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
	Ignition coil			3.8 - 4.4 (0.39 - 0.44, 34 - 38)*2
	Spark plug			19.6 - 29.4 (2.0 - 2.9, 15 - 21)
*1	Rocker cover	M6 × 45 mm (1.77 in)		8.8 - 10.8 (0.90 - 1.1, 78 - 95)*2
		M6 × 20 mm (0.79 in)		6.9 - 10.8 (0.71 - 1.1, 61 - 95)*2
	Intake valve timing control solenoid valve			6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
	Harness bracket			6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
*1	Oil pan (upper)			6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
*1	Oil pan (lower)			6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
	Oil pan drain plug			29.4 - 39.2 (3.0 - 3.9, 22 - 28)
	Connecting bolt between oil pan (upper) and transaxle			16.6 - 23.5 (1.7 - 2.3, 13 - 17)
	Oil strainer			6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
	Cylinder head front cover			6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
	Chain tensioner			6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
	Camshaft position sensor (PHASE)			7.1 - 10.8 (0.73 - 1.1, 63 - 95)*2
	Camshaft sprocket	Intake		78.4 - 88.2 (8.0 - 8.9, 58 - 65)
		Exhaust		78.4 - 88.2 (8.0 - 8.9, 58 - 65)

*1	Camshaft bracket	1)	2.0 (0.2, 18)*2
		2)	5.9 (0.6, 52)*2
		3)	9.0 - 11.8 (0.92 - 1.2, 80 - 104)*2
	Chain tension guide		16.6 - 23.5 (1.7 - 2.3, 13 - 17)
	Chain slack guide		12.7 - 18.6 (1.3 - 1.8, 10 - 13)
	Crankshaft pulley		132.4 - 152.0 (14 - 15, 98 - 112)
	Front cover		6.3 - 8.3 (0.65 - 0.84, 56 - 73)*2
*1	Cylinder head bolt	1)	61.7 - 71.7 (6.3 - 7.3, 46 - 52)
		2)	0 (0.0, 0)
		3)	22.5 - 32.5 (2.3 - 3.3, 17 - 23)
		4)	90° - 95° (Angle tightening)
*1	Cylinder head auxiliary bolt		9.0 - 11.8 (0.92 - 1.2, 80 - 104)*2
	Engine slinger		16.6 - 23.5 (1.7 - 2.3, 13 - 17)
	LH engine mount insulator		95 - 115 (9.7 - 11, 70 - 84)
	LH engine mount bracket (vehicle side)		43 - 54 (4.4 - 5.5, 32 - 39)
	LH engine mount bracket (transaxle side)		60 - 70 (6.2 - 7.1, 45 - 51)
	RH engine mount stay		40 - 50 (4.1 - 5.1, 30 - 36)
	RH engine mount insulator RH		60 - 70 (6.2 - 7.1, 45 - 51)
	RH engine mount bracket (upper)		40 - 50 (4.1 - 5.1, 30 - 36)
	RH engine mount bracket (lower)		40 - 50 (4.1 - 5.1, 30 - 36)
	Rear engine mount bracket	A/T models M/T models	64 - 74 (6.6 - 7.5, 48 - 54) 75 - 85 (7.7 - 8.7, 56 - 62)
	Rear torque rod		75 - 85 (7.7 - 8.7, 56 - 62)
	Connecting nut between LH engine mount insulator and LH engine mount bracket (transaxle side)		60 - 70 (6.2 - 7.1, 45 - 51)
	Connecting bolt between RH engine mount insulator and RH engine mount bracket (upper)		90 - 100 (9.2 - 10, 67 - 73)
*1	Main bearing cap	1)	24.5 - 30.3 (2.5 - 3.0, 18 - 22)
		2)	95° - 100° (Angle tightening)
	Connecting rod cap	1)	13.7 - 15.7 (1.4 - 1.6, 10.1 - 11.5)
		2)	45° - 50° (Angle tightening)
	Rear oil seal retainer		6.9 - 9.5 (0.71 - 0.96, 61 - 84)*2
	Flywheel (M/T)		83.4 - 93.2 (8.5 - 9.5, 62 - 68)
	Drive plate (A/T)		93.2 - 103 (9.5 - 10, 69 - 75)
	Knock sensor		15.7 - 20.6 (1.6 - 2.1, 12 - 15)
	Crankshaft position sensor (POS) [Note: transaxle side mounting parts]		7.1 - 10.8 (0.73 - 1.1, 63 - 95)*2

PRECAUTIONS

PFP:00001

Precautions for Drain Coolant

EBS01C5X

Drain coolant when engine is cooled.

Precautions for Disconnecting Fuel Piping

EBS01C5Y

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precautions for Removal and Disassembly

EBS01C5Z

- When instructed to use special service tools, use the specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with tape or the equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified.

Precautions for Inspection, Repair and Replacement

EBS01C60

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precautions for Assembly and Installation

EBS01C61

- Use torque wrench to tighten bolts or nuts to specified value.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly same as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check oil or coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assemble, spread the oil on sliding surfaces well.
- Release air within route when refilling after draining coolant.
- Before starting engine, apply fuel pressure to fuel lines with turning ignition switch ON (with engine stopped). Then make sure that there are no leaks at fuel line connections.
- After repairing, start engine and increase engine speed to check coolant, fuel, oil, and exhaust systems for leakage.

Parts Requiring Angular Tightening

EBS01C62

- Use an angle wrench for the final tightening of the following engine parts.
  - Cylinder head bolts
  - Lower cylinder block bolts
  - Connecting rod cap bolts
  - Crankshaft pulley bolt (No angle wrench is required as the bolt flange is provided with notches for angular tightening)
- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Precautions For Liquid Gasket

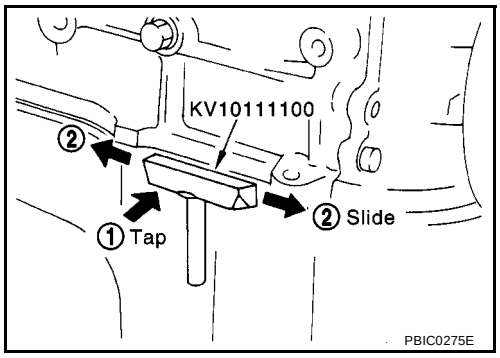
EBS01C63

REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

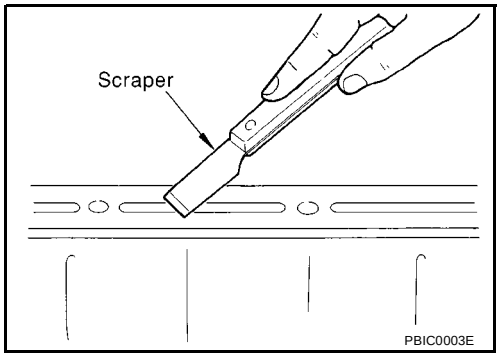
  CAUTION:
  Be careful not to damage the mating surfaces.
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the liquid gasket applied area.

  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

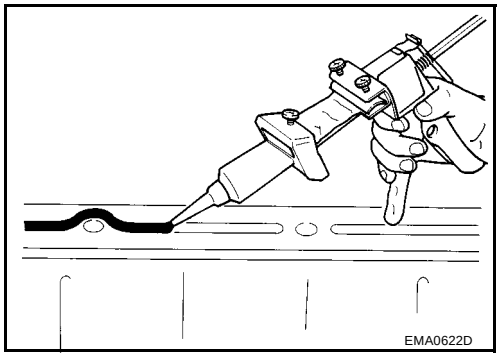


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

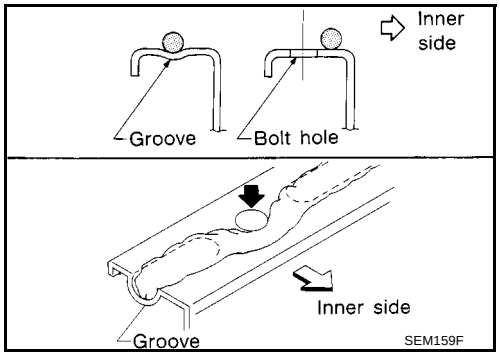


4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



   - As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
   - Within five minutes of gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten after the installation.
   - After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

   CAUTION:
   If there are instructions in this manual, observe them.



Cleanliness Instructions Which Must Be Followed When Working On The High Pressure Direct Injection System

EBS01C64

RISKS RELATING TO CONTAMINATION

The system is very sensitive to contamination. The risks caused by the introduction of contamination are:

- Damage to or destruction of the high pressure injection system,
- Seizing or leaking of a component.

All After-Sales operations must be performed under very clean conditions. This means that no impurities (particles a few microns in size) must be allowed to enter the system during dismantling or into the circuits via the fuel unions. The cleanliness principle must be applied from the filter to the injectors.

The Sources Of Contamination

EBS01C65

Contamination is caused by:

- Metal or plastic chips,
- Paint,
- Fibres,
  - Of cardboard,
  - Brushes,
  - Paper,
  - Clothing,
  - Cloths.
- Foreign bodies such as hairs,
- Ambient air,
- Etc.

CAUTION:

It is forbidden to clean the engine using a high pressure washer because of the risk of damaging connections. Also moisture may collect in the connectors and cause electrical connection problems.

Precautions To Be Followed Before Any Work Is Carried Out On The Injection System

EBS01C66

- Ensure that you have the plugs for the unions to be opened [bag of plugs sold by the Parts Stores - Nissan part No.: 16830 BN700 (Renault part No.: 77 01 206 804)]. Plugs are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plugs must be thrown away.
- Ensure that you have the resealable plastic bags for storing removed parts. There is less risk of parts stored in this way being exposed to contamination. The bags must be used only once, and after use they must be thrown away.
- Make sure that lint-free cleaning cloths are available. The use of conventional cloth or paper is prohibited. These are not lint-free and may contaminate the fuel circuit of the system. Each lint-free cloth should only be used once.

Cleaning Precautions To Be Followed Before Carrying Out Any Work On The Fuel System

EBS01C67

- For each operation, use new thinner (used thinner contains impurities). Pour it into a clean receptacle.
- For each operation, use a clean brush which is in good condition (the brush must not shed its bristles).
- Use a brush and thinners to clean the connections to be opened.
- Blow compressed air over the cleaned parts (tools, bench and parts, connections and injection system zone). Check that no bristles remain adhered.
- Wash your hands before and during the operation if necessary.
- When wearing leather protective gloves, cover these with latex gloves.

Precautions To Be Followed During The Operation

EBS01C68

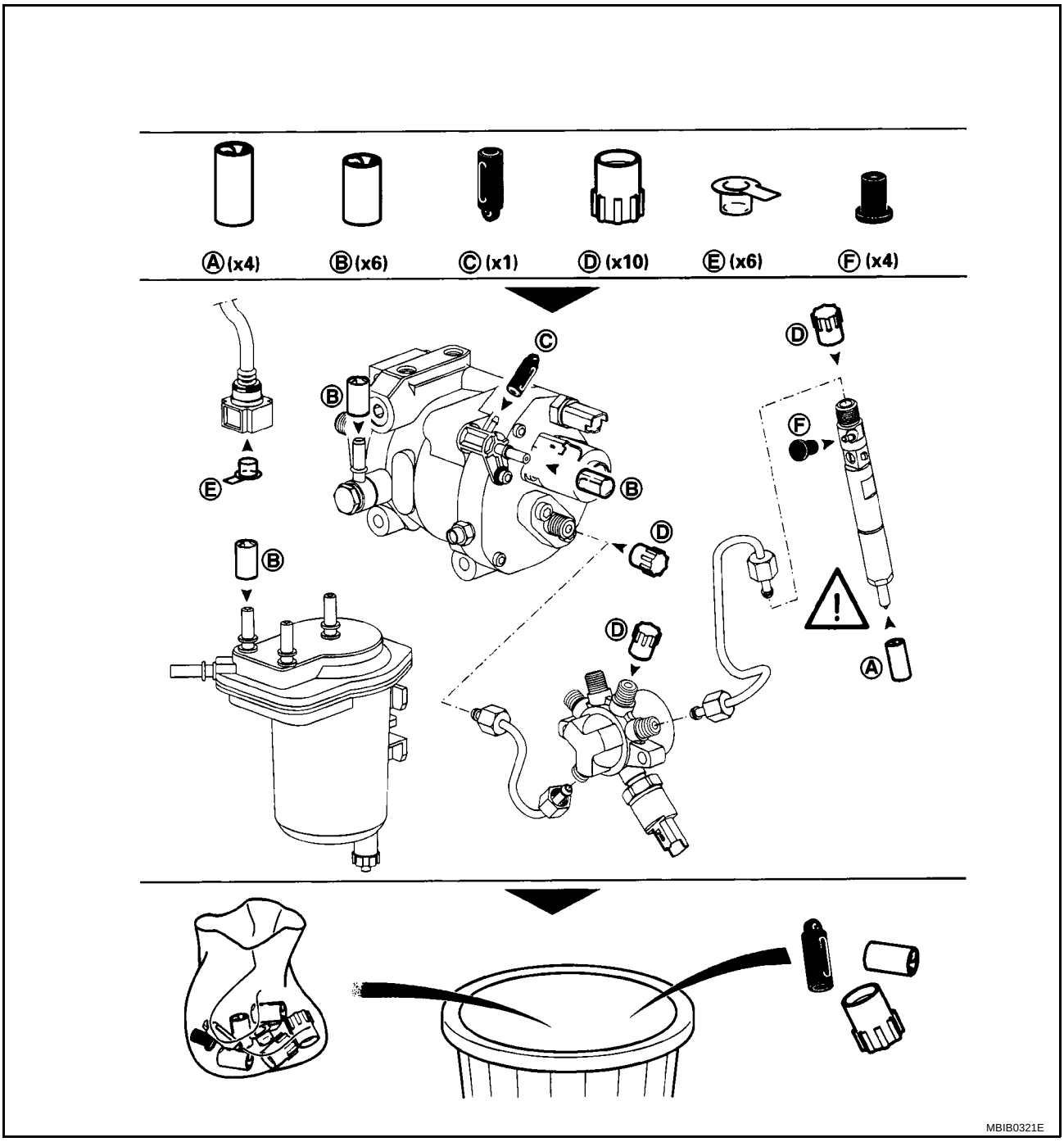
- As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system. The plugs to be used are available from the Parts Stores [Nissan Part No.: 16830 BN700 (Renault Part No.: 77 01 206 804)]. They must not be reused under any circumstances.
- Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries contamination.
- All components of the injection system that are removed must be stored in a hermetically sealed plastic bag once the plugs have been inserted.
- The use of a brush, thinner, bellows, sponge or normal cloth is strictly forbidden once the circuit has been opened. In fact, these items are likely to result in impurities entering the system.

- A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

Instructions For Fitting The Plugs

EBS01C69

NISSAN part number: 16830 BN700
(Renault part number: 77 01 206 804)



CAUTION:

- **The engine must not run with:**
  - **Diesel containing more than 10% diester**
  - **Petrol, even in very small amounts.**
- **The system can inject the diesel into the engine at a pressure of up to 140,000 kPa (1,400 bar, 1,428 kg/cm^2 , 20,300 psi). Before carrying out any work, check that the injector rail is no longer pressurized and that the fuel temperature is not too high.**
- **You must respect the cleaning and safety advice specified in this document for any work on the high pressure injection system.**

- **Removal of the interior of the pump and injectors is prohibited. Only the flow actuator, the diesel temperature sensor and the venturi may be changed on the pump.**
- **For safety reasons, it is strictly forbidden to undo a high pressure pipe union when the engine is running.**
- **It is forbidden to remove the pressure sensor from the fuel rail because this may cause contamination problems. If the pressure sensor develops a fault, the pressure sensor, fuel rail and the five high pressure pipes must be replaced.**
- **It is strictly forbidden to remove any fuel injection pump pulley bearing the Renault part No. 070 575. The pulley must be replaced when the high pressure pump is replaced.**
- **It is forbidden to repair the wiring connecting the accelerometer and the engine speed sensor. If the wiring should fail, it has to be replaced with new wiring.**
- **Applying 12 volts directly to any component in the system is prohibited.**
- **Ultrasonic decoking and cleaning are prohibited.**
- **Never start the engine if the battery is not connected correctly.**
- **Disconnect the injection system computer when carrying out any welding work on the vehicle.**
- **All disconnected plastic air inlet hoses must be replaced.**

A 16 character code called C2I (Individual Injector Corrector) is marked on the injectors. This code, specific to each injector, takes into account any manufacturing variations and specifies the flow injected by each injector.
The code of the new injector must be programmed into the computer when injector is replaced.
The code of the four injectors must be programmed into the computer when the computer is replaced.
There are two possibilities:

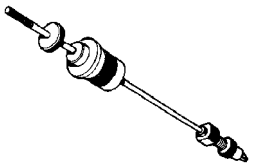
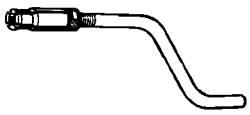
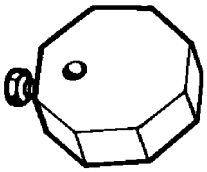
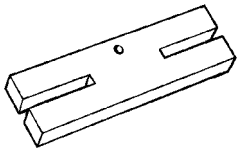
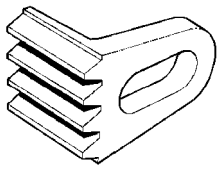
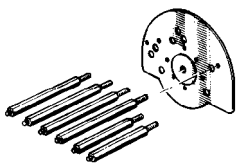
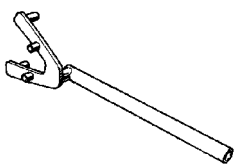
- If it is possible to communicate with the computer:
  - Upload the data from the computer into the diagnostic tool.
  - Change the computer.
  - Download the data from the diagnostic tool to the computer.
  - Using the diagnostic tool, ensure that the computer has not detected errors relating to the injector codes and check that the instrument panel warning light is off.
- If it is not possible to communicate with the computer:
  - Change the computer.
  - Read the data on the injectors.
  - Store the data in the computer using the diagnostic tool.
  - Using the diagnostic tool, ensure that the computer has not detected faults relating to the injector codes and check that the instrument panel warning light is off.

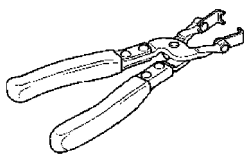
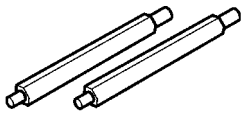
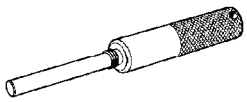
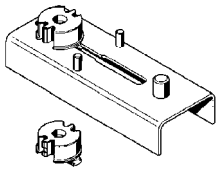
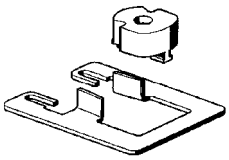
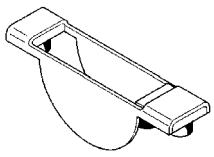
PREPARATION

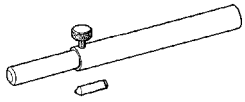
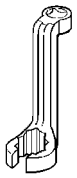
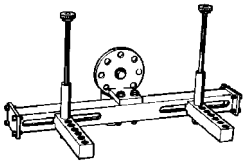
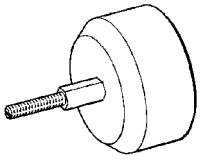
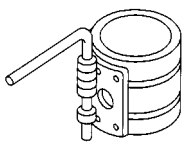
PFP:00002

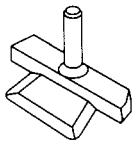
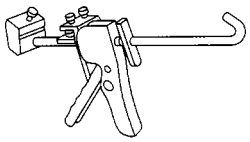
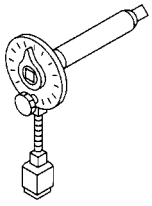
Special Service Tools

EBS01C6A

NISSAN tool number (RENAULT tool No.) Tool name		Description
KV113B0020 **(Emb. 880)** **Sliding hammer**	 MBIB0358E	Inertia extractor
KV113B0030 **(Mot. 11)** **Crankshaft bearing remover**	 MBIB0359E	Crankshaft bearing extractor
KV113B0040 **(Mot. 251-01)** **Dial gauge stand set**	 MBIB0360E	Gauge stand used with KV113B0050 (Mot. 252-01)
KV113B0050 **(Mot. 252-01)** **Dial gauge stand set**	 MBIB0361E	Thrust plate for measuring the protrusion of cylinder liners used with KV113B0040 (Mot. 251-01).
KV113B0060 **(Mot. 582-01)** **Ring gear stopper**	 MBIB0363E	Flywheel immobilizing tool.
KV113B0070 **(Mot. 792-03)** **Engine sub-attachment**	 MBIB0367E	Engine mounting plate for engine stand
KV113B0080 **(Mot. 799-01)** **Camshaft pulley holder**	 MBIB0368E	Tool for locking sprockets for toothed timing belt

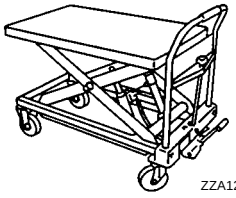
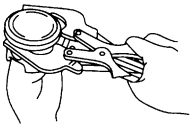
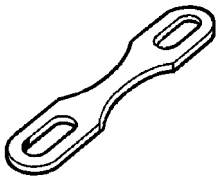
NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0090 **(Mot. 1335)** **Valve seal remover**  MBIB0370E	Tool for removing valve stem seals
KV113B0100 **(Mot. 1378)** **Engine sub-attachment**  MBIB0371E	X and Y engine pins
KV113B0110 **(Mot. 1430)** **TDC set pin**	Set of TDC pins
KV113B0120 **(Mot. 1485-01)** **Oil jet remover** MBIB0372E	Tool for removing the piston bottom oil jets
KV113B0130 **(Mot. 1489)** **TDC set pin**  MBIB0373E	TDC setting pin
KV113B0140 **(Mot. 1492)** **Bearing assembling set**  MBIB0374E	Tool for installing connecting rod bearing
KV113B0150 **(Mot. 1492-03)** **Bearing assembling adapter**  MBIB0375E	Adaptation kit for installing the detachable cap connecting rod bearing
KV113B0160 **(Mot. 1493-01)** **Bearing insert**  MBIB0376E	Tool for installing main bearing

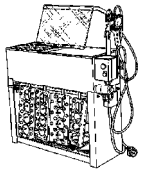
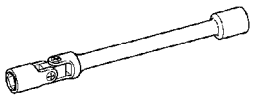
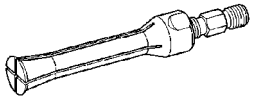
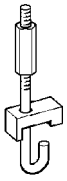
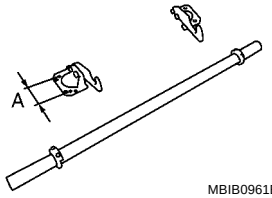
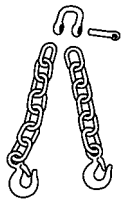
NISSAN tool number (RENAULT tool No.) Tool name	Description
KV113B0170 **(Mot. 1494)** **Oil jet remover plate**	Tool for removing oil jets
KV113B0180 **(Mot. 1511-01)** **Valve seal drift**  MBIB0378E	Tool for installing valve stem seals
KV113E0010 **(Mot. 1566)** **Fuel spill tube spanner**  MBIB0379E	Spanner for installing and removing high pressure pipes
KV113B0190 **(Mot. 1567)** **Clip pliers**	Pliers for exhaust gas recycling pipe clips
KV113B0200 **(Mot. 1573)** **Cylinder head stand**  MBIB0380E	Cylinder head support
KV113B0210 **(Mot. 1585)** **Front oil seal drift**  MBIB0381E	Tool for installing crankshaft seals, flywheel end
KV113B0220 **(Mot. 1586)** **Front oil seal drift set**	Tool for installing crankshaft seals, timing end
KV113B0230 **(Mot. 1632)** **Camshaft seal insert**	Tool for installing inlet camshaft seals
KV113B0240 **(Rou. 15-01)** **Shaft protector**	Internal shaft protector **16 mm (0.63 in) dia.**
EM03470000 **(—)** **Piston ring compressor**  NT044	Installing piston assembly into cylinder bore

NISSAN tool number (RENAULT tool No.) Tool name	Description
KV10111100 **(—)** **Seal cutter**  NT046	Removing oil pan
WS39930000 **(—)** **Tube presser**  NT052	Pressing the tube of liquid gasket
KV10112100 **(—)** **Angle wrench**  NT014	Tightening bolts for bearing cap, cylinder head, etc. in angle

Commercial Service Tools

EBS01C6B

(RENAULT tool No.) Tool name	Description
Manual lift table caddy  ZZA1210D	Removing and installing engine
Piston ring expander  NT030	Removing and installing piston ring
(Mot. 588)  MBIB0364E	Liner retaining strap

(RENAULT tool No.) Tool name	Description
(664000) Cylinder head test container  MBIB0383E	Tool for testing the cylinder head, including: a tray and the various kits suited for each model of cylinder head (plug, sealing plate, blanking plate).
Torx socket	Standard 1/2" (12.7 mm) square drive 8/12 / 14 female torx socket.
(Mot. 1505) MBIB0384E	Tool for installing valve stem seals
Glow plug wrench  MBIB0387E	Articulated wrench for removing and installing the glow plugs
Main bearing wrench  MBIB0388E	Wrench for removing main bearings
(Mot. 1638) Belt tension gauge  MBIB0382E	Checking drive belt tension
Engine support bar  MBIB0961E	Using with engine support chain A: Approx. 12.5 mm (0.492in)
Engine support chain  MBIB0962E	Using with engine support bar

IDENTIFICATION INFORMATION

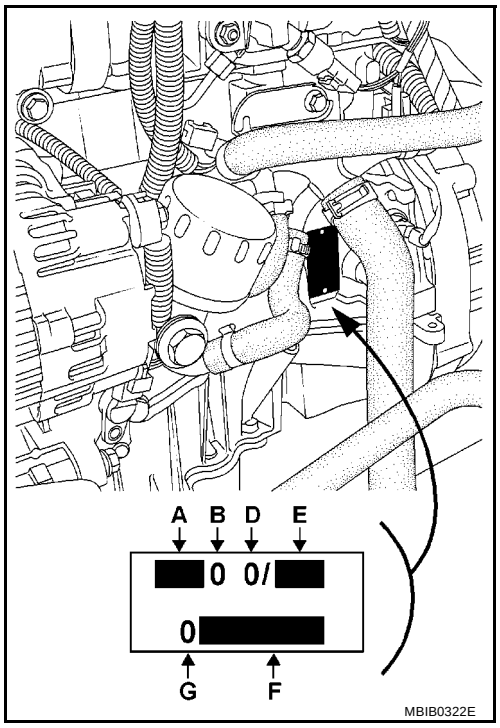
PFP:00010

Engine Identification

EBS01C6C

Identification is by means of an engraved plate on the cylinder block which carries:

- A: engine type
- B: engine type approval letter
- D: code
- E: engine suffix
- F: engine serial number
- G: engine assembly plant



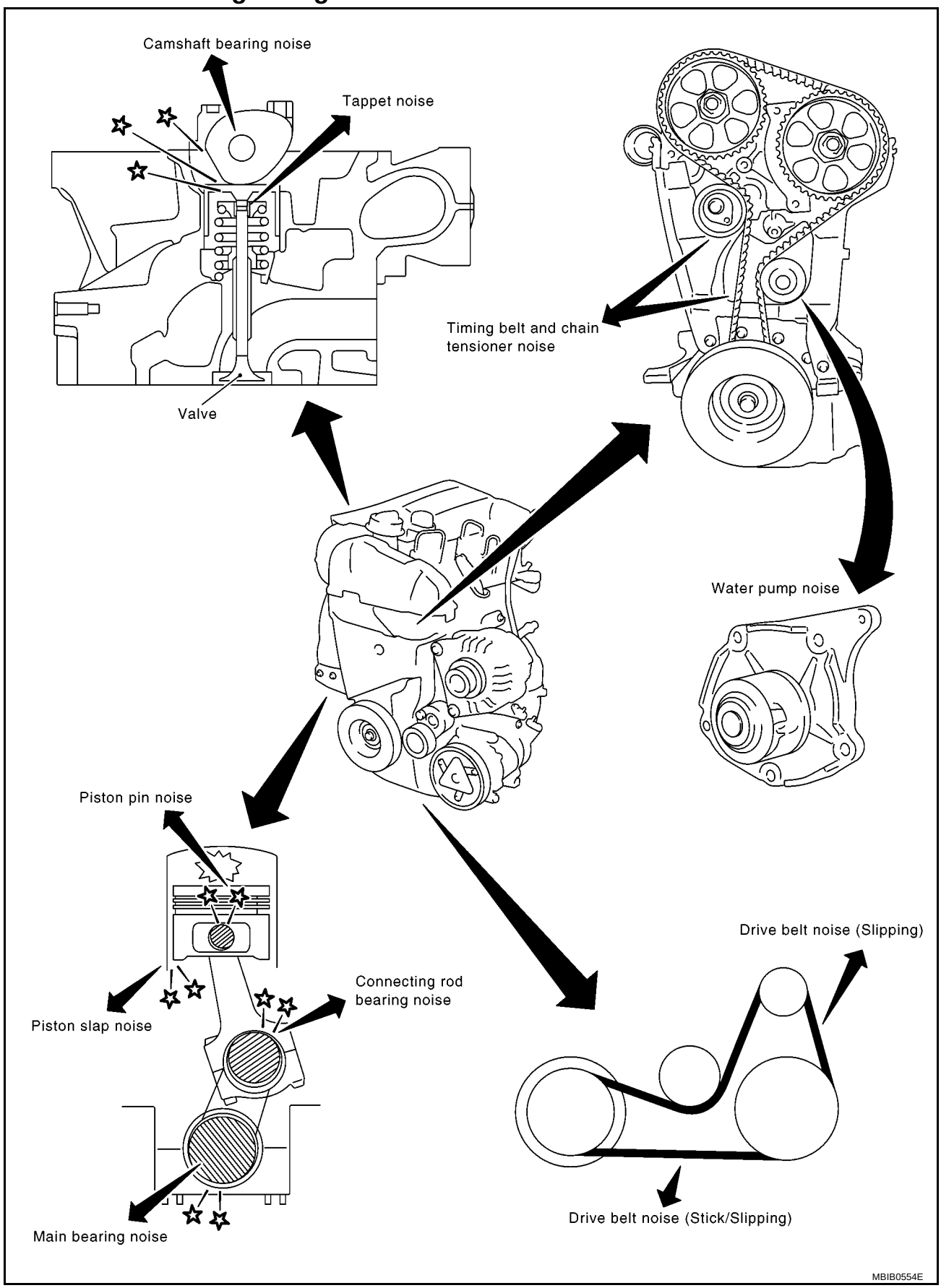
Engine	Compression ratio	Bore and stroke mm (in)	Displacement cm^3 (cu in)
K9K	18.25/1	76 x 80.5 (2.992 x 3.169)	1,461 (89.15)

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting —Engine Noise

EBS01C6D



Use the Chart Below to Help You Find the Cause of the Symptom.

EBS01C6E

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-194
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston ring end gap	EM-197
Front of engine Timing belt cover	Tapping or ticking	A	A	—	B	B	B	Timing belt tensioner noise	Timing belt tensioner operation	EM-140
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belts (Sticking or slipping)	Drive belts deflection	EM-121
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-39

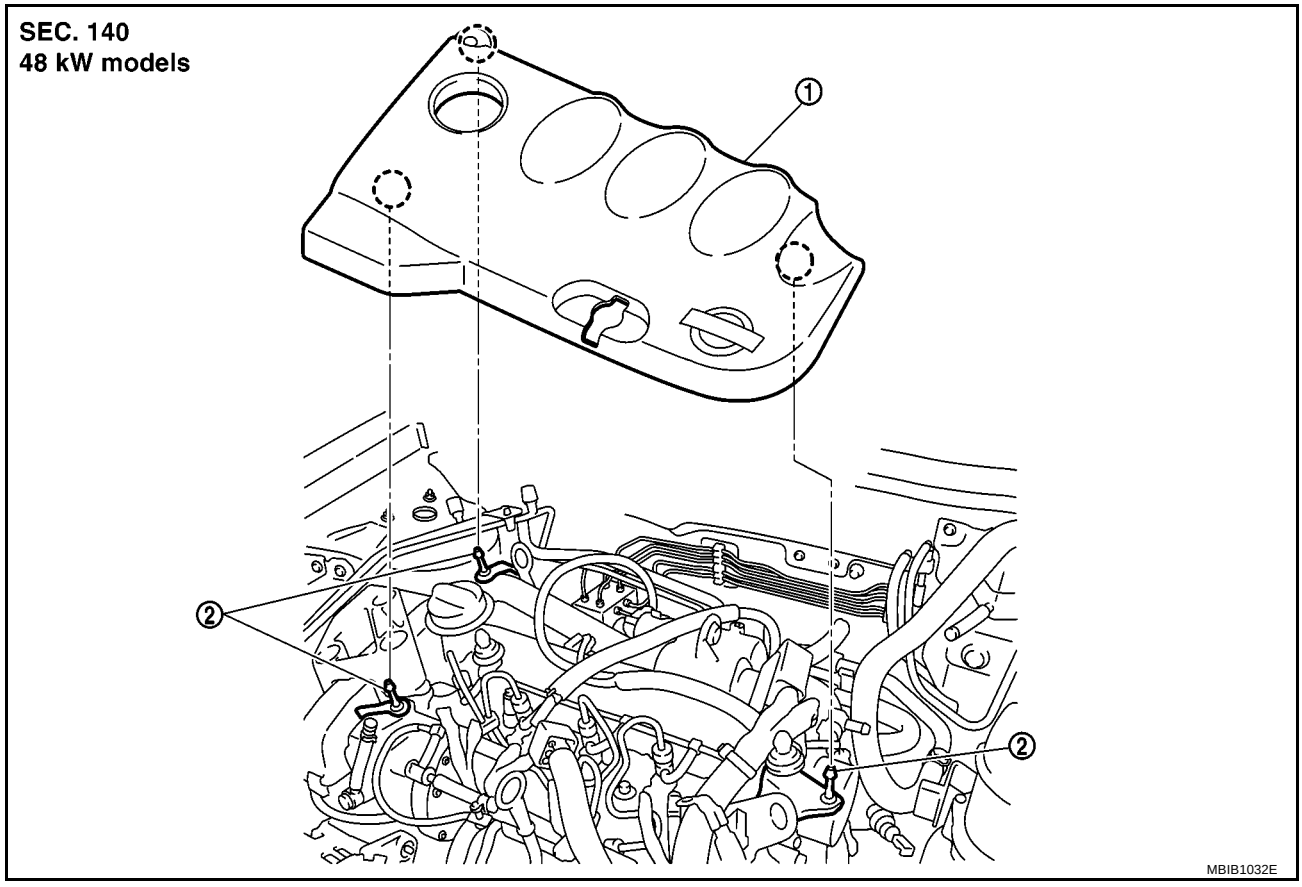
A: Closely related B: Related C: Sometimes related —: Not related

ENGINE ROOM COVER

PFP:14049

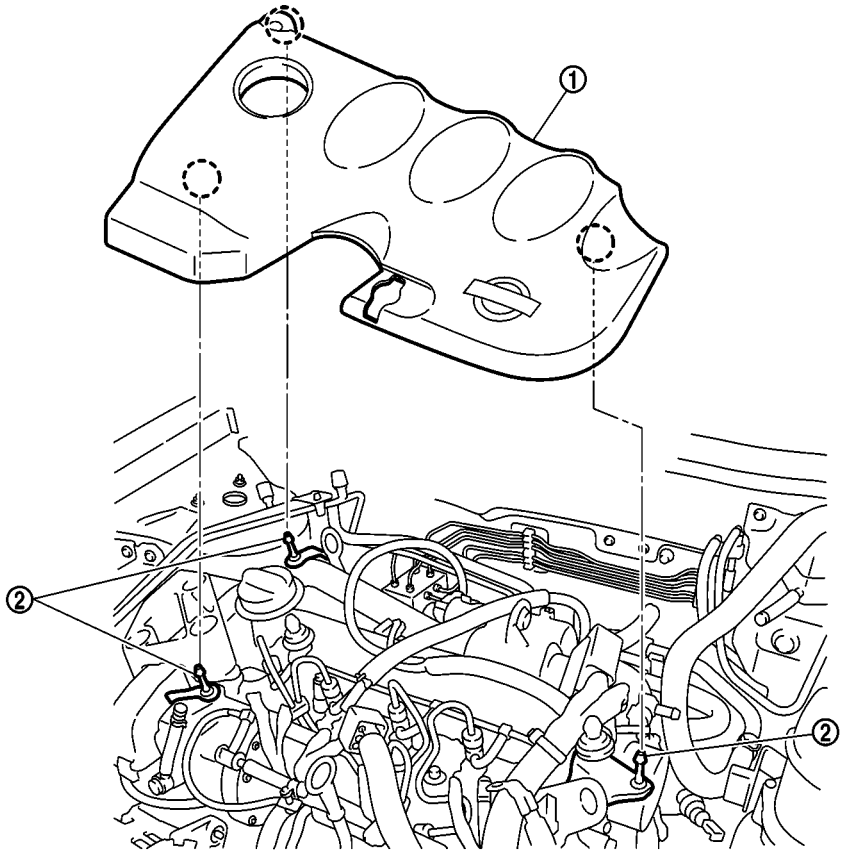
Removal and Installation

EBS01C6F



1. Engine room cover
2. Engine room cover bracket

SEC. 140
60 kW models



1. Engine room cover
2. Engine room cover bracket

REMOVAL

- Remove engine room cover from engine room cover bracket.

CAUTION:
Do not damage or scratch cover when installing or removing.

INSTALLATION

- Install in the reverse order of removal.

  NOTE:
  Press engine room cover until hearing the “click”.

DRIVE BELTS

PFP:02117

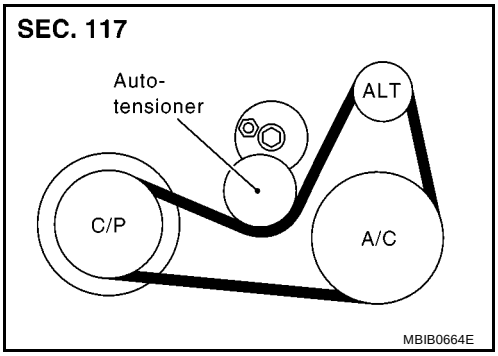
Checking Drive Belts

EBS01C6G

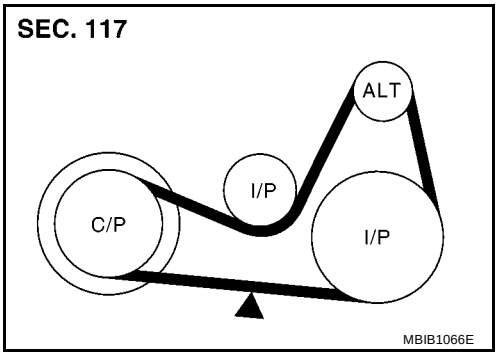
WARNING:

Be sure to perform when the engine is stopped.

1. Inspect belts for cracks, fraying, wear and oil. If necessary, replace.
2. Tighten auto-tensioner lock nut (models with A/C compressor) or idler pulley lock nut (models without A/C compressor) by hand and measure deflection or tension without looseness.



3. When measuring deflection, apply 98 N (10 kg, 22 lb) at the ▼ marked point as shown (models without A/C compressor).



Tension Adjustment

EBS01C6H

MODELS WITH A/C COMPRESSOR

Belt tensioning is not necessary, as it is automatically adjusted by auto-tensioner.

MODELS WITHOUT A/C COMPRESSOR

Belt tightening method for adjustment	Adjusting bolt on idler pulley

- The tension value is 234±10 Hz.

NOTE:

The engine must be turned through two revolutions in order to position the belt correctly.

CAUTION:

- **When checking belt tension immediately after installation, first adjust it to the specified value. Then, after turning the crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**
- **When installing belt, make sure that it is correctly engaged with pulley groove.**
- **Keep oil and water away from belt.**
- **Do not twist or bend belt excessively.**

Removal and Installation

EBS01C6I

CAUTION:

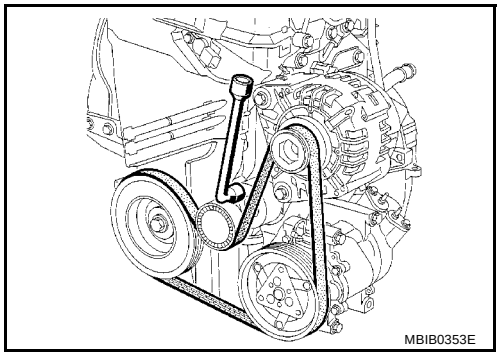
- **Replace any belt that has been removed with a new one.**
- **Auto-tensioner and idle pulley must be replaced with a new one when the belt is replaced.**
- **Do not run the engine without the drive belts to avoid damaging the crankshaft pulley.**

REMOVAL

1. Remove engine undercover.
2. Remove RH front wheel.
3. Remove right side splash cover.

4. Remove RH head light assembly.
5. Remove drive belt.

- Turn clockwise adjusting bolt.



6. If necessary, remove auto-tensioner (models with A/C compressor) or idler pulley (models without A/C compressor).

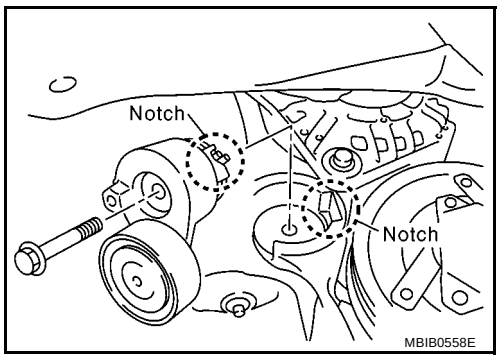
INSTALLATION

1. Install auto-tensioner mounting bolt (models with A/C compressor) or idler pulley mounting bolt (models without A/C compressor).

Auto-tensioner mounting bolt (models with A/C compressor) : **40 N·m (4.1 kg-m, 30 ft-lb)**

Idler pulley mounting bolt (models without A/C compressor) : **30 N·m (3.1 kg-m, 22 ft-lb)**

- The right figure is for example of models with A/C compressor. Align the notch and tighten mounting bolt.

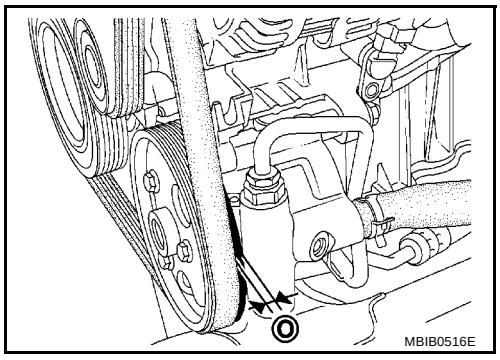


2. Install the drive belt.

CAUTION:

- **Make sure belt is correctly engaged with the pulley groove.**
- **Check for oil and coolant on belt and each pulley groove.**

NOTE:
The drive belt has five teeth as opposed to the pulleys which have six. It is therefore essential to ensure that tooth (O) remains free when installing the belt.



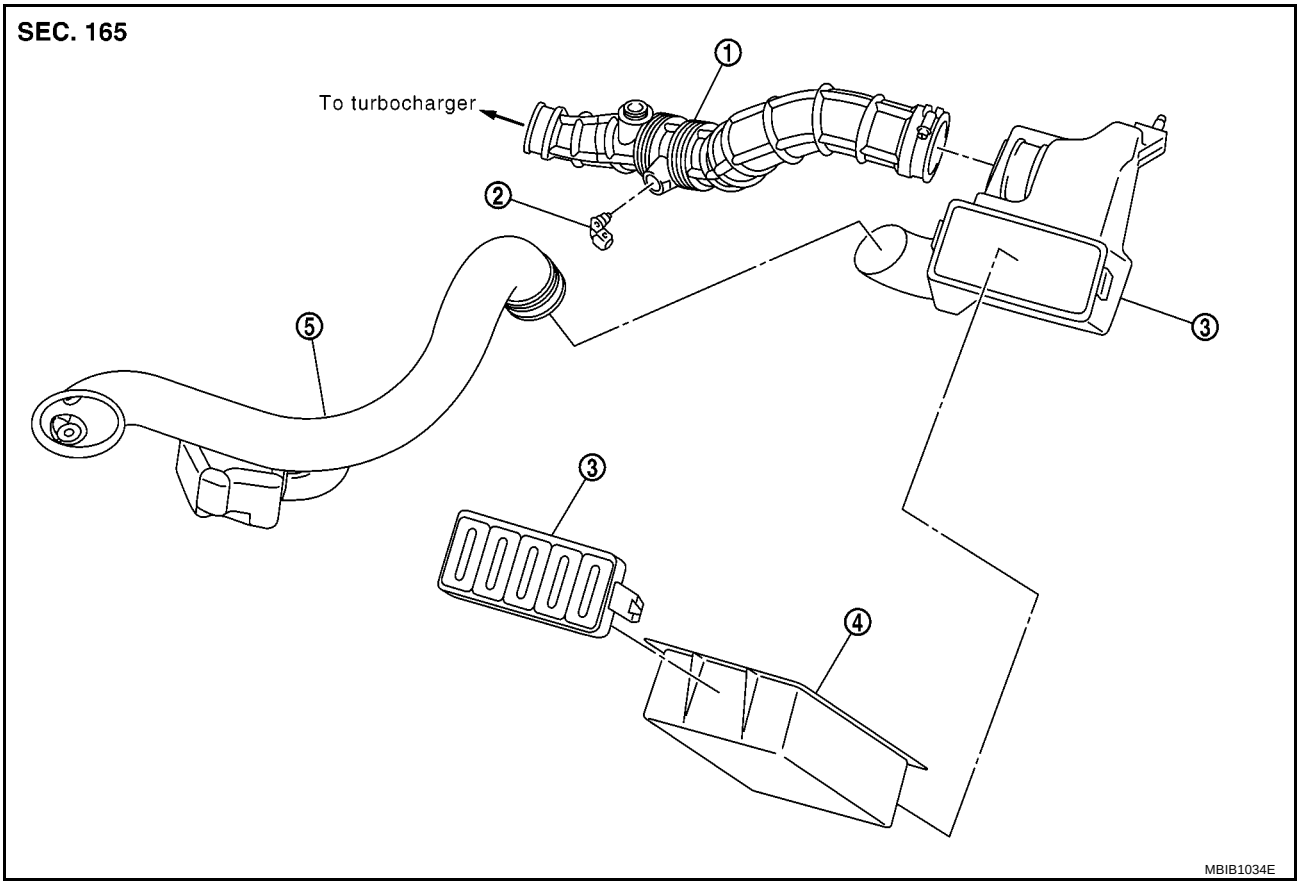
3. Adjust belt tension (models without A/C compressor). Refer to EM-121, "Tension Adjustment" .
4. Make sure that tension of each belt is within the standard.

AIR CLEANER AND AIR DUCT

PFP:16500

Removal and Installation

EBS01C6J



1. Air duct (suction)
2. Intake air temperature sensor (Models without charge air cooler)
3. Air cleaner case
4. Air cleaner filter
5. Air duct (inlet)

REMOVAL

1. Disconnect battery ground cable.
2. Disconnect battery positive cable.
3. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
4. Remove air duct (suction) mounting clip and remove air duct (suction).
5. Remove battery.
6. Disconnect the harness connector from the temperature sensor. (Models without charge air cooler)
7. Remove air duct (inlet) by loosing clamp screw.
8. Remove temperature sensor from air duct (inlet). (Models without charge air cooler)
9. Remove air cleaner case by sliding the air cleaner case frontward.

CAUTION:

Handle temperature sensor with care.

- **Do not shock it.**
- **Do not disassemble it.**
- **Do not touch its sensor.**

INSTALLATION

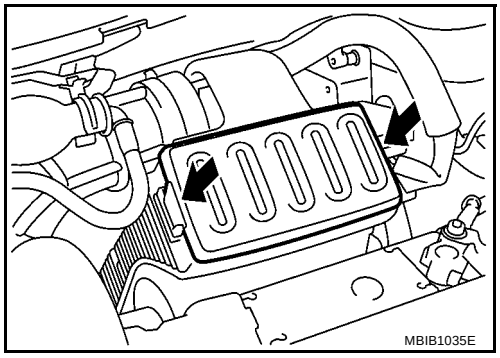
- Install in the reverse order of removal.

Changing Air Cleaner Filter

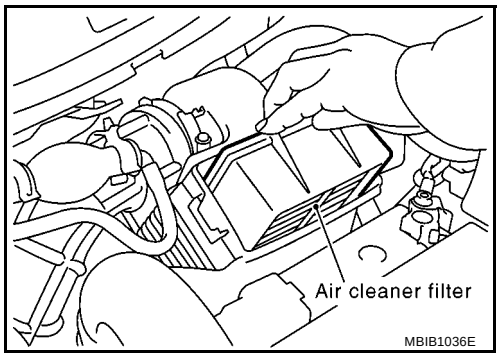
EBS01C6K

REMOVAL

1. Open air cleaner case.



2. Remove air cleaner filter.



INSTALLATION

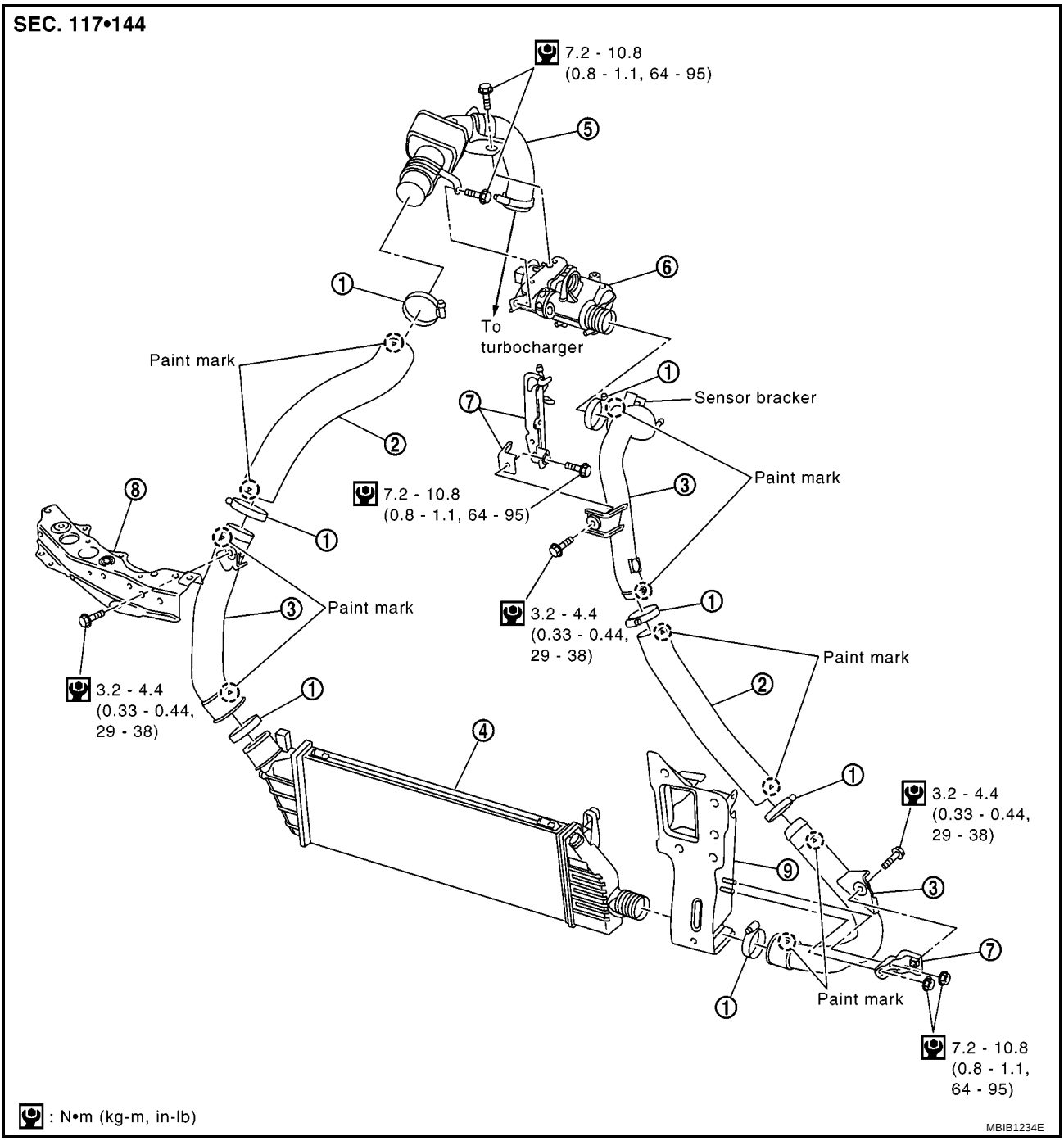
Install in the reverse order of removal.

CHARGE AIR COOLER

PFP:14461

Removal and Installation

EBS01C6L

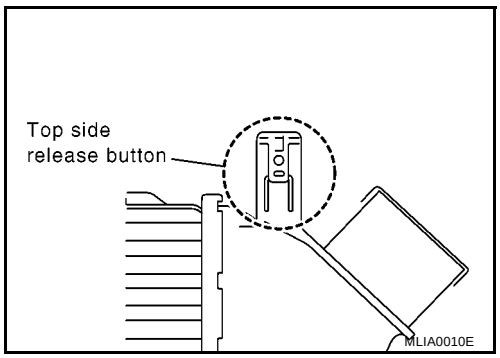


1. Hose clamp
2. Air inlet hose
3. Air inlet tube
4. Charge air cooler
5. Inlet pipe assembly
6. EGR control solenoid
7. Bracket
8. Radiator core support upper
9. Reinforcement

REMOVAL

1. Remove the front bumper. Refer to EI-4, "FRONT BUMPER" .
2. Remove the engine room cover.
3. Remove air inlet hose and tube between inlet pipe assembly and charge air cooler.

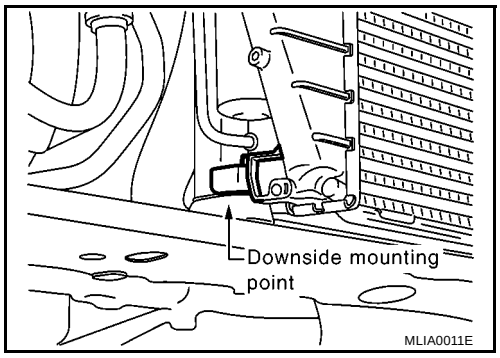
4. Push releases buttons on each topside of the charge air cooler and release it from downside mounting points.



5. Pull the charge air cooler to right side to disconnect it from the air inlet tube.

CAUTION:

- **Avoid interference between the charge air cooler and radiator.**
- **When removing charge air cooler, close opening on turbo charger and intake manifold with shop cloth or other suitable material.**



INSPECTION AFTER REMOVAL

1. Check that the charge air cooler is not full of oil. In that case, clean it with cleaning agent and then let it dry.
2. Check air passages of charge air cooler core and fins for clogging, leaks or deformation. Clean or replace charge air cooler in necessary.

- Be careful not to deform core fins.
- For cleaning procedure of charge air cooler core, refer to CO-38, "Checking Radiator" .

INSTALLATION

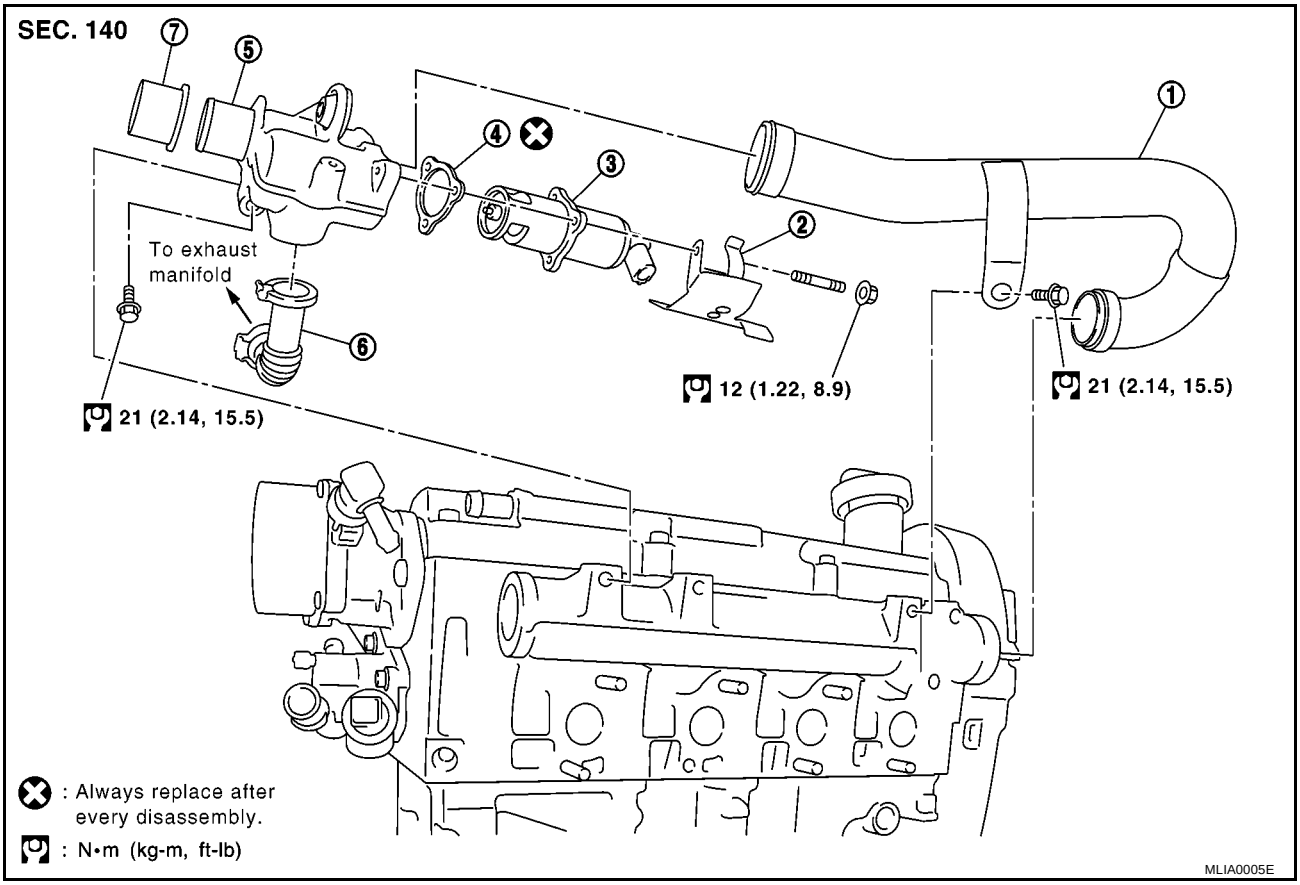
Apply a neutral detergent (fluid) to the joint between hoses and pipes (oil is not permissible).
Pay attention to identification mark and direction.
When installing air inlet hoses and tubes. Refer to EM-125, "Removal and Installation" .

EGR UNIT

PFP:14710

Removal and Installation

EBS01C6M

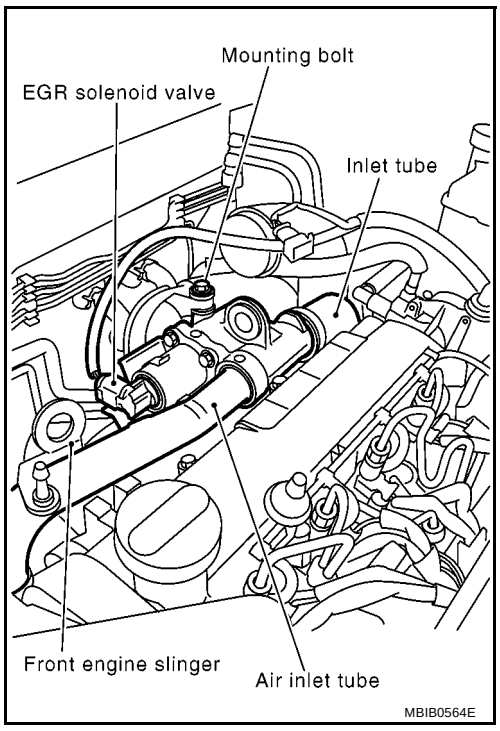


1. Air inlet tube
2. Heat insulator
3. EGR solenoid valve
4. Gasket
5. EGR unit housing
6. EGR tube
7. Joint

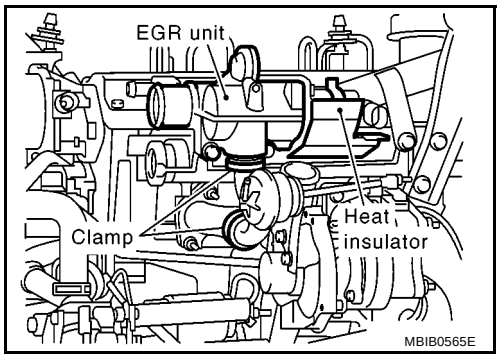
REMOVAL

1. Remove battery ground cable.
2. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
3. Remove air cleaner case and air duct (inlet). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
4. Remove wiper assembly.
5. Remove bulk head cover.

6. Disconnect EGR solenoid valve connector.
7. Remove mounting bolt.
8. Loosen turbocharger inlet tube.
9. Remove front engine slinger. Refer to EM-147, "ENGINE ASSEMBLY" .
10. Remove air inlet tube.



11. Remove heat insulator.
12. Remove EGR tube clamp.
13. Remove air duct assembly.
14. Remove EGR unit housing and EGR tube.



INSTALLATION

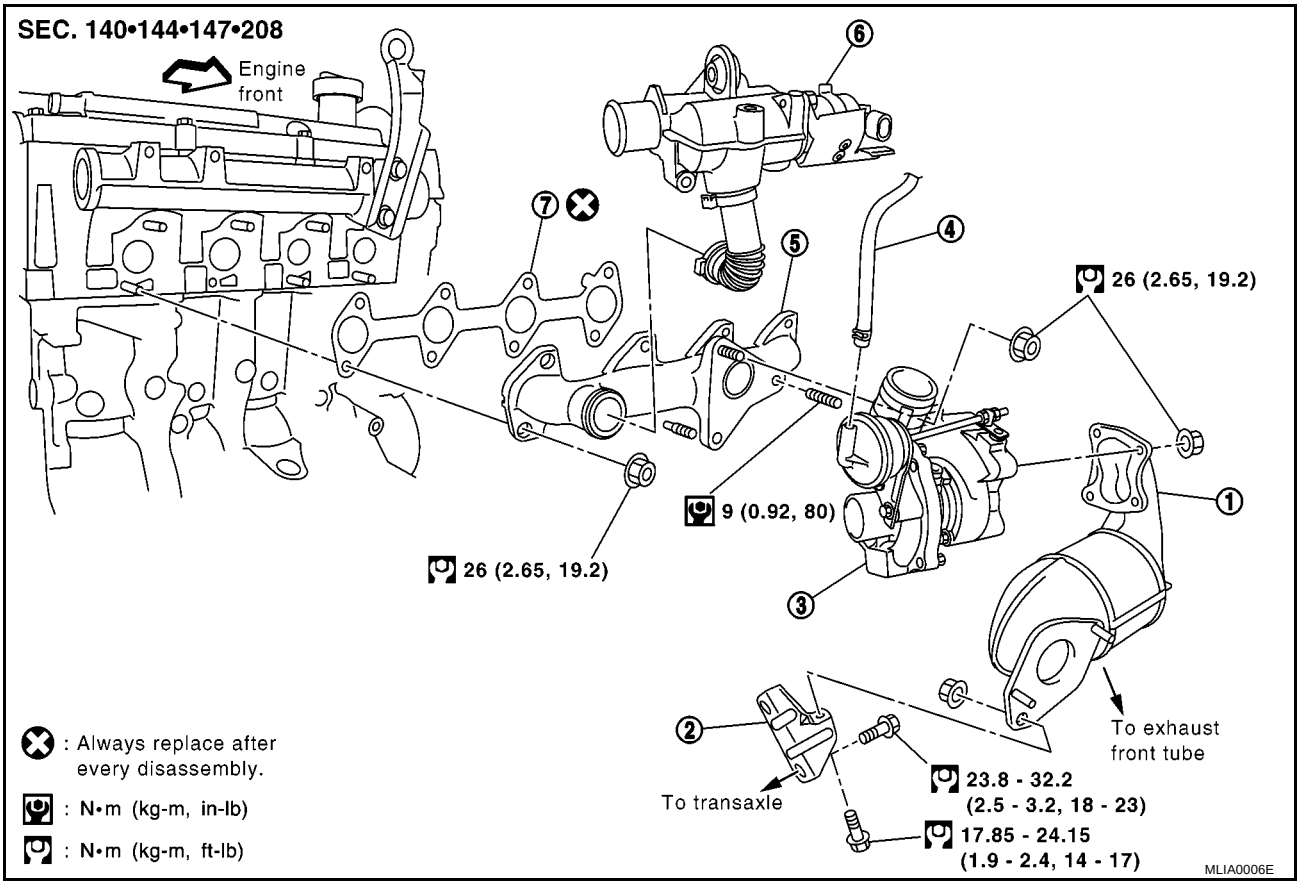
- Install in the reverse order of removal.

EXHAUST MANIFOLD, TURBOCHARGER, CATALYST

PFP:14004

Removal and Installation

EBS01C6N



1. Catalyst
2. Bracket
3. Turbocharger assembly
4. Hose
5. Exhaust manifold
6. EGR unit
7. Gasket

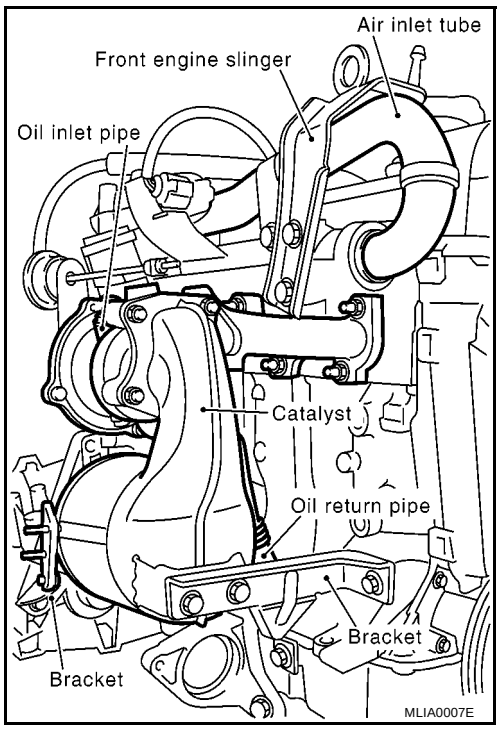
REMOVAL

1. Remove battery ground cable.
2. Remove engine undercover.
3. Remove air cleaner case and air duct (inlet). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
4. Remove wiper assembly.
5. Remove bulk head cover.
6. Remove EGR unit assembly. Refer to EM-127, "EGR UNIT" .
7. Remove turbocharger assembly as follows:

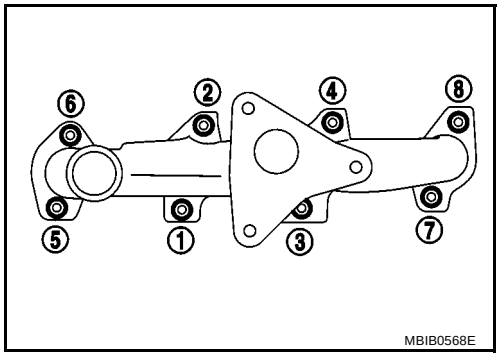
a. Remove catalyst mounting bolts and brackets.
b. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .

CAUTION:
Temporarily fix on vehicle side with rope or so to avoid putting stress on exhaust center tube.

c. Remove catalyst.



8. Each wiring and piping (disconnect/move).
9. Loosen exhaust manifold mounting nuts in the reverse order as shown.

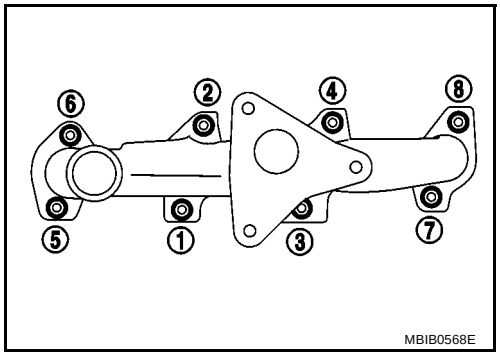


10. Rotate the exhaust manifold and turbocharger assembly so that the rear side (EGR tube mounting side) faces upward. And then pull out the assembly from between the engine and the air conditioning piping.

CAUTION:
Be careful not to deform each turbocharger piping when pulling out the assembly.

INSTALLATION

1. Tighten the mounting nuts in numerical order as shown.



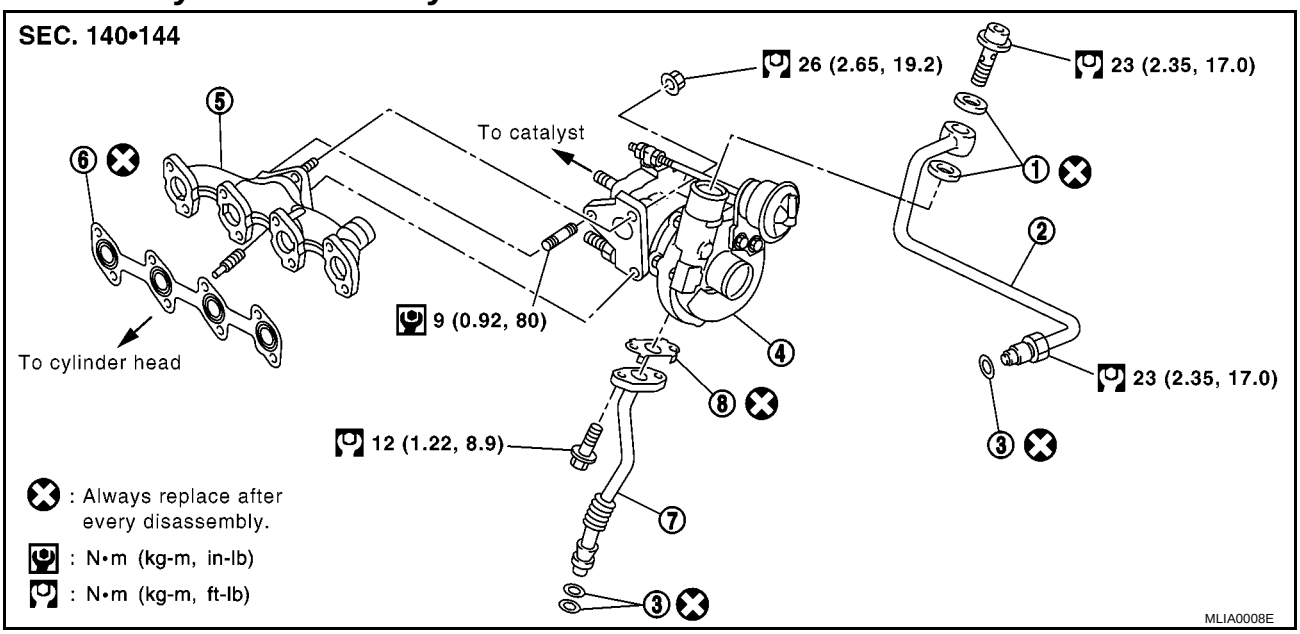
2. Install in reverse order of removal after this step.

INSPECTION AFTER INSTALLATION

Start engine and raise engine speed to check no exhaust emission leaks.

Disassembly and Assembly

EBS01C6O



1. Washer
2. Oil tube
3. O-ring
4. Turbocharger
5. Exhaust manifold
6. Gasket
7. Turbocharger oil outlet pipe
8. Gasket

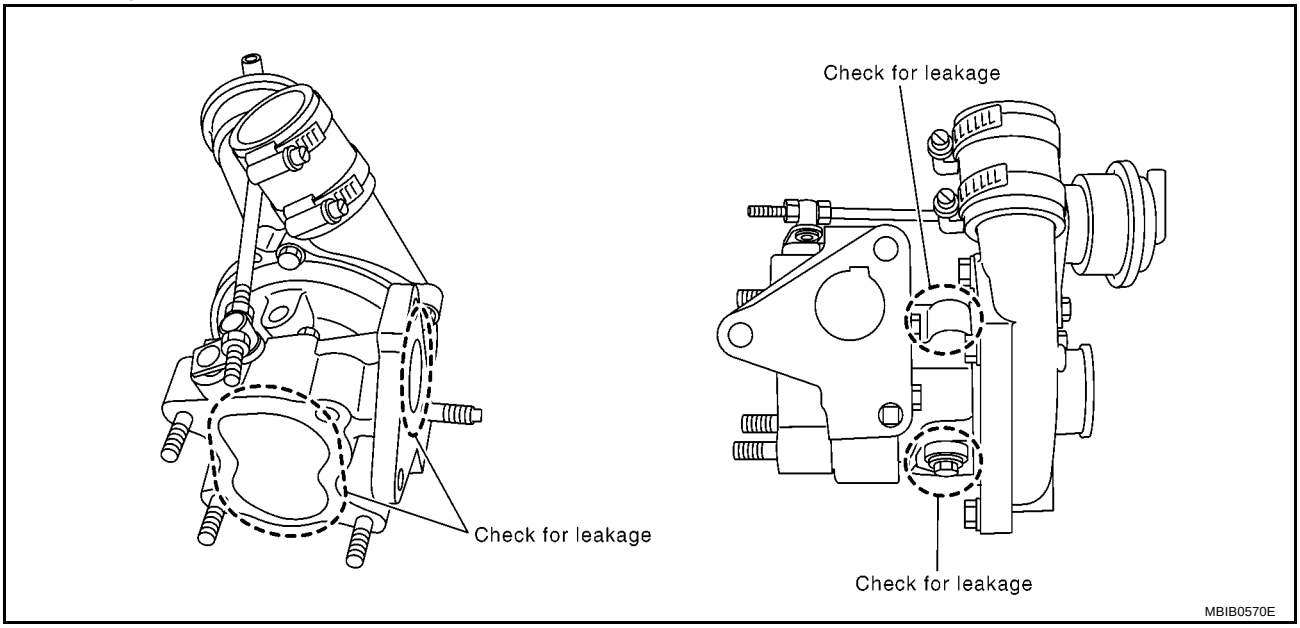
DISASSEMBLY

- After applying penetrative lubricant to the mounting nuts, check for the penetration of the lubricant, and then loosen the nuts to remove.

CAUTION:
Do not disassemble or adjust the turbocharger body.

INSPECTION AFTER DISASSEMBLY

Turbocharger



CAUTION:
When the compressor wheel turbine wheel or rotor shaft is damaged, remove all the fragments and foreign matter left in the following passages in order to prevent a secondary failure:

Suction side : Between turbocharger and air cleaner
Exhaust side : Between turbocharger and catalyst

ASSEMBLY

- Install in the reverse order of removal.

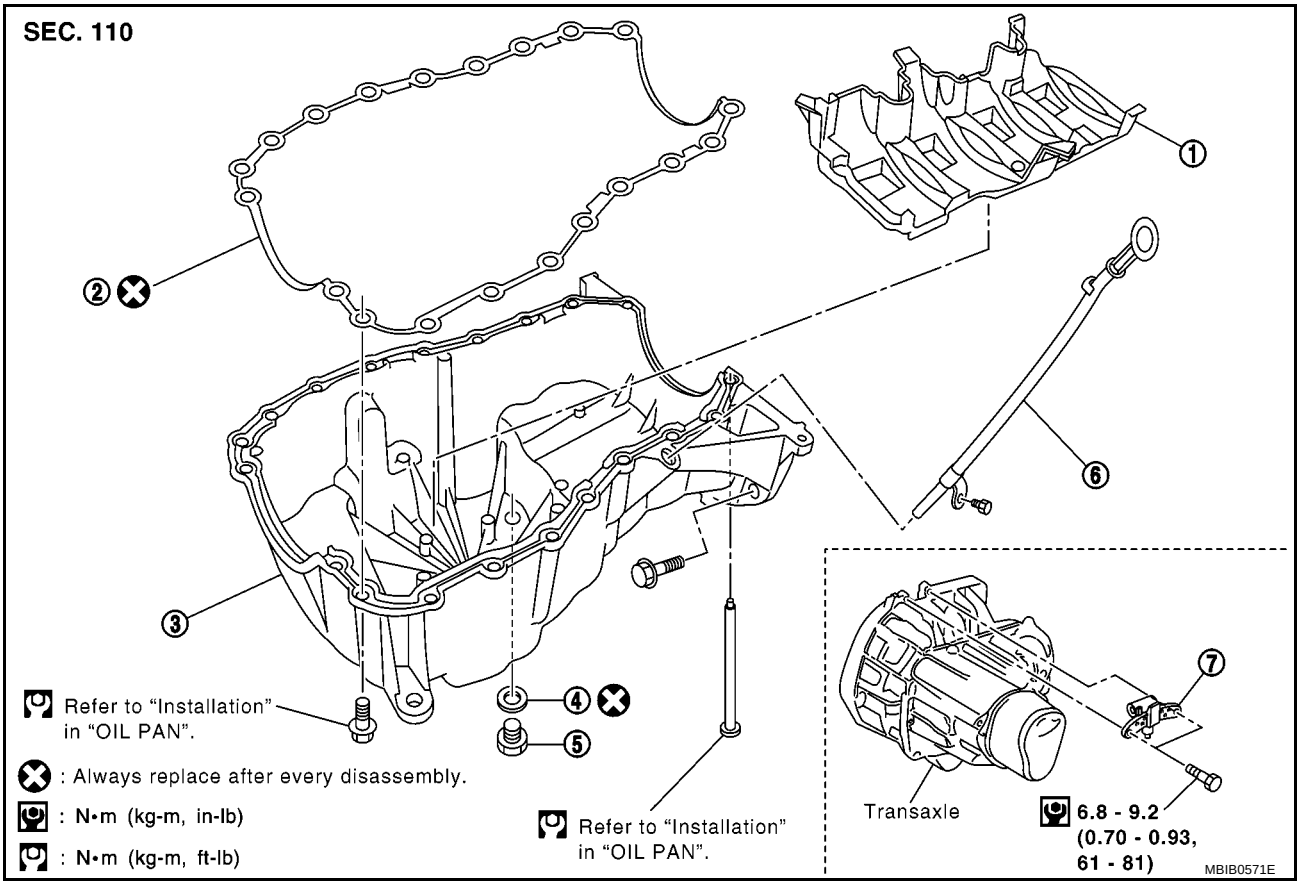
NOTE:
Apply LOCTITE FRENETANCH or equivalent to the threads of the turbocharger oil inlet pipe union to the cylinder head.

OIL PAN

PFP:11110

Removal and Installation

EBS01C6P



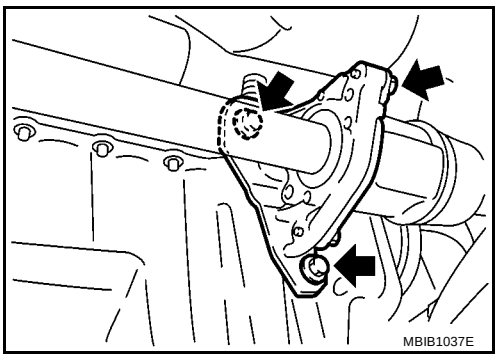
1. Baffle plate
2. Gasket
3. Oil pan
4. O-ring
5. Drain plug
6. Oil level gauge
7. Crankshaft position sensor (POS)

CAUTION:

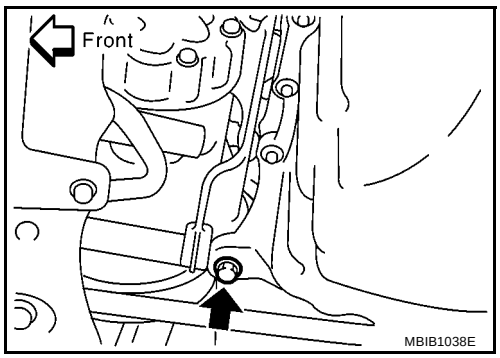
To avoid the danger of being scalded, never drain the engine oil when the engine is hot.

REMOVAL

1. Remove engine undercover.
2. Remove RH front wheel.
3. Remove right side splash cover.
4. Remove drive shaft assembly RH side. Refer to FAX-10, "FRONT DRIVE SHAFT" .
5. Remove center bearing bracket as shown.



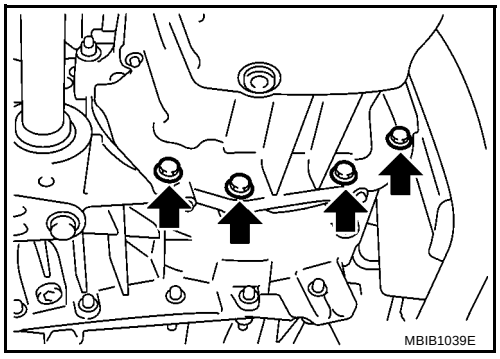
6. Remove A/C compressor bracket mounting bolt as shown.



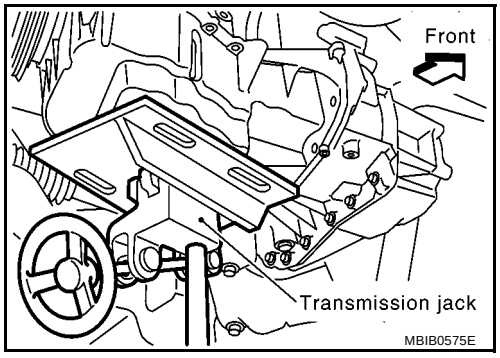
7. Remove oil level gauge guide.
8. Drain engine oil. Refer to LU-13, "Changing Engine Oil" .

CAUTION:
Perform when engine is cold.

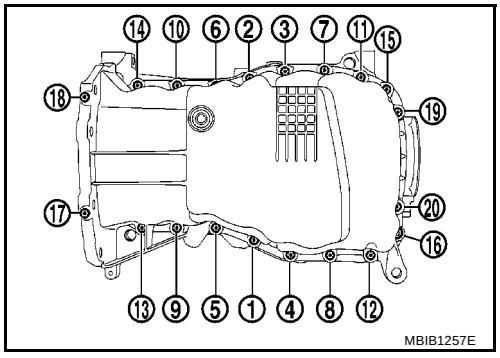
9. Remove oil pan and transaxle joint bolts.



10. Support the engine bottom of the oil pan with a transmission jack etc.

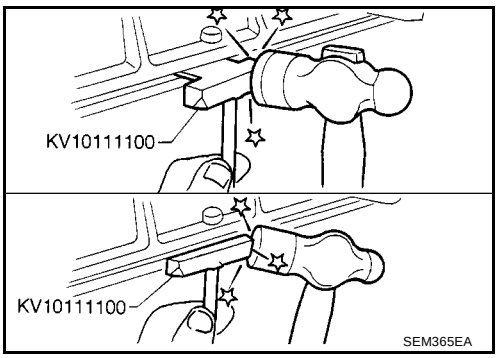


11. Remove oil pan bolt reverse order as shown.



- Insert seal cutter (special service tool) between upper oil pan and cylinder block. Slide tool by tapping on the side of the tool with a hammer.

CAUTION:
Exercise care not to damage mating surface.



12. Remove oil pan and baffle plate.

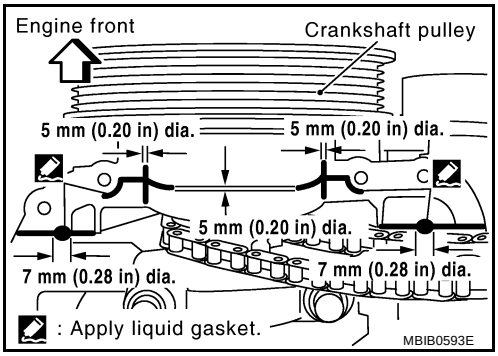
INSPECTION AFTER REMOVAL

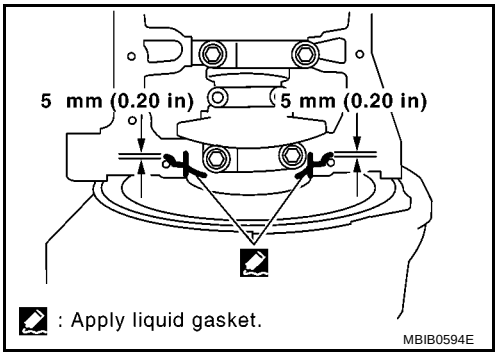
Clean oil pump assembly if any object attached.

INSTALLATION

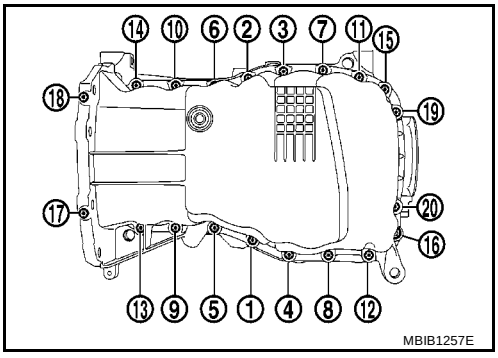
- Install in the reverse order of removal paying attention to the following.

1. Apply liquid gasket as shown.
   - Use Genuine Liquid Gasket or equivalent.





2. Install baffle plate.
3. Install oil pan bolts in numerical order as shown.
   - Tighten the bolts in the numerical order shown in the figure to a torque of 8 N·m (0.8 kg-m, 71 in-lb).
   - Tighten the mounting bolts of oil pan on the clutch housing without locking.
   - Tighten the bolts in the numerical order shown in the figure to a torque of 15 N·m (1.5 kg-m, 11 ft-lb).
   - Tighten the mounting bolts of oil pan on the clutch housing to a torque of 44 N·m (4.5 kg-m, 32 ft-lb).
4. At least 30 minutes after oil pan is installed, pour engine oil.



INSPECTION AFTER INSTALLATION

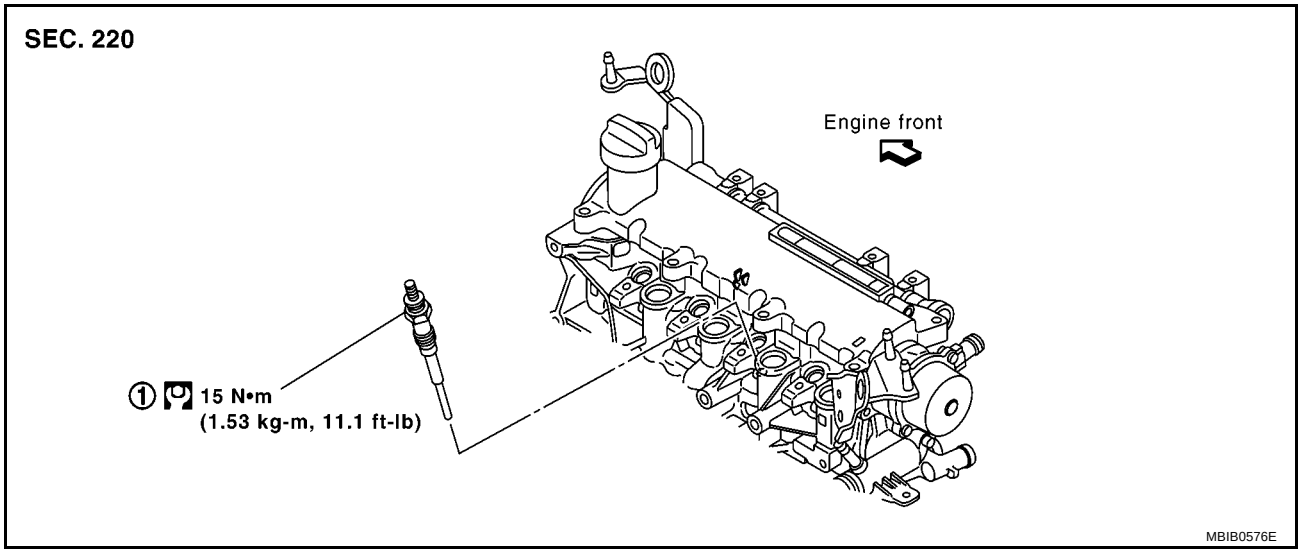
- Inspection the engine oil level. Refer to LU-12, "ENGINE OIL" .
- Start the engine, and make sure there is no leak of engine oil. Refer to LU-12, "ENGINE OIL" .

GLOW PLUG

PFP:22401

Removal and Installation

EBS01C6Q



1. Glow plug

REMOVAL

CAUTION:

Remove glow plug only if necessary. If carbon adheres, it may be stuck and broken.

1. Disconnect battery ground cable.
2. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
3. Disconnect harness connector from glow plug.
4. Remove glow plug.

CAUTION:

- **When removing or installing, do not use such tools as an air impact wrench.**
- **Handle it carefully without giving any impact, even after removal. [As a guide, if it drops from height of 10 cm (3.94 in) or higher, always replace it.]**

INSTALLATION

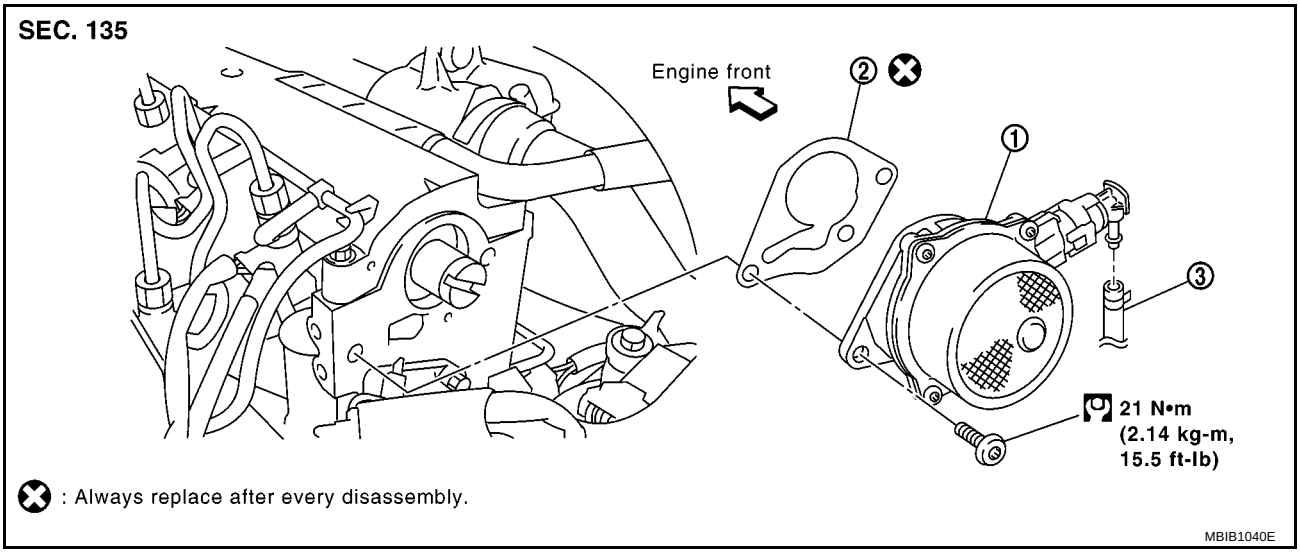
1. Remove adhered carbon from glow plug installation hole with a reamer.
2. Install glow plug.
3. Install remaining parts in reverse order of removal.

VACUUM PUMP

PFP:41920

Removal and Installation

EBS01C6R



1. Vacuum pump
2. Gasket
3. Vacuum hose

REMOVAL

1. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
2. Remove battery.
3. Remove air cleaner case and air duct (suction). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
4. Remove rear engine slinger. Refer to EM-147, "ENGINE ASSEMBLY" .
5. Disconnect vacuum hose from vacuum pump side.
6. Remove vacuum pump.

INSTALLATION

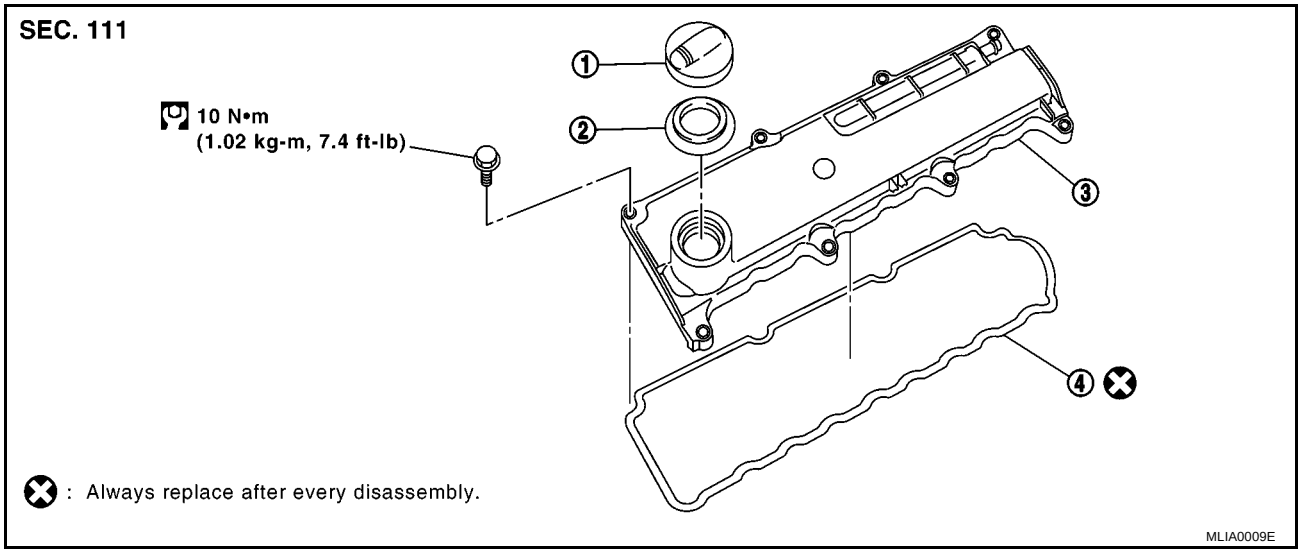
- Install in the reverse order of removal.

ROCKER COVER

PFP:13264

Removal and Installation

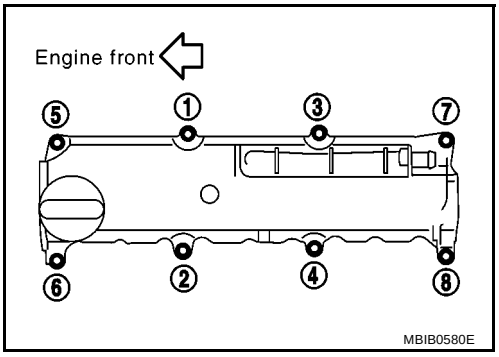
EBS01C6S



1. Oil filler cap
2. Oil catcher
3. Rocker cover
4. Gasket

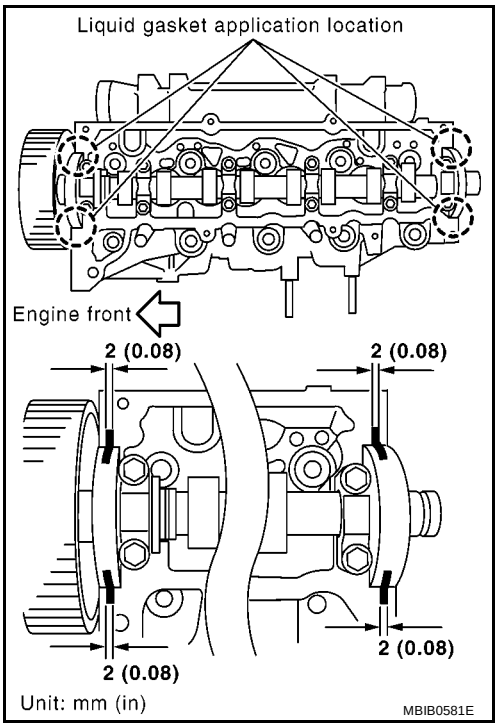
REMOVAL

1. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
2. Remove battery.
3. Remove air cleaner case and air duct (suction). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
4. Remove rocker cover.
   - Loosen holding bolts in the reverse order as shown in the figure and remove.



INSTALLATION

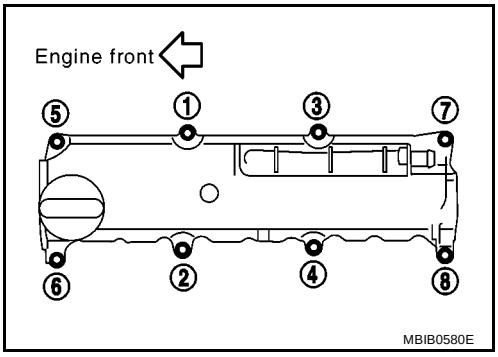
1. Apply liquid gasket on locations shown in the figure.
   - Use Genuine Liquid gasket or equivalent.



2. Tighten holding bolts in the numerical order as shown in the figure.

   : 10 N·m (1.02 kg-m, 7.4 ft-lb)

3. Install in the reverse order of removal after this steps.

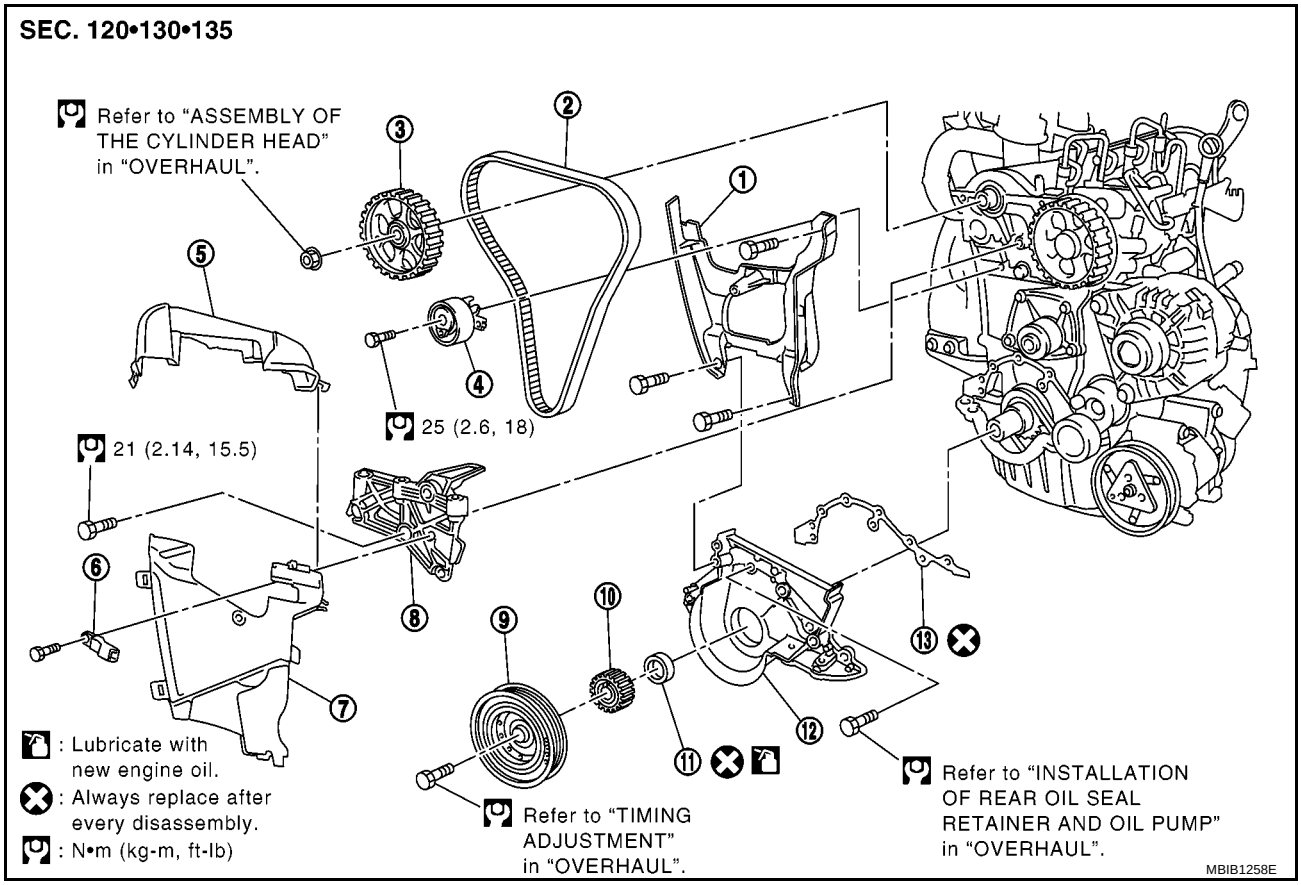


TIMING BELT

PFP:13028

Removal and Installation

EBS01C6T



1. Timing belt inner cover
2. Timing belt
3. Camshaft sprocket
4. Timing belt tensioner
5. Timing belt upper cover
6. Camshaft position sensor
7. Timing belt lower cover
8. Cylinder head suspended bracket
9. Crankshaft pulley
10. Crankshaft sprocket
11. Rear oil seal
12. Rear oil seal retainer
13. Gasket

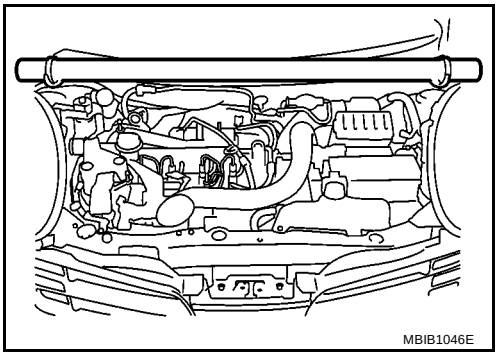
CAUTION:

- **Apply new engine oil to parts marked in illustration before installation.**
- **Replace any belt that has been removed.**
- **Never turn the engine in the direction opposite to that of normal operation.**
- **When replacing the timing belt, be sure to replace the timing belt tensioner.**
- **Do not run the engine without the drive belts to avoid damaging the crankshaft pulley.**

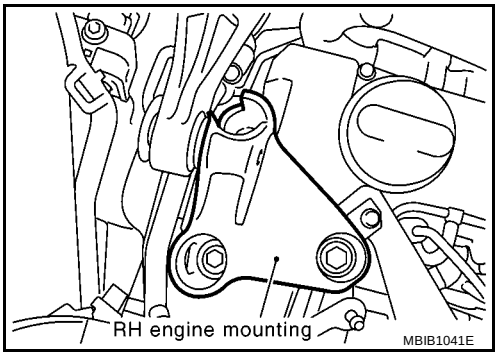
REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
   - RH head light assembly
2. Remove right side splash cover.
3. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
4. Remove air cleaner case and air duct (suction). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
5. Remove drive shaft lock pin and lock nut. Refer to FAX-10, "FRONT DRIVE SHAFT" .
6. Remove ABS sensor from brake caliper.
7. Remove strut lower bolts.

8. Remove drive shaft assembly RH side.
9. Remove drive belt. Refer to EM-121, "DRIVE BELTS" .
10. Remove oil pan. Refer to EM-133, "OIL PAN" .
11. Install engine slingers. Refer to EM-147, "ENGINE ASSEMBLY" .
12. Set the engine support bar (commercial service tool) or suitable tool, and secure the engine in position.

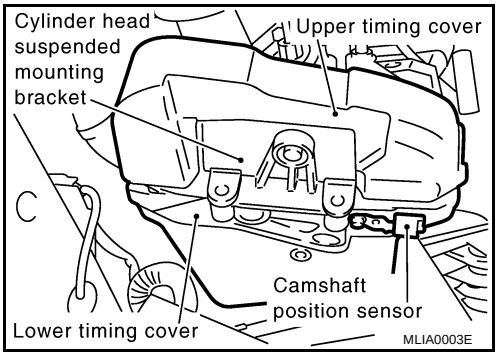

MBIB1046E

13. Remove RH engine torque rod.
14. Remove RH engine mounting.



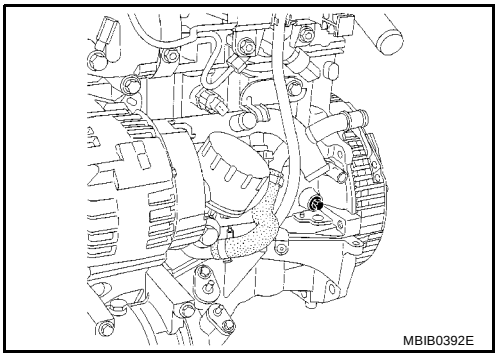
MBIB1041E

15. Remove RH engine mounting support bracket, RH engine mounting insulator and reservoir tank.
16. Remove upper timing cover, camshaft position sensor and cylinder head suspended mounting bracket.

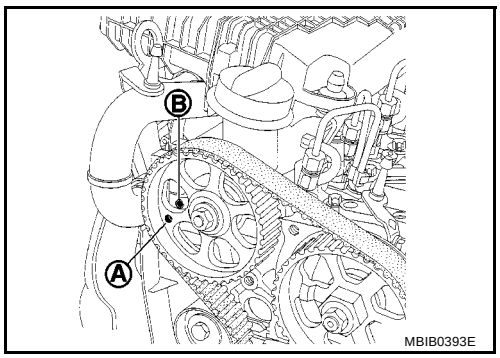


MLIA0003E

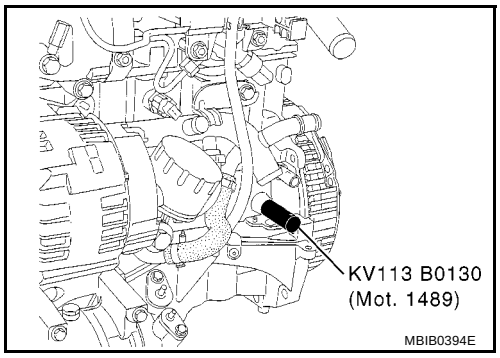
17. Remove the TDC pin cap.


MBIB0392E

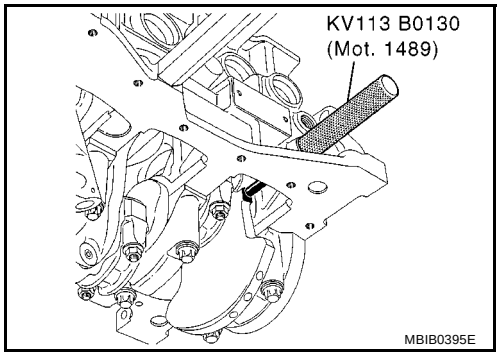
18. Position the hole (A) of the camshaft pulley almost opposite the hole (B) of the cylinder head.



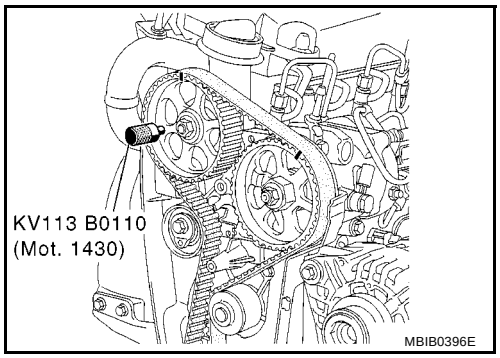
19. Screw in the TDC pin (special service tool).



20. Turn the engine clockwise (timing side) until the crankshaft touches the TDC pin (special service tool).



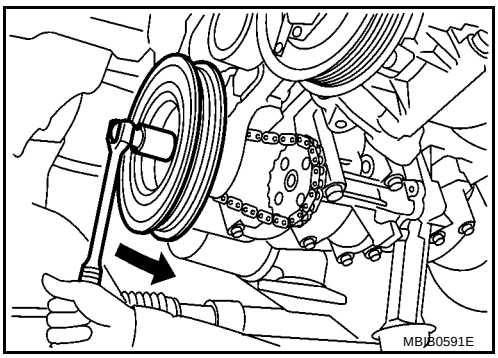
21. The pin (special service tool) must engage in the camshaft pulley and cylinder head holes.
22. Remove TDC pin (special service tool).



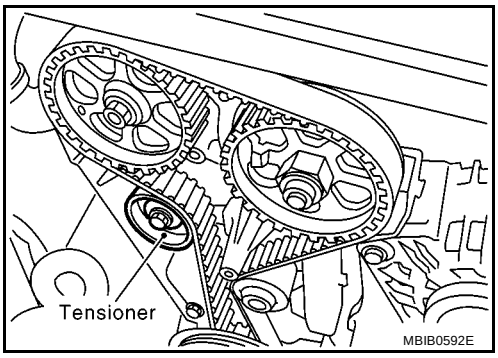
23. Remove crankshaft pulley as follows:

- Loosen the crankshaft pulley fixing bolts by locking the flywheel with a screwdriver and pull crankshaft pulley with both hands to remove it.

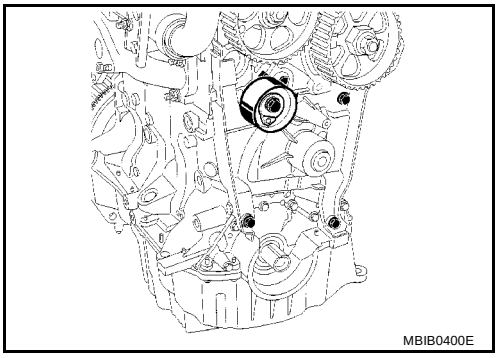
  CAUTION:
  Do not remove fixing bolts. Keep loosened fixing bolts in place to protect removed crankshaft pulley from dropping.



24. Slacken the timing belt by loosening the bolt of tensioner, then remove timing belt.



25. Remove crankshaft sprocket.
26. Remove timing belt tensioner and inner timing cover.



27. If necessary, remove rear oil seal retainer.

INSTALLATION

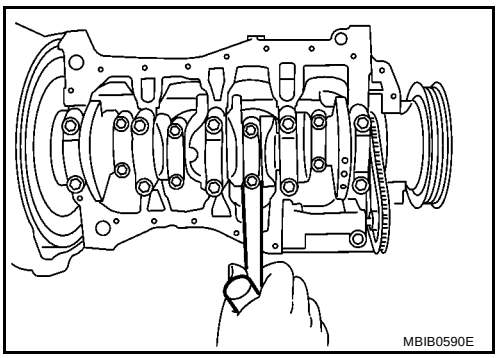
- Install in the reverse order of removal paying attention to the following.

Rear Oil Seal Retainer

- Refer to EM-179, "INSTALLATION OF REAR OIL SEAL RETAINER AND OIL PUMP" .

Timing Belt

- Refer to EM-186, "TIMING ADJUSTMENT" .
- When install crankshaft pulley, lock crankshaft with a hammer handle or similar tool.

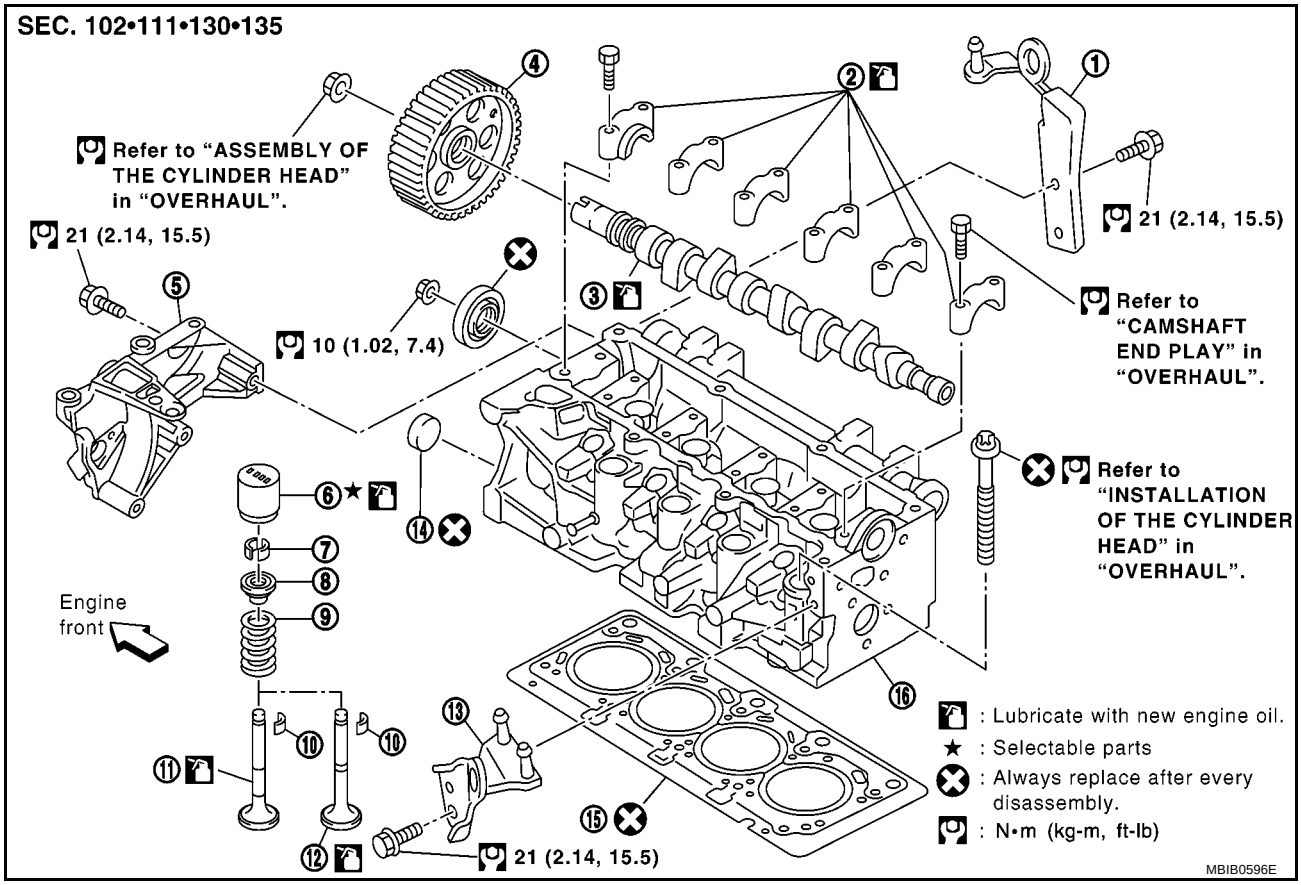


CYLINDER HEAD

PFP:11041

Removal and Installation

EBS01C6U



1. Front engine slinger
2. Camshaft bracket
3. Camshaft
4. Camshaft sprocket
5. Cylinder head suspended bracket
6. Shim
7. Valve rotator
8. Valve spring retainer
9. Valve spring
10. Valve cotter
11. Exhaust valve
12. Intake valve
13. Rear engine slinger
14. Cap
15. Cylinder head gasket
16. Cylinder head

CAUTION:
Apply new engine oil to parts marked in illustration before installation.

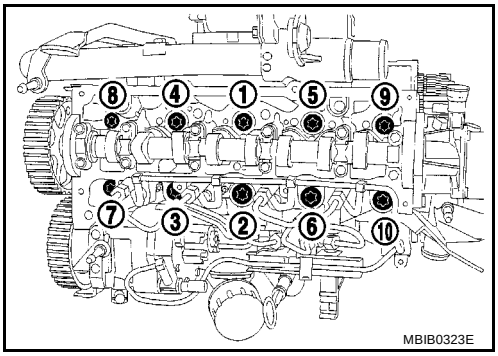
REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
   - RH head light assembly
2. Remove right side splash cover.
3. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
4. Drain engine coolant. Refer to CO-32, "DRAINING ENGINE COOLANT" .
   CAUTION:
   Perform when engine is cold.
5. Remove air cleaner case and air duct (suction). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
6. Remove radiator upper hose. Refer to CO-34, "RADIATOR" .
7. Disconnect fuel feed tube and return tube from fuel injection pump. Refer to EC-K9K-31, “Injector rail”, “DIESEL EQUIPMENT” in EC section.
8. Remove oil level gauge guide.

9. Remove harnesses and connectors.
10. Remove heater hoses.
11. Remove turbocharger assembly. Refer to EM-129, "EXHAUST MANIFOLD, TURBOCHARGER, CATALYST" .
12. Remove drive belt. Refer to EM-121, "DRIVE BELTS" .
13. Remove rocker cover. Refer to EM-138, "ROCKER COVER" .
14. Support underneath of engine by setting a manual lift table caddy (commercial service tool) or equivalent tool.

    CAUTION:
    Put a piece of wood or something similar as supporting surface, secure a completely stable condition.
15. Remove timing belt. Refer to EM-140, "TIMING BELT" .
16. Remove engine support bar.

    CAUTION:
    During the removal operation, always be careful to prevent engine moves downward from the vehicle.
17. Remove cylinder head bolt in the reverse order as shown.



18. Remove cylinder head assembly.

INSTALLATION

- Install in the reverse order of removal paying attention to the following.

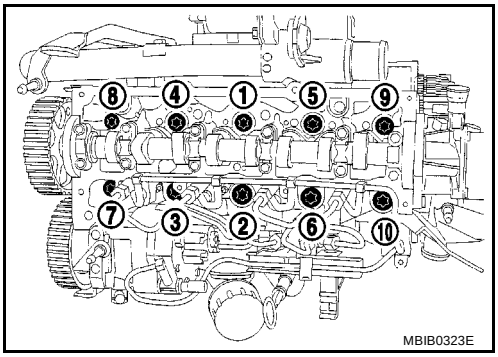
Cylinder Head Bolts

NOTE:
Use a syringe to remove any oil which may have entered the cylinder head mounting bolt holes to achieve correct tightening of the bolts.

CAUTION:
All bolts must always be changed after removal. Do not oil the new bolts.

- Tighten all the bolts in the numerical order as shown.

  : 25 N·m (2.6 kg-m, 18 ft-lb)



- Check that all the bolts are correctly tightened to 25 N·m (2.6 kg-m, 18 ft-lb), then angle tightening of 245 to 265 degrees.

  CAUTION:
  - **Use an angle wrench (special service tool) to check tightening angle.**
  - **Do not retighten the cylinder head bolts after preforming this procedure.**

Disassembly and Assembly

EBS01C6V

DISASSEMBLY

- Refer to EM-158, "DISASSEMBLY OF THE CYLINDER HEAD" .

INSPECTION AFTER DISASSEMBLY

- Refer to EM-160, "Inspection" .

- Refer to EM-161, "Valve Clearance" .
- Refer to EM-191, "Cylinder Head" .

ASSEMBLY

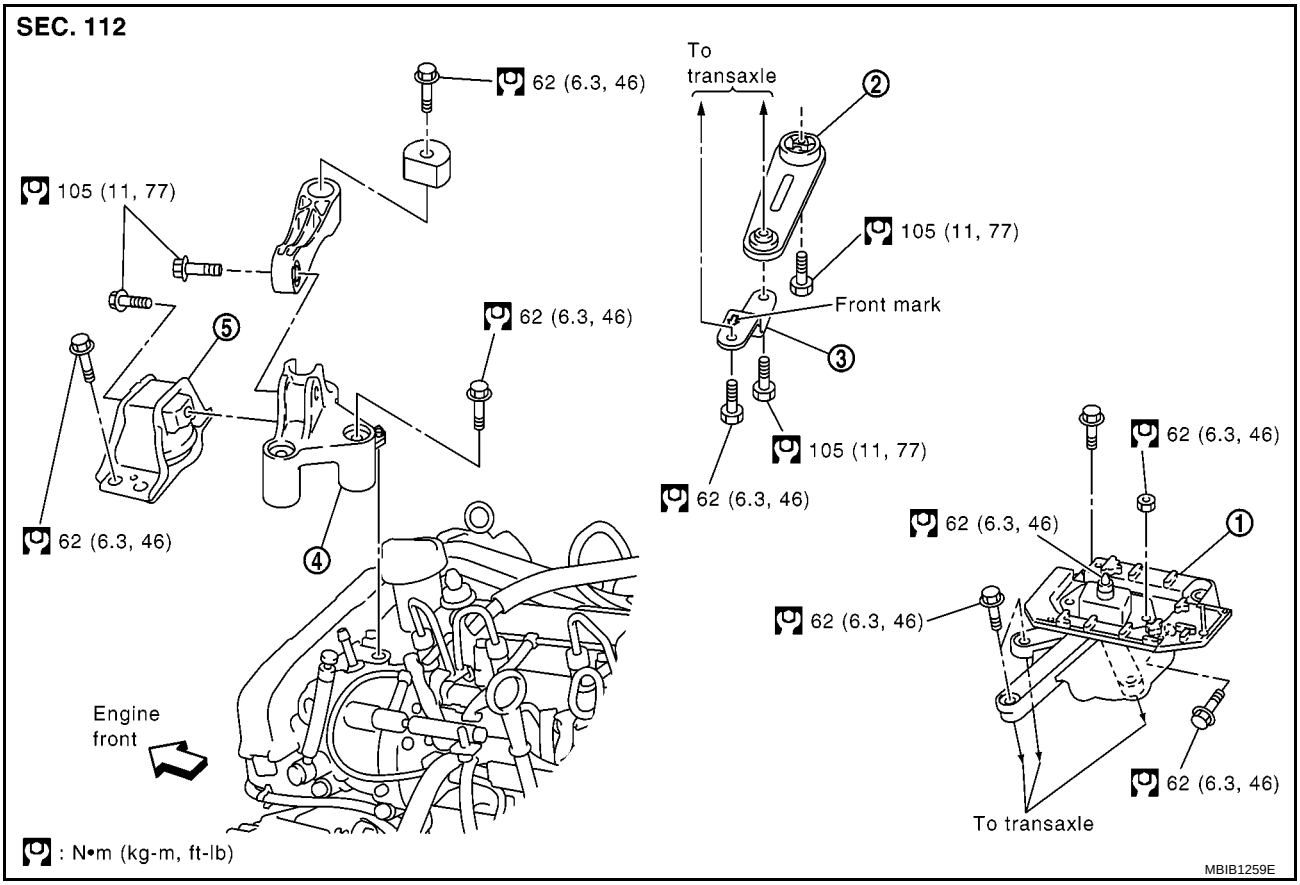
- Refer toEM-170, "Assembly" .

ENGINE ASSEMBLY

PFP:10001

Removal and Installation

EBS01C6W



1. LH engine mounting
2. Rear torque rod
3. Engine rear mounting bracket
4. RH engine mounting
5. RH engine mounting insulator

WARNING:

- **Situate vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **For engines not equipped with engine slingers, attach proper slingers and bolts described in PARTS CATALOG.**

CAUTION:

- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine main body section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-38, "LIFTING POINT" .**

REMOVAL

Description of work

Remove engine and transaxle assembly from vehicle down ward. Separate engine and transaxle.

Preparation

1. Remove the following parts.
   - Battery ground cable
   - Undercover

- Right side splash cover
- LH/RH front wheel
- RH head light assembly

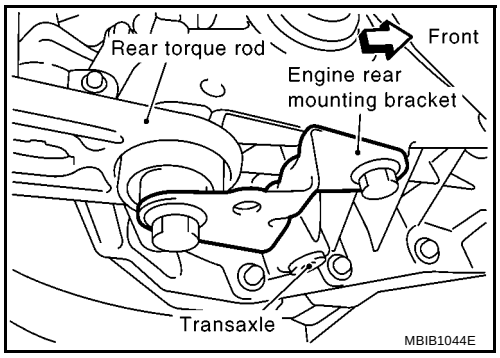
Engine room

2. Drain engine coolant. Refer to LU-13, "Changing Engine Oil" .

   CAUTION:
   Perform when engine is cold.
3. Remove engine room cover. Refer to EM-119, "ENGINE ROOM COVER" .
4. Remove air cleaner case and air duct (suction). Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
5. Remove radiator upper hose. Refer to CO-34, "RADIATOR" .
6. Remove reservoir tank and hoses. Refer to CO-34, "RADIATOR" .
7. Remove fuel feed and return tubes. Refer to EC-K9K-31, “Injection rail”, “DIESEL EQUIPMENT”.
8. Remove vacuum hose. Refer to EM-137, "VACUUM PUMP" .
9. Remove turbocharger air duct. Refer to EM-129, "EXHAUST MANIFOLD, TURBOCHARGER, CATALYST" .
10. Disconnect heater hoses.
11. Disconnect engine room harness from the engine side and set it aside for easier work.
12. Disconnect transaxle side harness and clutch hose. Refer to CL-10, "CLUTCH DISC, CLUTCH COVER AND FLYWHEEL" .
13. Disconnect drain hose transaxle side.
14. Disconnect shift cable and select cable. Refer to MT-12, "CONTROL LINKAGE" (with JH3 transaxle) or MT-42, "CONTROL LINKAGE" (with JR5 transaxle).
15. Loosen wire bracket.
16. Disconnect all the body-side vacuum hoses and air hoses at engine side.
17. Disconnect fuel feed and return hoses, and plug it to prevent fuel from draining.

Vehicle underbody

18. Remove drive shaft lock pin and lock nut. Refer to FAX-10, "FRONT DRIVE SHAFT" .
19. Remove ABS sensor from brake caliper.
20. Remove strut lower bolts.
21. Remove drive shaft assembly RH and LH.
22. Remove drive belt. Refer to EM-121, "DRIVE BELTS" .
23. Remove A/C compressor with piping connected from engine (with A/C compressor models). Temporarily secure it on body with a rope to avoid putting load on it.
24. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .
25. Remove engine rear mounting bracket.

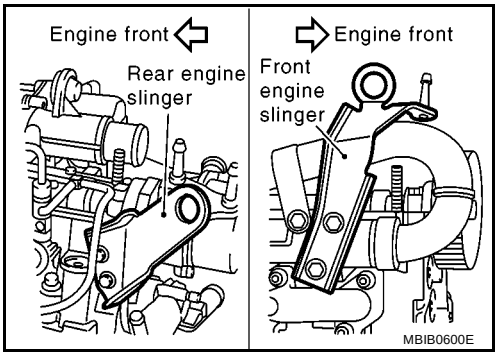


Removal

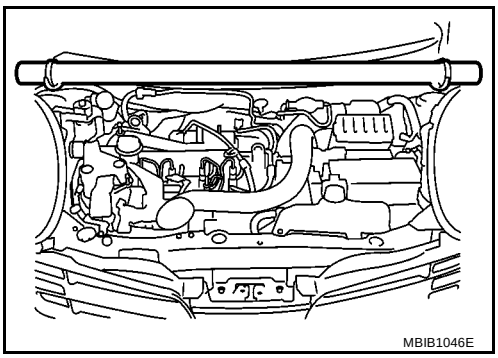
26. Install engine slingers into front right of cylinder head and rear left of cylinder head.

Slinger bolts:

: 21 N·m (2.14 kg-m, 15.5 ft-lb)



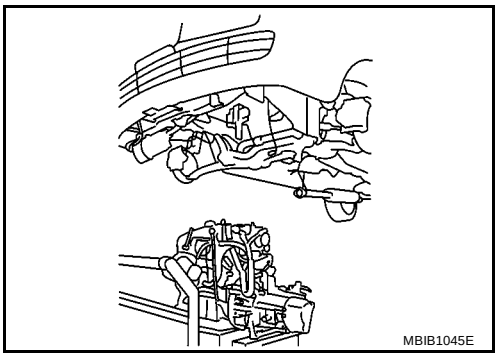
27. Set the engine support bar (commercial service tool) or suitable tool, and secure the engine in position.



- Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a jack or trestle. Securely support bottom of engine and transaxle.

CAUTION:
Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.

28. Remove RH and LH engine mounting bolts.
29. Remove engine and transaxle assembly from vehicle downward by carefully operating supporting tools.



CAUTION:
- **During the operation, make sure that no part interferes with body side.**
- **Before and during this lifting, always check if any harnesses are left connected.**
- **During the removal operation, always be careful to prevent vehicle from falling off the lift due to changes in the center of gravity.**
- **If necessary, support vehicle by setting a jack or equivalent tool at the rear.**

Separation Work

CAUTION:
During the operation, secure support the engine by placing a piece of wood under the engine oil pan, transaxle oil pan and suspended the engine slinger by baby crane (movable hoist) etc.

30. Remove starter motor.
31. Separate engine and transaxle.

INSTALLATION

Install in the reverse order of removal.

- Do not allow oil to get on mounting insulator. Be careful not to damage mounting insulator.
- When installation directions are specified, install parts according to the direction marks on them referring to components illustration.
- Make sure that each mounting insulator is seated properly, and tighten mounting bolts and nuts.

INSPECTION AFTER INSTALLATION

- Before starting engine check the levels of coolant, lubrications and working oils. If less than required quantity, fill to the specified level.

- Before starting engine, bleed air from fuel piping. Refer to FL-16, "Bleeding Fuel Filter" .
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of coolant, lubricants, working oil, fuel and exhaust gas.
- Bleed air from passages in pipes and tubes of applicable lines.

OVERHAUL

PFP:00000

Tightening Torques

EBS01C6X

UPPER ENGINE

Unit: N·m (kg-m, in-lb)*2 Unit: N·m (kg-m, ft-lb)

Tightening torque	Cylinder head	: *1
	Camshaft bearing	: 10 (1.0, 7)
	Camshaft pulley	: 30 (3.1, 22) + 84° (Angle tightening)
	Vacuum pump	: 21 (2.1, 15)
	Cylinder head coolant outlet unit	: 10 (1.0, 7)
	Exhaust manifold	: 26 (2.7, 19)
	Glow plug	: 15 (1.5, 11)
	Rocker cover	: 10 (1.0, 7)
	Turbocharger-manifold mounting	: 26 (2.7, 19)
	Turbocharger oil return pipe	: 9 (0.9, 80)*2
	Turbocharger oil delivery pipe	: 23 (2.3, 17)
	Timing tensioner	: 25 (2.6, 18)
	TDC cap	: 20 (2.0, 15)
	Cylinder head suspended mounting bracket	: 21 (2.1, 15)

*1: Refer to tightening procedure in the text.

BOTTOM ENGINE

Unit: N·m (kg-m, in-lb)*2 Unit: N·m (kg-m, ft-lb)

Tightening torque	Oil cooler connector bolt	: 45 (4.6, 33)
	Oil filter bracket	: 45 (4.6, 33)
	Main bearing cap	: 27 (2.8, 20) + 47°±5° (Angle tightening)
	Connecting rod	: 20 (2.0, 15) + 45°±6° (Angle tightening)
	Knock sensor	: 20 (2.0, 15)
	Oil level sensor	: 22 (2.2, 16)
	Oil pump	: 25 (2.6, 18)
	Oil pan	: *1
	Water pump	: 11 (1.1, 8)
	Flywheel	: 50 - 55 (5.1 - 5.6, 37 - 40)
	Crankshaft pulley	: 20 (2.0, 15) + 130°±15° (Angle tightening)
	Water pump inlet pipe	: 20 (2.0, 15)
	Alternator bracket	: 44 (4.5, 32)
	Alternator	: 25 (2.6, 18)
	A/C compressor	: 21 (2.1, 15)

*1: Refer to tightening procedure in the text.

Standard Replacement

EBS01C6Y

PREPARING USED ENGINE

The engine should be cleaned and drained (oil and water).

Leave on the used engine or include in the return box:

- Oil filter
- Oil pressure switch
- Water pump
- Fuel injection pump
- Rail
- Injectors
- Glow plugs
- Oil level gauge
- Vacuum pump
- Flywheel

Remember to remove:

- All coolant pipes
- Exhaust manifold
- Alternator
- Power steering pump
- A/C compressor
- Alternator bracket
- Oil level sensor
- Cylinder head coolant outlet unit

The used engine should be secured to the base under the same conditions as the overhauled engine:

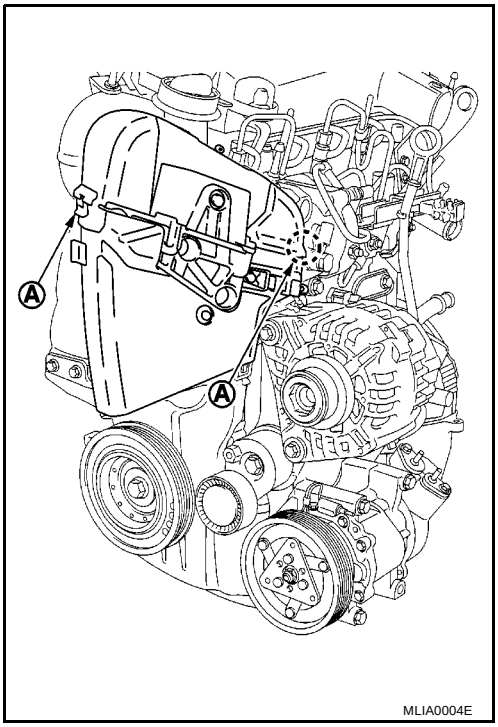
- Plastic plugs and covers fitted
- Cardboard cover over the assembly

Disassembly

EBS01C6Z

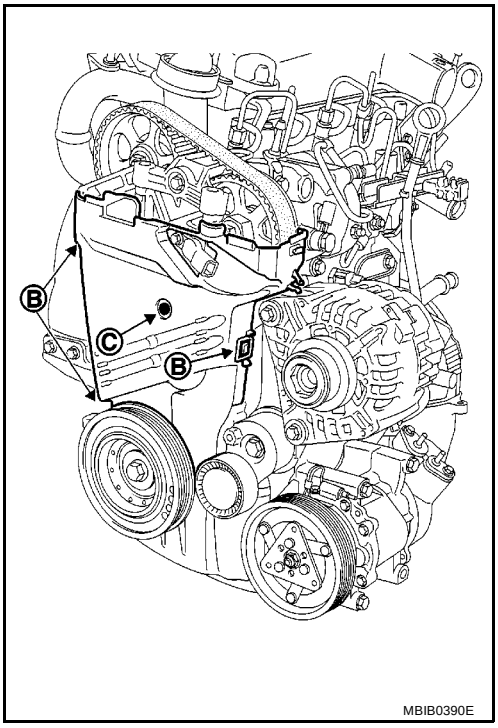
REMOVING THE UPPER ENGINE

1. Remove the upper timing cover by unclipping the two tabs (A).



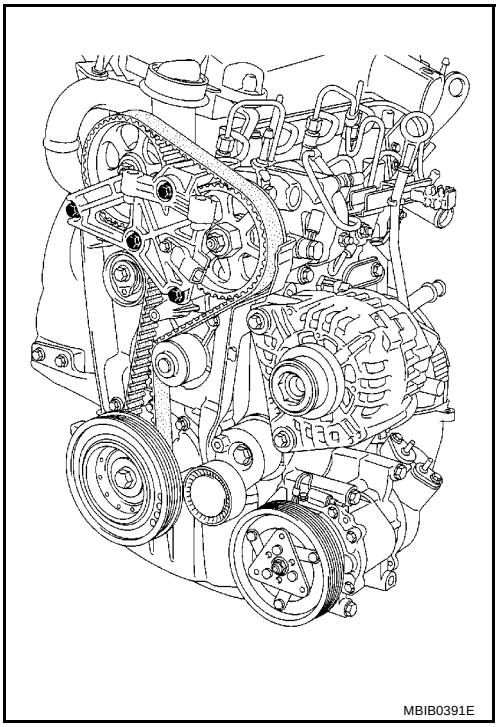
MLIA0004E

2. Remove the lower timing cover by unclipping the three tabs (B) and pulling out the plastic bolt (C).



MBIB0390E

3. Remove the cylinder head suspended mounting bracket.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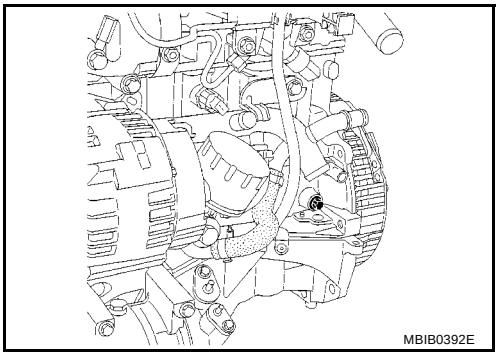
4. Remove the TDC pin cap.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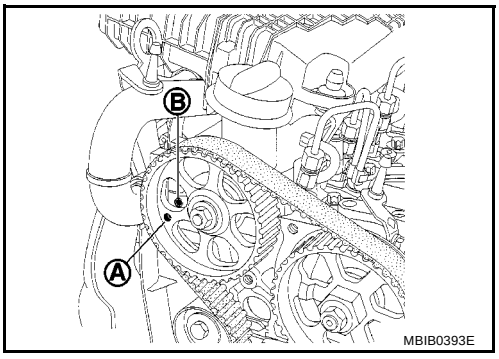
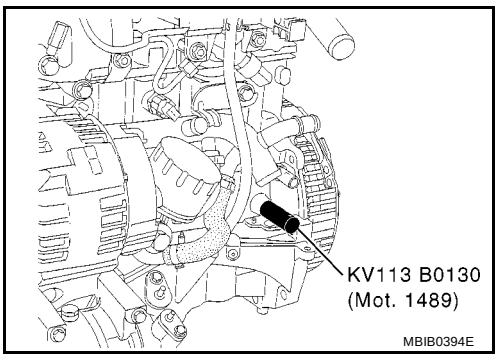
POSITIONING THE BELT AT THE TIMING POINT

1. Position the hole (A) of the camshaft pulley almost opposite the hole (B) of the cylinder head.

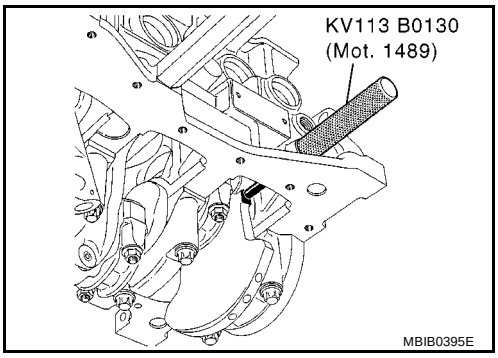


MBIB0393E

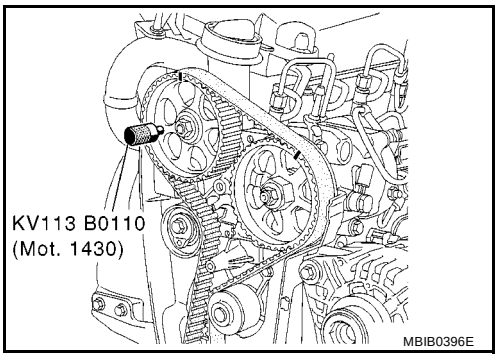
2. Screw in the Tool KV113B0130 (Mot. 1489).



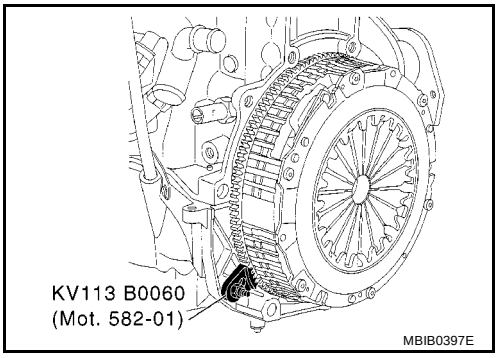
3. Turn the engine clockwise (timing side) until the crankshaft touches the Tool KV113B0130 (Mot. 1489).



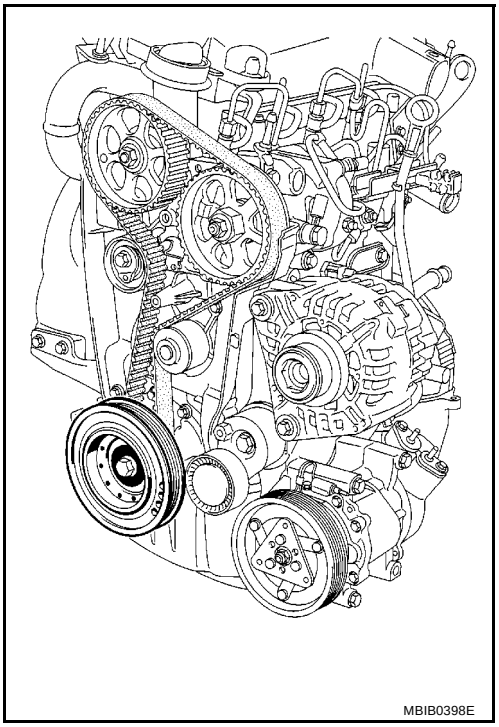
4. The Tool KV113B110 (Mot. 1430) must engage in the camshaft pulley and cylinder head holes.
5. Remove Tool KV113B0130 (Mot. 1489).



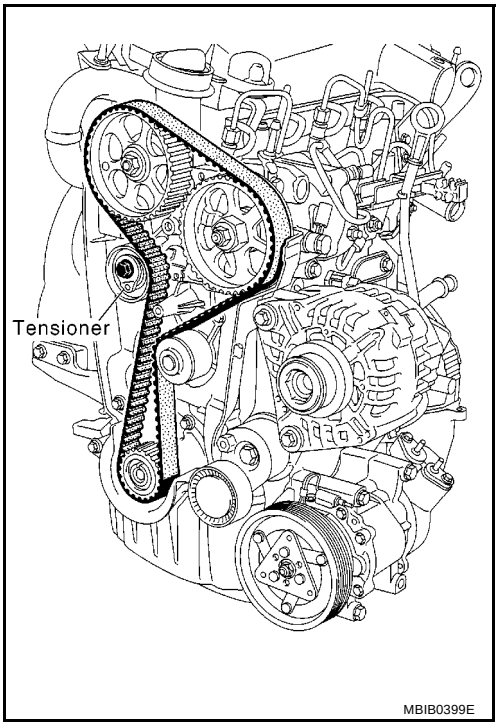
6. Install the Tool KV113B0060 (Mot. 582-01).



7. Remove the crankshaft pulley.

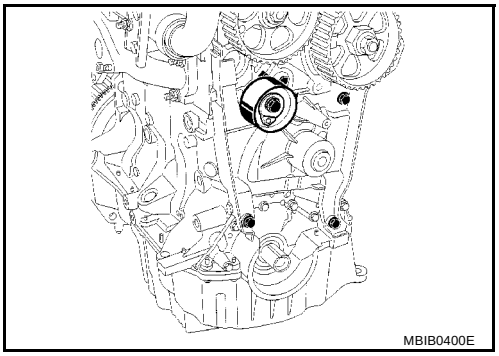

MBIB0398E

8. Slacken the timing belt by loosening the bolt of the tensioner, then remove the timing belt.

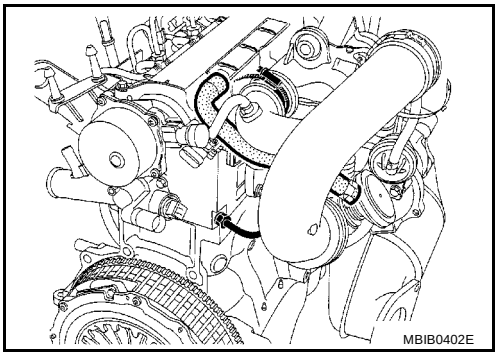


MBIB0399E

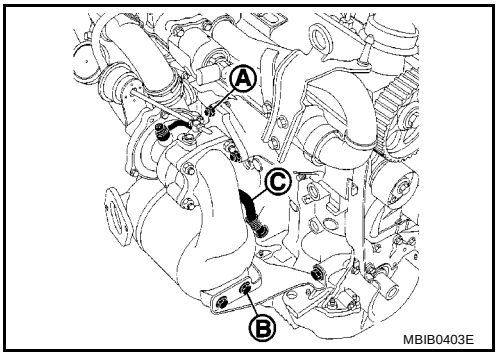
9. Remove the timing belt tensioner and inner timing cover.


MBIB0400E

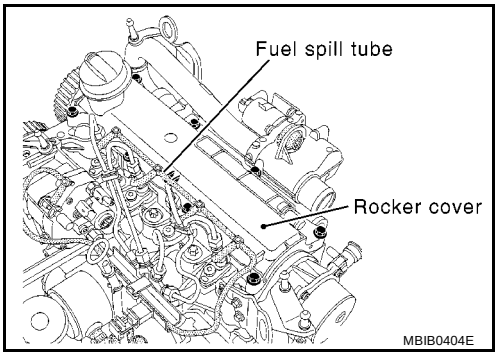
10. Remove air cleaner case. Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
11. Remove the clamp, oil vapor rebreathing pipe and turbocharger oil supply pipe on the cylinder head side.



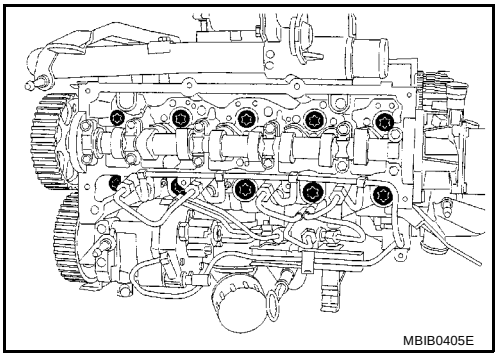
12. Remove the turbocharger oil supply pipe on the turbocharger side, nuts (A) and the torx bolt of the turbocharger flange, bolts (B) of the catalytic converter bracket, and turbocharger oil return pipe (C).



13. Unclip the fuel return pipe from the cylinder head cover at the fuel spill tube, then remove the rocker cover.



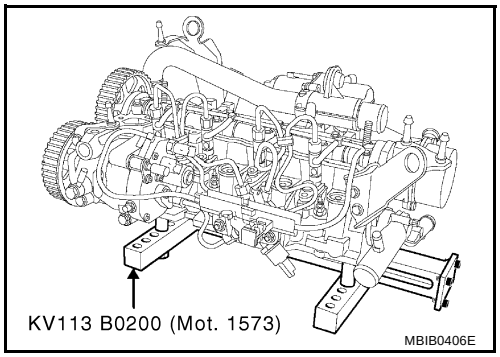
14. Remove the oil level gauge guide and cylinder head.



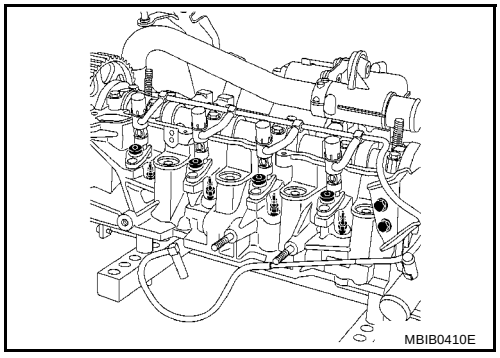
DISASSEMBLY OF THE CYLINDER HEAD

1. Place the cylinder head on Tool KV113B0200 (Mot. 1573).

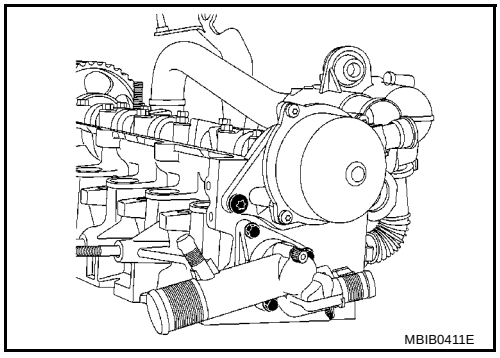
   CAUTION:
   Pay strict attention to the rules regarding cleanliness. Refer to EM-105, "PRECAUTIONS" .



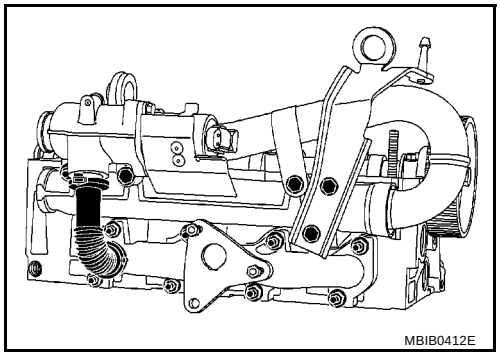
2. Remove fuel injection pump and related parts. Refer to EC-K9K-20, “High pressure pump”, “DIESEL EQUIPMENT” in EC section.
3. Remove the injectors (by marking them in relation to their cylinder), glow plugs using Tool KV113E0010 (Mot. 1566), and rear engine slinger.



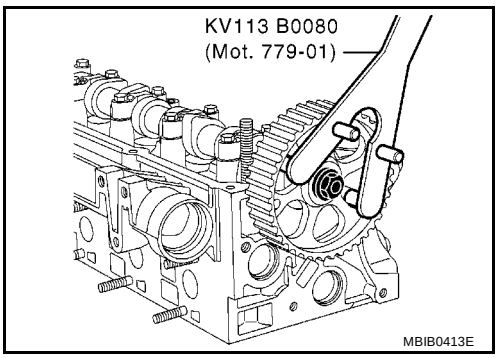
4. Remove the vacuum pump and water outlet.



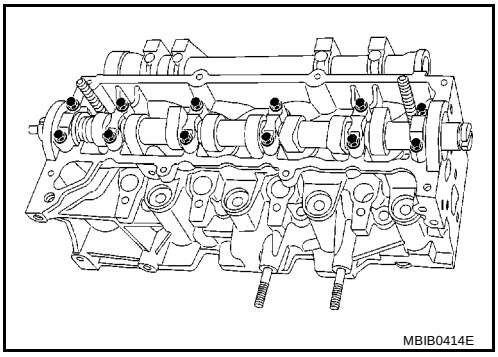
5. Remove the front engine slinger, EGR unit, air inlet pipe and exhaust manifold.



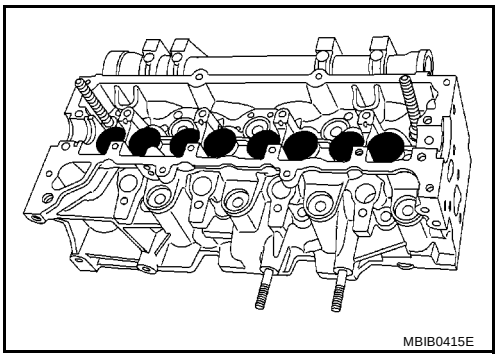
6. Remove the camshaft pulley using Tool KV113B0080 (Mot. 799-01).



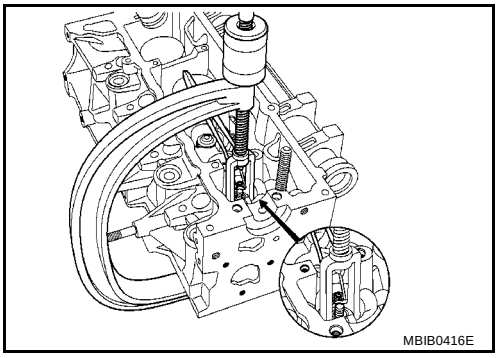
7. Remove the camshaft brackets.



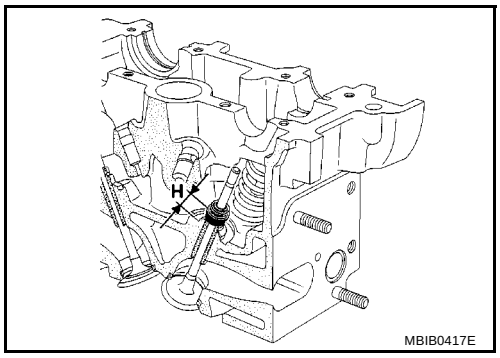
8. Remove the tappets, noting their position.



9. Compress the valve springs using the valve lifter. Remove the keys, upper cups and springs.

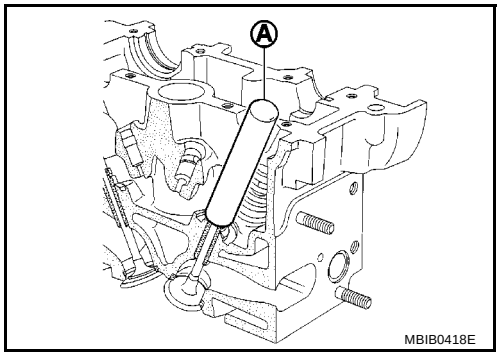


NOTE:
Before removing the valves and the valve stem seals, it is vital to measure position "H" of one of the old seals in relation to the cylinder head using Tool KV113B0180 (Mot. 1511-01) or suitable tool.

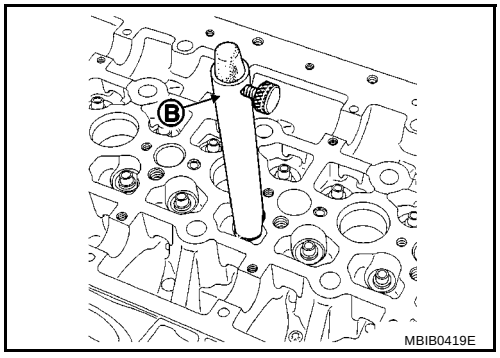


10. Install the push rod (A) of Tool KV113B0180 (Mot. 1511-01) on the valve stem seal.

    NOTE:
    The inner diameter of the push rod must be identical to that of the valve. In addition, the bottom of the push rod must come into contact with the metal upper section of the valve stem seal.



11. Install the guide tube (B) over the push rod until the guide tube comes into contact with the cylinder head, locking the push rod with the knurled wheel.
12. Remove the guide tube assembly plus push rod, being careful not to loosen the knurled wheel.
13. Remove the valves and valve guide seals using the Tool KV113B0090 (Mot. 1335).



Cleaning

EBS01C70

- It is very important not to scratch the gasket faces of any aluminium components.
- Use suitable tool to dissolve any part of the seal which remains stuck to the metal surface.
- Apply the dissolving product to the part to be cleaned, wait approximately 10 minutes, then remove it using a wooden spatula.
- Wear gloves while carrying out this operation.
- Do not allow this dissolving product to drip on to the paintwork.
- **Great care should be taken when performing this operation, to prevent foreign objects from entering the pipes taking oil under pressure to the camshafts (pipes in both the cylinder head and its cover) and the oil return pipes.**
- **Failure to follow these instructions could lead to the blocking of the oilways, resulting in rapid and serious damage to the engine.**

Inspection

EBS01C71

GASKET FACE

- Inspect mating surface bow using a ruler and a set of shims.

Maximum bow : 0.05 mm (0.0020 in)

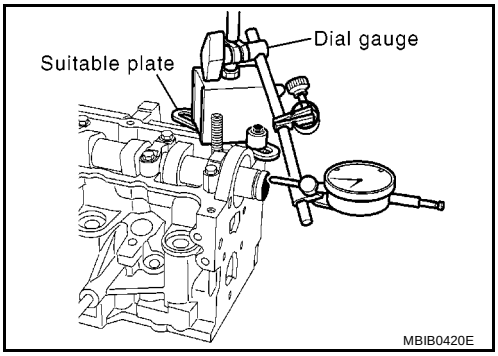
- Test the cylinder head to detect possible cracks using the cylinder head test tools (comprising a tray and a kit suited to the cylinder head, plug, sealing plate and blanking plate). The approval number of the cylinder head test container (commercial service tool) is 664000.

CAMSHAFT END PLAY

NOTE:
Set the dial gauge to the cylinder head and inspect following dimensions:

Outer diameter : 18 mm (0.71 in)
Height : 15 mm (0.59 in)

1. Install the camshaft.
2. Install the camshaft brackets (positioning them correctly with bracket 1 on the flywheel end), then tighten the bolts to a torque of 10 N·m (1.0 kg-m, 7 ft-lb).
   Check the end play, which must be between 0.08 mm (0.0031 in) and 0.178 mm (0.0070 in).
   Remove the camshaft brackets and the camshaft.



Valve Clearance

EBS01C72

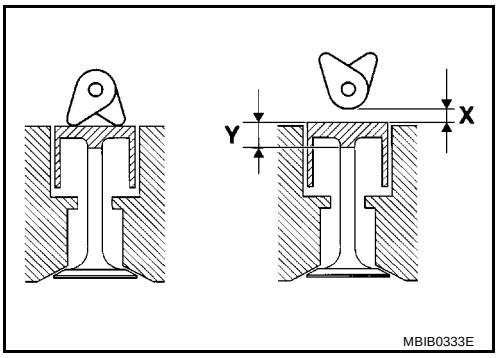
CHECKING AND ADJUSTING THE VALVE CLEARANCE

1. Install the tappet.
2. Install the camshaft.
3. Install the camshaft brackets.

   : 10 N·m (1.0 kg-m, 7 ft-lb)

4. Place the valves of the cylinder concerned at the “end of exhaust - beginning of inlet” position and check the clearance (X).

   NOTE:
   Dimension (Y) corresponds to the tappet thickness sizes (there are 25 sizes at the service parts).

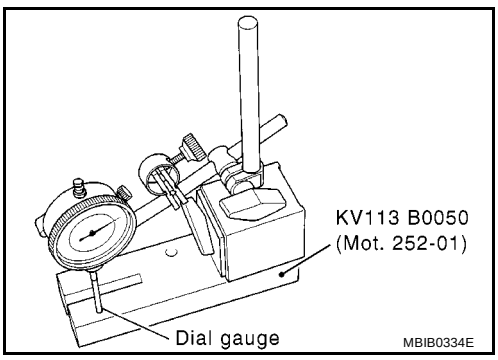


1	4
3	2
4	1
2	3

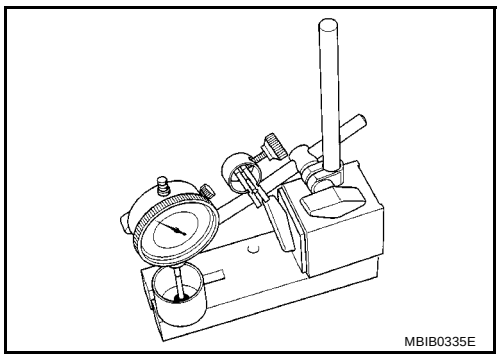
5. Compare the values recorded with the values specified, then replace the tappets which are not within tolerance.

   Clearance, under cold condition:
   Intake : 0.125 - 0.25 mm (0.0049 - 0.0098 in)
   Exhaust : 0.325 - 0.45 mm (0.0128 - 0.0177 in)

6. Remove the camshaft brackets.
7. Remove the camshaft.
8. Remove the tappet not within tolerance.
   Determining dimension Y.
   Set up the following assembly using KV113B0050 (Mot. 252-01) and dial gauge, then calibrate the gauge.

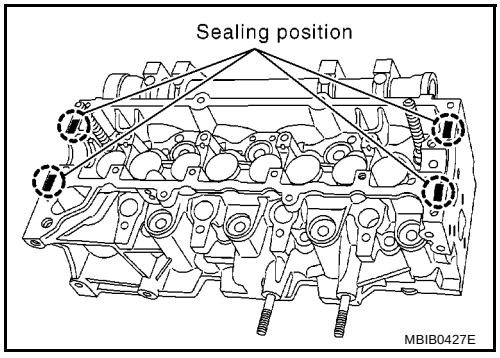


9. Raise the gauge extension (without modifying the position of the magnetic support/gauge assembly), then slide in the tappet to be measured.
   - Note dimension (Y) and repeat the operation for the tappets where the valve clearance is not within tolerance.
   - Refer to the Replacement Parts Catalogue for the vehicle concerned to select the various thicknesses of the tappet(s).
10. Check the valve clearance again.
11. Remove the camshaft brackets.
12. Remove the camshaft.
13. Remove the tappet(s) not within tolerance.


MBIB0335E

14. Grease the underside of the tappets and the camshaft brackets.
15. Degrease the gasket faces (of the cylinder head and brackets 1 and 6). They should be clean, dry and free from grease (in particular, remove finger marks).
16. Lay four beads of Loctite with a width of 1 mm (0.04 in) on brackets 1 and 6 of the cylinder head.
17. Install the camshaft.
18. Install the camshaft brackets (these are numbered from 1 to 6 and bearing (1) should be positioned on the flywheel end).

: 10 N·m (1.0 kg-m, 7 ft-lb)



MBIB0427E

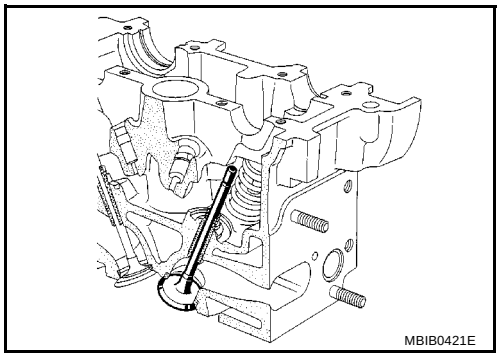
Assembly

EBS01C73

ASSEMBLY OF THE CYLINDER HEAD

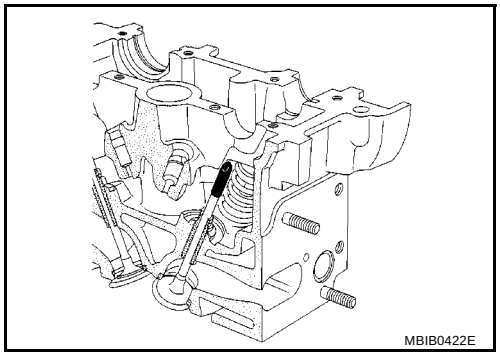
1. Install new valves and grind them gently into their respective seats. Clean all the parts thoroughly, mark them for identification purposes, then carry out the refitting operation.
   Lubricate the inside of the valve guide.
   - It is imperative to fit the valve stem seals using Tool KV113B0180 (Mot. 1511-01) or suitable tool.

   NOTE:
   Do not lubricate the valve stem seals before fitting them.

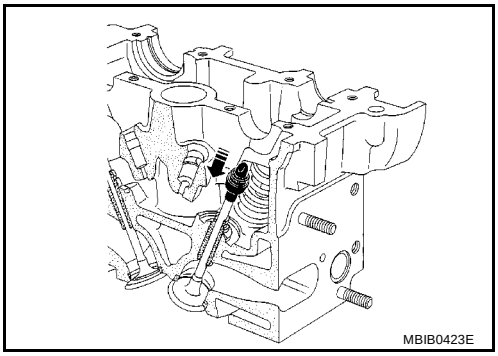

MBIB0421E

New Valve Stem Seals

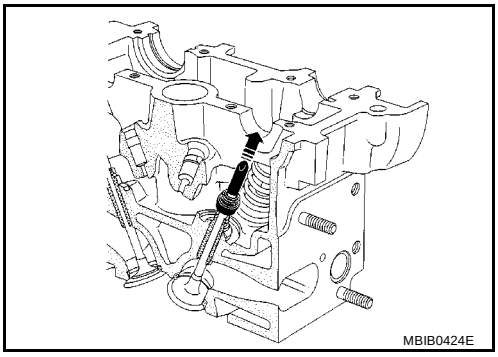
1. Place the valve in the cylinder head.
2. Place the barrel of Tool KV113B0180 (Mot. 1511-01) over the valve stem (the inner diameter of the barrel must be identical to the diameter of the valve stem).


MBIB0422E

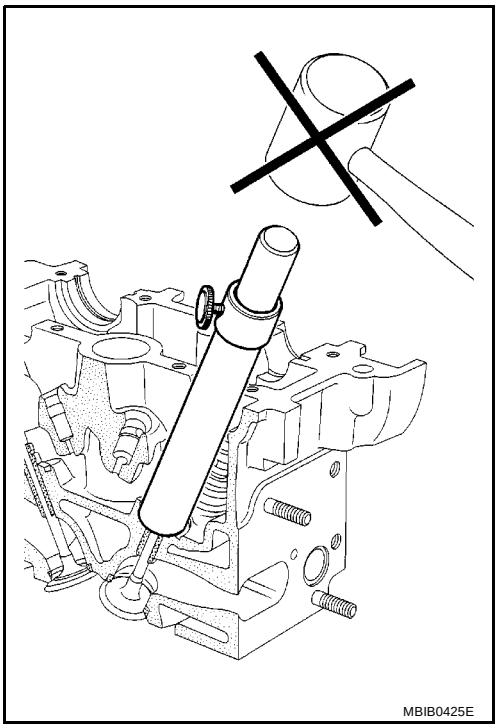
3. Keep the valve pressed against its seat.
4. Place the valve stem seal (not lubricated) over the tool barrel.


MBIB0423E

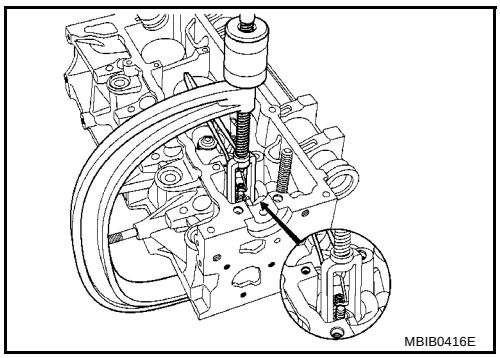
5. Push the valve stem seal past the tool barrel, then withdraw the barrel.


MBIB0424E

6. Place the guide tube plus push rod assembly on the valve stem seal.
7. Push the valve stem seal down by tapping the top of the sleeve with the palm of your hand until the guide tube touches the cylinder head.
8. Repeat these operations for all the valves.

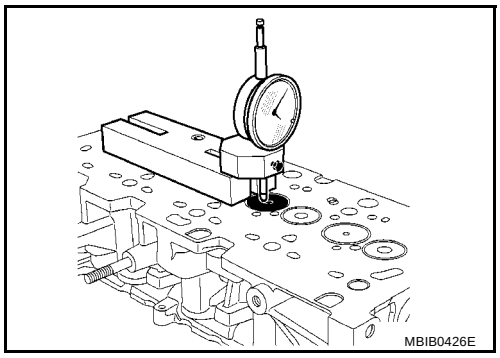

MBIB0425E

9. Install the valve springs and upper cups using valve spring compressor.
10. Install the keys using tweezers.


MBIB0416E

11. Check the valve protrusion using KV113B0040 (Mot. 251-01) and KV113B0050 (Mot. 252-01) as shown.

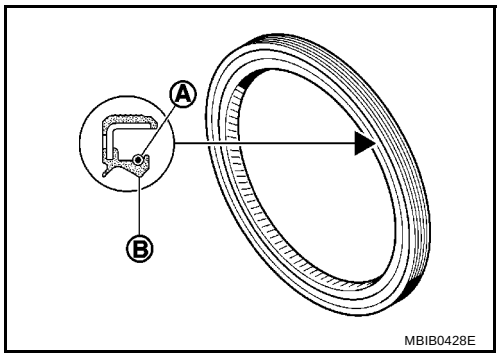
Valve protrusion : −0.07 to 0.07 mm (−0.0028 to 0.0028 in)


MBIB0426E

Camshaft Seal

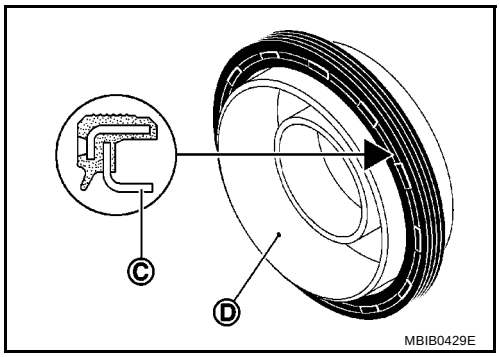
- This engine can be fitted with two different types of seals. Old and new seals are easily recognized.

1. The old rubber seal is installed with a spring (A) and has a “V”-shaped sealing lip (B).



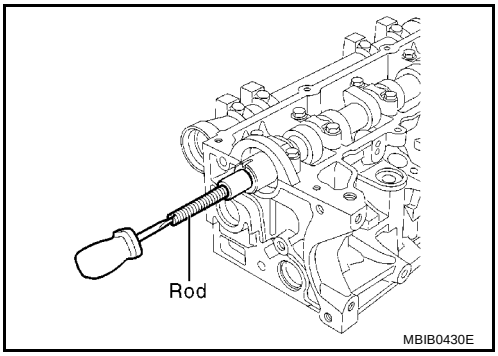
MBIB0428E

2. The new rubber seal has a flat sealing lip (C) and a protector (D) which also assists in installing the seal to the engine.

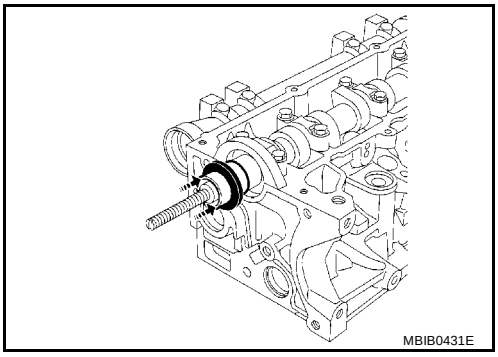


MBIB0429E

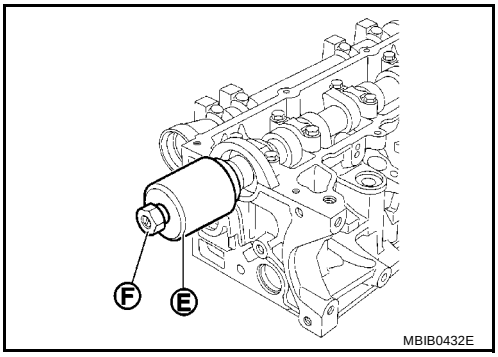
3. Screw the shouldered rod of Tool KV113B0230 (Mot. 1632) onto the stud of the camshaft.
4. Install the old seal on the camshaft.



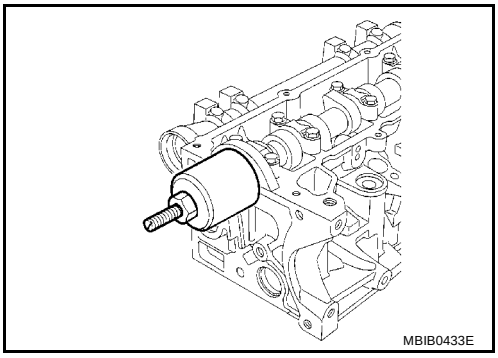
5. For the new seal, put the protector with the seal on the camshaft, taking care not to touch the seal.



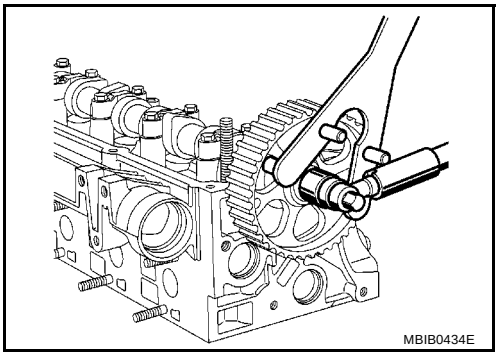
6. Install the cover (E) and the collar nut (F) of Tool KV113B0230 (Mot. 1632).



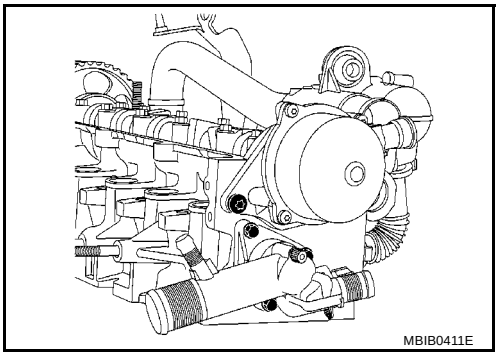
7. Screw the collar nut until the cover touches the cylinder head.



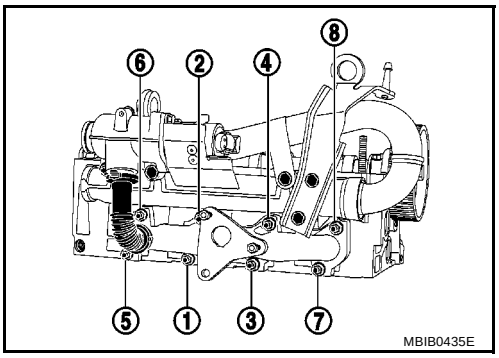
8. Remove the nut, the cover, the protector and the shouldered rod.
9. Install the camshaft pulley. Tighten the new nut to a torque of 30 N·m (3.1 kg-m, 22 ft-lb) plus an angle tightening of 84°.


MBIB0434E

10. Install the vacuum pump with a new gasket. Tighten the bolts to a torque of 21 N·m (2.1 kg-m, 15 ft-lb).
11. Install water outlet unit with a new gasket. Tighten the bolts to a torque of 26 N·m (2.7 kg-m, 19 ft-lb).

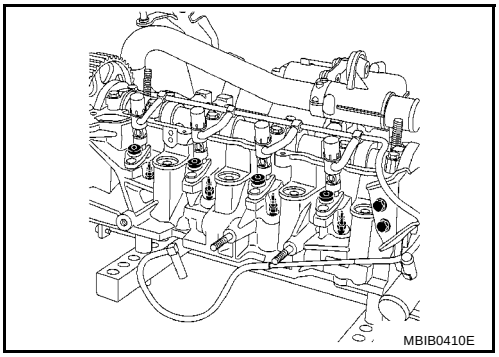

MBIB0411E

12. Install the exhaust manifold with new gasket. Tighten the bolts to a torque of 26 N·m (2.7 kg-m, 19 ft-lb) in the numerical order as shown.
13. Install the EGR unit with new clips. Tighten the mounting bolts of the valve to a torque of 21 N·m (2.1 kg-m, 15 ft-lb), then tighten the clips of the pipe using Tool KV113B0190 (Mot. 1567).
14. Install the air inlet pipe with a new seal.
15. Install the front engine slinger.



MBIB0435E

16. Clean the injector sockets and the injector bodies, as well as their brackets using a lint-free cloth (use the wipes recommended for this purpose) dipped in clean solvent.
    Dry off using a different new wipe.
    Replace the compression washer with a new washer.
17. Install the injectors (using the marks made during removal). Tighten the mounting flanges to a torque of 28 N·m (2.9 kg-m, 21 ft-lb).
18. Install the glow plugs. Tighten them to a torque of 15 N·m (1.5 kg-m, 11 ft-lb).
19. Install the rear engine slinger.


MBIB0410E

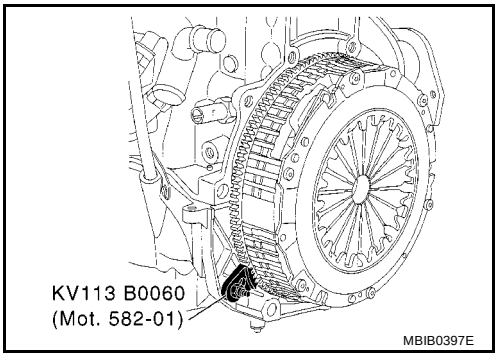
20. Install fuel injection pump and related parts. Refer to EC-K9K-20, “High pressure pump”, “DIESEL EQUIPMENT” in EC section.

Disassembly of The Bottom Engine

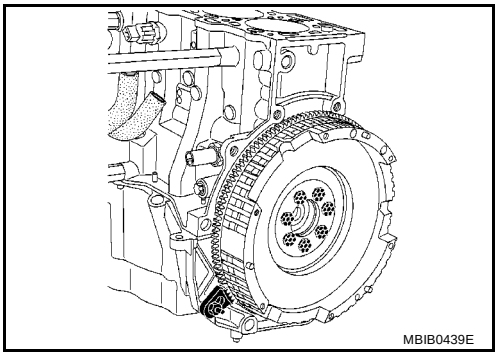
EBS01C74

REMOVAL

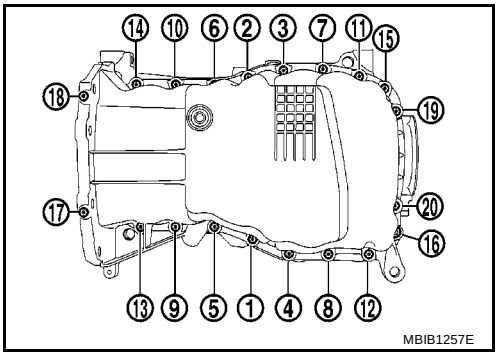
1. Install the Tool KV113B0060 (Mot. 582-01).



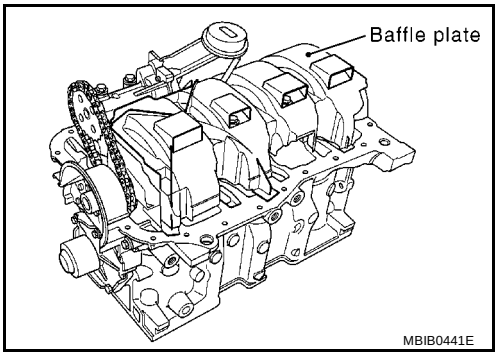
2. Remove the clutch housing.
3. Remove the flywheel.



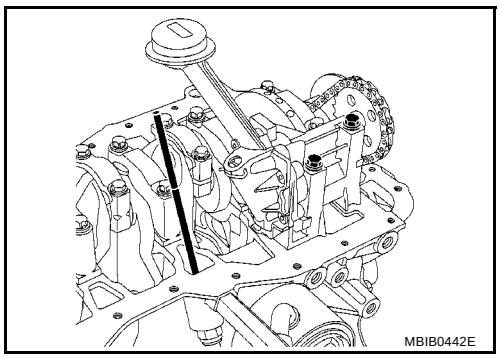
4. Remove the oil pan bolt in reverse order as shown.



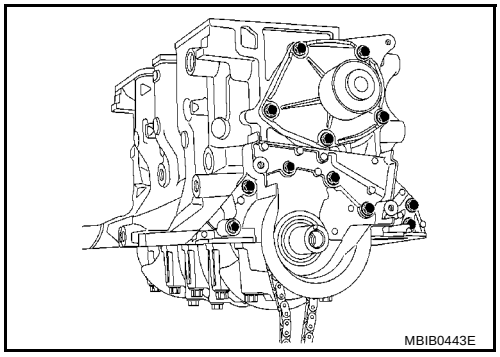
5. Remove the baffle plate.



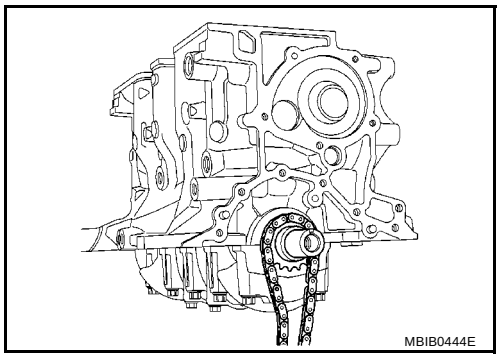
6. Remove the oil level sensor.
7. Remove the oil pump.


MBIB0442E

8. Remove the rear oil seal retainer.
9. Remove the water pump.


MBIB0443E

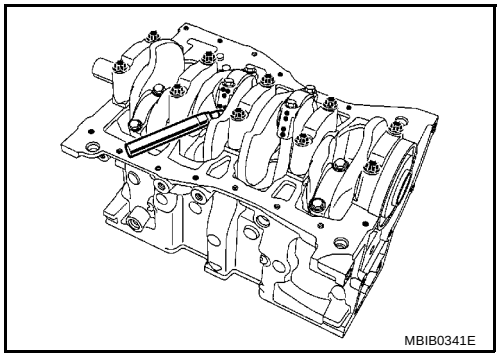
10. Remove the oil pump chain.
11. Remove the oil pump drive sprocket.


MBIB0444E

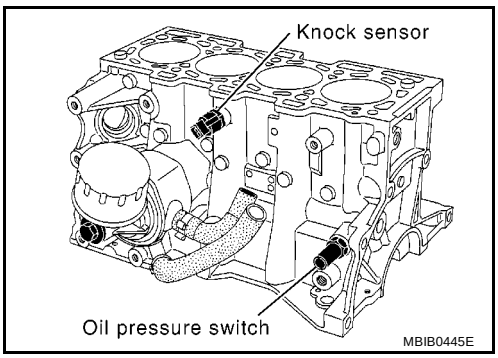
WARNING:
Do not use a sharp point to mark the bearing caps in relation to their connecting rods to avoid starting a crack in the rod. Use a permanent marker pen.

12. Remove the big end cap bolts and the connecting rod/piston assemblies.

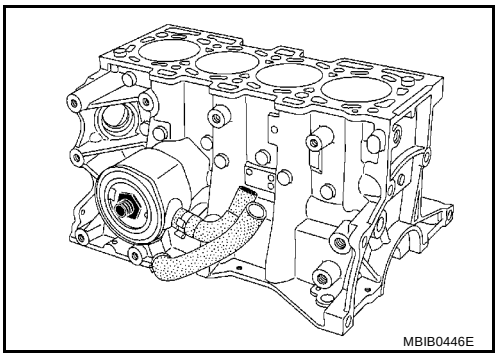
    NOTE:
    It is essential to mark the position of the main bearing cap, as the category may be different for each bearing.
13. Remove the main bearing caps.
14. Remove the crankshaft.


MBIB0341E

15. Remove the oil pressure switch, the knock sensor and oil filter bracket connecting bolt.



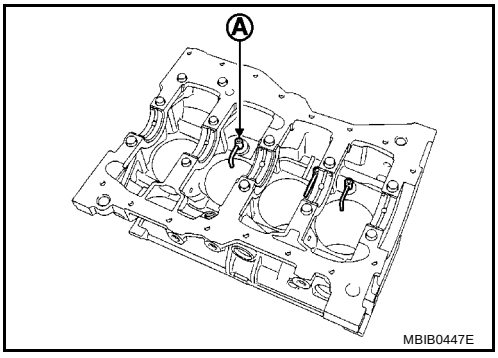
16. Remove the oil cooler connecting bolt.



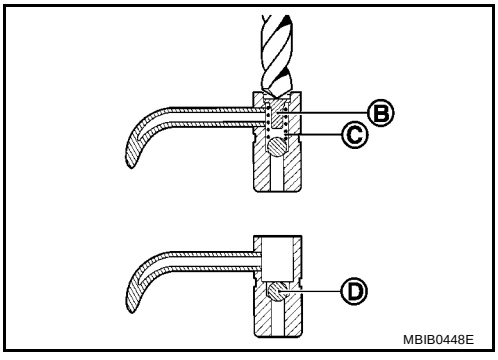
REPLACEMENT OF THE OIL JETS

Removal

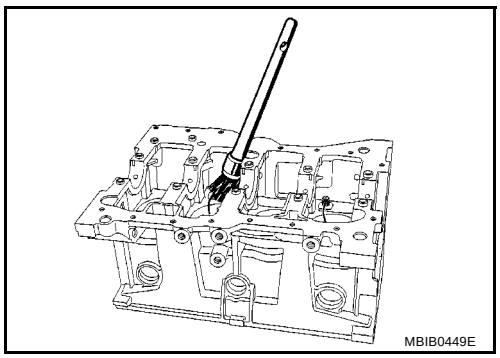
1. To remove the oil jets (A), they must be drilled with a 7 mm (0.28 in) diameter drill. This is necessary in order to remove the spring stop (B) and the spring (C).



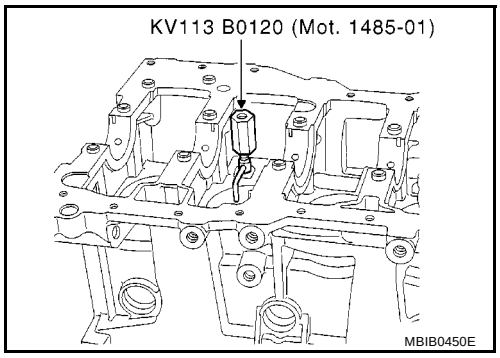
NOTE:
Do not remove the ball (D) to prevent from entering the cooling circuit.



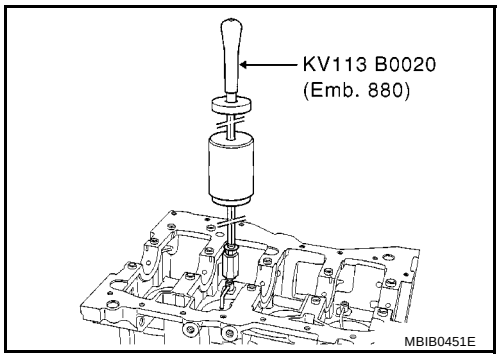
2. Remove the using a suitable brush.



3. Screw Tool KV113B0120 (Mot. 1485-01) in the drilled out jets using a 6 mm (0.24 in) Allen key which must slide into the tool.



4. Screw Tool KV113B0020 (Emb. 880) onto KV113B0120 (Mot. 1485-01) and remove the oil jet.



Assembly

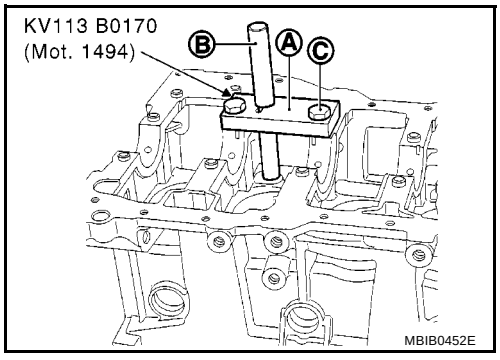
EBS01C75

INSTALLATION OF OIL JETS

- The oil jets must be installed using Tool KV113B0170 (Mot. 1494).

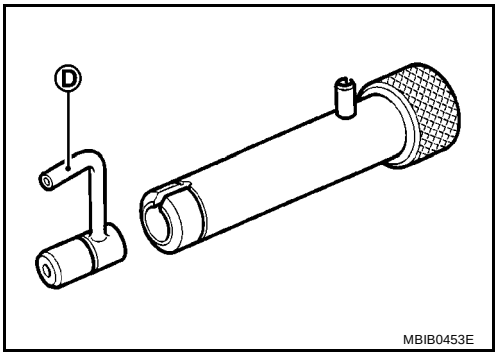
Installation of The Oil Jets For No. 1 and No. 3 Cylinders

1. Install plate (A) of Tool KV113B0170 (Mot. 1494) onto the cylinder block (as shown in the figure) without tightening the two bolts (C).
2. Position the guide rod (B) in the plate (A) and the end of the guide rod in the hole of the oil jet to center the plate (A).
3. Tighten the two bolts (C).
4. Remove the guide rod.

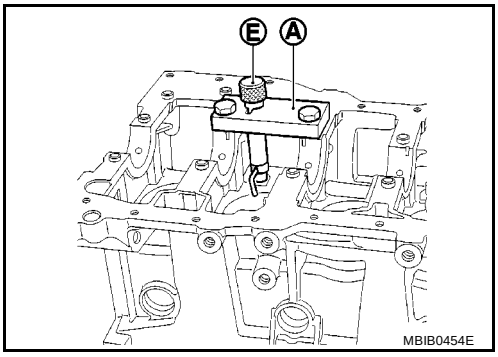


5. Install the push rod instead of the guide rod, then insert the oil jet into the push rod.

   NOTE:
   Check that the oil jet is correctly oriented with the end of the jet (D) directed towards the center of the cylinder.

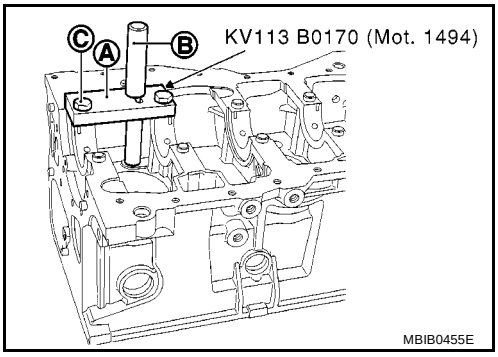


6. With a hammer, tap the push rod until the shoulder (E) of the push rod comes into contact with the plate (A).



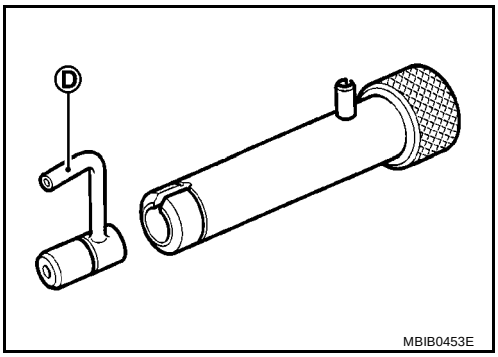
Installation of The Oil Jets For No. 1 and No. 4 Cylinders

1. Fit plate (A) of Tool KV113B0170 (Mot. 1494) onto the cylinder block (as shown in the figure) without tightening the two bolts (C).
2. Position the guide rod (B) in the plate (A) and the end of the guide rod in the hole of the oil jet to center the plate (A).
3. Tighten the two bolts (C).
4. Remove the guide rod.

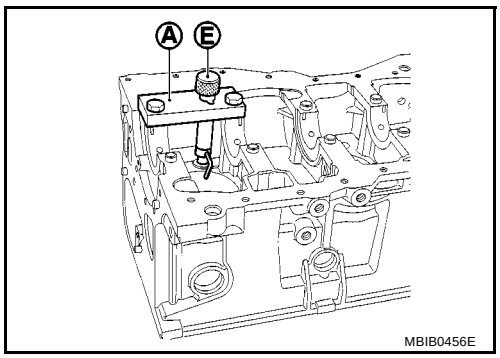


5. Position the push rod instead of the guide rod, then insert the oil jet into the push rod.

   NOTE:
   Check that the oil jet is correctly oriented with the end of the jet (D) directed towards the center of the cylinder.



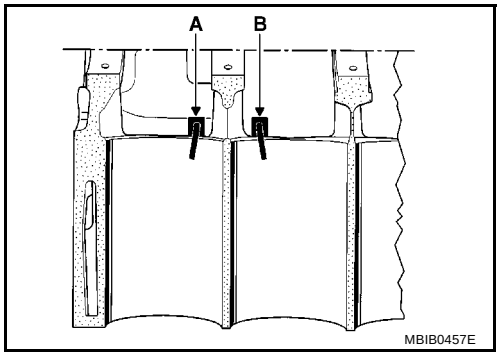
6. With a hammer, tap the push rod until the shoulder (E) of the push rod comes into contact with the plate (A).



Orientation Of The Oil Jets (See Diagram Below)

A	Orientation of the oil jets of No. 2 and No. 4 cylinders
B	Orientation of the oil jets of No. 1 and No. 3 cylinders

1. Clean the cylinder block and crankshaft by passing a wire through the lubrication channels.



METHOD FOR INSTALLING THE OIL COOLER AND OIL FILTER

1. Install oil cooler. Refer to LU-16, "OIL COOLER" .
2. Install oil filter. Refer to LU-14, "OIL FILTER" .

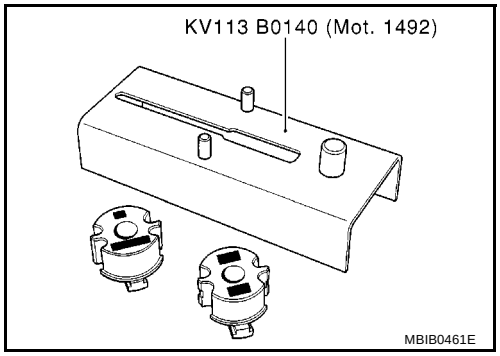
Removing The Piston Pins

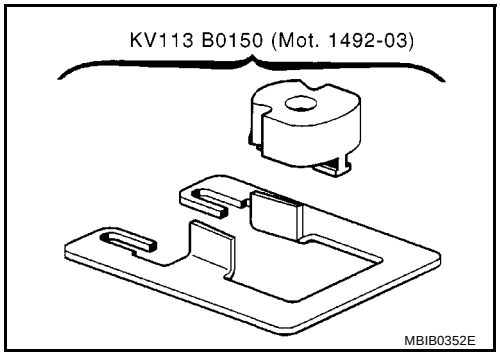
EBS01C76

NOTE:
It is imperative to mark the connecting rod to match it to its piston, because the piston height classes in the same engine may be different (see Technical Specifications section).
To remove the piston pin, remove the snap ring using a screwdriver, then release the pin.

CONNECTING ROD BEARING

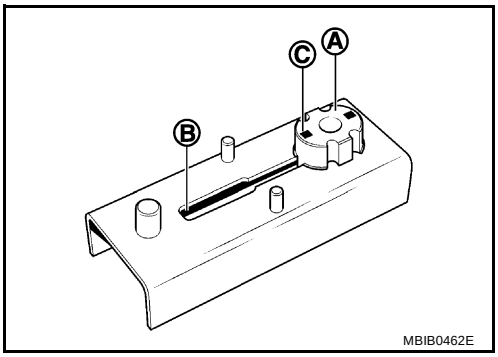
1. The connecting rod bearing are installed using Tool KV113B0140 (Mot. 1492) and Tool KV113B0150 (Mot. 1492-03).





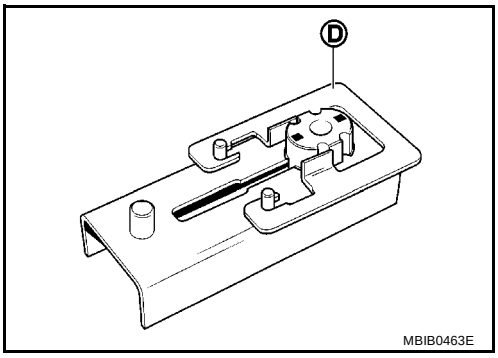
ON THE CONNECTING ROD BODY

1. Slide the connecting rod bearing support (A) of Tool KV113B0150 [Mot. 1492-03 (positioning the engraved mark (B) as shown in the figure)] into the groove (C) of the base of Tool KV113B0140 (Mot. 1492).



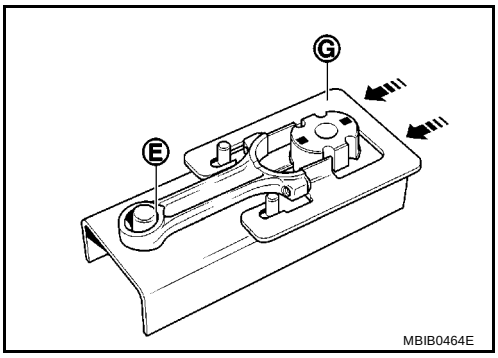
MBIB0462E

2. Install the guide (D) of Tool KV113B0150 (Mot. 1492-03) onto the base (as shown in the figure).



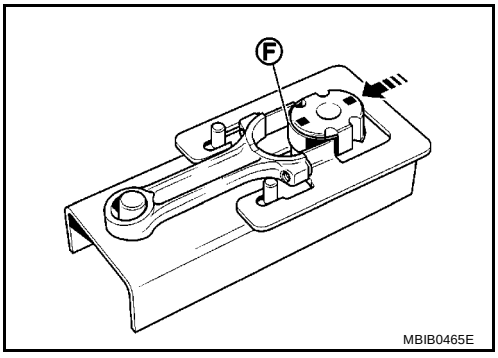
MBIB0463E

3. Lay the body of the connecting rod on the base of the tool (as shown in the diagram). Check that the lower part (E) of the small end is touching the centering pin and push the guide (G) in the direction of the arrow.



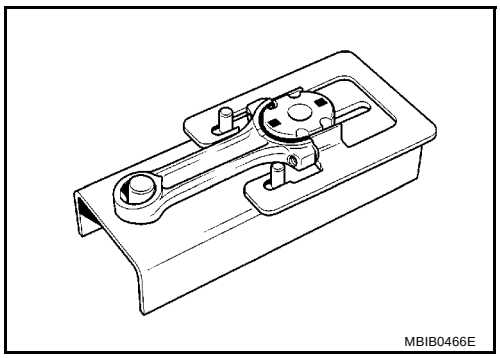
MBIB0464E

4. Lay the connecting rod bearing [with a width of 20.625 mm (0.8120 in)] (F) on the connecting rod bearing support, then push it in the direction of the arrow (as shown in the figure).



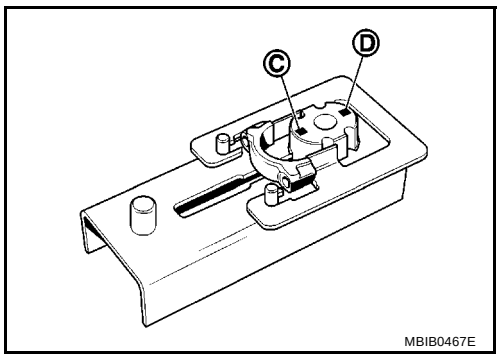
MBIB0465E

5. Bring the connecting rod support up against the base of the connecting rod body.
6. Remove the connecting rod body support and repeat the operation for the remaining connecting rod bodies.


MBIB0466E

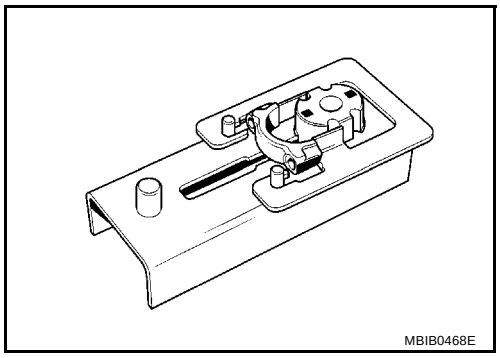
ON THE CONNECTING ROD CAP

1. Position the connecting rod bearing support either on the engraved mark (C) if the width of the connecting rod bearing is equal to 20.625 mm (0.8120 in).
2. Position the connecting rod bearing support either on the engraved mark (D) if the width of the connecting rod bearing is equal to 17.625 mm (0.6939 in).

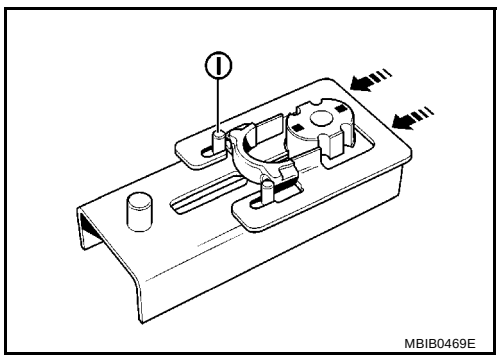


MBIB0467E

3. Install the connecting rod cap as shown in the figure.

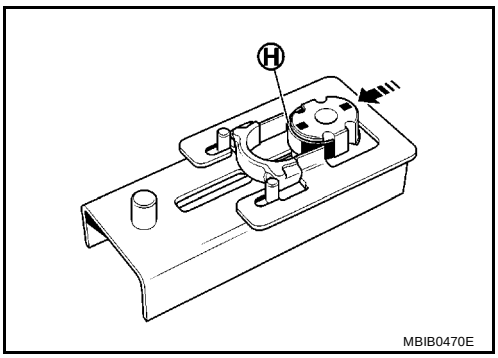

MBIB0468E

4. Push the guide (in the direction of the arrow) until the connecting rod cap is in contact with the pins (I) on the base of the tool.

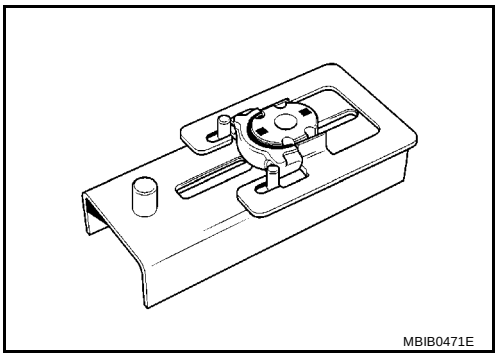


MBIB0469E

5. Install the connecting rod bearing (H) on the bearing support, then push it in the direction of the arrow (as shown in the figure).

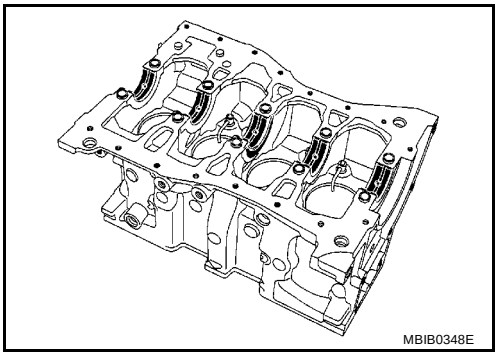


6. Bring the connecting rod bearing support up against the base of the connecting rod cap.
7. Remove the connecting rod bearing support and repeat the operation for the remaining connecting rod caps.

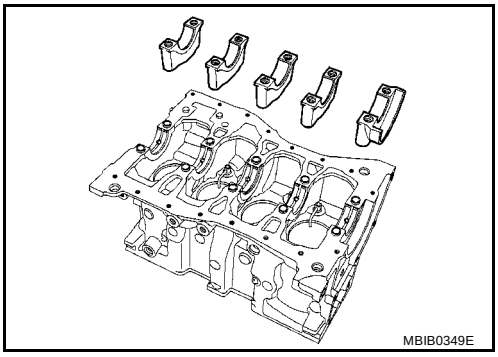


INSTALLATION OF MAIN BEARING

1. Position the grooved main bearing on the cylinder block.

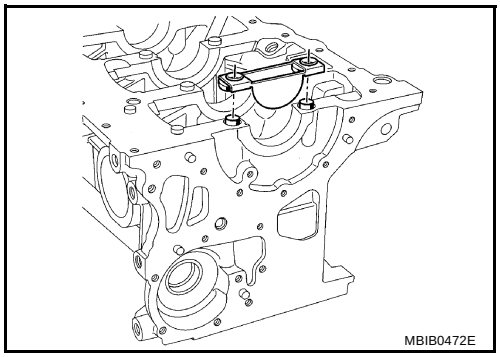


2. Install the smooth bearing cap on the bearings.

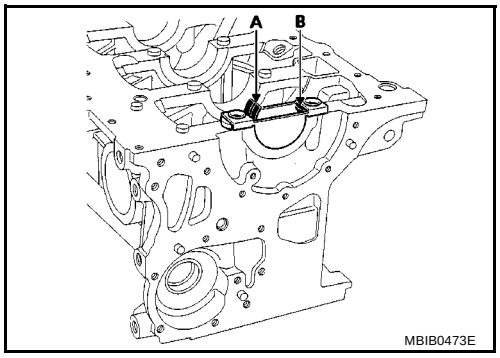


ON THE CYLINDER BLOCK

1. Position tool KV113B0160 (Mot. 1493-01) on the cylinder block.


MBIB0472E

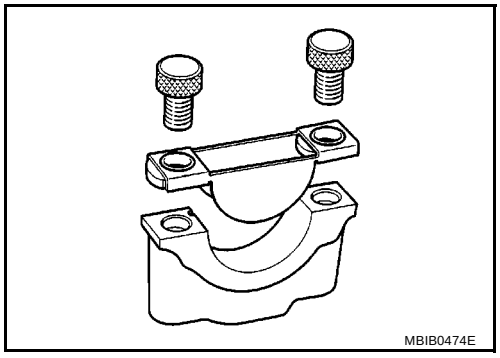
2. Install the bearing cap in Tool KV113B0160 (Mot. 1493-01), then press at (A) until the bearing cap is touching at (B) with KV113B0160 (Mot. 1493-01).



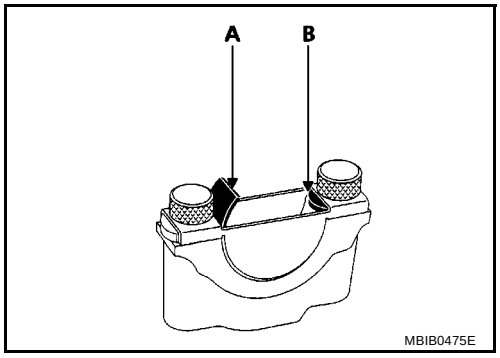
MBIB0473E

ON THE BEARING CAPS

1. Position Tool KV113B0160 (Mot. 1493-01) on the bearing cap.

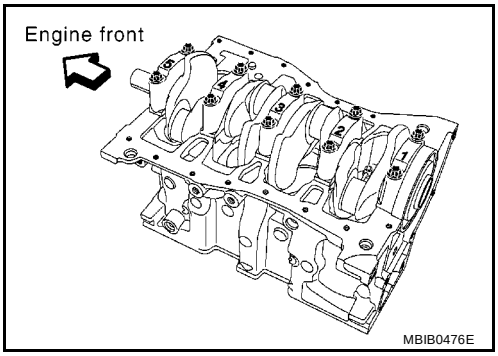

MBIB0474E

2. Install the main bearing in Tool KV113B0160 (Mot. 1493-01), then press at (A) until the main bearing is touching at (B) with Tool KV113B0160 (Mot. 1493-01).

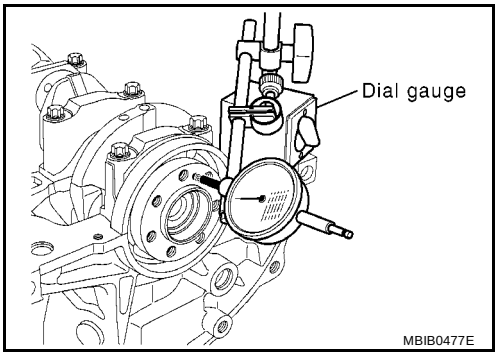


MBIB0475E

3. Oil the main bearing.
4. Install the crankshaft.
5. Install the lateral shims on bearing No. 3, putting the grooves on the crankshaft side.
6. Install the main bearing caps on bearing cap No. 1 (these are numbered from 1 - 5 and these numbers should be positioned opposite the water pump). Then tighten the bolts to a torque of 27 N·m (2.8 kg-m, 20 ft-lb) plus an angle tightening of 47°±5°.

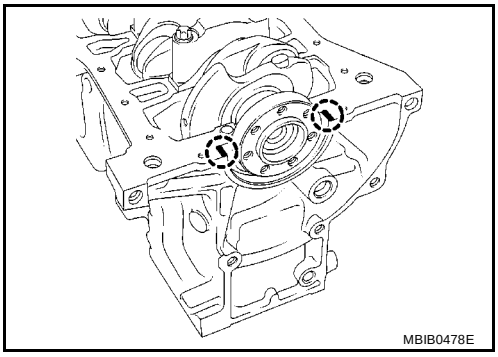


7. Check the lateral clearance of the crankshaft which should be without wear on lateral shims: 0.045 - 0.252 mm (0.0018 - 0.0099 in)
8. Check the lateral clearance of the crankshaft which should be with wear on the lateral shims: 0.045 - 0.852 mm (0.0018 - 0.0335 in)



INSTALLATION OF NO. 1 BEARING

1. **Degrease the gasket faces (of the cylinder block and bearing No. 1). They should be clean, dry and free from grease (in particular, remove finger marks).**
2. Lay two beads of liquid sealant with a width of 1 mm (0.04 in) on bearing No. 1 of the cylinder block.
   Tighten the bolts of bearing cap No. 1 to a torque of 27 N·m (2.8 kg-m, 20 ft-lb) plus an angle tightening of 47°±5°.



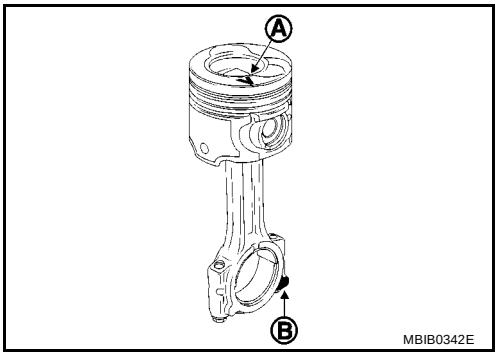
CONNECTING RODS / PISTON ASSEMBLY

- The pistons have a mark engraved on their heads indicating the engine rear side.

1. Oil the piston pin.
2. Check that the piston pins rotate correctly in the new piston and in the matching connecting rod.

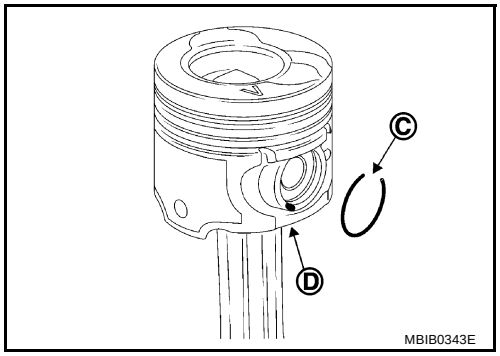
Direction Of Installation Of The Connecting Rod In Relation To The Piston

- Point the mark (A) engraved on the top of the piston upwards and the flat (B) of the big end downwards as shown in the figure.



DIRECTION FOR INSTALLATION THE SNAP RINGS ON THE PISTON

- Position the opening (C) of the snap rings opposite the removal and fitting channel (D).

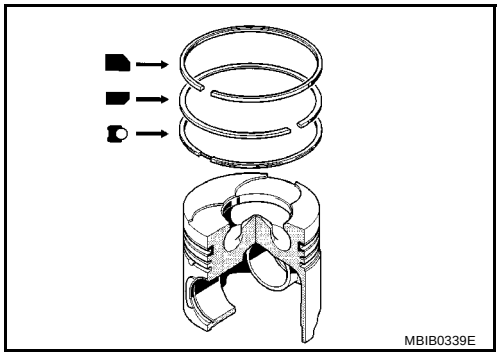


INSTALLATION OF THE SNAP RINGS

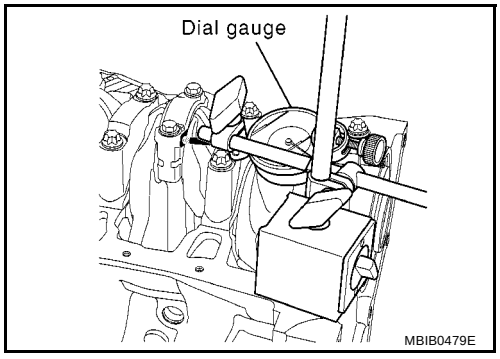
1. Rings set to their original adjustment must be free within their channels.
2. Ensure the snap rings are fitted the correct way, with the word TOP pointing upwards.

Orientation Of The Piston Rings In The Piston

1. Ensure the break in each piston ring is correctly oriented as shown in the figure.



2. Apply new engine oil to the pistons.
3. Install the connecting rod/piston assemblies into the cylinder block using the ring, being careful to fit them the right way round (mark towards the flywheel).
4. Install the connecting rods onto the oiled crankshaft pins of the crankshaft.
5. Install the connecting rod caps, ensuring they are correctly matched.
6. Tighten the big end cap bolts to a torque of 20 N·m (2.0 kg-m, 15 ft-lb), plus an angle tightening of 45°±6°.
7. Inspect that the big ends have the correct lateral clearance of 0.205 to 0.467 mm (0.0081 to 0.0184 in).

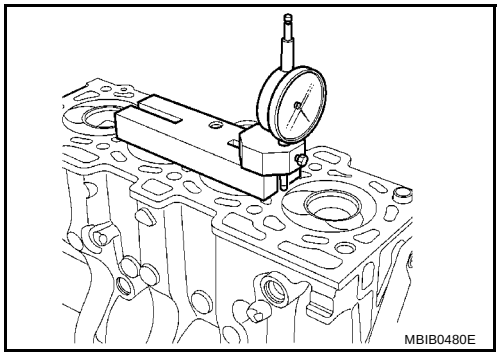


CHECKING PISTON PROTRUSION

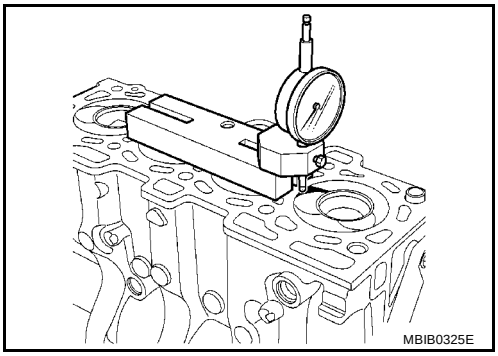
1. Clean the piston head.
2. Turn the crankshaft one turn in its operating direction to bring piston No. 1 close to TDC.
3. Install Tool KV113B0050 (Mot. 252-01) on the piston.
4. Install Tool KV113B0040 (Mot. 251-01) equipped with a gauge on support plate KV113B0050 (Mot. 252-01), and find TDC.

   NOTE:
   All measurements must be carried out along the longitudinal axis of the engine, in order to eliminate any errors due to tilting of the piston.

   WARNING:
   The gauge follower must not be in the valve clearance.

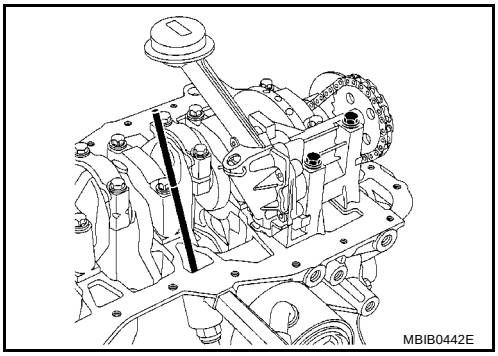


5. Inspect the piston protrusion which must be 0.099 to 0.285 mm (0.0039 to 0.0112 in).


MBIB0325E

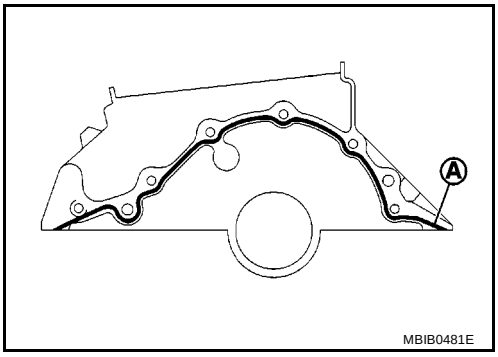
INSTALLATION OF REAR OIL SEAL RETAINER AND OIL PUMP

1. Tighten the knock sensor to a torque of 20 N·m (2.0 kg-m, 15 ft-lb).
2. Tighten the oil pressure switch to a torque of 22 N·m (2.2 kg-m, 16 ft-lb).
3. Install the oil pump sprocket and chain to a torque of 25 N·m (2.6 kg-m, 18 ft-lb).


MBIB0442E

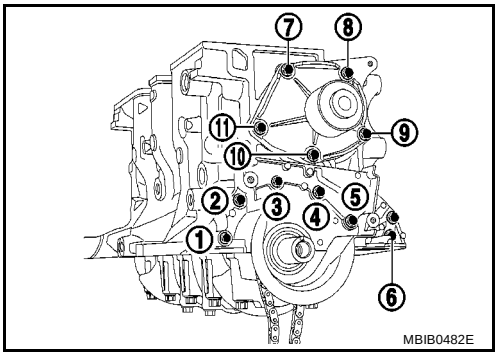
NOTE:
The gasket faces (cylinder block, rear oil seal retainer and water pump) must be clean, dry and free from grease (in particular, remove finger marks).
The rear oil seal retainer should be applied with liquid gasket. The bead (A) must be 1.5 to 2 mm (0.059 to 0.079 in) wide and be applied in accordance with the figure.

- Use Genuine Liquid Gasket or equivalent.



MBIB0481E

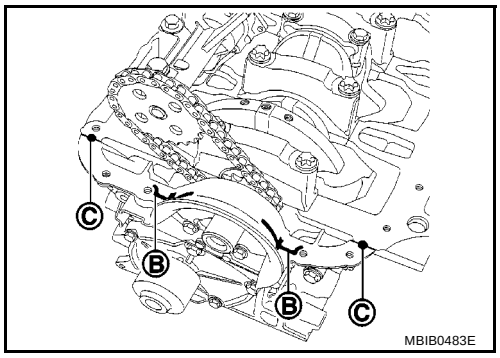
4. Install the rear oil seal retainer.
   - Tighten bolts 1 and 6 to a torque of 8 N·m (0.8 kg-m, 71 in-lb).
   - Tighten bolts 2, 3, 4 and 5 to a torque of 12 N·m (1.2 kg-m, 9 ft-lb).
   - Tighten bolts 1 and 6 to a torque of 12 N·m (1.2 kg-m, 9 ft-lb).
5. Put a new gasket to water pump face and install the water pump. Put a drop of locking sealant on the bolts, then tighten them to a torque of 11 N·m (1.1 kg-m, 8 ft-lb) in the numerical order.
   - Use Genuine thread locking sealant or equivalent.

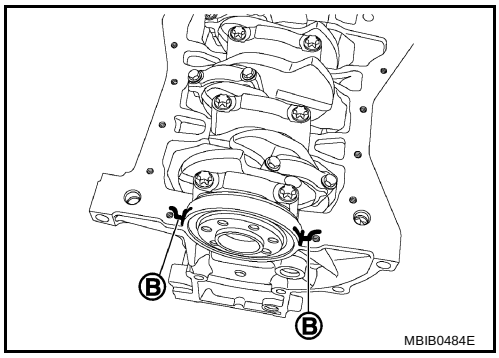


MBIB0482E

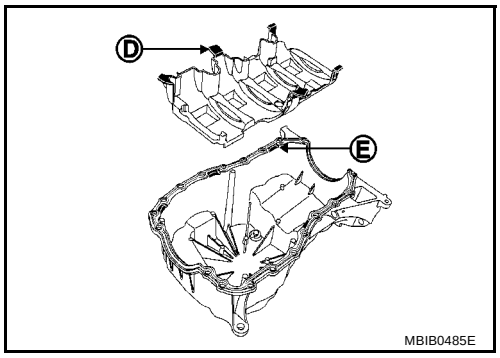
NOTE:
The gasket faces (cylinder block and rear oil seal retainer) must be clean, dry and free from grease (in particular, remove finger marks).

6. Apply four beads (B) of liquid gasket, with a diameter of 5 mm (0.20 in).
7. Apply two drops (C) of liquid gasket, with a diameter of 7 mm (0.28 in) at the intersection of the rear oil seal retainer and the cylinder block.
   - Use Genuine Liquid Gasket or equivalent.

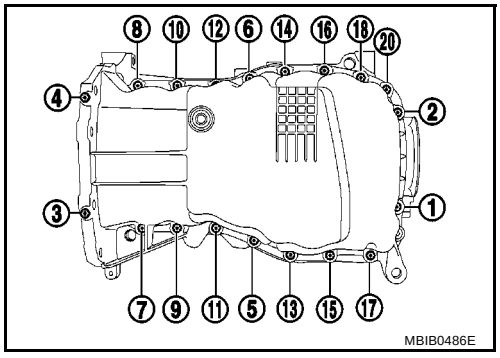




8. When installing the oil pan, ensure that the tabs (D) of the baffle plate are correctly positioned in the slots (E).
9. When installing the oil pan, ensure that the cylinder block and the oil pan are correctly aligned on the flywheel side, to prevent the clutch housing from being damaged when installing the transaxle.
10. Install the baffle plate.

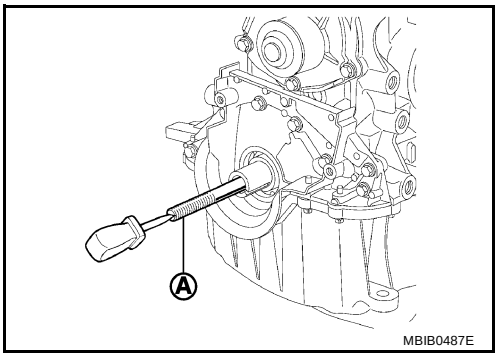


11. Install the oil pan and tighten the bolts as follows:
    - Tighten the bolts in the numerical order shown in the figure to a torque of 8 N·m (0.8 kg-m, 71 in-lb).
    - Tighten the mounting bolts of oil pan on the clutch housing without locking.
    - Tighten the bolts in the numerical order shown in the figure to a torque of 15 N·m (1.5 kg-m, 11 ft-lb).
    - Tighten the mounting bolts of oil pan on the clutch housing to a torque of 44 N·m (4.5 kg-m, 32 ft-lb).

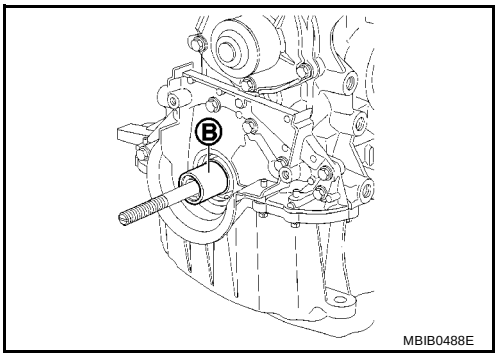


INSTALLATION OF THE CRANKSHAFT SEAL GASKETS

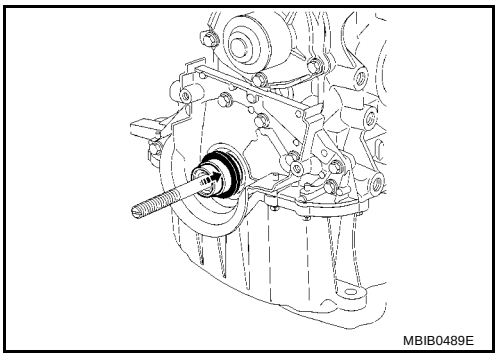
1. Crankshaft elastomer seal, timing side.
2. Screw the threaded rod (A) of Tool KV113B0220 (Mot. 1586) into the crankshaft.



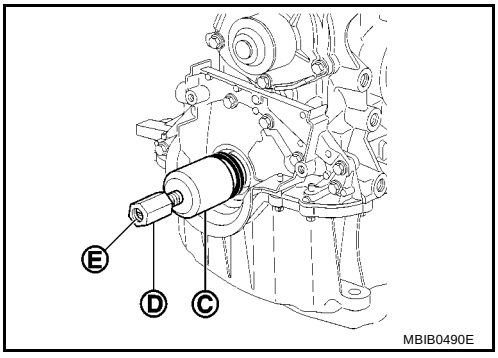
3. Position the spacer (B) of Tool KV113B0220 (Mot. 1586) on the crankshaft.



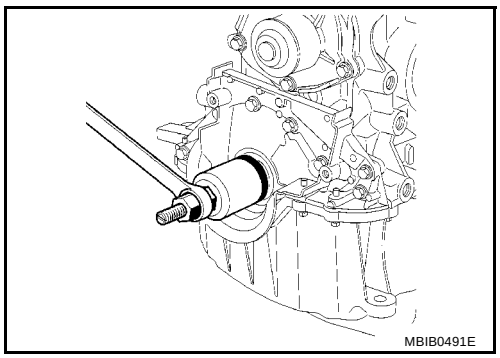
4. Install the protector complete with the seal onto the spacer, taking care not to touch the seal.

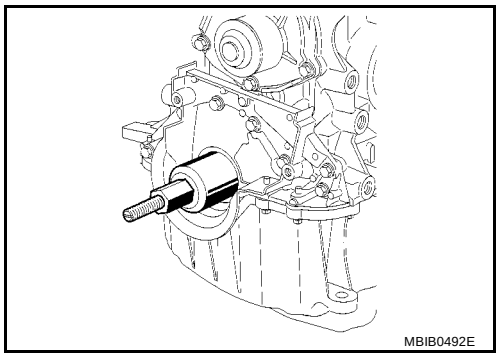


5. Install the cover (A) and the nut (B) (putting the threaded part (C) of the nut on the side away from the engine) of Tool KV113B0220 (Mot. 1586).

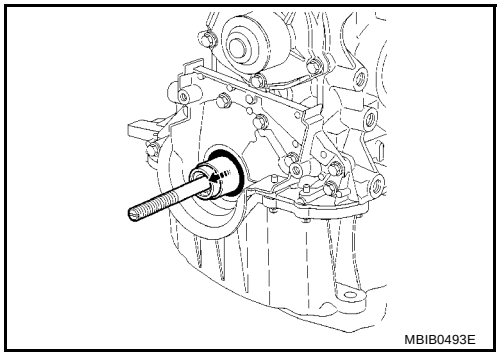


6. Tighten the nut until the cover touches the spacer.

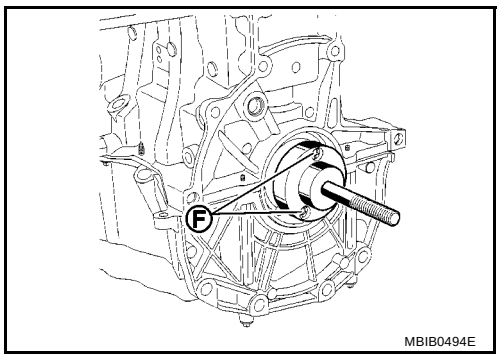

MBIB0491E


MBIB0492E

7. Remove the nut, the cover, the protector and the threaded rod.

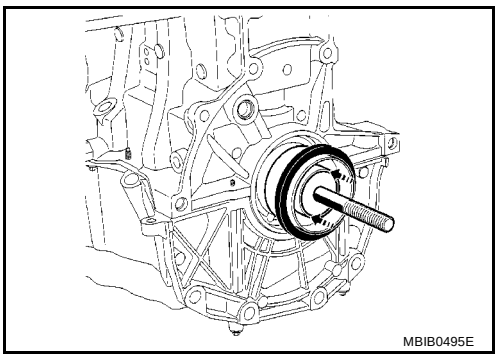

MBIB0493E

8. Crankshaft elastomer seal, flywheel side.
9. Install Tool KV113B0210 (Mot. 1585) on the crankshaft, securing it with bolts (F).

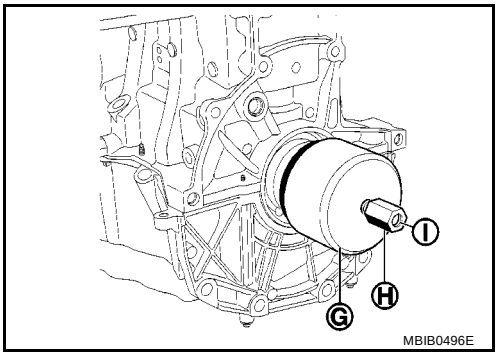


MBIB0494E

10. Put the protector complete with the seal on Tool KV113B0210 (Mot. 1585), being careful not to touch the seal.

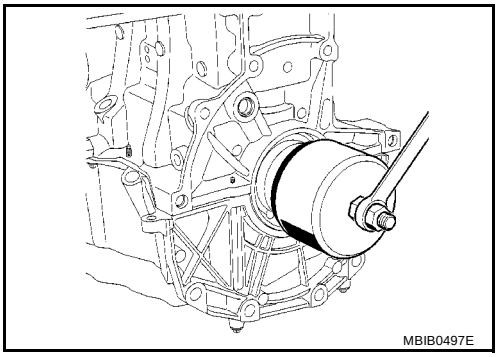

MBIB0495E

11. Install the cover (G) and nut (H) (putting the threaded part (I) of the nut on the side away from the engine) of Tool KV113B0210 (Mot. 1585).



MBIB0496E

12. Tighten the nut until the cover touches the cylinder block.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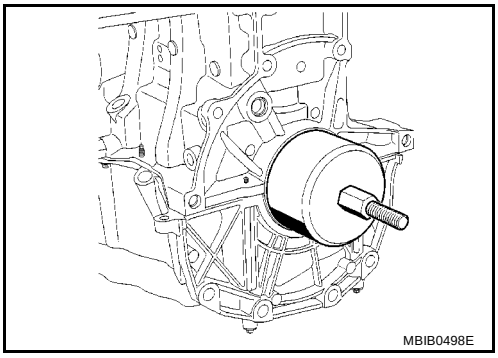
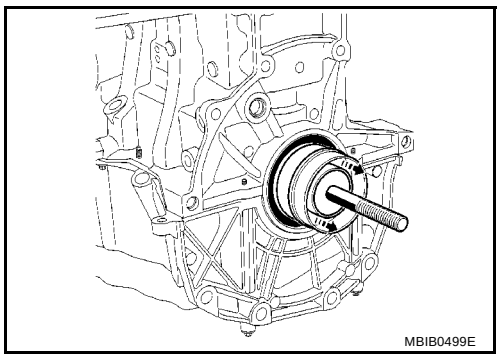
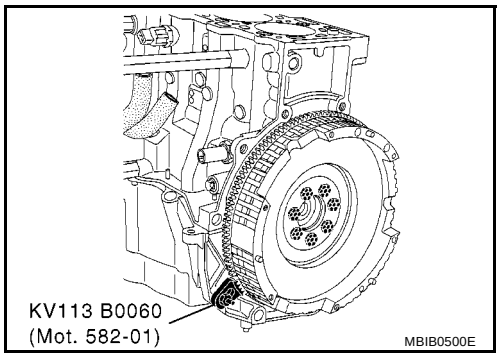

MBIB0498E

13. Remove the nut, the cover, the protector and the threaded rod.

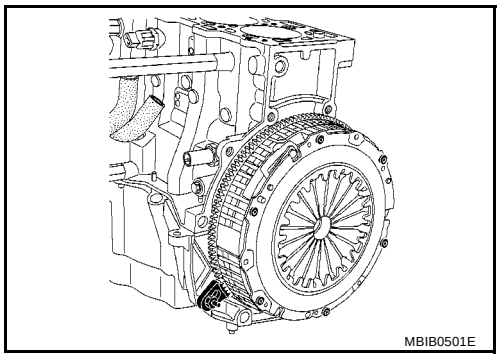

MBIB0499E

14. Install Tool KV113B0060 (Mot. 582-01) and tighten the new bolts to a torque of 50 to 55 N·m (5.1 to 5.6 kg-m, 37 to 40 ft-lb).



MBIB0500E

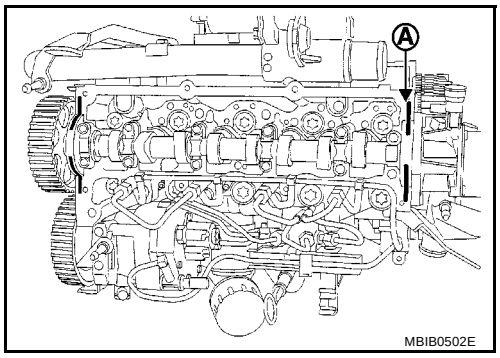
15. Install the clutch housing, tightening the bolts to a torque of 8 N·m (0.8 kg-m, 71 in-lb).
16. Remove Tool KV113B0060 (Mot. 582-01).


MBIB0501E

INSTALLATION OF THE CYLINDER HEAD

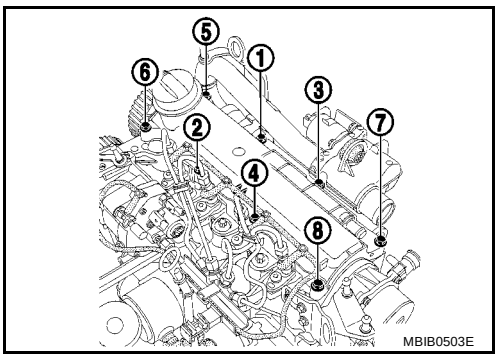
1. Position the pistons at mid-stroke.
2. Install the cylinder head gasket using the centering dowels of the cylinder block.
3. Tighten the cylinder head, Refer to EM-162, "ASSEMBLY OF THE CYLINDER HEAD" .

   NOTE:
   The gasket faces (cylinder head and rocker cover) must be clean, dry and free from grease (in particular, remove finger marks).
4. Lay four beads (A) of liquid gasket, with a diameter of 2 mm (0.08 in).
   - Use Genuine Liquid Gasket or equivalent.



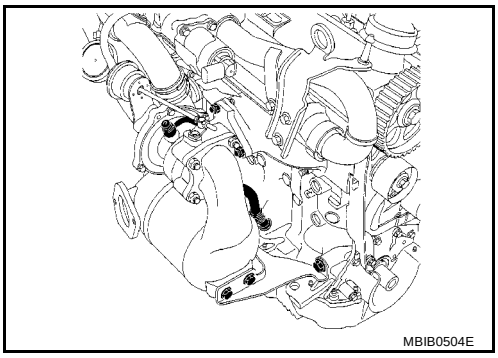
MBIB0502E

5. Install the rocker cover, tightening the bolts to a torque of 10 N·m (1.0 kg-m, 7 ft-lb) in the numerical order as shown.

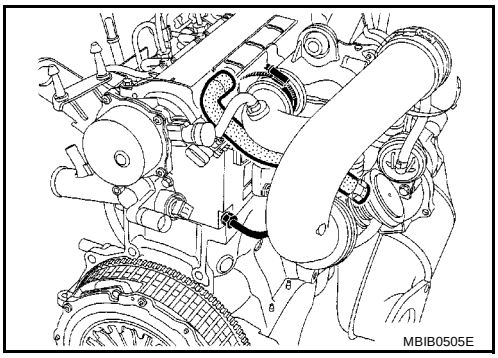


MBIB0503E

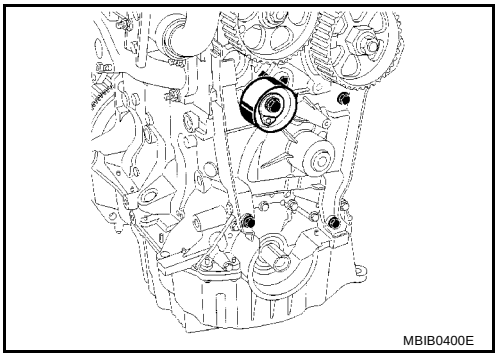
6. Put new seals on the pipe ends and install the turbocharger oil return pipe.
7. Install the turbocharger, tightening the nuts and the torx bolt to a torque of 26 N·m (2.7 kg-m, 19 ft-lb).
8. Install the catalytic converter bracket.
9. Install the turbocharger oil supply pipe.


MBIB0504E

10. Tighten the bolts of the turbocharger oil return pipe to a torque of 9 N·m (0.9 kg-m, 80 in-lb).
11. Tighten the nut and the bolt of the turbocharger oil supply pipe to a torque of 23 N·m (2.3 kg-m, 17 ft-lb).
12. Install the oil vapor rebreathing pipe.
13. Install the new turbocharger air ducts.


MBIB0505E

14. Install the inner timing cover.
15. Install the timing tensioner.


MBIB0400E

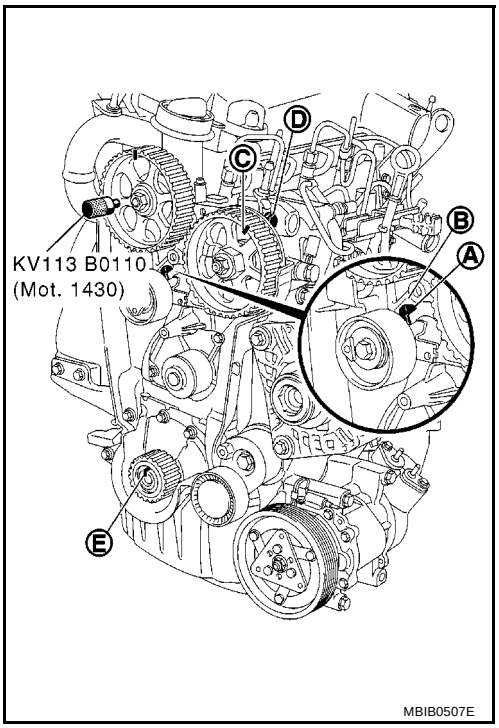
TIMING ADJUSTMENT

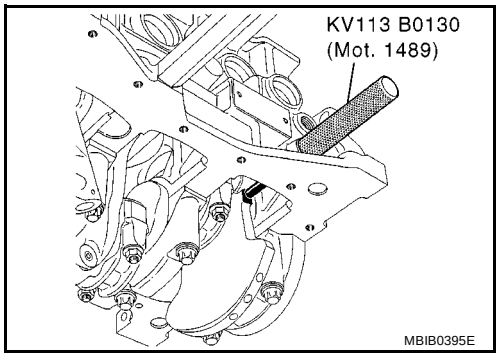
CAUTION:

It is essential to degrease the end of the crankshaft, the bore of the crankshaft sprocket and the bearing faces of the accessories pulley to prevent any slip between the timing and the crankshaft which would risk destroying the engine.

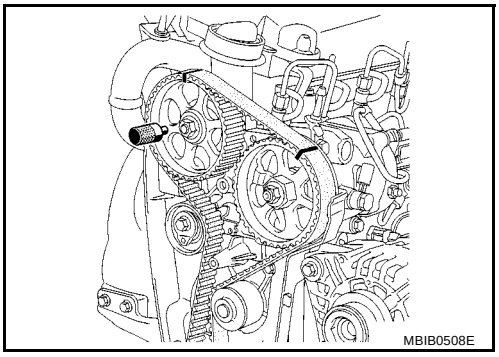
Ensure that the peg (A) of the tension wheel is correctly positioned in the groove (B).

1. Insert Tool KV113B0110 (Mot. 1430) in the camshaft and cylinder head pulley holes.
2. Check that the mark on the high pressure pump pulley (C) is opposite the bolt head (D).
3. Check that the crankshaft is touching Tool KV113B0130 (Mot. 1489) (the crankshaft groove (E) must be facing upwards).

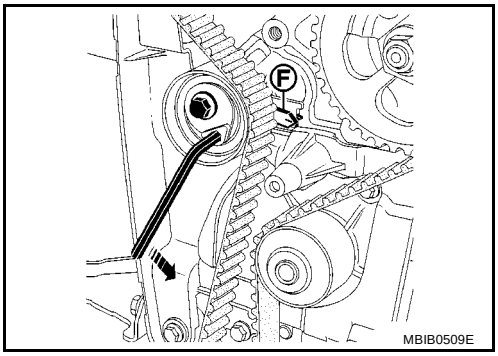




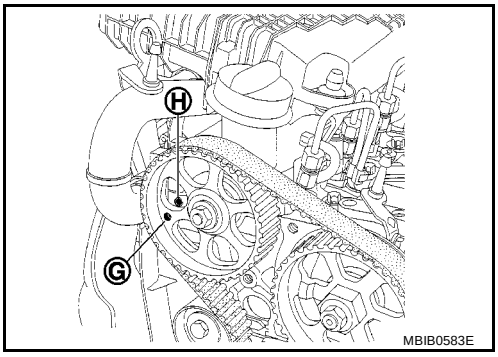
4. Install the timing belt, aligning the marks on the belt with those on the camshaft and fuel injection pump sprockets (19 teeth spaces on the belt between the marks on the camshaft and pump sprockets).



5. Using a 6 mm (0.24 in) Allen key, move the movable index (F) of the tension wheel into the position shown below, by turning the key counterclockwise.

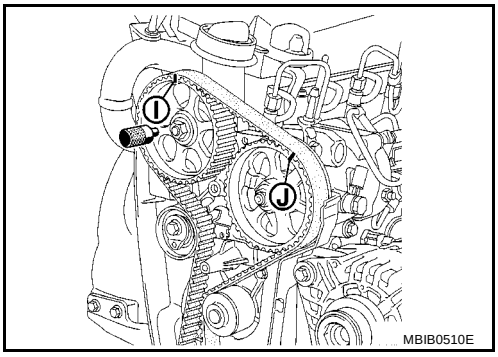


6. Tighten the tension wheel bolts to a torque of 25 N·m (2.6 kg-m, 18 ft-lb).
7. Install the crankshaft pulley, tightening the M12 bolt to a torque of 60 N·m (6.1 kg-m, 44 ft-lb), then angle tighten to 100°±10°, or M14 bolt to a torque of 120 N·m (12 kg-m, 89 ft-lb), then angle tighten to 95°±15°.
8. Remove Tool KV113B0130 (Mot. 1489) and Tool KV113B0110 (Mot. 1430).
9. Turn the crankshaft two full turns in a clockwise direction (timing side). Just before the hole (G) of the camshaft pulley is opposite the cylinder head hole (H), Tool KV113B0130 (Mot. 1489) into the cylinder block.

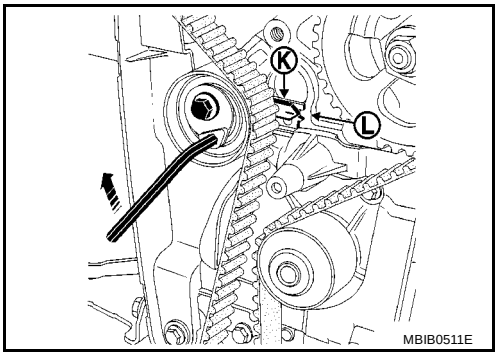


10. Then move the crankshaft slowly and without jolting it until it is resting on the pin.

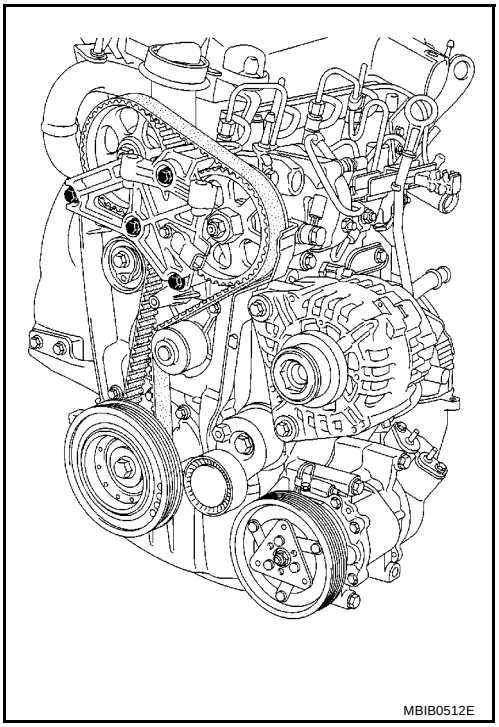
11. Check that Tool KV113B0110 (Mot. 1430) is correctly inserted in the holes of the camshaft and cylinder head pulleys and that there are 19 teeth spaces between the marks on the camshaft (I) and the fuel pump (J) sprockets.
12. Remove Tool KV113B0130 (Mot. 1489) and Tool KV113B0110 (Mot. 1430).



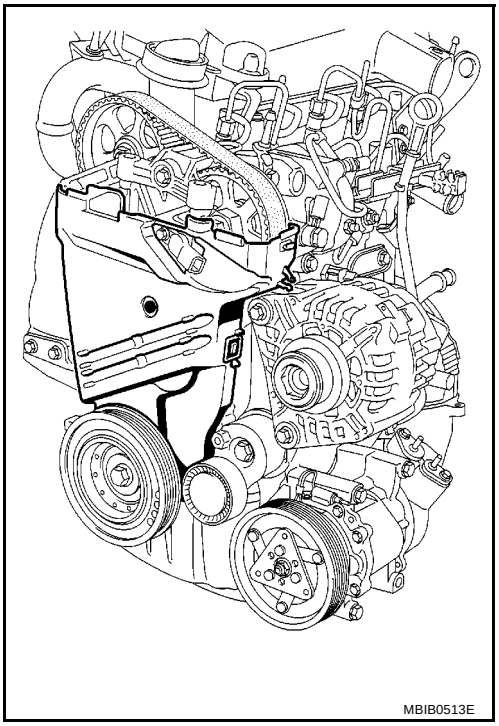
13. Undo the tension wheel bolt by a maximum of one turn while holding it using a 6 mm (0.24 in) Allen key, then gradually bring the movable index (K) (by turning the key clockwise) to the center of the timing window (L) and tighten the nut to a torque of 25 N·m (2.6 kg-m, 18 ft-lb).
14. Install the cap of the TDC pin, apply liquid gasket to the thread and tighten to a torque of 20 N·m (2.0 kg-m, 15 ft-lb).



15. Install the cylinder head suspended bracket. Tighten the bolts to a torque of 21 N·m (2.1 kg-m, 15 ft-lb).


MBIB0512E

16. Install the lower timing cover by positioning the tab (M) into the hole (N) on the inner timing cover.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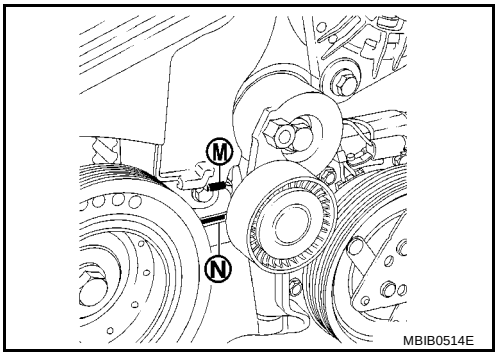
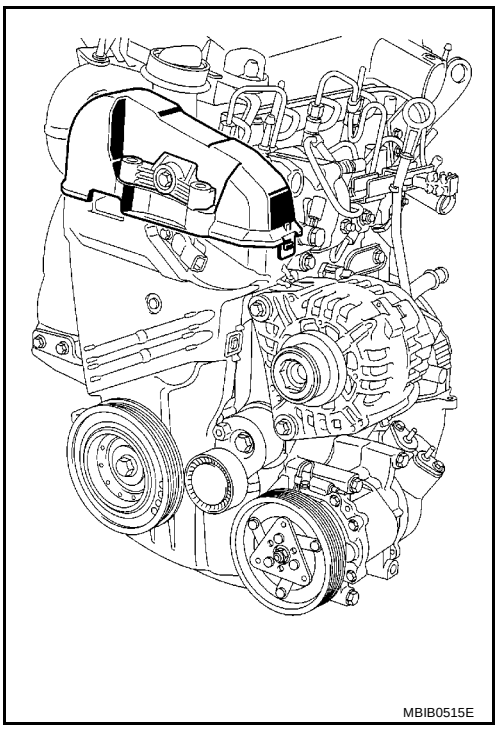
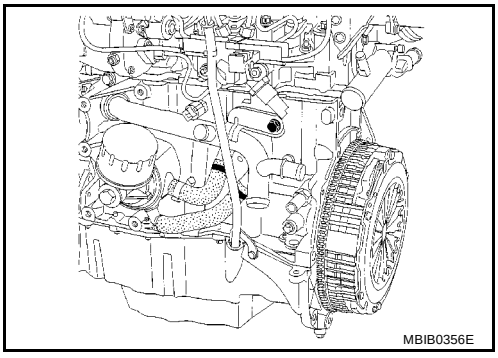


MBIB0514E

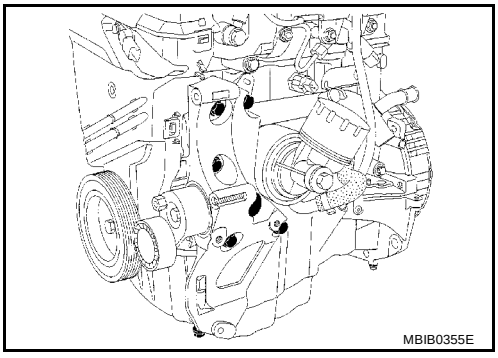
17. Install the upper timing cover.
18. Remove the engine from the Tool KV113B0070 (Mot. 792-03).


MBIB0515E

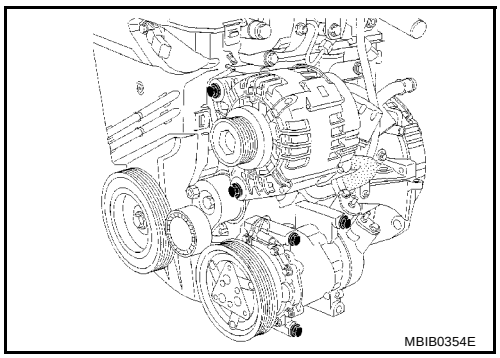
19. Install the water pipe. Tighten the bolt to a torque of 22 N·m (2.2 kg-m, 16 ft-lb).
20. Install the two water hoses.


MBIB0356E

21. Install the alternator bracket. Tighten the bolts to a torque of 44 N·m (4.5 kg-m, 32 ft-lb).

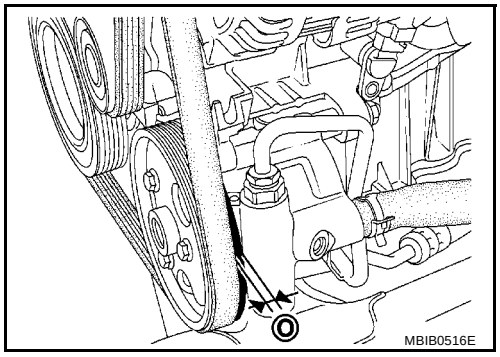

MBIB0355E

22. Install the alternator. Tighten the bolts to a torque of 21 N·m (2.1 kg-m, 15 ft-lb).
23. Install the A/C compressor. Tighten the bolts to a torque of 21 N·m (2.1 kg-m, 15 ft-lb).
24. Install the power steering pump or the washer which replaces the pulley (if the engine has one). Tighten the bolts to a torque of 21 N·m (2.1 kg-m, 15 ft-lb).


MBIB0354E

25. Install the drive belt.

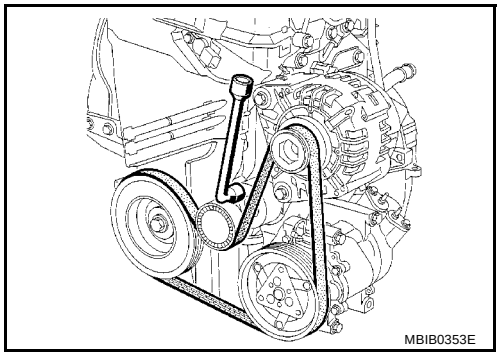
    NOTE:
    The accessories belt has five teeth as opposed to the pulleys which have six. It is therefore essential to ensure that tooth "O" remains free when installing the belt.



MBIB0516E

Models With A/C Compressor

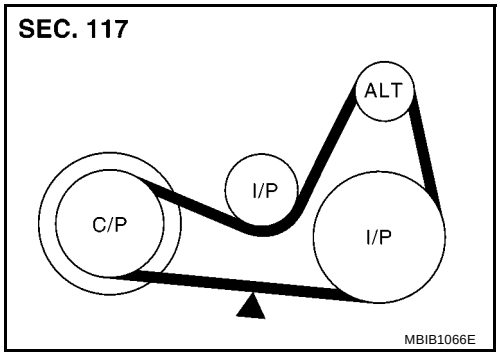
NOTE:
The engine must be turned through two revolutions in order to position the belt correctly.


MBIB0353E

Models Without A/C Compressor

1. The belt is tensioned using tool belt tension gauge (commercial service tool) (with the two mounting bolts of the tensioner undone).
2. The tension value is 233±5 Hz.

    NOTE:
    The engine must be turned through two revolutions in order to position the belt correctly.



MBIB1066E

BASIC INSPECTION

PFP:00013

Cylinder Head

EBS01C77

CYLINDER HEAD TIGHTENING PROCEDURE

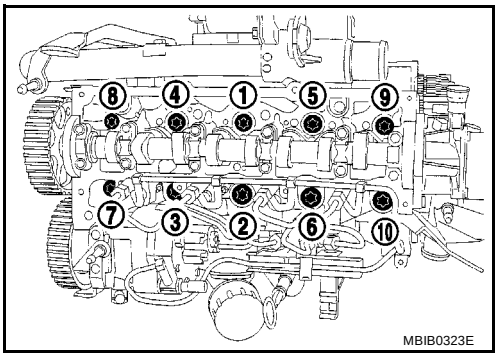
NOTE:
Use a syringe to remove any oil which may have entered the cylinder head mounting bolt holes to achieve correct tightening of the bolts.

1. All bolts must always be changed after removal. Do not oil the new bolts.
2. Tighten all the bolts in the numerical order as shown.

   : 25 N·m (2.6 kg-m, 18 ft-lb)

3. Check that all the bolts are correctly tightened to 25 N·m (2.6 kg-m, 18 ft-lb) then angle tightening of 245 to 265 degrees.

Do not retighten the cylinder head bolts after performing this procedure.

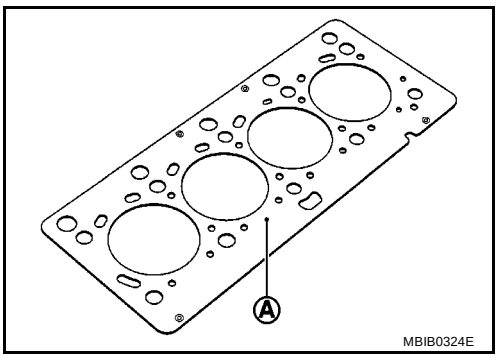


MBIB0323E

THICKNESS OF THE CYLINDER HEAD GASKET

- The thickness of the cylinder head gasket is measured at (A):

  Thickness : 0.75 - 0.81 mm (0.0295 - 0.0319 in)



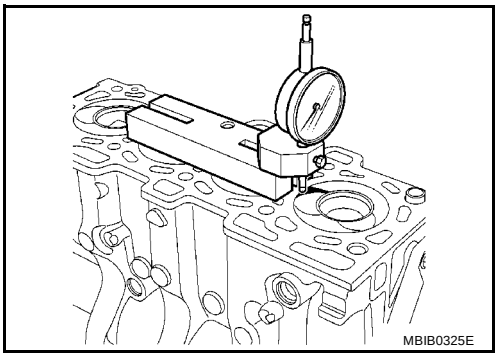
MBIB0324E

INSPECTION OF THE PISTON PROTRUSION

1. Clean the piston heads in order to eliminate any traces of deposits.
2. Turn the crankshaft one turn in its operating direction to bring piston No. 1 close to TDC.
3. Install Tool KV113B0040 (Mot. 251-01) equipped with a gauge on its base plate KV113B0050 (Mot. 252-01), and find TDC of the piston.

NOTE:
All measurements must be carried out along the longitudinal axis of the engine, in order to eliminate any errors due to tilting of the piston.

WARNING:
The gauge follower must not be in the valve clearance.
Measure the piston protrusion.
The protrusion must be: 0.099 - 0.285 mm (0.0039 - 0.0112 in).

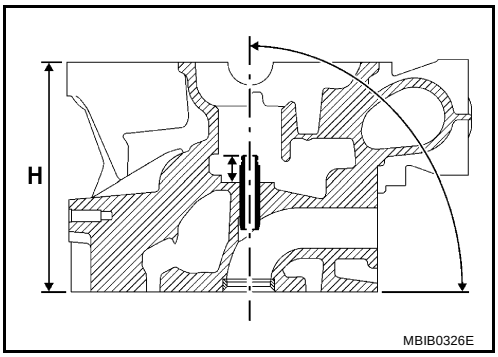

MBIB0325E

Height of the cylinder head:

H = 127 mm (5.00 in)

Gasket face bow:

Cylinder head : 0.05 mm (0.0020 in)
Cylinder block : 0.03 mm (0.0012 in)



MBIB0326E

NO REGRINDING IS AUTHORIZED
Test the cylinder head to detect possible cracks using the cylinder head test container (comprising a tray and a kit suited to the cylinder head, plug, sealing plate and blanking plate).

VALVE

Valve Dimensions

Stem diameter:

Intake	: 5.969 - 5.985 mm (0.2350 - 0.2356 in)
Exhaust	: 5.955 - 5.971 mm (0.2344 - 0.2351 in)

Face angle:

Intake and exhaust	: 90°

Head diameter:

Intake	: 33.38 - 33.62 mm (1.3142 - 1.3236 in)
Exhaust	: 28.88 - 29.12 mm (1.1370 - 1.1465 in)

Valve length:

Intake	: 100.73 - 101.17 mm (3.9657 - 3.9831 in)
Exhaust	: 100.53 - 100.97 mm (3.9579 - 3.9752 in)

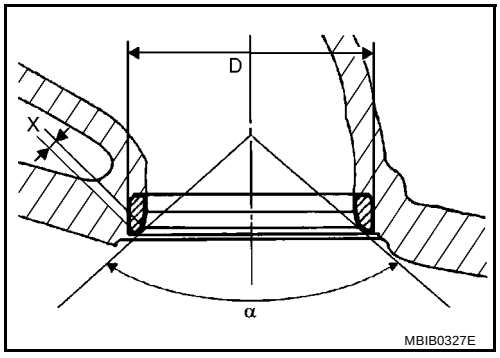
Max. valve lift:

Intake	: 8.015 mm (0.3156 in)
Exhaust	: 8.595 mm (0.3384 in)

Protrusion of valves in relation to the cylinder head gasket face:

Intake and exhaust	: –0.7 to 0.7 mm (–0.028 to 0.028 in)

VALVE SEAT



Seat angle (α):

Intake and exhaust	: 89°30′

Contacting width (X):

Intake and exhaust	: 1.8 mm (0.071 in)

Seat outer diameter (D):

Intake	: 34.444 - 34.460 mm (1.3561 - 1.3567 in)
Exhaust	: 30.034 - 30.050 mm (1.1824 - 1.1831 in)

Diameter of the housing in the cylinder head:

Intake	: 34.444 - 34.474 mm (1.3561 - 1.3572 in)
Exhaust	: 29.955 - 29.985 mm (1.1793 - 1.1805 in)

VALVE GUIDE

Length:

Intake and exhaust	: 40.35 - 40.65 mm (1.5886 - 1.6004 in)

Guide outer diameter:

Standard	: 11.044 - 11.062 mm (0.4348 - 0.4355 in)

Guide inner diameter:

Intake and exhaust

Not machined	: 5.50 - 5.62 mm (0.2165 - 0.2213 in)
Machined*	: 6.000 - 6.018 mm (0.2362 - 0.2369 in)

*** This dimension is measured with the guide fitted in the cylinder head.**

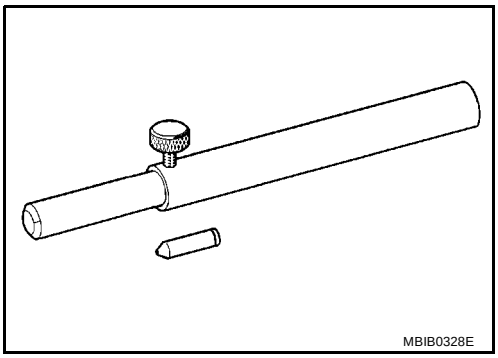
Diameter of the housing in the cylinder head:

Standard : 10.9925 - 11.0075 mm (0.4328 - 0.4334 in)

The intake and exhaust guides have valve stem seals which must be changed each time the valves are removed.

It is imperative to fit the valve stem seals using Tool KV113B0180 (Mot. 1511-01) or suitable tool.

NOTE:
Do not lubricate the valve stem seals before fitting them.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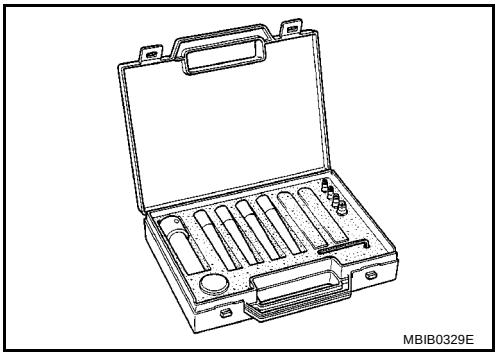
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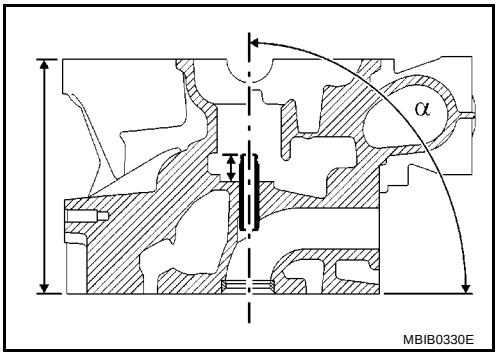
Angle of the intake and exhaust guides (in degrees)

Intake and exhaust : α = 90



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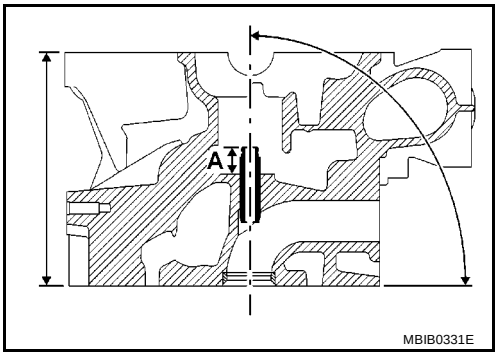
Position of the intake and exhaust valve guides

Intake : A = 14 mm (0.55 in)

Exhaust : A = 14.2 mm (0.559 in)



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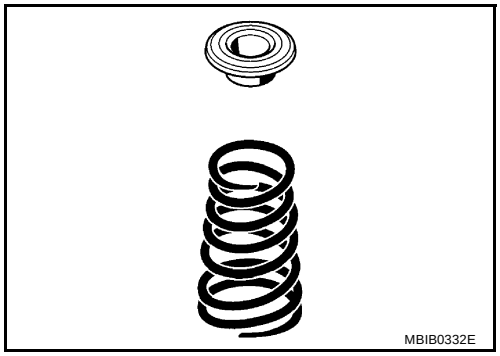
VALVE SPRING

The valve springs are tapered (ensure the correct direction of fitting).



Free height:	**: 43.31 mm (1.7051 in)**
Length under a load of	
230 N (23.5 kg, 51.7 lb)	**: 33.80 mm (1.3307 in)**
500 N (51.0 kg, 112.4 lb)	**: 24.80 mm (0.9764 in)**
Joined spires:	**: 23.40 mm (0.9213 in)**
Wire diameter:	**: 3.45 mm (0.1358 in)**
Inner diameter:	
Bottom	**: 18.78 - 18.82 mm (0.7394 - 0.7409 in)**
Top	**: 13.90 - 14.30 mm (0.5472 - 0.5630 in)**
Outer diameter:	
Bottom	**: 25.50 - 25.90 mm (1.0039 - 1.0197 in)**
Top	**: 20.8 - 21.2 mm (0.819 - 0.835 in)**

WARNING:
This engine does not have any valve spring lower washers.

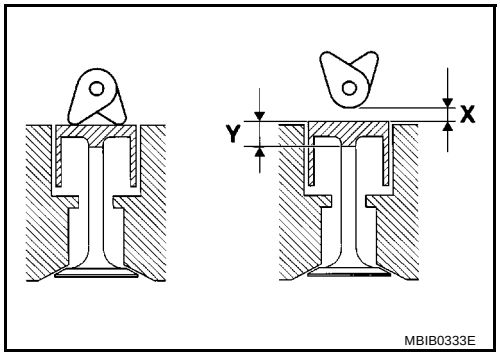
PISTON

Piston outer diameter	**: 34.965 - 34.985 mm (1.3766 - 1.3774 in)**
Diameter of the housing in the cylinder head	**: 35.00 - 35.04 mm (1.3780 - 1.3795 in)**

INSPECTION OF VALVE CLEARANCE

1. Place the valves of the cylinder concerned at the “end of exhaust - beginning of intake” position and inspect the clearance (X).

   NOTE:
   Dimension (Y) corresponds to the tappet thickness sizes (there are 25 sizes at the service parts).



1	4
3	2
4	1
2	3

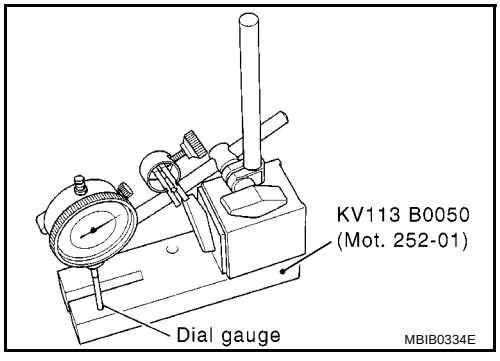
2. Compare the values recorded with the values specified, then replace the tappets which are not within tolerance.

   Clearance, when the engine is cold:

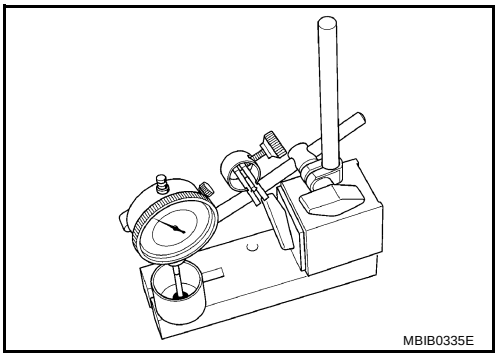
   Intake : 0.125 - 0.25 mm (0.0049 - 0.0098 in)

   Exhaust : 0.325 - 0.45 mm (0.0128 - 0.0177 in)

3. The camshaft must be removed to replace the tappets.
   Determining dimension “Y”.
4. Set up the following assembly using Tool KV113B0050 (Mot. 252-01) and dial gauge, then calibrate the gauge.



5. Raise the gauge extension (without modifying the position of the magnetic support/gauge assembly), then slide in the tappet to be measured.
Note dimension (Y) and repeat the operation for the tappets where the valve clearance is not within tolerance.
Refer to the Replacement Parts Catalogue for the vehicle concerned to select the various thicknesses of the tappet(s). The service parts supplies 25 sizes of single-piece tappets.

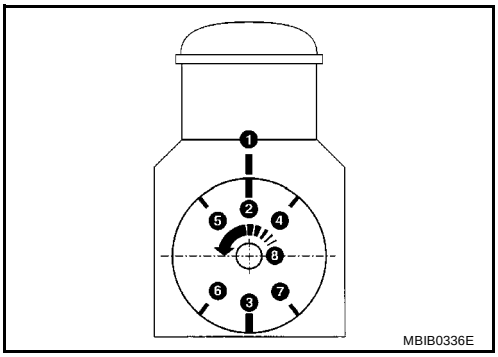

MBIB0335E

CAMSHAFT

End play	**: 0.08 - 0.178 mm (0.0031 - 0.0070 in)**
Number of bearings	**: 6**
Diameter of the camshaft bearings	
On the camshaft:	
Bearings 1, 2, 3, 4, 5	**: 24.979 - 24.999 mm (0.9834 - 0.9842 in)**
Bearing 6	**: 27.979 - 27.999 mm (1.1015 - 1.1023 in)**
On the cylinder head:	
Bearings 1, 2, 3, 4, 5	**: 25.04 - 25.06 mm (0.9858 - 0.9866 in)**
Bearing 6	**: 28.04 - 28.06 mm (1.1039 - 1.1047 in)**
Timing diagram	
Intake opening retard *	**: –9**
Intake closing retard	**: 20**
Exhaust opening advance	**: 27**
Exhaust closing advance **	**: –7**

*** As the intake opening retard is negative, the valve is opened after TDC.**
**** As the exhaust closing advance is negative, the valve is closed before TDC.**

1	Cylinder block TDC fixed mark
2	Flywheel TDC moving mark
3	Flywheel BDC moving mark
4	Intake Opening Retard
5	Exhaust Closing Advance
6	Intake Closing Retard
7	Exhaust Opening Advance
8	Direction of engine rotation (flywheel end).



MBIB0336E

Piston

EBS01C78

- Install the piston pin in the connecting rod and in the piston.
- The piston pin is retained by circlips.

PISTON MARKING

1	Direction of fitting of the piston mark towards the flywheel
2	Height between the piston pin and the top of the piston (see table below).
3	Used by the supplier only
4	Used by the supplier only
5	Used by the supplier only
6	Piston axis of symmetry
7	Piston pin hole axis
8	Offset between the hole axis (7) and the piston's axis of symmetry (6) is 0.3 mm (0.012 in)

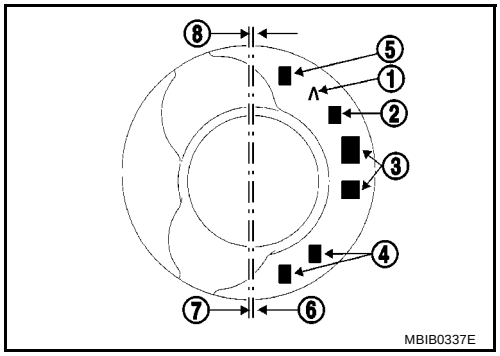


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TABLE OF PISTON PIN HEIGHT

Unit: mm (in)

* Mark on piston	Piston pin height
K	41.667 (1.6404)
L	41.709 (1.6421)
M	41.751 (1.6437)
N	41.793 (1.6454)
P	41.835 (1.6470)

The tolerance on the piston pin heights is ±0.02 mm (±0.0008).
*** The different piston pin heights are exclusively reserved for the engine assembly plant.**
The service parts will only supply piston classes (height) L, M, N.

NOTE:

- **If the engine is installed with a K class piston, an L class piston must be installed as a replacement.**
- **If the engine is installed with a P class piston, an N class piston must be installed as a replacement.**

MEASURING THE PISTON DIAMETER

The piston diameter must be measured at height A = 56 mm (2.20 in).

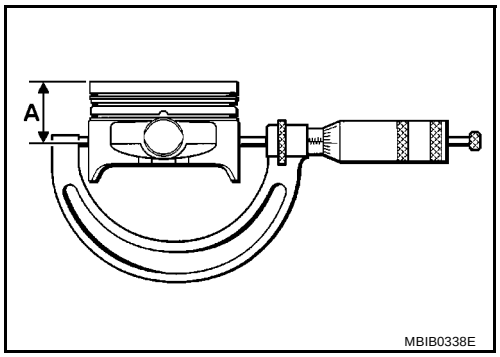
Piston diameter : 75.933 - 75.947 mm (2.9895 - 2.9900 in)

Piston pin:

Length : 59.7 - 60.3 mm (2.350 - 2.374 in)

Outer diameter : 24.8 - 25.2 mm (0.976 - 0.992 in)

Inner diameter : 13.55 - 13.95 mm (0.5335 - 0.5492 in)



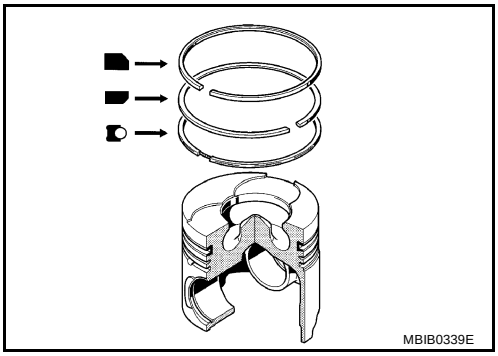
MBIB0338E

PISTON RING

Thickness:

Top ring	**: 1.97 - 1.99 mm (0.0776 - 0.0783 in)**
2nd ring	**: 1.97 - 1.99 mm (0.0776 - 0.0783 in)**
Oil ring	**: 2.47 - 2.49 mm (0.0972 - 0.0980 in)**

The piston rings are supplied ready adjusted.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PISTON RING END GAP

Top ring	**: 0.20 - 0.35 mm (0.0079 - 0.0138 in)**
2nd ring	**: 0.70 - 0.90 mm (0.0276 - 0.0354 in)**
Oil ring	**: 0.25 - 0.50 mm (0.0098 - 0.0197 in)**

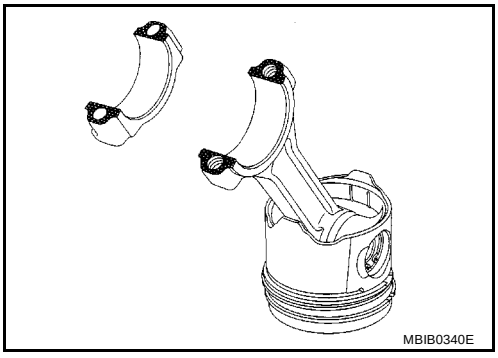
Connecting Rod

EBS01C79

The connecting rod is of the detachable cap type.

WARNING:

- **The bolts must be coated with engine oil under the heads and on the threads when the connecting rods are installed in the engine.**
- **The big end caps are positioned on the connecting rod by irregularities on the parting line.**
- **The occurrence of impacts or a foreign body between the body - cap mating surfaces will lead to rapid rupture of the connecting rod.**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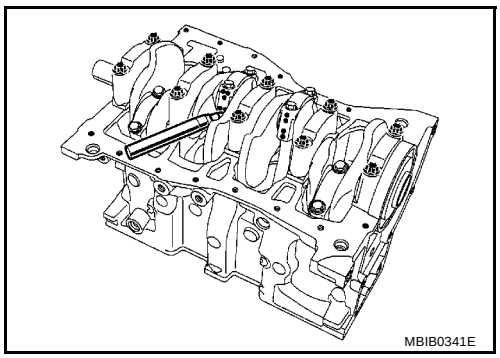
Lateral big end play	**: 0.205 - 0.467 mm (0.0081 - 0.0184 in)**
Diametrical big end play	**: 0.035 - 0.045 mm (0.0014 - 0.0018 in)**
Center distance between the big end and small end	**: 133.75 mm (5.2657 in)**
Diameter of the big end	**: 47.610 - 47.628 mm (1.8744 - 1.8751 in)**
Diameter of the small end	
(without ring)	**: 27.24 - 27.26 mm (1.0724 - 1.0732 in)**
(with ring)	**: 25.013 - 25.025 mm (0.9848 - 0.9852 in)**

NOTE:
The connecting rod small end rings cannot be replaced.

The maximum weight difference for the connecting rod, piston and piston pin assemblies for the same engine must be 0.245 N (25 g, 0.88 oz).

WARNING:

- **To avoid initiating a crack in the connecting rod, do not use a sharp point to mark the big end caps in relation to their connecting rod.**
- **Use a permanent marker pen.**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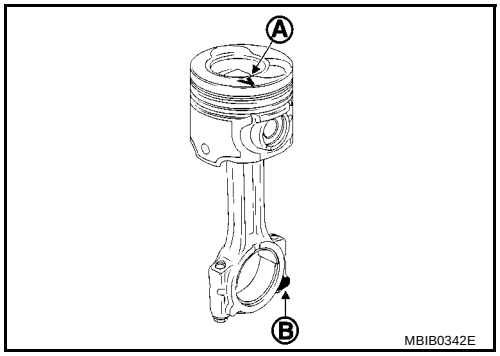
DIRECTION OF INSTALLATION OF THE CONNECTING ROD IN RELATION TO THE PISTON

- Point the mark (A) engraved on the top of the piston upwards and the machined flat (B) of the big end downwards as shown in the figure.



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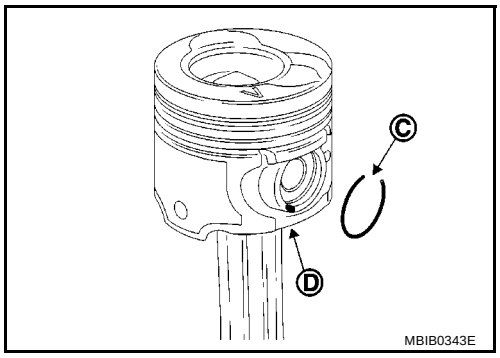
DIRECTION FOR INSTALLATION THE SNAP RINGS ON THE PISTON

- Position the opening (C) of the snap rings opposite of the removal and installation channel (D).



MBIB0343E

Crankshaft

EBS01C7A

Number of main journals	**: 5**
Crankshaft side clearance:	
Without wear on side shims	**: 0.045 - 0.252 mm (0.0018 - 0.0099 in)**
With wear on side shims	**: 0.045 - 0.852 mm (0.0018 - 0.0335 in)**
Crankshaft diametrical clearance:	
Journals	**: 0.027 - 0.054 mm (0.0011 - 0.0021 in)**
Crankshaft pins	**: 0.035 - 0.045 mm (0.0014 - 0.0018 in)**
Journal diameter:	**: 47.99 - 48.01 mm (1.8894 - 1.8902 in)**
Crankshaft pin diameter:	**: 43.96 - 43.98 mm (1.7307 - 1.7315 in)**

- The lateral shims are located on bearing No. 3.
- No rectifications are allowed.

WORKING OUT THE CLASS OF MAIN BEARING (ORIGINAL FITMENT)

Marking (A) On The Crankshaft

Detail of the marking (A):
Number of journals

1*	2	3	4	5	Classes of journal diameters A = D1 B = D2 C = D3
B	B	C	C	B	

* Flywheel end.

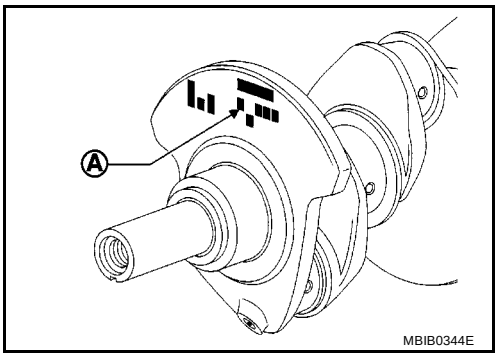


Table Of Journal Diameter Classes

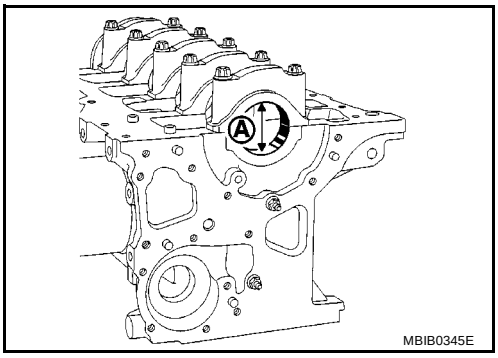
Unit: mm (in)

Journal class mark on the crankshaft	Journal diameter
A = D1	47.990 - 47.996 (1.8894 - 1.8896)
B = D2	47.997 - 48.003 (1.8896 - 1.8899)
C = D3	48.004 - 48.010 (1.8899 - 1.8902)

Cylinder Block

EBS01C7B

The diameters of the bearings (A) of the cylinder block are marked by a hole on the block (B) located above the oil filter.



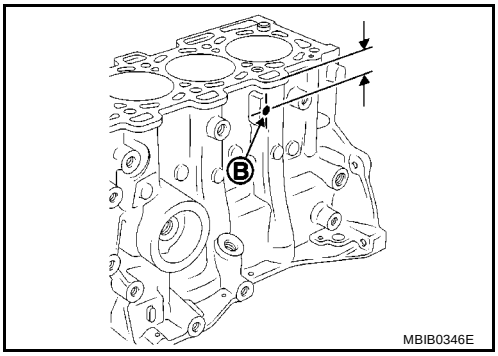


TABLE OF CYLINDER BLOCK MAIN BEARING HOUSING INNER DIAMETERS

Hole position (B)	Class reference	Cylinder block main bearing housing inner diameter
X = 33 mm (1.30 in)	1 or blue	51.936 - 51.942 mm (2.0447 - 2.0450 in)
Y = 43 mm (1.69 in)	2 or red	51.942 - 51.949 mm (2.0450 - 2.0452 in)

NOTE:
The marking zone includes:

- X - Y gives the diameter class of bearings A or B.

MATCHING THE MAIN BEARING

	Journal diameter class		
	D1	D2	D3
1*	C1 1.949 - 1.955 mm (0.0767 - 0.0770 in) yellow	C2 1.946 - 1.952 mm (0.0766 - 0.0769 in) blue	C3 1.943 - 1.949 mm (0.0765 - 0.0767 in) black
2*	C4 1.953 - 1.959 mm (0.0769 - 0.0771 in) red	C1 1.949 - 1.955 mm (0.0767 - 0.0770 in) yellow	C2 1.946 - 1.952 mm (0.0766 - 0.0769 in) blue
	Bearing thickness and class		

* Cylinder block main bearing diameter class.

NOTE:
The service parts will only supply class C2 (blue).

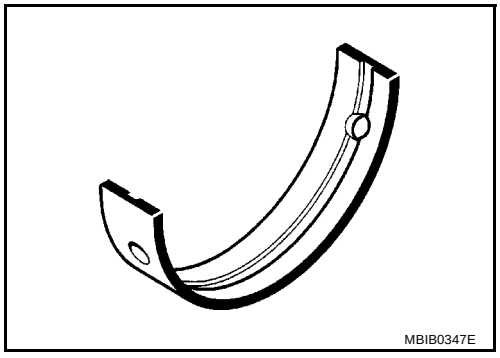
Main Bearing and Cap

EBS01C7C

MAIN BEARING

- **The engine is installed with main bearing without a locator notch.**

1. The main bearings are installed on the cylinder block and on the bearings using Tool KV113B0160 (Mot. 1493-01).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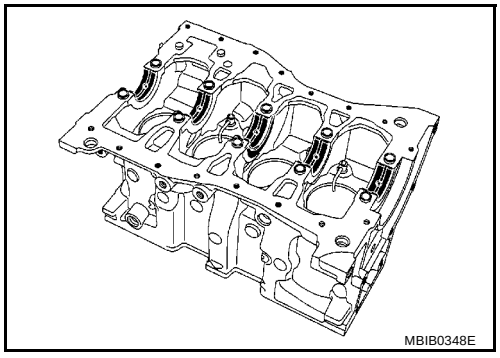
2. For direction of installation on the cylinder block, install grooved main bearing on all the bearings.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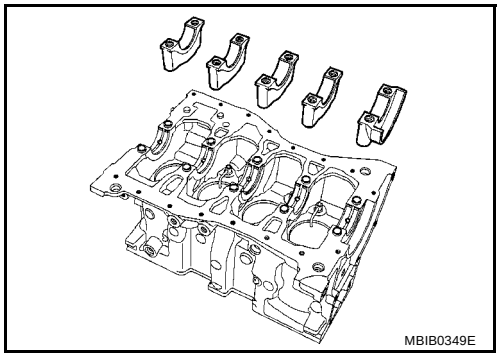
3. For direction of installation on the bearing caps, install non-grooved main bearing.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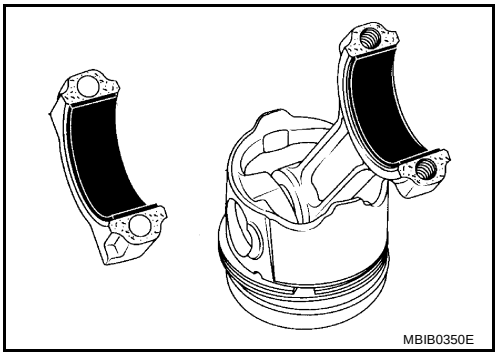
CONNECTING ROD BEARING

- **The engine is installed with connecting rod bearing without a locator notch.**

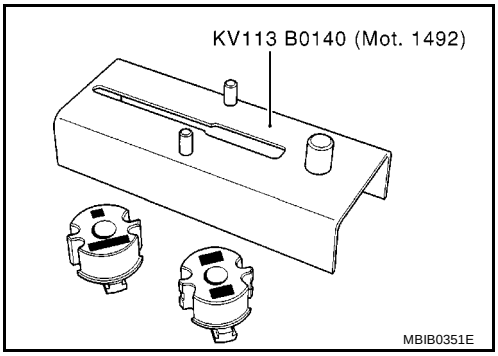
  NOTE:
  The upper and lower connecting rod bearing are not the same width.

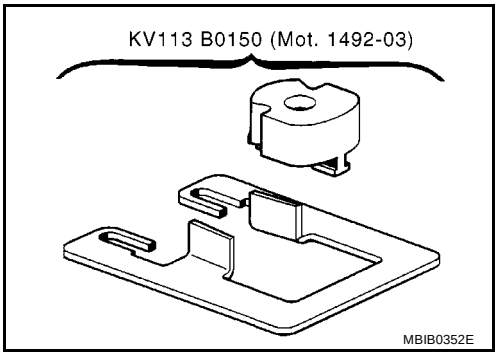
  Connecting rod bearing width:

  Upper bearing : 20.625 mm (0.8120 in)
  Lower bearing : 17.625 mm (0.6939 in)



- The connecting rod bearing are installed using Tool KV113B0140 (Mot. 1492) and Tool KV113B0150 (Mot. 1492-03).



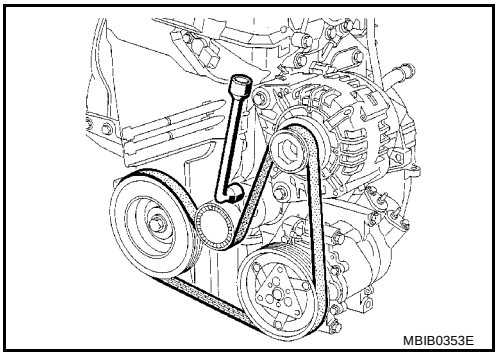


Preparing the engine to be on the stand

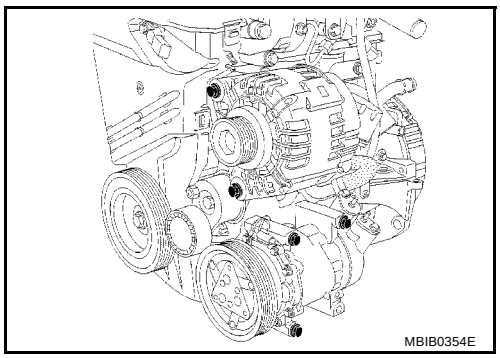
EBS01C7D

Before the engine is mounted on the Tool KV113B0070 (Mot. 792-03), the engine's electrical harness must be removed and the engine oil drained.

1. Remove the drive belt.



2. Remove the alternator.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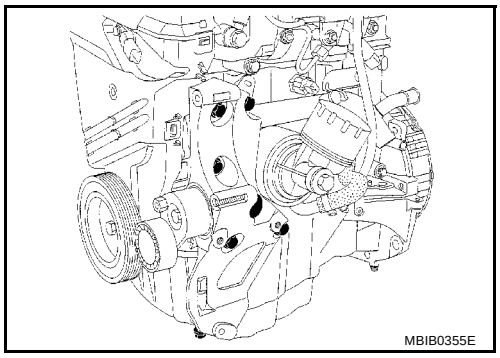
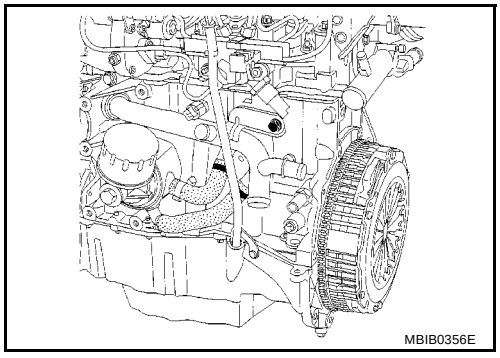
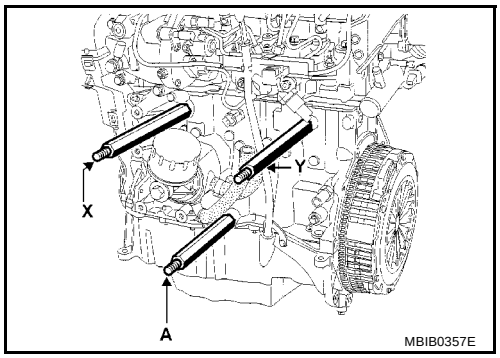
3. Remove the air conditioning compressor or idler pulley.
4. Remove the multifunction support.


MBIB0355E

5. Remove the coolant inlet pipe on the water pump.


MBIB0356E

6. Place the rods (**A**), (**X**), (**Y**) or Tool KV113B0100 (Mot. 1378) on the cylinder block so that they fit into the holes (**20, 32, 33**) on the plate of Tool KV113B0070 (Mot. 792-03).



MBIB0357E

Parts To Be Replaced After Removal

EBS01C7E

- All gaskets
- Flywheel bolts
- Crankshaft bearing bolts
- Camshaft pulley bolt
- Crankshaft pulley bolts
- Big end cap bolts
- Injector holder copper washers
- Fuel injection tubes

- Pipe plugs
- Belts
- Timing belt tension wheel
- Oil jets
- Turbocharger plastic pipes

Installation of Thread Inserts

EBS01C7F

Threaded holes on all engine component parts can be repaired by using thread inserts.

SECTION EX

EXHAUST SYSTEM

CONTENTS

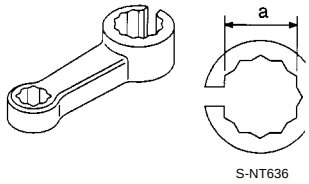
PREPARATION 2
Special Service Tool 2
EXHAUST SYSTEM 3
Checking Exhaust System 3
Removal and Installation 3
CR ENGINE 3
K9K ENGINE 4
REMOVAL 4
INSTALLATION (CR ENGINE) 5
INSTALLATION (K9K ENGINE) 6
Inspection After Installation 6
SERVICE DATA AND SPECIFICATIONS (SDS) 7
Tightening Torque 7
CR ENGINE 7
K9K ENGINE 7

PREPARATION

PFP:00002

Special Service Tool

EBS00OJC

Tool number Tool name	Description
KV10117200 Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensors **a: 22 mm (0.87 in)**

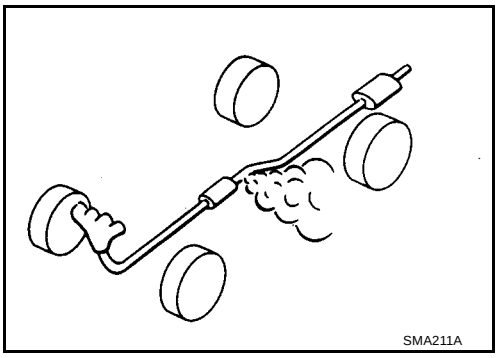
EXHAUST SYSTEM

PFP:20100

Checking Exhaust System

EBS00OJQ

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.



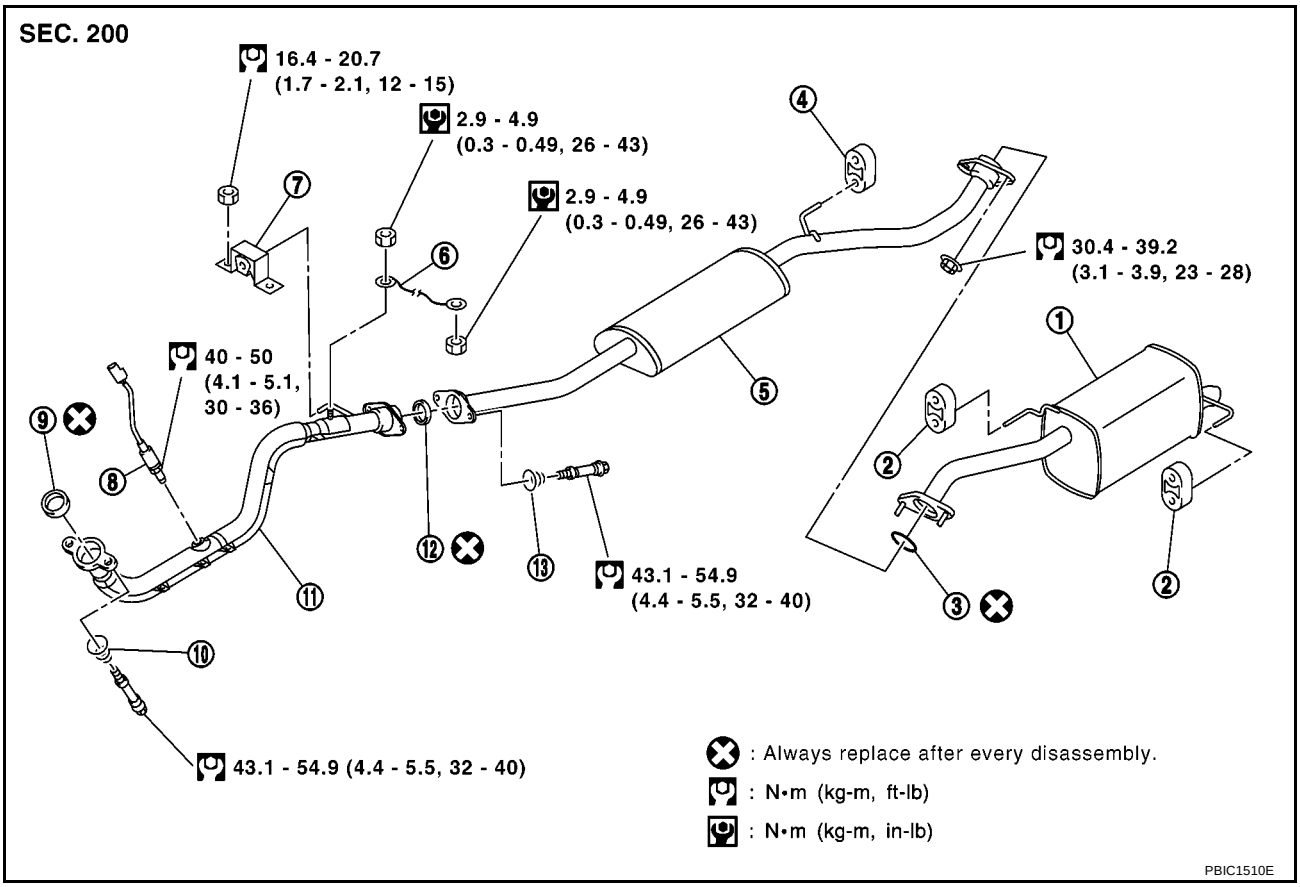
Removal and Installation

EBS00OJD

CAUTION:

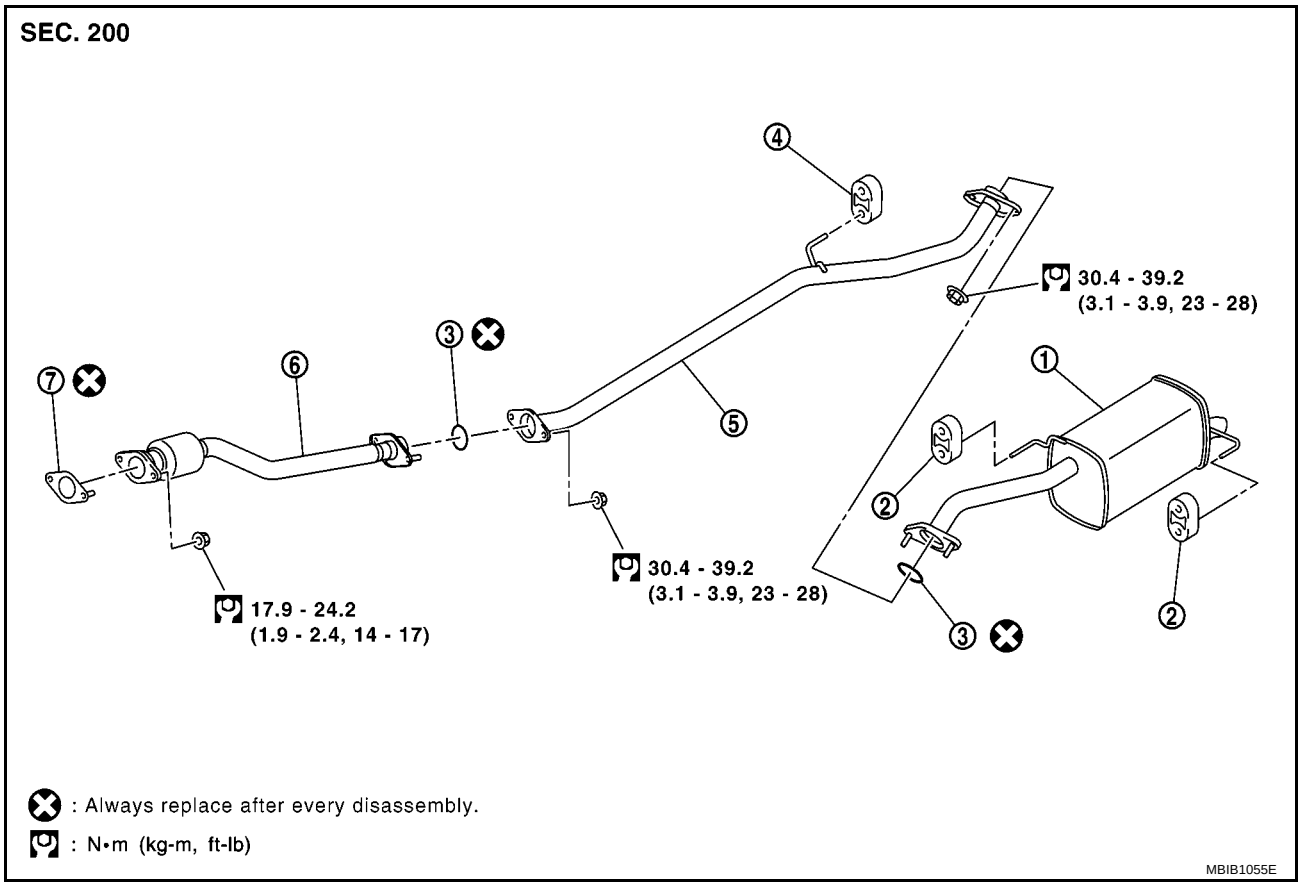
- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system is still hot just after the engine stops.**
- **Be careful not to cut your hand on the insulator edge.**

CR ENGINE



1. Main muffler
2. Mounting rubber
3. Ring gasket
4. Mounting rubber
5. Center muffler
6. Ground cable
7. Mounting bracket
8. Heated oxygen sensor 2
9. Seal bearing
10. Spring
11. Exhaust front tube
12. Seal bearing
13. Spring

K9K ENGINE



1. Main muffler
2. Mounting rubber
3. Ring gasket
4. Mounting rubber
5. Exhaust center tube
6. Exhaust front tube
7. Gasket

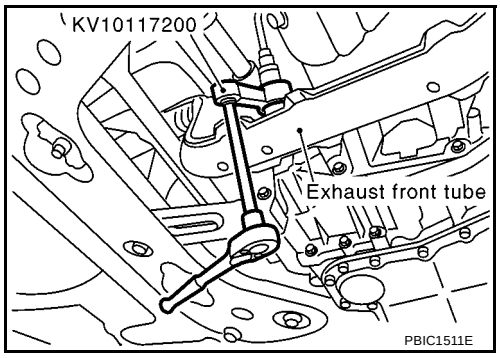
REMOVAL

- Disconnect each joint and mounting.

Heated Oxygen Sensor 2 (CR Engine)

- When removing heated oxygen sensor 2 on vehicle, perform following procedure.

1. Disconnect harness connector.
2. Use a heated oxygen sensor wrench (special service tool) for removal of heated oxygen sensor 2.

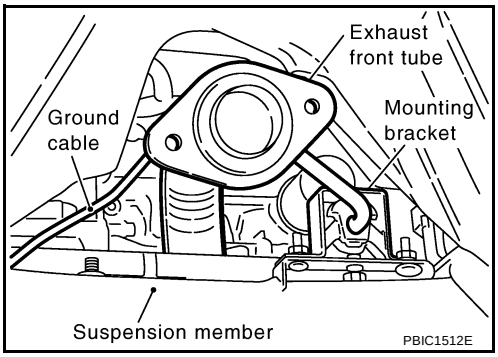


CAUTION:

- **Do not apply impact while handling.**

Exhaust Front Tube (CR Engine)

1. Disconnect center muffler connecting points.
2. Remove the ground cable on vehicle.
3. Remove mount bracket mounting nuts on suspension member.
4. Disconnect three way catalyst connecting points to remove exhaust front tube.



INSTALLATION (CR ENGINE)

Install in the reverse order of removal paying attention to the following.

- Remove all deposits, such as old gasket, from the sealing surfaces of each connection. Connect firmly without any leaks.
- When installing exhaust pipe assembly, temporarily tighten nuts on the exhaust manifold side mounting bolts and vehicle side mounting nuts. After making sure there is no unusual tension on each part, tighten nuts and bolts to the specified torque.
- Be careful not to twist or apply excess tension in any direction when installing mounting rubbers.
- Because thickness is different between center muffler rear side mounting rubber and main muffler side mounting rubbers, install thick mount rubber at main muffler side.
- Install seal bearing unit in the following procedures.
- When installing heated oxygen sensor 2, use heated oxygen sensor wrench (special service tool: KV10117200).

CAUTION:

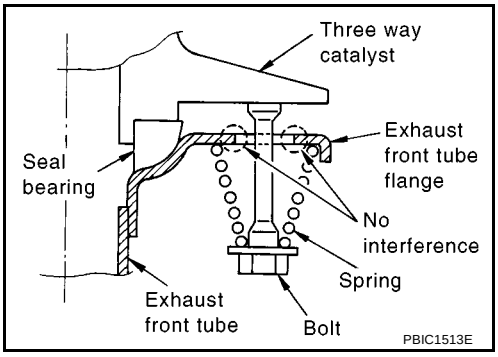
- **Do not apply impact while handing.**
- **Do not use heated oxygen sensor 2 after being dropped on a solid concrete floor, from a height of 0.5 m (1.6 ft) or higher. Replace it with a new one.**
- **Do not tighten heated oxygen sensor 2 to a torque larger than specified. Excess tightening may result in damage of heated oxygen sensor 2, causing MI to turn ON.**
- **when using heated oxygen sensor wrench (special service tool: KV10117200), tighten to the middle of specified torque because length of tool may induce slight indication increase. Do not tighten to the maximum specified torque.**

Three Way Catalyst to Exhaust Front Tube

1. Securely insert seal bearing into three way catalyst side in the direction shown in figure.

   CAUTION:

   Be careful not to damage seal bearing surface when installing.
2. With spring large diameter side facing to exhaust front tube flange, tighten mounting bolt.
   - Be careful that mounting bolt does not interfere with flanged area, and tighten it.



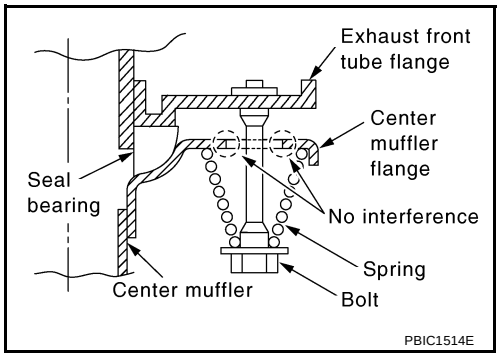
Exhaust Front Tube to Center Muffler

1. Securely insert seal bearing into exhaust front tube side in the direction shown in figure.

   CAUTION:

   Be careful not to damage seal bearing surface when installing.

2. With spring large diameter side facing to center muffler flange, tighten mounting bolt.
   - Be careful that mounting bolt does not interfere with flanged area, and tighten it.



INSTALLATION (K9K ENGINE)

- Install in the reverse order of removal.

CAUTION:

- **Always replace exhaust gaskets with new ones when reassembling.**
- **If the insulator is badly deformed, repair or replace it. If deposits such as mud pile up on the insulator, remove them.**
- **When installing the insulator avoid large gaps or interference between the insulator and each exhaust pipe.**
- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid gas leakage.**
- **Temporarily tighten mounting nuts on the exhaust manifold side and mounting bolts on the vehicle side. Check each part for unusual interference, and then tighten them to the specified torque.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**

Inspection After Installation

EBS01C86

- With the engine running, check exhaust tube joints for gas leakage and unusual noises.
- Check to ensure that mounting brackets and mounting insulators are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Tightening Torque

EBS00OJE

CR ENGINE

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*2

Exhaust system connecting parts	
Three way catalyst to Exhaust front tube	43.1 - 54.9 (4.4 - 5.6, 32 - 40)
Exhaust front tube to Center muffler	43.1 - 54.9 (4.4 - 5.6, 32 - 40)
Center muffler to Main muffler	30.4 - 39.2 (3.1 - 3.9, 23 - 28)
Heated oxygen sensor 2	40 - 50 (4.1 - 5.1, 30 - 36)
Exhaust front tube mounting bracket	16.4 - 20.7 (1.7 - 2.1, 12 - 15)
Ground cable	2.9 - 4.9 (0.3 - 0.49, 26 - 43)*2

K9K ENGINE

Unit: N·m (kg-m, ft-lb)

Exhaust system connecting parts	
Catalyst to Exhaust front tube	17.9 - 24.2 (1.9 - 2.4, 14 - 17)
Exhaust front tube to Exhaust center tube	30.4 - 39.2 (3.1 - 3.9, 23 - 28)
Exhaust center tube to Main muffler	30.4 - 39.2 (3.1 - 3.9, 23 - 28)

SECTION FAX
FRONT AXLE

CONTENTS

PRECAUTIONS 2
Cautions 2
Precautions for Brake System 2
PREPARATION 3
Special Service Tools 3
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 5
NVH Troubleshooting Chart 5
FRONT WHEEL HUB AND KNUCKLE 6
On-Vehicle Inspection 6
FRONT WHEEL BEARING 6
Removal and Installation 6
REMOVAL 6
INSTALLATION 7
Disassembly and Assembly 7
DISASSEMBLY 7
INSPECTION AFTER DISASSEMBLY 8
ASSEMBLY 8
INSPECTION AFTER ASSEMBLY 9
FRONT DRIVE SHAFT 10
On-Vehicle Inspection and Service 10
DRIVE SHAFT BOOT 10
Removal and Installation 13
REMOVAL 14
INSPECTION AFTER REMOVAL 15
INSTALLATION 15
Disassembly and Assembly 16
INSPECTION BEFORE DISASSEMBLY 16
DISASSEMBLY (CR ENGINE MODELS) 16
DISASSEMBLY (K9K ENGINE MODELS) 18
INSPECTION AFTER DISASSEMBLY (CR ENGINE MODELS) 20
INSPECTION AFTER DISASSEMBLY (K9K ENGINE MODELS) 20
ASSEMBLY (CR ENGINE MODELS) 21
ASSEMBLY (K9K ENGINE MODELS) 23
SERVICE DATA AND SPECIFICATIONS (SDS) 27
Wheel Bearing 27
Drive shaft 27
FOR CR ENGINES: 27
FOR K9K ENGINES: 27
Dynamic Damper 28
FOR CR ENGINES: 28
FOR K9K ENGINES: 28
Tightening Torque 28

PRECAUTIONS

PFP:00001

Cautions

EDS0012H

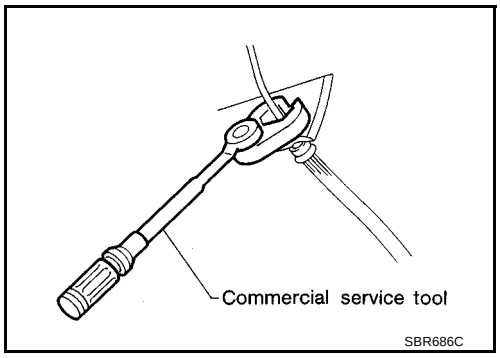
Observe the following precautions when disassembling and servicing drive shaft.

- The joint of drive shaft cannot be disassembled. Do not attempt to disassemble it.
- Perform work in a location which is as dust-free and dirt-free as possible.
- Before disassembling and servicing, clean the outside of parts.
- The disassembly and service location must be clean. Care must be taken to prevent parts from becoming dirty and to prevent the entry of foreign objects.
- Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.
- Paper shop cloths must be used. Fabric shop cloths must not be used because of the danger of lint adhering to parts.
- Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.

Precautions for Brake System

EDS0012I

- When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
  *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- Use flare nut wrench when removing or installing brake tubes.
- After installing removed suspension parts, check wheel alignment and adjust if necessary.
- Always torque brake lines when installing.

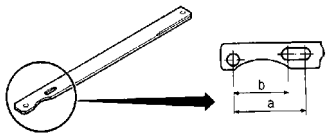
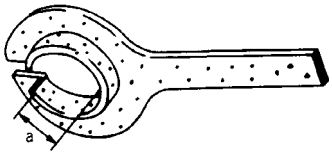
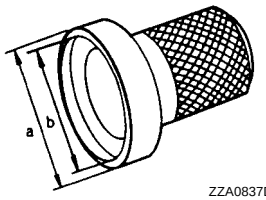
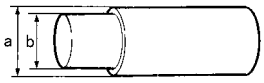
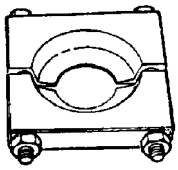
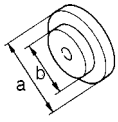


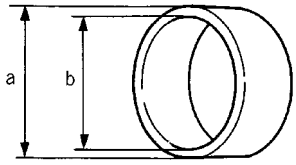
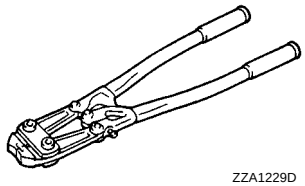
PREPARATION

PFP:00002

Special Service Tools

EDS0012J

Description	Application
Hub lock nut wrench KV40104000 a: 85 mm (3.35 in) dia. b: 65 mm (2.56 in) dia.  ZZA0802D	● Removing and installing hub lock nuts ● Removing and installing drive shaft
Protector KV38107900 a: 32 mm (1.26 in) dia.  ZZA0835D	Installing drive shaft
Drift ST35271000 a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.  ZZA0837D	Installing wheel bearing
Drift ST33710000 a: 30 mm (1.18 in) dia. b: 23 mm (0.91 in) dia.  ZZA1233D	● Removing wheel hub ● Removing inner race (outside) of wheel bearing
Bearing replacer ST30031000  ZZA0700D	Removing inner race (outside) of wheel bearing
Drift ST35321000 a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia. ST30621000 a: 79 mm (3.11 in) dia. b: 59 mm (2.32 in) dia.  ZZA1051D	● Removing wheel bearing ● Installing wheel hub

Description	Application
Drift ST27863000 a: 74 mm (2.91 in) dia. b: 62 mm (2.44 in) dia.  ZZA0936D	Installing wheel bearing
Boot band crimping tool KV40107300  ZZA1229D	Installing boot band

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS0012K

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

			Reference page	Improper installation, looseness	Parts interference	Wheel bearing damage	TIRES	ROAD WHEEL	STEERING
			Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE"		Refer to FAX-6, "FRONT WHEEL HUB AND KNUCKLE"	NVH in WT section.	NVH in WT section.	NVH in PS section.
Symptom	FRONT AXLE	Noise		×	×		×	×	×
		Shake		×	×		×	×	×
		Vibration		×	×		×		×
		Shimmy		×	×		×	×	×
		Judder		×			×	×	×
		Poor quality ride or handling		×	×	×	×	×	

×: Applicable

FRONT WHEEL HUB AND KNUCKLE

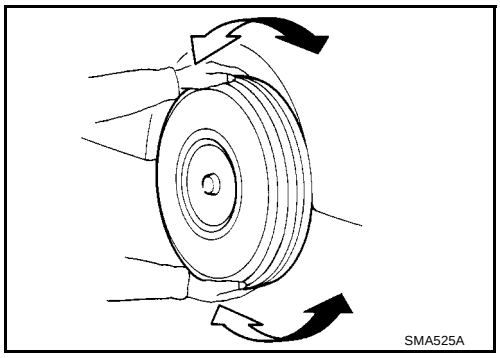
PFP:40202

On-Vehicle Inspection

EDS0012L

Inspect to check that there is no excessive play, cracking, wear, or other damage to front axle.

- Turn front wheels (left/right) and check the play.
- Check that no nails or other foreign objects are embedded.
- Retighten all axle nuts and bolts to the specified torque.



FRONT WHEEL BEARING

With the vehicle raised, inspect the following:

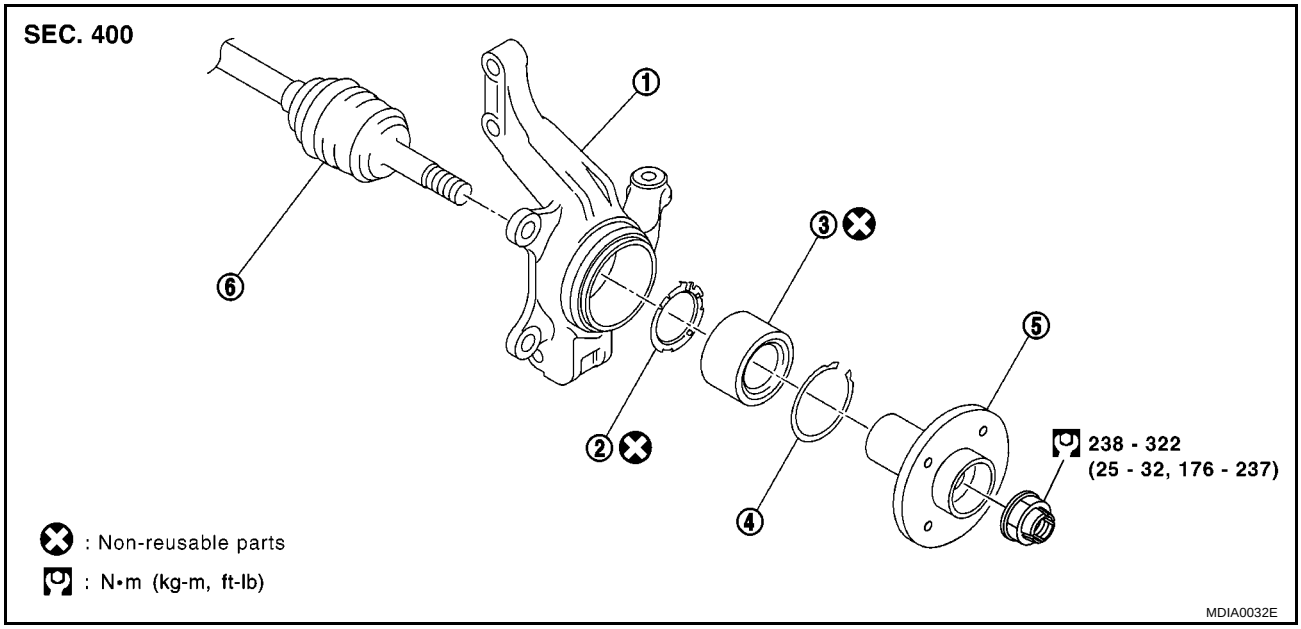
- Move wheel hub in the axial direction by hand. Check if there is no looseness of front wheel bearings.

Axial end play : 0.05 mm (0.0020 in)

- Rotate wheel hub and Make sure there is no unusual noise or other non-standard condition. If there are any non-standard conditions, replace the wheel bearing.

Removal and Installation

EDS0012M



1. Steering knuckle
2. Sensor housing
3. Wheel bearing
4. Snap rings
5. Wheel hub
6. Front drive shaft

REMOVAL

1. Lift up the vehicle and remove tire from the vehicle.
2. Remove lock plate from strut. Disconnect brake hose from strut. Refer to BR-11, "BRAKE PIPING AND HOSE" .
3. Remove brake caliper from steering knuckle. Hang it in a place where it does not interfere with work. Refer to BR-23, "Removal and Installation of Brake Caliper Assembly" .

   CAUTION:
   Avoid depressing the brake pedal with the brake caliper removed.
4. Remove disc rotor from wheel hub.
5. Pull out ABS wheel sensor from steering knuckle. Refer to BRC-44, "WHEEL SENSORS" .

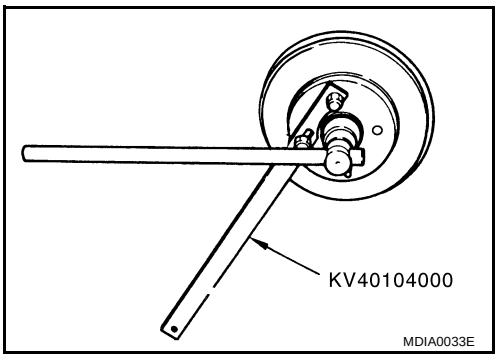
CAUTION:
Do not pull on ABS wheel sensor harness.

6. Use wheel hub lock nut wrench (SST) to remove lock nut from drive shaft.
7. Remove tie-rod from steering knuckle. If tie-rod is not easily removed, use ball joint remover (commercial service tool).

CAUTION:
To prevent damage to threads and to prevent ball joint remover (commercial service tool) from sudden coming off, temporarily tighten lock nuts.

8. Remove steering knuckle from strut.

CAUTION:
Do not place drive shaft joint at an extreme angle (22° or more). Also, hold steering knuckle tightly and do not overextend slide joint.



9. Remove drive shaft from steering knuckle.

CAUTION:
When removing drive shaft, do not place drive shaft joint at an extreme angle (22° or more). Also be careful not to overextend slide joint.

- **Do not lift drive shaft with axle attached by grasping countershaft only.**
- **Do not allow drive shaft, with transaxle inserted, to hang down without support for countershaft, wheel joints, and other parts.**

10. Remove transverse link ball joint mounting bolt and nut. Then, remove transverse link from steering knuckle.

INSTALLATION

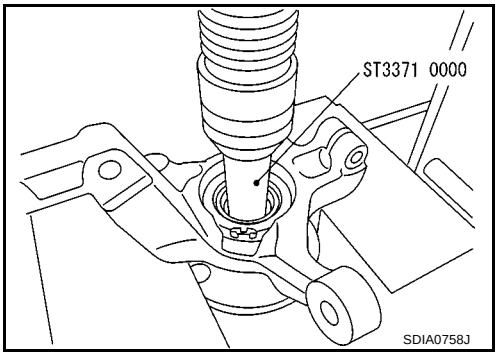
For tightening torque and other details, FAX-6, "FRONT WHEEL BEARING" , BRC-44, "WHEEL SENSORS" , FSU-5, "FRONT SUSPENSION ASSEMBLY" and tighten in the reverse order of removal.

Disassembly and Assembly

EDS0012N

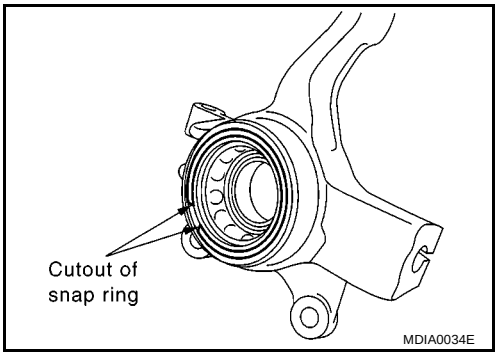
DISASSEMBLY

1. Press the wheel bearing out with a drift (SST) to remove.

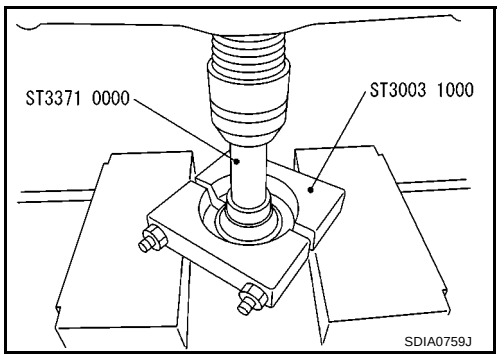


2. Insert a screwdriver into cutout of snap ring and remove it from steering knuckle.

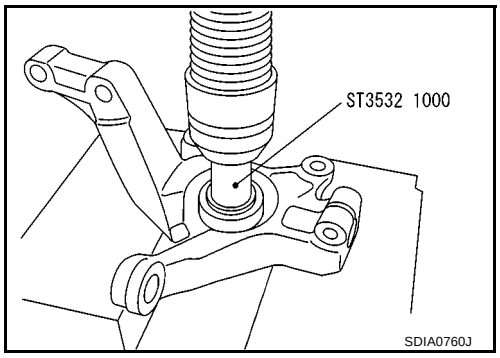
CAUTION:
Be careful not to scratch the steering knuckle.



3. Use a puller (commercial service tool), drift (SST), and bearing replacer (SST) to remove inner race of outer wheel bearing from wheel hub.



4. Press the wheel bearing and sensor housing out of the steering knuckle with a drift (SST).



INSPECTION AFTER DISASSEMBLY

Wheel Hub

- Check wheel hub for cracks (with magnetic exploration or dye testing). Replace if necessary.

Steering Knuckle

- Check steering knuckle for deformation, cracks, and other damage. Replace if any non-standard conditions are found.

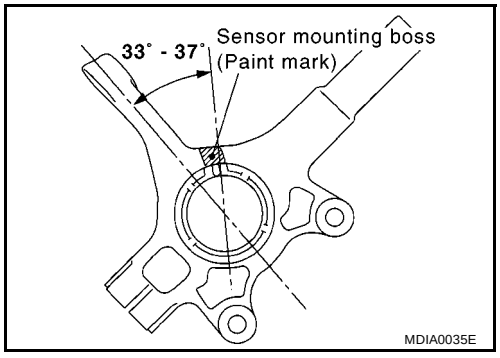
Snap Rings

- Check snap ring for wear or cracks. Replace if necessary.

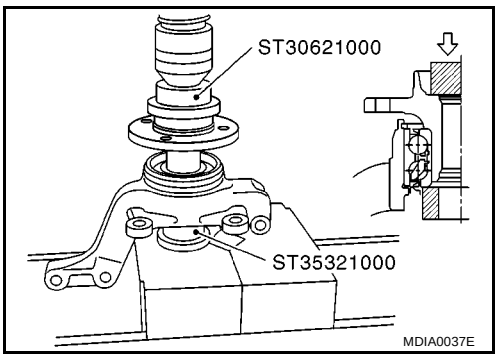
ASSEMBLY

1. Temporarily put sensor housing on steering knuckle.

   CAUTION:
   Protrusion of sensor housing ABS sensor mounting should fit in cutout of steering knuckle (as shown in figure).



2. Press-fit a wheel bearing into the steering knuckle with a drift (SST) from steering knuckle outer side.



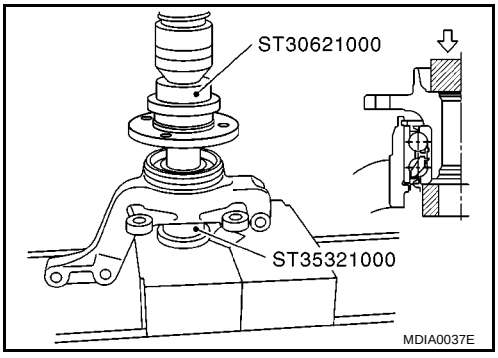
CAUTION:

- **Be sure that wheel bearing is completely press-fit until sensor housing contacts the body tightly.**
- **Be sure that protrusion of ABS sensor mounting does not roll onto steering knuckle.**
- **Be sure to mount so that sensor rotor (rubber side) side comes to steering knuckle inner side.**
- **Do not press and weigh on wheel bearing inner lace and sealing part.**

NOTE:
Final press-loading guideline [49,000 N (5,000 kg, 11,015 lb)]

3. Install snap ring onto steering knuckle.

4. Press-fit a wheel bearing into the steering knuckle with a drift (SST) from steering knuckle outer side.

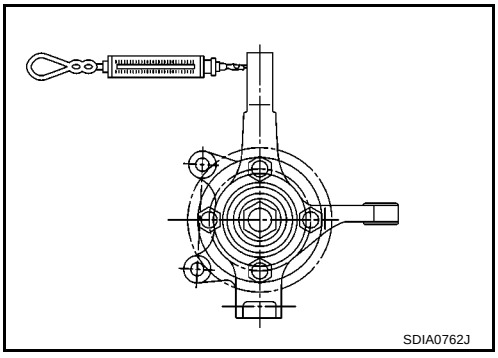


NOTE:
Final press-loading guideline [49,000 N (5,000 kg, 11,015 lb)]

CAUTION:
Drift (special tool) which touches wheel bearing inner lace shall not touch sensor housing.

INSPECTION AFTER ASSEMBLY

1. Apply a load of 34,300 to 49,000 N (3,500 to 5,000 kg, 7,710 - 11,015 lb). In this condition, rotate in forward and reverse directions 10 times each to insure a good fit.
2. Set a spring balance on strut mounting hole (upper). Measure rotating torque at an rpm of 8 - 12 rpm.



Rotating torque : 0.30 - 1.43 N·m (0.03 - 0.14 kg-m)
Spring balance measurement : 6.0 - 28.6 N (0.61 - 2.92 kg)

NOTE:
In case the above loading is not possible

- Assemble drive shaft and tighten wheel hub lock nuts to specified torque. Then rotate in forward and reverse direction 10 times each to insure a good fit.
- At a rotating speed of 8 - 12 rpm, place a spring balance on hub bolt to measure torque.

Rotating torque : 0.23 N·m (0.02 kg-m) or less
Spring balance measurement : 15.9 N (1.62 kg) or less

FRONT DRIVE SHAFT

PFP:39100

On-Vehicle Inspection and Service

EDS0012O

DRIVE SHAFT BOOT

Replacement

CAUTION:

When noise or vibration occur from drive shaft, replace entire drive shaft assembly.

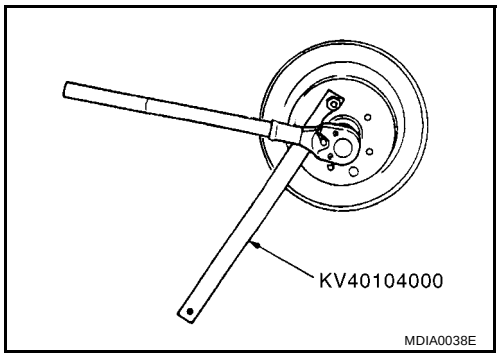
1. Lift up the vehicle and remove tire from the vehicle.
2. Remove lock plate from strut. Disconnect brake hose from strut. Refer to BR-11, "BRAKE PIPING AND HOSE" .
3. Remove the ABS wheel sensor from the steering knuckle. Refer to BRC-44, "WHEEL SENSORS" .

   CAUTION:

   Do not pull on ABS wheel sensor harness.
4. Use a hub lock nut wrench (SST), remove lock nuts.
5. Remove tie-rod from steering knuckle. If tie-rod is not easily removed, use ball joint remover (commercial service tool).

   CAUTION:

   To prevent damage to threads and to prevent ball joint remover (commercial service tool) from sudden coming off, temporarily fix lock nuts.



6. Remove steering knuckle and strut installation bolt.

   CAUTION:

   Do not place drive shaft joint at an extreme angle (22° or more). Also, hold steering knuckle tightly and do not over-extend slide joint.
7. Using a puller (commercial service tool), remove the drive shaft from the steering knuckle.

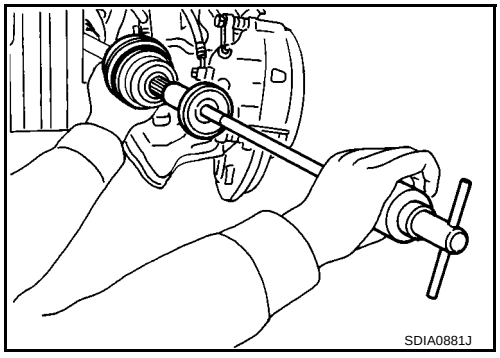
   CAUTION:

   When removing drive shaft, do not place drive shaft joint at an extreme angle (22° or more). Also be careful not to overextend slide joint.

   - **Do not lift drive shaft with axle attached by grasping countershaft only.**
   - **Do not allow drive shaft, with transaxle inserted, to hang down without support for countershaft, wheel joints, and other parts.**
8. Remove boot bands and remove boot from the joint subassembly.
9. Screw drive shaft puller (commercial service tool) into joint subassembly screw part in depth of 30 mm (1.18in) or more. Fix drive shaft by one hand and pull out joint subassembly with sliding hammer (commercial service tool) from shaft.

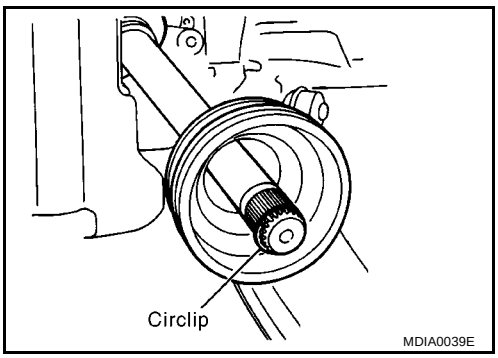
   CAUTION:

   - **For K9K engines: before separating joint subassembly put matching marks on drive shaft and joint subassembly.**
   - **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
   - **When joint subassembly is not able to be pulled out, try after removing drive shaft from the vehicle.**



10. Remove boot from shaft.

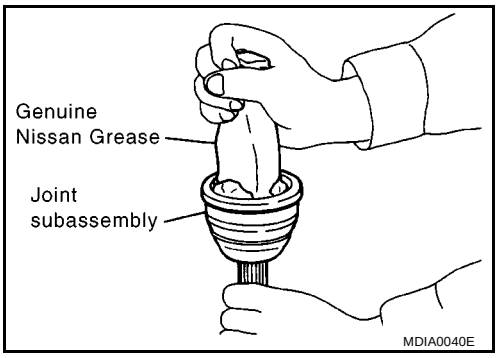
11. Remove circlip from the shaft.



12. While rotating ball cage, remove old grease on joint subassembly with paper towels.

CAUTION:
Visually check joint subassembly for compression scar, cracks, fractures. If any non-standard condition is detected, replace entire joint subassembly.

13. Inject Genuine Nissan Grease (see parts catalog) into the joint subassembly serration hole until the grease begins to ooze from the ball groove and serration hole.
After injecting the grease, wipe off the old grease that has oozed out with towel.

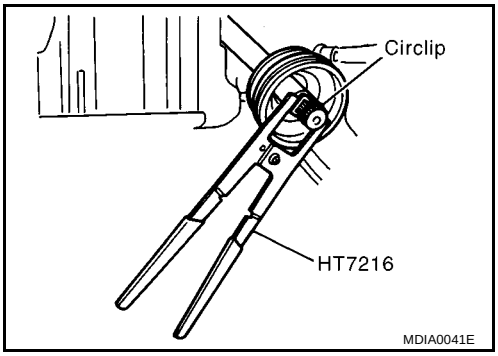


14. Cover drive shaft serration with tape so as not to damage boot during installation. Install new boot and boot bands to the shaft.

CAUTION:
Do not reuse the boot bands and boot.

15. Remove the tape wrapped around the serration on the shaft.
16. Mount circlip on circlip groove at the shaft edge. Align the shaft edge and joint subassembly center axle. Then, assemble on the circlip groove, holding circlip with screwdriver tip. Drive joint inserter (commercial service tool) is recommended as an assisting tool when mounting circlip.
For K9K engines: install joint subassembly securely, ensuring marks which were made during disassembly are properly aligned.

CAUTION:
Do not reuse the circlip.



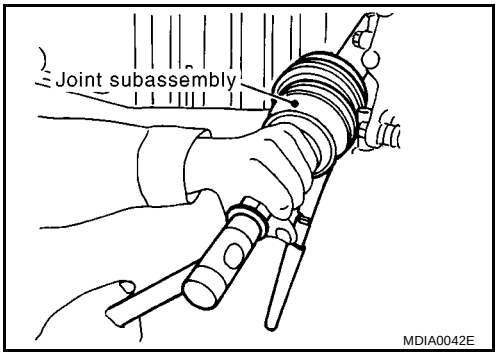
17. Press joint subassembly into shaft with plastic hammer.

CAUTION:
Confirm that joint subassembly is correctly engaged while rotating.

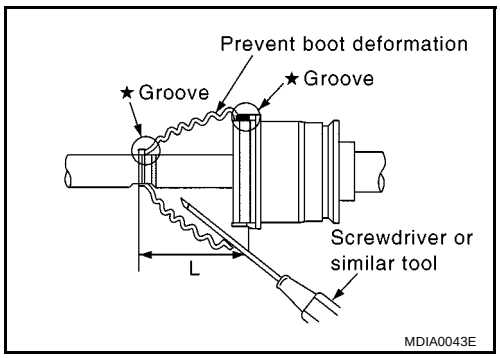
18. Working from the big end of the boot, add enough Genuine Nissan Grease (refer to the part catalog) to the housing to equal the quantity mentioned below.

Grease quantity : For CR engines: 45 - 55 g (1.59 - 1.94 oz)
For K9K engines: 40 - 50 g (1.41 - 1.76 oz)

19. Remove grease on the boot mounting surface.



20. Mount boot firmly on the groove shown in the figure (with * mark) and confirm the length of the boot (L) is same diameter as shown below. Insert a screwdriver or fitting tool from the large-diameter side. Bleed air out of the inside boot (to adjust pressure outside and inside of boot) to prevent deformation of boot.



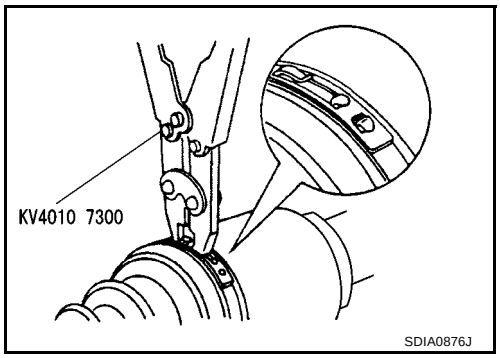
Boot mounting length : **For CR engines: 90.4±1 mm (3.56±0.04 in)**

For K9K engines: 90 mm (3.54 in)

CAUTION:

- **If boot mounting length is outside the standard, it may cause breakage in the boot.**
- **Be careful not to touch inside of the boot with the tip of a screwdriver.**

21. As shown in the figure, secure the big and small ends of the boot with new boot bands.



22. Rotate joint part and confirm that mounting position of boot does not deviate. When it deviates, mount a new boot band again.

CAUTION:

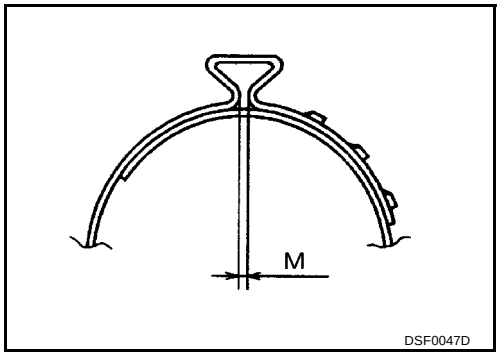
When fixing boot band, fix so that the M diameter on the drawing becomes as follows.

M diameter

For CR engines:

Large-diameter side : **2.5±0.5 mm (0.10±0.02 in)**

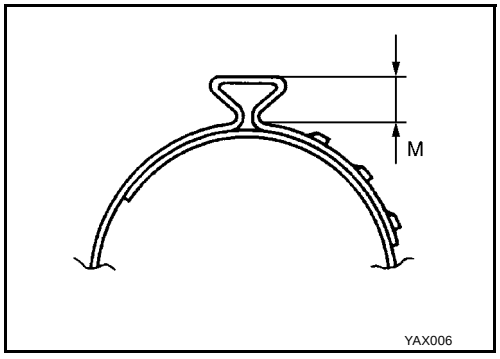
Small-diameter side : **2.5±0.5 mm (0.10±0.02 in)**



For K9K engines:

Large-diameter side : **5 mm (0.20 in)**

Small-diameter side : **5mm (0.20 in)**

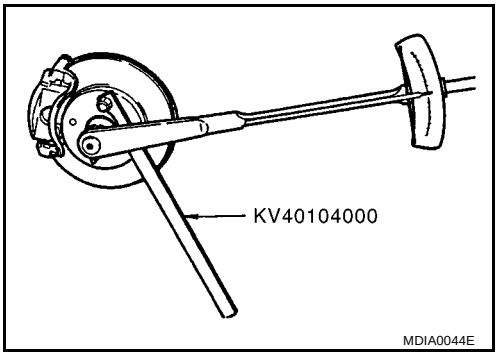


23. Confirm that circlip on the transaxle side is not pulled out.
24. Insert the drive shaft to the steering knuckle, and tighten the lock nut.

25. Install bolts securing steering knuckle to the strut. For tightening torque, refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" .
26. Fix the brake hose onto the strut with the lock plate.
27. Install tie-rod to steering knuckle. For tightening torque, refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" .
28. Install ABS wheel sensor. Refer to BRC-44, "WHEEL SENSORS" .
29. Using a hub lock nut wrench (SST), tighten lock nut to the specified torque.

    Tightening torque : 238 - 322 N·m (25 - 32 kg-m, 176 - 237 ft-lb)

30. Mount tire and lower lift.

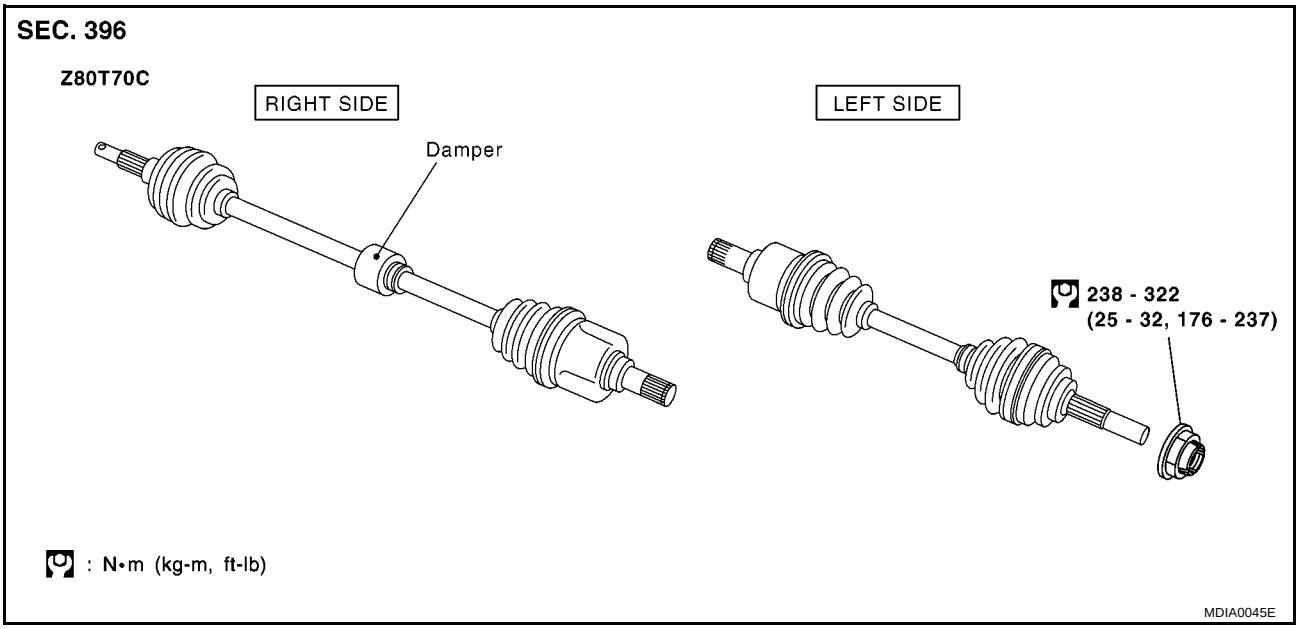


Removal and Installation

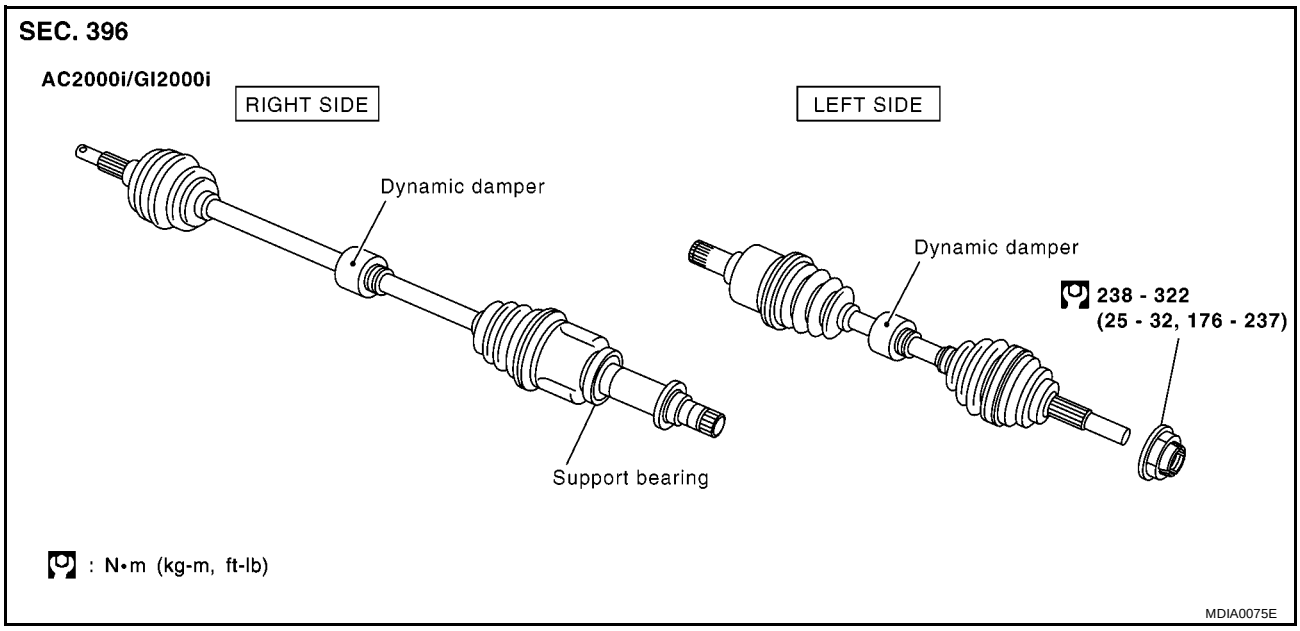
EDS0012P

SMA for VIN >SJNxxAK12U1000000

FOR CR ENGINES:



FOR K9K ENGINES:



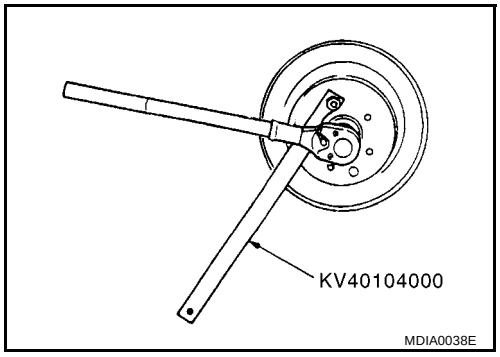
REMOVAL

1. Lift up the vehicle and remove tire from the vehicle.
2. Remove lock plate from strut. Disconnect brake hose from strut. Refer to BR-11, "BRAKE PIPING AND HOSE" .
3. Remove the ABS wheel sensor from the steering knuckle. Refer to BRC-44, "WHEEL SENSORS" .

   CAUTION:
   Do not pull on ABS wheel sensor harness.
4. Use a hub lock nut wrench (SST), remove lock nuts.
5. Remove tie-rod from steering knuckle. If tie-rod is not easily removed, use ball joint remover (commercial service tool).

   CAUTION:
   To prevent damage to threads and to prevent ball joint remover (commercial service tool) from sudden coming off, temporarily fix lock nuts.
6. Remove steering knuckle and strut installation bolt.

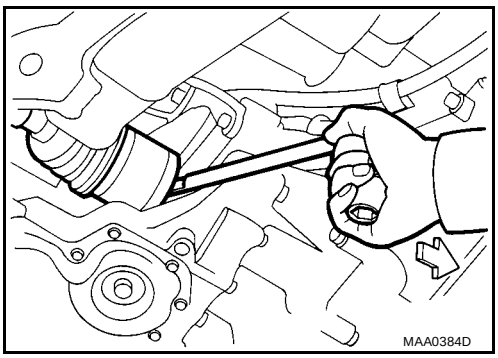
   CAUTION:
   Do not place drive shaft joint at an extreme angle (22° or more). Also, hold steering knuckle tightly and do not over-extend slide joint.



7. Using a puller (commercial service tool), remove the drive shaft from the steering knuckle.

   CAUTION:
   When removing drive shaft, do not place drive shaft joint at an extreme angle (22° or more). Also be careful not to overextend slide joint.
   - **Do not lift drive shaft with axle attached by grasping countershaft only.**
   - **Do not allow drive shaft, with transaxle inserted, to hang down without support for countershaft, wheel joints, and other parts.**

8. Remove driveshaft from transaxle with a wheel wrench or equivalent, as shown in figure.

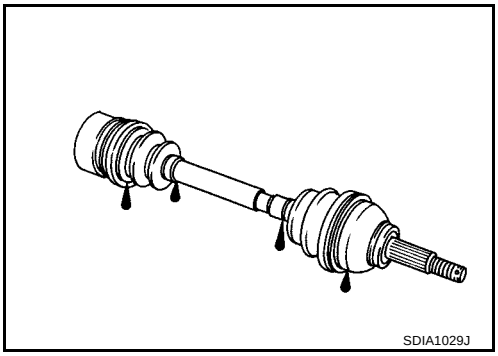

MAA0384D

CAUTION:
When removing drive shaft from vehicle, be careful to avoid interfering with brake hose, ABS wheel sensor harness, and other parts.

- Confirm that circlip is attached on the edge.

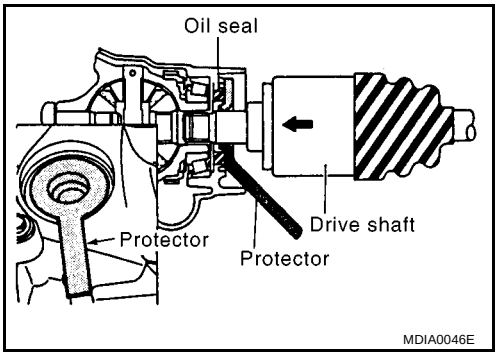
INSPECTION AFTER REMOVAL

- Move joint in up/down, left/right, and axial directions. Check for motion that is not smooth and for significant looseness.
- Check the boot for cracks, damage, and leakage of grease.


SDIA1029J

INSTALLATION

1. In order to prevent damage to differential side oil seal, first fit a protector (SST) onto oil seal before inserting drive shaft. Slide drive shaft slide joint and tap with a hammer to install securely.

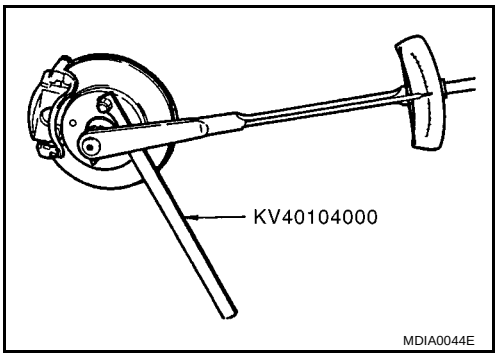


MDIA0046E

CAUTION:
Make sure the circlip is fully engaged.

Protector SST (special service tool) No. : KV38107900

2. Insert the drive shaft to the steering knuckle, and tighten the lock nut.
3. Install bolts securing steering knuckle to the strut. For tightening torque, refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" .
4. Fix the brake hose onto the strut with the lock plate.
5. Install tie-rod to steering knuckle. For tightening torque, refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" .
6. Install ABS wheel sensor. Refer to BRC-44, "WHEEL SENSORS" .
7. Using a hub lock nut wrench (SST), tighten lock nut to the specified torque.



MDIA0044E

Tightening torque : 238 - 322 N·m (25 - 32 kg·m, 176 - 237 ft-lb)

8. Mount tire and lower lift.

Disassembly and Assembly

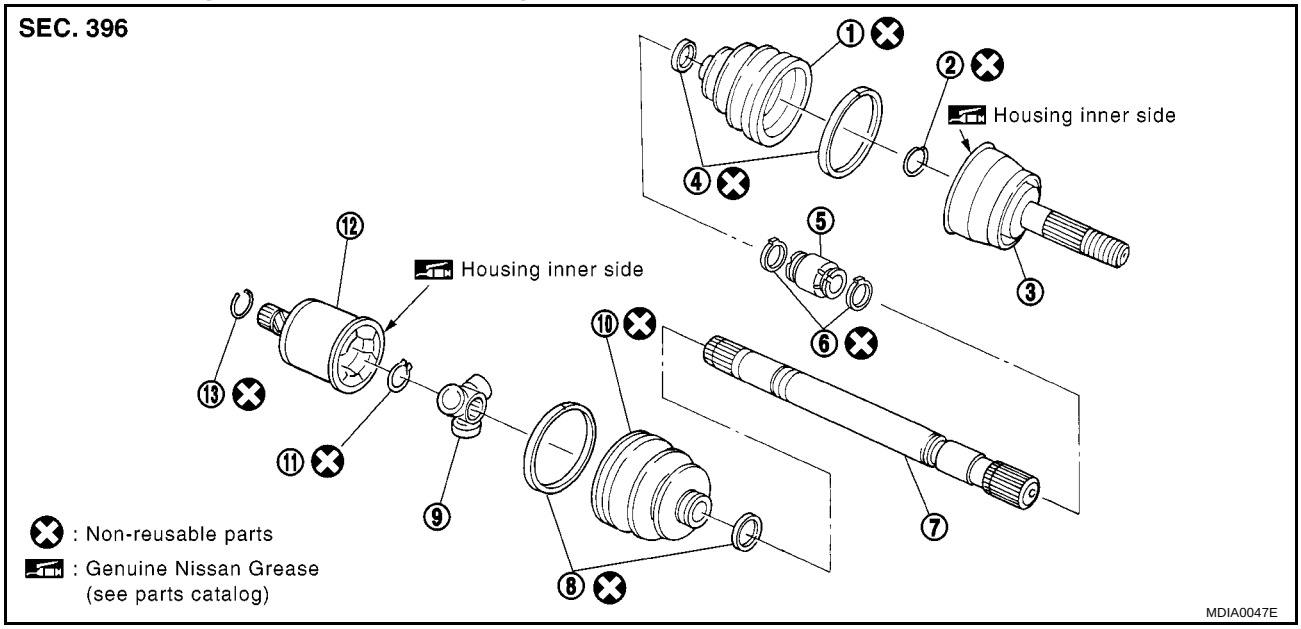
SMA for VIN >SJNxxAK12U1000000

EDS0012Q

INSPECTION BEFORE DISASSEMBLY

- Move joint in up/down, left/right, and axial directions. Check for motion that is not smooth and for significant looseness.
- Check the boot for cracks, damage, and leakage of grease.

DISASSEMBLY (CR ENGINE MODELS)



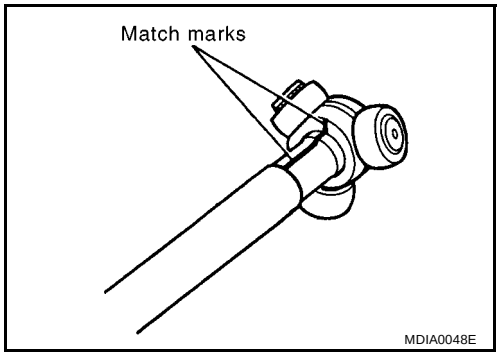
1. Boot
2. Circlip
3. Joint subassembly (fixed joint)
4. Boot band
5. Dynamic damper (right side only)
6. Band
7. Shaft
8. Boot band
9. Spider assembly
10. Boot
11. Snap rings
12. Housing (slide joint)
13. Circlip

Transaxle Side

1. Remove the boot bands.
2. Fix shaft on a vise. Remove stopper ring and housing.

   CAUTION:
   When securing in a vise, use aluminum plates, copper plates or something similar to protect the shaft.
3. Put mating marks onto the shaft and spider assembly.

   CAUTION:
   Use paint or similar substance for alignment marks. Do not scratch the surface.
4. Remove the snap ring, and remove the spider assembly from the shaft.
5. Remove boot from shaft.

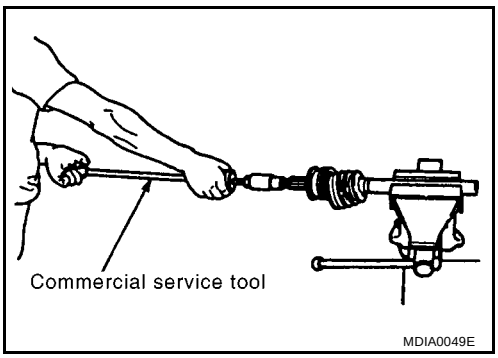


Wheel Side

1. Using a vise, secure the shaft.

   CAUTION:
   When securing in a vise, use aluminum plates, copper plates or something similar to protect the shaft.
2. Remove boot bands and remove boot from the joint subassembly.

3. Screw the drive shaft puller (commercial service tool) 30 mm (1.18 in) or more over the thread on joint subassembly, and pull the joint subassembly out of the shaft.

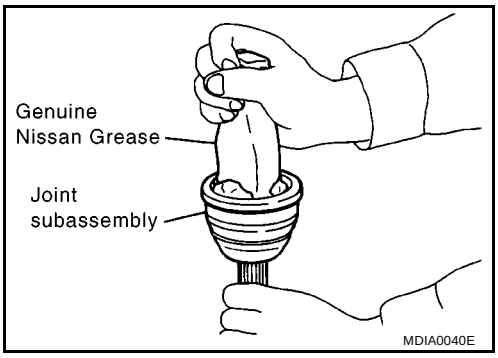


CAUTION:

- **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
- **If joint subassembly cannot be removed after five or more unsuccessful attempts, replace entire drive shaft assembly.**

4. Remove boot from shaft.
5. Remove circlip from the shaft.

6. While rotating ball cage, remove old grease on joint subassembly with paper towels.



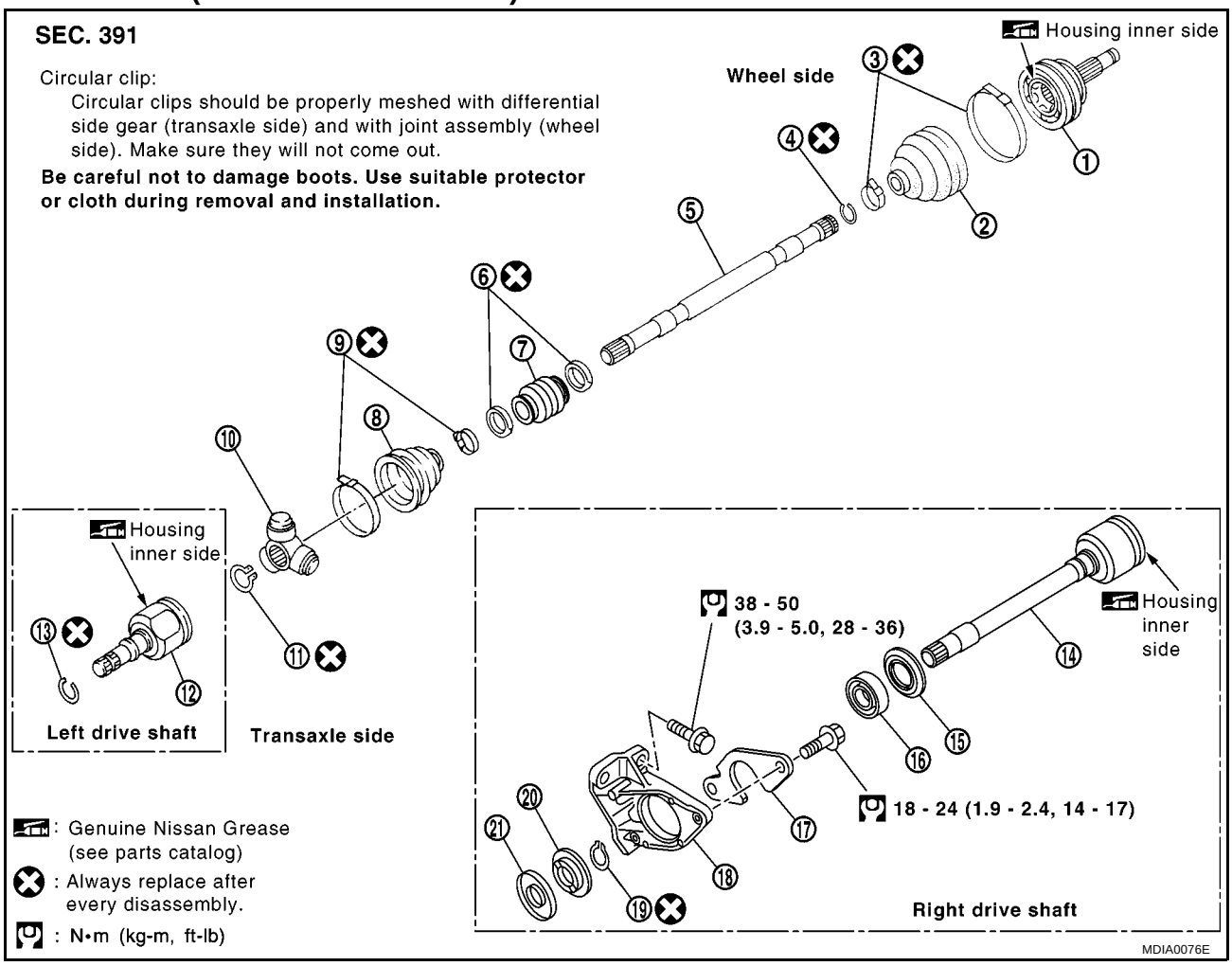
CAUTION:

Visually check joint subassembly for compression scar, cracks, fractures. If any non-standard condition is detected, replace entire joint subassembly.

Dynamic Damper (Right drive shaft)

- Remove band. Then, remove dynamic damper from shaft.

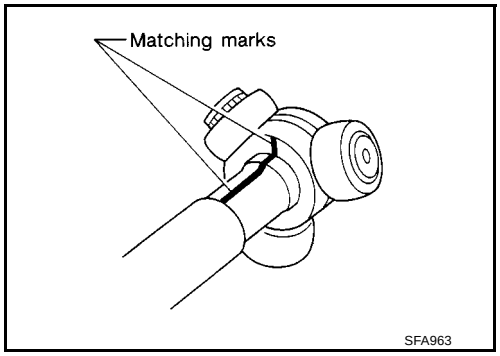
DISASSEMBLY (K9K ENGINE MODELS)



1. Joint assembly
2. Boot
3. Boot band
4. Circular clip
5. Drive shaft
6. Dynamic damper band
7. Dynamic damper
8. Boot
9. Boot band
10. Spider assembly
11. Snap ring
12. Slide joint housing
13. Circular clip
14. Slide joint housing with extension shaft
15. Dust shield
16. Support bearing
17. Support bearing retainer
18. Bracket
19. Snap ring
20. Dust shield
21. Dust shield

Transaxle Side

1. Remove the boot bands.
2. Put matching marks on slide joint housing and drive shaft before separating joint assembly.
3. Put matching marks on spider assembly and drive shaft.
4. Remove slide joint housing.

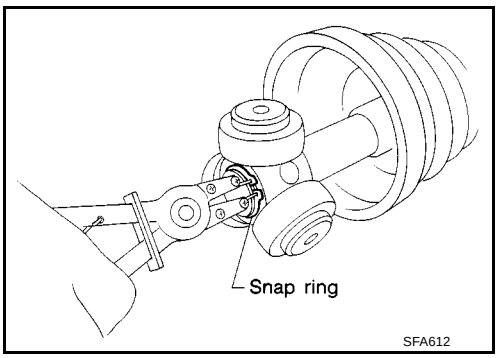


5. Pry off snap ring, then remove spider assembly.

CAUTION:
Do not disassemble spider assembly.

6. Draw out boot.

CAUTION:
Cover drive shaft serration with tape to prevent damage to the boot.



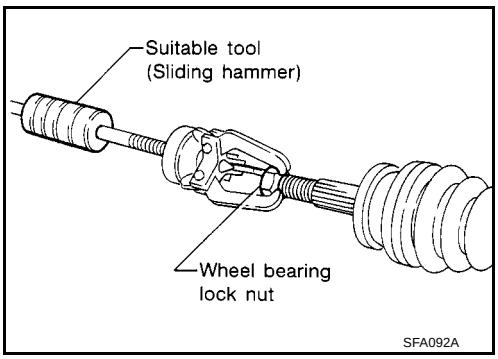
Wheel Side

CAUTION:
The joint on the wheel side cannot be disassembled.

1. Before separating joint assembly, put matching marks on drive shaft and joint assembly.
2. Separate joint assembly with a suitable tool.

CAUTION:
Be careful not to damage threads on drive shaft.

3. Remove boot bands.
4. Draw out boot.

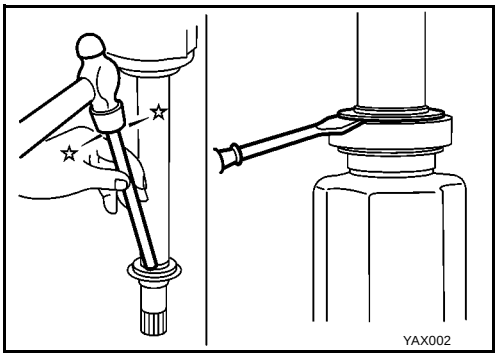


Dynamic Damper

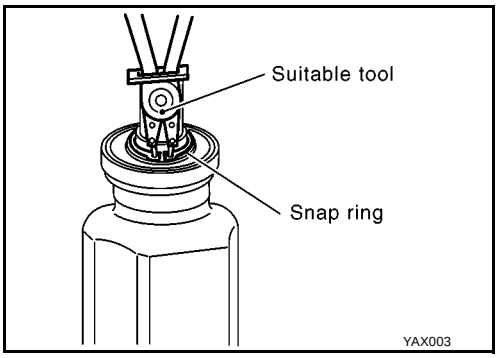
Remove bands. Then, remove dynamic damper from drive shaft.

Support Bearing

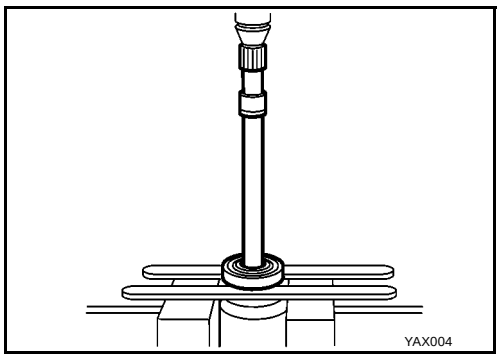
1. Remove dust shield.



2. Remove dust shield. Then, remove snap ring.



3. Press support bearing assembly off of drive shaft.
4. Remove dust shield.



INSPECTION AFTER DISASSEMBLY (CR ENGINE MODELS)

Shaft

- If the shaft has runout, cracks, or damage, replace the shaft.

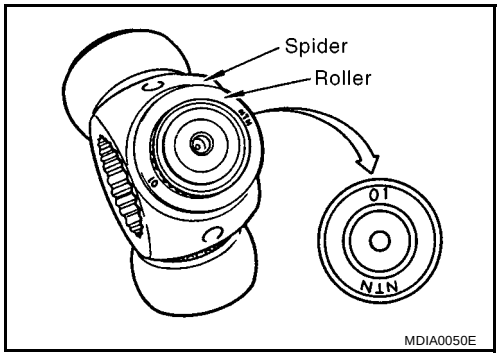
Joint Subassembly (Fixed Joint)

- Check the joint for rough rotation and abnormal axial looseness.
- Check if there is any compression scar, cracks, or fractures.

CAUTION:
If there are any non-standard conditions of joint assembly component parts, replace the joint assembly.

Joint Assembly (Sliding Joint)

- If there is scratching or wear of housing roller contact surface or spider roller contact surface, replace housing and spider assembly.
- If there is circumferential looseness or rough rotation of spider roller, replace spider assembly.
- As shown in the figure, the spider roller has a stamped number which corresponds to a part number. Select a suitable replacement part with the same stamp number from the table below.
- If there are any non-standard conditions of joint assembly component parts, replace the joint assembly.
- For housing replacement, spider assembly and joint assembly are in a set.



Stamped number	Part No.	Type
00	3972051E00	T70C
01	3972051E01	
02	3972051E02	
03	3972051E03	

Housing (Slide Joint)

- Check the ball rolling surface for damage and abnormal wear.
- Check the shaft thread for damage.
- Check the boot mount for deformation.

Dynamic Damper (Right Drive Shaft)

- Check for cracks, wear, and damage. Replace if necessary.

INSPECTION AFTER DISASSEMBLY (K9K ENGINE MODELS)

Thoroughly clean all parts in cleaning solvent, and dry with compressed air. Check parts for evidence of deformation or other damage.

Drive Shaft

Replace drive shaft if it is twisted or cracked.

Boot

Check boot for fatigue, cracks or wear. Replace boot with new boot bands.

Joint Assembly (Transaxle side)

- Check spider assembly for needle bearing and washer damage. Replace if necessary.
- Check roller surfaces for scratches, wear or other damage. Replace if necessary.
- Check serration for deformation. Replace if necessary.
- Check slide joint housing for any damage. Replace if necessary.

Joint Assembly (Wheel side)

Replace joint assembly if it is deformed or damaged.

Support Bearing

Make sure wheel bearing rolls freely and is free from noise, cracks, pitting or wear.

Support Bearing Bracket

Check support bearing bracket for cracks with a magnetic exploration or dyeing test.

Dynamic Damper

Check dynamic damper for cracks, wear, and damage. Replace if necessary.

ASSEMBLY (CR ENGINE MODELS)

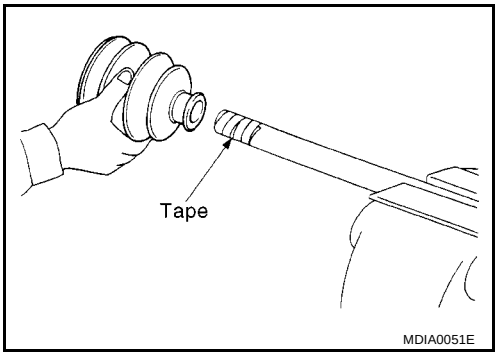
Wheel Side

For mounting, perform steps 13 to 20 of On-Vehicle Inspection and Service,FAX-10, "On-Vehicle Inspection and Service" .

Transaxle Side

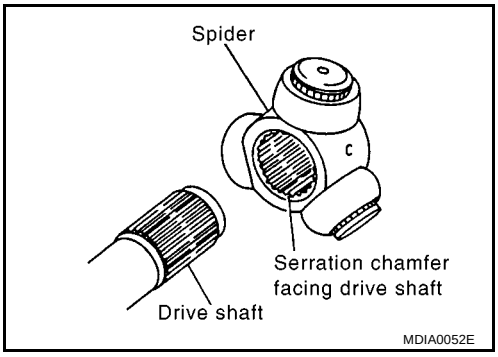
1. Cover drive shaft serration with tape so as not to damage boot during installation. Install new boot and boot bands to the shaft.

   CAUTION:
   Do not reuse the boot bands and boot.



2. Remove the tape wrapped around the serration on the shaft.
3. Align mating marks painted when spider assembly was removed. Install spider assembly with serrated mounting surface facing drive shaft.
4. Secure the spider assembly with a snap ring.

   CAUTION:
   Do not reuse the snap ring.
5. Apply Genuine Nissan Grease (refer to the part catalog) onto the spider assembly and sliding surface.
6. Assemble the sliding joint housing onto spider assembly, and add enough grease to equal the value mentioned below.

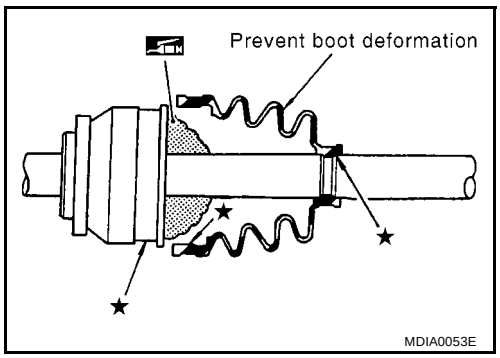


Grease quantity : 115±5 g

7. Install boot securely into grooves (indicated by * marks) shown in figure.

CAUTION:

If grease adheres to the boot mounting surface (with * mark) on the joint, the boot may come off. Remove all grease from the surface.

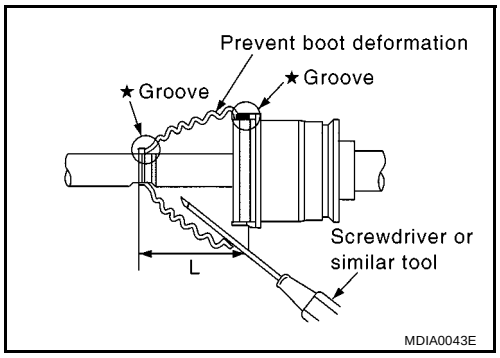


8. Make sure boot installation length “L” is the length indicated below. Insert a screwdriver or similar tool into the large-diameter side. Bleed air out of the inside boot (to adjust pressure outside and inside of boot) to prevent deformation of boot.

Boot mounting length : 96.5±1 mm

CAUTION:

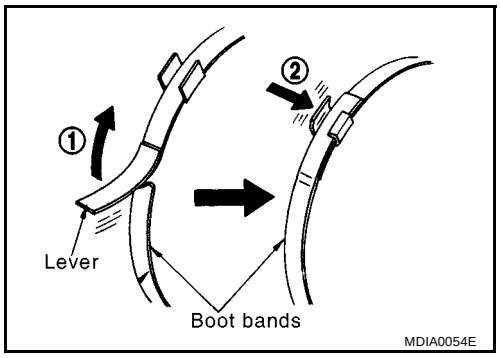
- **If boot mounting length is outside the standard, it may cause breakage in the boot.**
- **Be careful not to touch inside of the boot with the tip of a screwdriver.**



9. Secure big and small ends of boot with new boot bands as shown in figure.

CAUTION:

Rotate housing and check if boot installation position does not change. If position changes, reinstall boot bands.



Dynamic Damper (Right Drive Shaft)

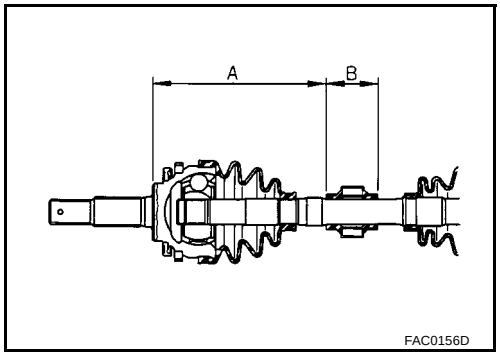
- When dynamic damper has been removed, secure with bands as shown in figure so that measurements from fixed-joint side are as listed below.

CAUTION:

Do not reuse dynamic damper bands.

Dimension A : 434 - 440 mm (17.09 - 17.32 in)

Dimension B : 70 mm (2.76 in)



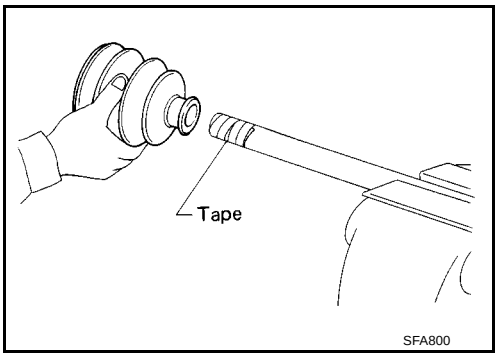
ASSEMBLY (K9K ENGINE MODELS)

- **After drive shaft has been assembled, ensure that it moves smoothly over its entire range without binding.**
- **Use NISSAN GENUINE GREASE or equivalent after every overhaul.**

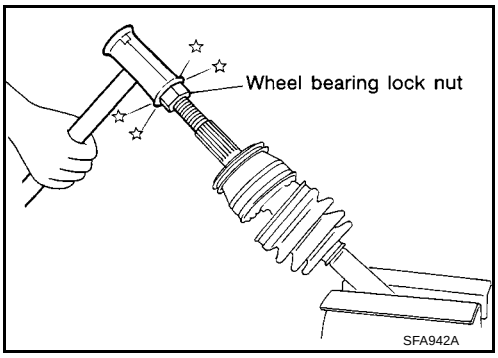
Wheel Side

1. Install boot and new small boot band on drive shaft.

   CAUTION:
   Cover drive shaft serration with tape so as not to damage boot during installation.



2. Set joint assembly onto drive shaft by lightly tapping it. Install joint assembly securely, ensuring marks which were made during disassembly are properly aligned.

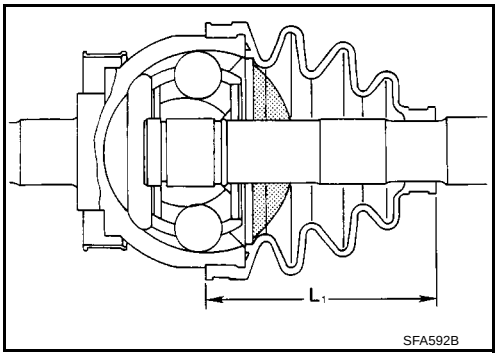


3. Pack drive shaft with specified amount of grease.

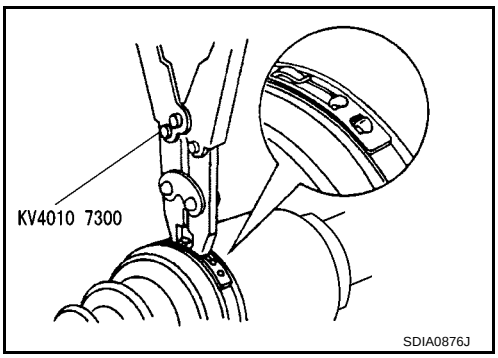
   Specified amount of grease : 40 - 50 g (1.41 - 1.76 oz)

4. Make sure that boot is properly installed on the drive shaft groove.
   Set boot so that it does not swell and deform when its length is "L_1".

   Length "L_1" : 90 mm (3.54 in)



5. Secure the big and small ends of the boot with new boot bands.



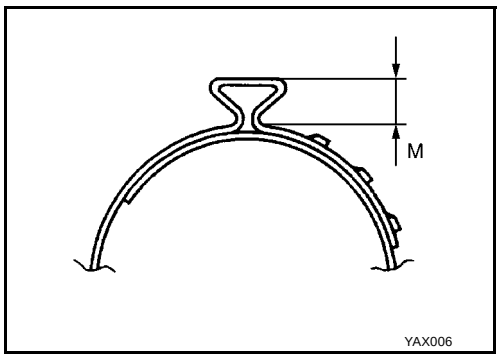
6. Rotate joint part and confirm that mounting position of boot does not deviate. When it deviates, mount a new boot band again.

CAUTION:
When fixing boot band, fix so that the M diameter on the drawing becomes as follows.

M diameter

Large diameter side: 5 mm (0.20 in)

Small diameter side: 5 mm (0.20 in)

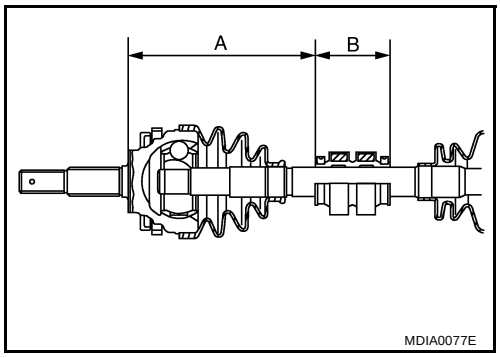


Dynamic Damper

1. Use new damper bands when installing.
2. Install dynamic damper from stationary-joint side while holding it securely.

Dimension A : 207 - 213 mm (8.15 - 8.39 in)

Dimension B : 70 mm (2.76 in)



Transaxle Side

1. Install boot and new small boot band on drive shaft.

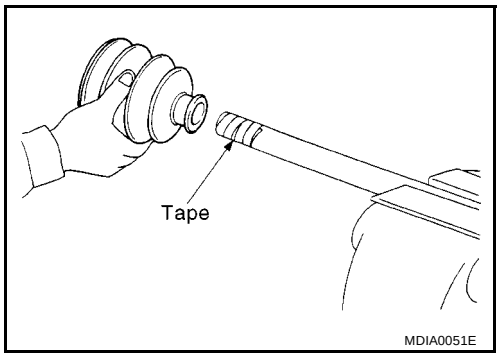
CAUTION:
Cover drive shaft serration with tape so as not to damage boot during installation.

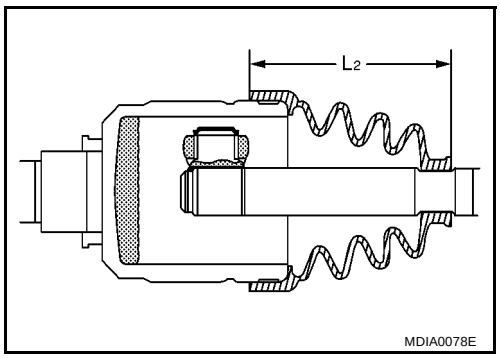
2. Install spider assembly as a unit, making sure the marks which were made during disassembly are properly aligned.
3. Install new snap ring.
4. Pack drive shaft with specified amount of grease.

Specified amount of grease : 113 - 123 g (3.98 - 4.34 oz)

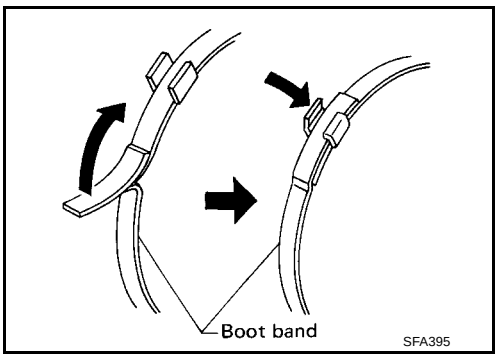
5. Install slide joint housing.
6. Make sure that boot is properly installed on the drive shaft.
Set boot so that it does not swell and deform when its length is "L_2 ".

Length "L_2 " : 90 mm (3.54 in)

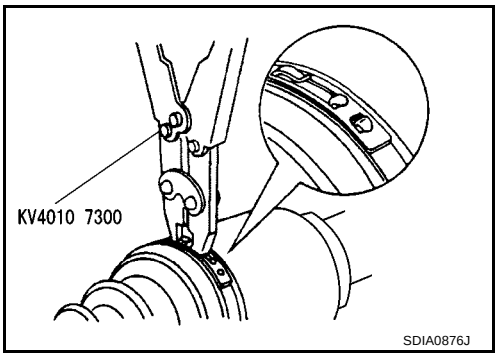




7. Lock new larger boot band securely with a suitable tool.



8. Secure the smaller end of the boot with new boot band.



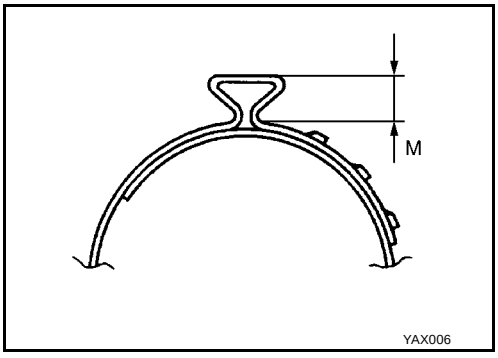
9. Rotate joint part of smaller end boot band and confirm that mounting position of boot does not deviate. When it deviates, mount a new boot band again.

CAUTION:

When fixing boot band, fix so that the M diameter on the drawing becomes as follows.

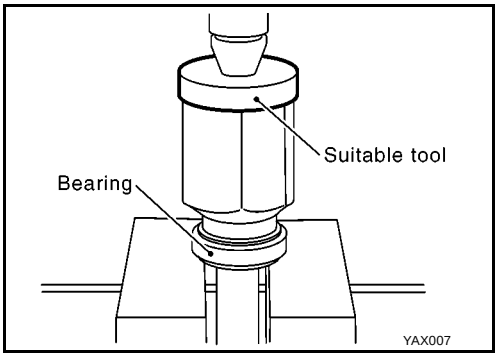
M diameter

Small diameter side: 5 mm (0.20 in)

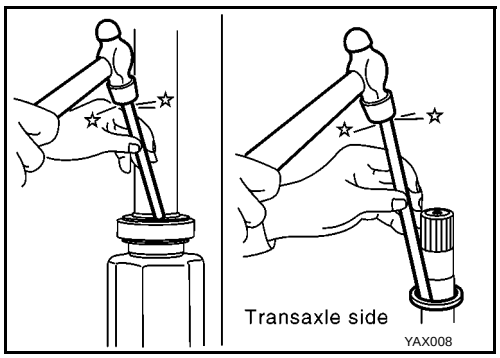


Support Bearing

- Install new dust shield on drive shaft.
- Press drive shaft into bearing.



- Install new snap ring.
- Install new dust shields.

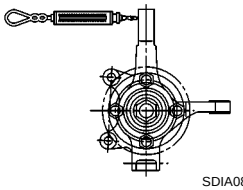


SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Bearing

EDS0012R

Drive type	2WD
Axial end play	0.05 mm (0.0020 in)
Rotating torque	0.30 - 1.43 N·m (0.03 - 0.14 kg-m)
Spring balance measurement	6.0 - 28.6 N (0.61 - 2.92 kg)
Spring balance mounting position (Strut mounting hole upper side)	 SDIA0833J

Drive shaft

EDS0012S

FOR CR ENGINES:

Joint type		Z80 (Wheel side)	T70C (Transaxle side)
Amount of grease g (oz)		45 - 55 (1.59 - 1.94)	115±5 g
Boot length mm (in)		90.4±1 (3.56±0.04)	96.5±1 (3.80±0.04)
T70C (Transaxle side) spider assembly	Stamped number	Part No.	
	00	3972051E00	
	01	3972051E01	
	02	3972051E02	
	03	3972051E03	

FOR K9K ENGINES:

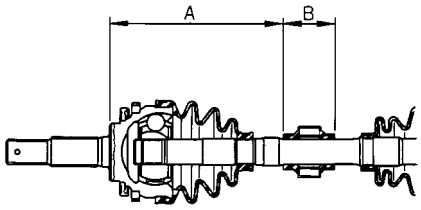
Joint type	AC2000i (Wheel side)	GI2000i (Transaxle side)
Amount of grease g (oz)	40 - 50 (1.41 - 1.76)	113 - 123 (3.98 - 4.34)
Boot length mm (in)	90 (3.54)	

Dynamic Damper

EDS0012T

FOR CR ENGINES:

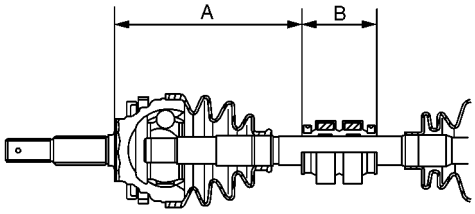
Type	Drive type	Specification	Dimension A mm (in)	Dimension B mm (in)
Z80T70C	2WD	RH	434 - 440 (17.09 - 17.32)	70 (2.76)



FAC0156D

FOR K9K ENGINES:

Type	Drive type	Specification	Dimension A mm (in)	Dimension B mm (in)
AC2000i/GI2000i	2WD	RH, LH	207 - 213 (8.15 - 8.39)	70 (2.76)



MDIA0077E

Tightening Torque

EDS0012U

Unit: N·m (kg-m, ft-lb)

Hub lock nut	238 - 322 (20 - 32, 176 - 237)

SECTION FL
FUEL SYSTEM

CONTENTS

CR

PREPARATION 2
Special Service Tools 2
FUEL SYSTEM 3
Checking Fuel Lines 3
General Precautions 3
FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY 4
Removal and Installation 4
REMOVAL 4
INSTALLATION 6
INSPECTION AFTER INSTALLATION 7
FUEL TANK 8
Removal and Installation 8
REMOVAL 8
INSTALLATION 10
INSPECTION AFTER INSTALLATION 10
SERVICE DATA AND SPECIFICATIONS (SDS) 11
Standard and Limit 11
Tightening Torque 11

K9K

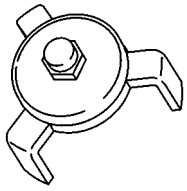
PREPARATION 12
Special Service Tool 12
FUEL SYSTEM 13
Checking Fuel Lines 13
FUEL FILTER 14
Removal and Installation 14
Water Draining from Fuel Filter 14
DRAINING WATER (RHD) 14
DRAINING WATER (LHD) 15
FUEL FILTER CHECK 15
Changing Fuel Filter 15
REMOVAL (RHD) 15
REMOVAL (LHD) 15
INSTALLATION 15
Bleeding Fuel Filter 16
FUEL LEVEL SENSOR UNIT 17
Removal and Installation 17
REMOVAL 17
INSTALLATION 18
FUEL TANK 19
Removal and Installation 19
REMOVAL 19
INSTALLATION 20
INSPECTION AFTER INSTALLATION 21

PREPARATION

PFP:00002

Special Service Tools

EBS00OJ5

Tool number (RENAULT tool number) Tool name	Description
KV993G0010 (Mot. 1397) Lock ring wrench  PBIC1627E	Removing and Installing lock ring

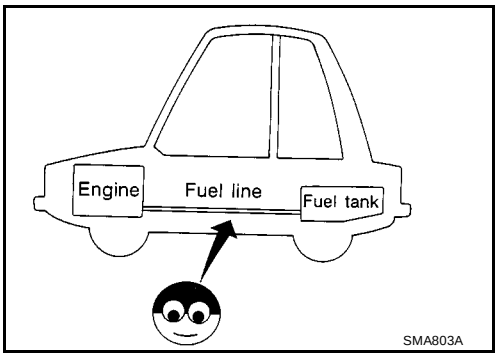
FUEL SYSTEM

PFP:17503

Checking Fuel Lines

EBS00OJM

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace faulty parts.



General Precautions

EBS00OJN

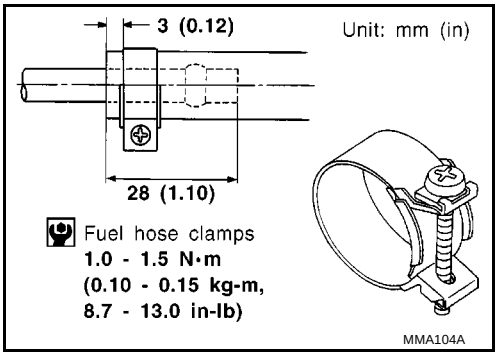
WARNING:

when replacing fuel line parts, be sure to observe the following.

- **Put a “CAUTION: IN FLAMMABLE” sign in workshop.**
- **Be sure to work in a well-ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system, keep open flames and spark away from work area.**

CAUTION:

- **Before removing fuel line parts, carry out the following procedures.**
  - **Put drained fuel in an explosion-proof container and put the lid on securely, keep the container in safe area.**
  - **Release fuel pressure from fuel line. Refer to EC-44, "FUEL PRESSURE RELEASE" (WITH EURO-OBD), refer to EC-505, "FUEL PRESSURE RELEASE" (WITHOUT EURO-OBD).**
  - **Disconnect battery ground cable.**
- **Always replace O-ring and clamps with new ones.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
- **Do not kink or twist tubes when they are being installed.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
  Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.
  Tightening torque specifications are the same for all rubber hose clamps.
  Ensure that screw does not contact adjacent parts.
- **After installing tubes, run engine and check for fuel leaks at connections.**
- **For servicing “Evaporative Emission System” parts, refer to EC-464, "EVAPORATIVE EMISSION SYSTEM" (WITH EURO-OBD), EC-840, "EVAPORATIVE EMISSION SYSTEM" (WITHOUT EURO-OBD).**

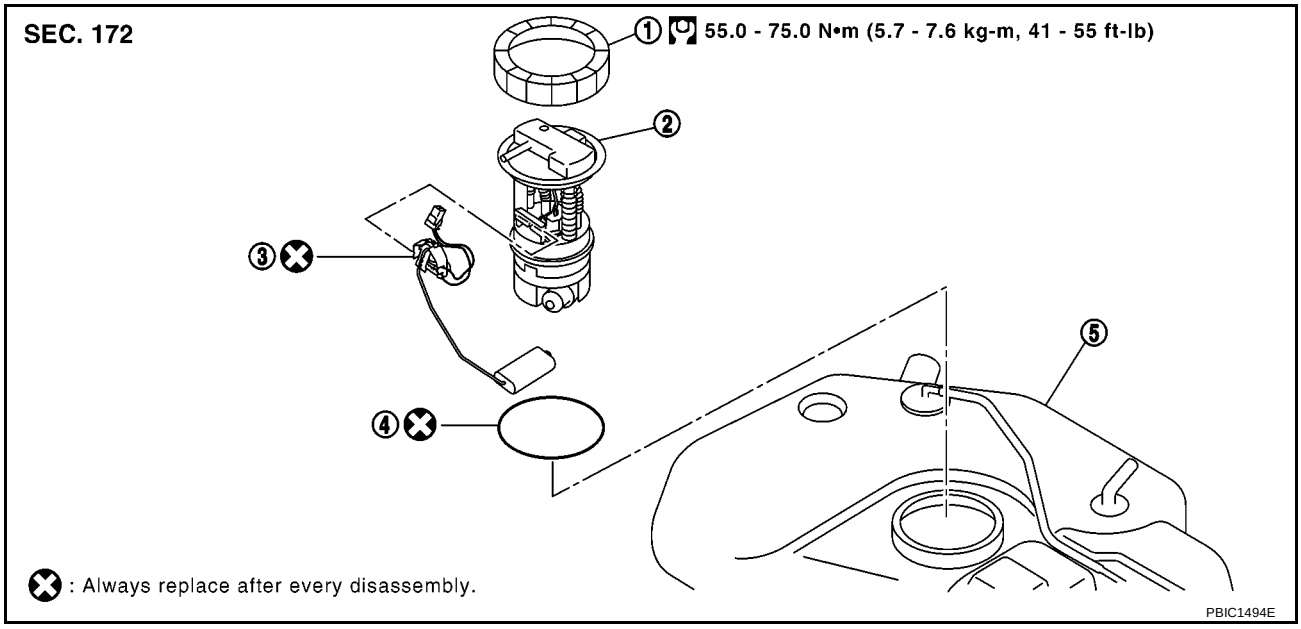


FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY

PFP:17042

Removal and Installation

EBS00OJH



1. Lock ring
2. Fuel filter and fuel pump assembly
3. Fuel level sensor unit
4. O-ring
5. Fuel tank

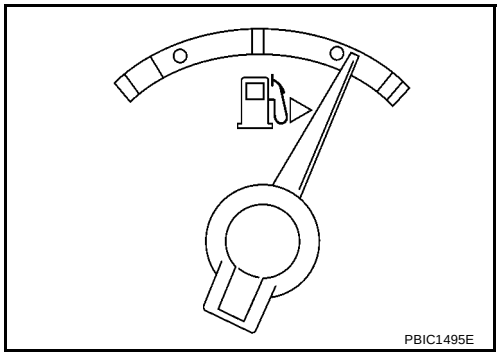
REMOVAL

WARNING:

Read “General Precautions” before working on the fuel system. Refer to FL-3, "General Precautions" .

1. Check fuel level. If gauge indicates more than the level shown in figure (full or almost full), drain fuel from fuel tank until gauge indicates the level in figure or below.
   When fuel pump malfunctions, insert hose with outer diameter of 25 mm (0.98 in) or less from fuel filler port. Drain fuel in fuel filler tube. Disconnect connections of fuel filler tube and fuel filler hose to drain fuel from fuel filler hose.
   - As guide, fuel amount becomes the level shown in figure or below when approximately 7 liter (1-1/2 lmp gal) of fuel are drained from full.

   NOTE:
   Adjusting fuel level is to prevent fuel from spilling, when fuel level sensor unit, fuel filter and fuel pump assembly are removed.



2. Release fuel pressure. Refer to EC-44, "Fuel Pressure Check" (WITH EURO-OBD), EC-505, "Fuel Pressure Check" (WITHOUT EURO-OBD).

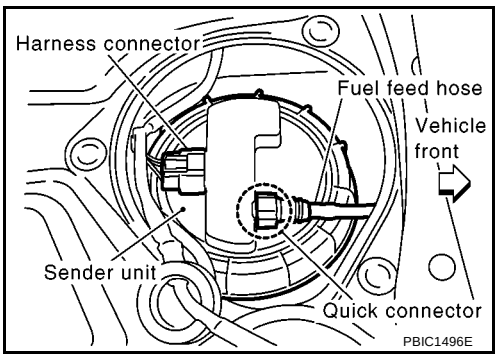
   NOTE:
   If CONSULT-II is not used, release fuel pressure with the following procedures.

a. Refer to steps 5 to 7 on this page. Remove harness connectors from fuel level sensor unit, fuel filter and fuel pump assembly.
b. Start the engine. After stopping the engine, crank it two or three times to consume the fuel in the fuel line.
3. Open fuel filler lid.
4. Open the filler cap and release the pressure inside the fuel tank.
5. Remove rear seat. Refer to SE-11, "REAR SEAT" .
6. Remove inspection hole cover.
   - Using a screwdriver, remove it by turning clips clockwise by 90°.

7. Remove harness connector and fuel feed hose from sender unit.

NOTE:

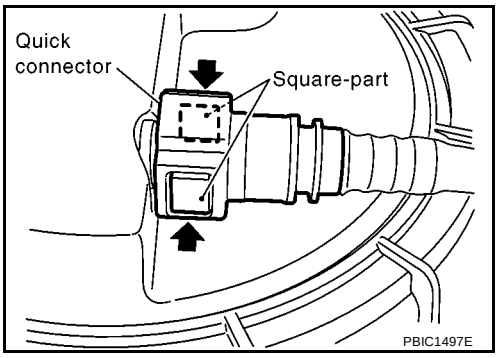
- Connections of harness connector and fuel feed hose are called sender unit.



- Remove quick connector in the following procedures.
  - Pinch quick connector square-parts with your fingers, and pull out the quick connector by hand.
  - If quick connector and tube on sender unit are stuck, push and pull several times until they move, and pull out.

CAUTION:

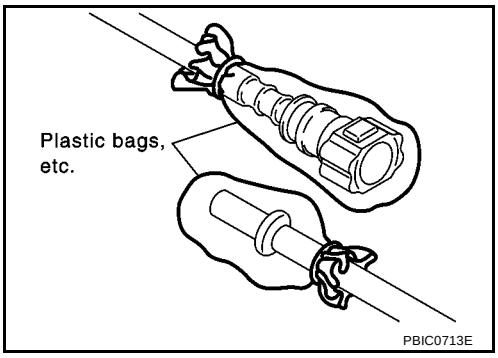
- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**



- To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.

CAUTION:

Do not insert plug, preventing damage on O-ring in quick connector.



8. Using lock ring wrench [SST: KV993G0010], remove lock ring.

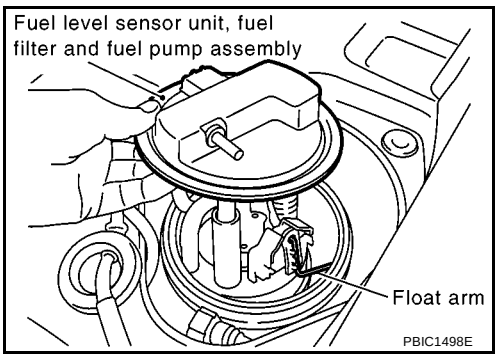
CAUTION:

Rotate SST while pressing fuel level sensor unit, fuel filter and fuel pump assembly as spring reaction force is applied from fuel tank inside to upward.

9. Remove fuel level sensor unit, fuel filter and fuel pump assembly.

CAUTION:

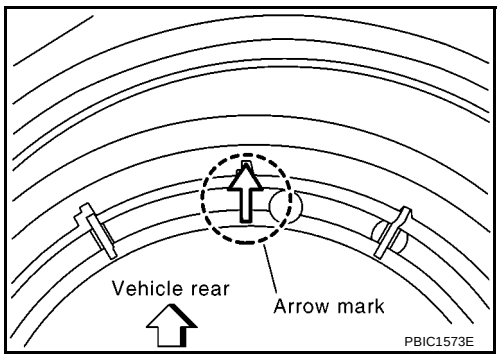
- **Be careful not to bend the float arm when removing.**
- **Handle them carefully without subjecting them to impacts such as dropping.**



10. Install lock ring temporally by hand tightening until it stops with maximum force.
    - Direct arrow mark on lock ring to vehicle rear. Then turn clockwise to tighten lock ring.

    CAUTION:
    Do not remove lock ring until fuel level sensor unit, fuel filter and fuel pump assembly is installed.
11. Remove fuel level sensor unit in the following procedures.

a. Remove harness connector (brown).
   - Hold connector with your fingers, because there is no tab for releasing stopper. Pull it out straight downward.

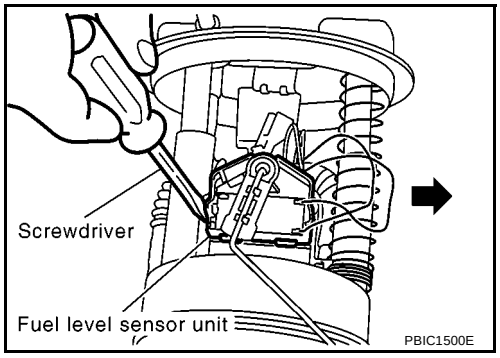


b. Insert a screwdriver into the gap between fuel level sensor unit left side and mounting part. Pry the screwdriver in the direction shown by arrow.

   CAUTION:
   Be careful not to damage anything.

c. When fixing tab comes off, slide fuel level sensor unit in the direction indicated by arrow to remove.

   CAUTION:
   - **Do not reuse removed fuel level sensor unit.**
   - **Do not disassemble fuel filter and fuel tank pump assembly.**



INSTALLATION

Install in the reverse order of removal which being careful of the following.

Installation of Fuel Level Sensor Unit

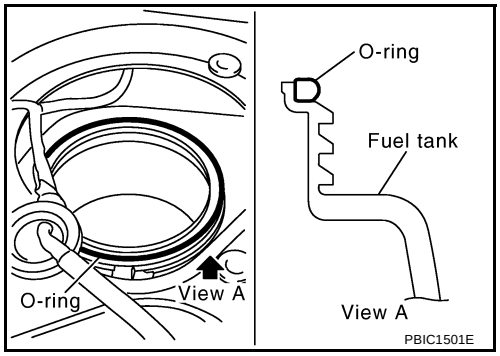
Install it in the following procedures.

1. Check fuel gauge mounting part of fuel filter and fuel pump assembly side for damage.
2. Slide fuel level sensor unit along with mounting groove. Insert new fuel level sensor unit until it contacts the face.
   - After inserting, apply force to the reverse direction (removal direction). Make sure fuel level sensor unit does not come off.
3. Connect harness connector.
   - Insert harness connector securely until it contacts the face.

Installation of Fuel Level Sensor Unit, Fuel Filter and Fuel Pump Assembly

Install it in the following procedures.

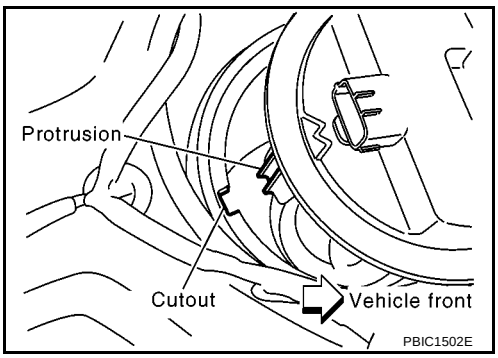
1. Remove lock ring.
2. Install O-ring to fuel tank without any twist.



3. Install fuel level sensor unit, fuel filter and fuel pump assembly, aligning the sender unit rear side protrusion with the fuel tank opening rear side cutout.

CAUTION:

- **Do not allow O-ring to drop.**
- **Maintain closely jointed status by pressing fuel level sensor unit, fuel filter and fuel pump assembly at an opening of the tank until the end of step 5, in order to prevent the fallout of O-ring (To maintain the O-ring installed status of view A in the figure at step 2).**

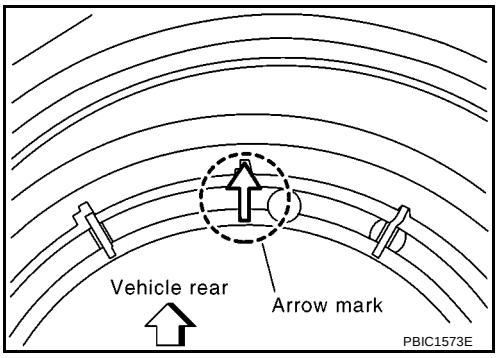


4. Direct arrow mark on lock ring to vehicle rear. Then turn lock ring clockwise by hand until it steps with maximum force.

CAUTION:

Install lock ring horizontally.

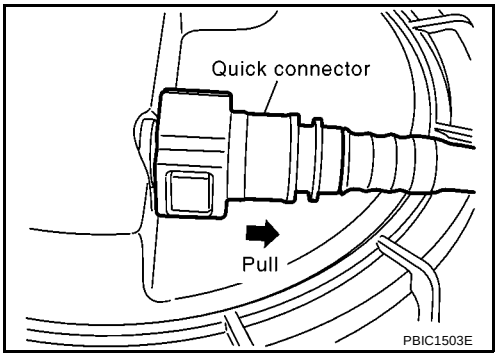
5. Tighten lock ring to the specification with lock ring wrench [SST: KV993G0010].



Fuel Feed Hose Installation

- Connect quick connector in the following procedures.

1. Check connections for damage or foreign material.
2. Align the mating side connection part with the center of shaft on the sender unit, and insert quick connector straight until it clicks.
3. After connecting, pull out quick connector by hand. Make sure connections are secure.



INSPECTION AFTER INSTALLATION

- Check for fuel leak in the following procedures.

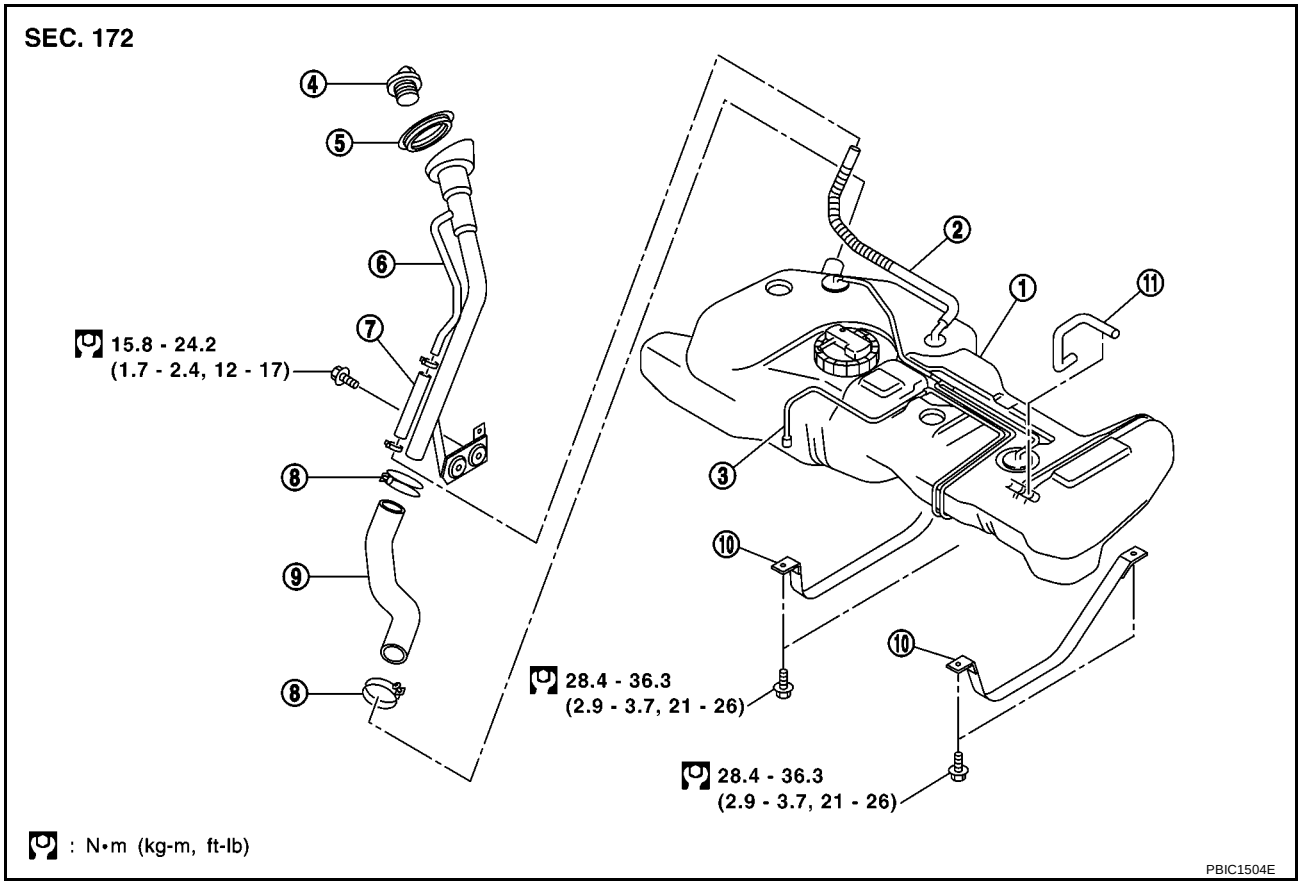
1. Turn the ignition switch to ON (do not start engine), and with fuel pressure applied in the fuel line, check to make sure there are no fuel leaks from the connection.
2. Start the engine, and at increased speed, check again to see if there any fuel leaks from the connection.

FUEL TANK

PFP:17202

Removal and Installation

EBS00OJ9



1. Fuel tank
2. Vent hose
3. EVAP tube
4. Fuel filler cap
5. Grommet
6. Fuel filler tube
7. Vent hose
8. Clamp
9. Fuel filler hose
10. Mounting band
11. EVAP hose

REMOVAL

WARNING:

Be sure to read “General Precautions” when working on fuel system. Refer to FL-3, "General Precautions" .

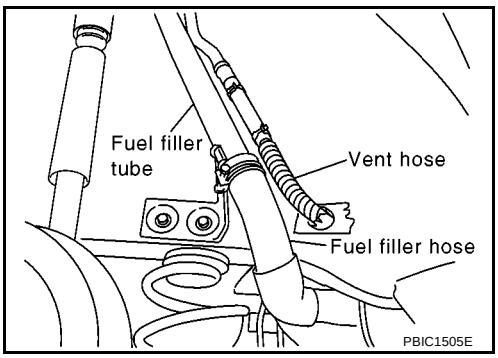
1. Remove RH rear wheel.
2. Perform steps 1 to 7 of FL-4, "REMOVAL" in “FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY”.

   CAUTION:

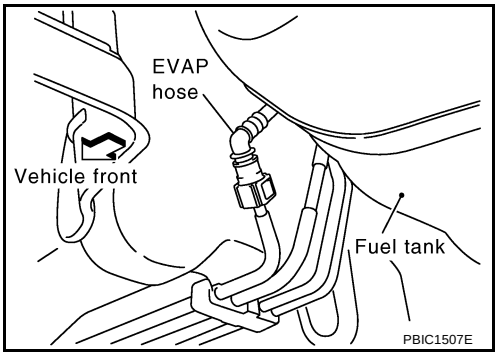
   If fuel tank bottom face is not level, and remaining fuel level is high, tank position becomes unstable, causing a danger. Drain fuel further than that in step 1 of the referenced procedure until tank can be held by hand even if the balance is lost.
3. Remove center muffler and main muffler. Refer to EX-3, "EXHAUST SYSTEM" .
4. Remove vehicle side insulator on upper center muffler and main muffler.
5. Move parking brake cable from the lower face of fuel tank. Then remove clips for parking brake cable.

6. Disconnect fuel filler hose on fuel tank side.

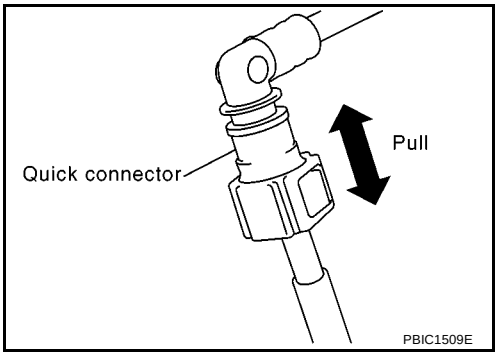
CAUTION:
Do not remove fuel filler hose at fuel filler tube side, preventing to interfere with suspension due to dislocation when installing. When removing at fuel filler tube side necessarily, put mating marks, and remove.



7. Remove vent hose at RH rear wheelwell side.
8. Remove EVAP hose at front side of fuel tank.



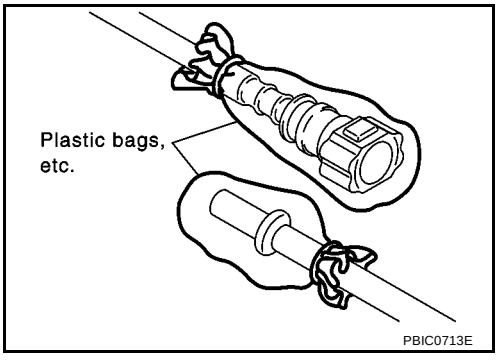
- Remove quick connector in the following procedures.
  - Pinch quick connector square-parts with your fingers, and pull out the quick connector by hand.
  - If quick connector and tube on vehicle are stuck, push and pull several times until they move, and pull out.



CAUTION:
- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**

- To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.

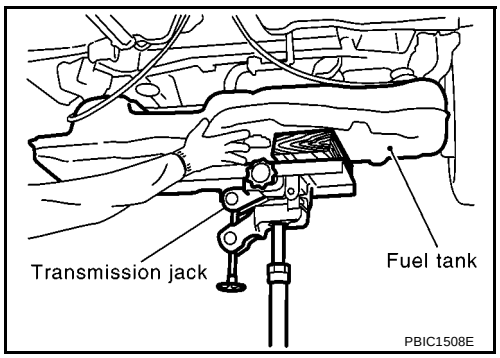
CAUTION:
Do not insert plug, preventing damage on O-ring in quick connector.



9. Support center of fuel tank with suitable transmission jack.

CAUTION:
Securely support the fuel tank with a piece of wood.

10. Remove RH/LH mounting band.
11. Lower suitable transmission jack carefully to remove fuel tank while holding it by hand. Perform the following works at the same time.
    - Pull out vent hose from through hole of vehicle.
    - Avoid interference with tank by pulling parking brake cable by hand.



CAUTION:
Tank may be in an unstable condition because of the shape of fuel tank bottom. Do not rely on jack too much. Be sure to hold tank securely.

INSTALLATION

Install in the reverse order of removal which being careful of the following.

Installation of Fuel Tank Mounting Band

- Install it by referring to the identification stamp mark “R” and “L” on the end.

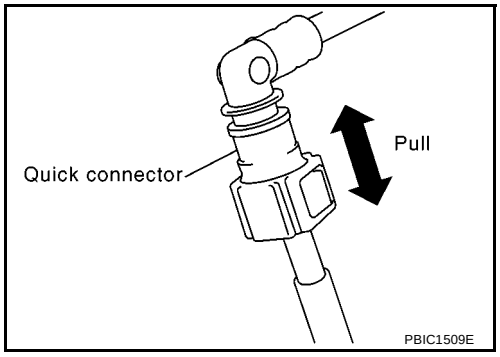
Installation of fuel Filler Hose

- Insert filler hose into mating side part by 35 mm (1.38 in), and secure it with clamp.
- When installing clamp, do not allow clamp to contact the bulge (bump) part of the tube.
- Tighten the clamp of filler hose so that the remaining length becomes 5 - 9 mm (0.20 - 0.35 in) [or tightening torque: 1.3 - 3.7 N·m (0.13 - 0.38 kg-m, 12 - 32 in-lb].

Installation of EVAP Hose

- Connect quick connector in the following procedures.

1. Check connections for damage or foreign material.
2. Align the mating side connection part with the center of shaft, and insert connector straight until it clicks.
3. After connecting, pull out quick connector by hand. Make sure connections are secure.



INSPECTION AFTER INSTALLATION

- Check for fuel leak in the following procedures.

1. Turn the ignition switch to ON (do not start engine), and with fuel pressure applied in the fuel line, check to make sure there are no fuel leaks from the connection.
2. Start the engine, and at increased speed, check again to see if there any fuel leaks from the connection.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00OJO

Fuel tank capacity	Approx. 46 ℓ (10-1/8 Imp gal)

Tightening Torque

EBS00OJP

Unit: N·m (kg-m, ft-lb)

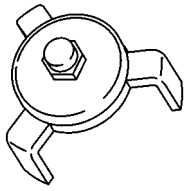
Fuel tank mounting band	28.4 - 36.3 (2.9 - 3.7, 21 - 26)
Fuel filler tube	15.8 - 24.2 (1.7 - 2.4, 12 - 17)
Lock ring	55.0 - 75.0 (5.7 - 7.6, 41 - 55)

PREPARATION

PFP:00002

Special Service Tool

EBS01C7Y

Tool number (RENAULT tool number) Tool name	Description
KV993G0010 (Mot. 1397) Lock ring wrench  PBIC1627E	Removing and Installing lock ring

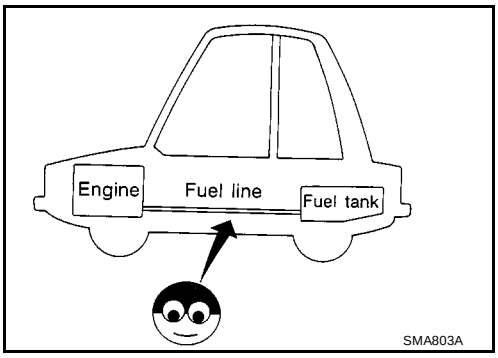
FUEL SYSTEM

PFP:17503

Checking Fuel Lines

EBS01C7Z

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, chafing and deterioration.If necessary, repair or replace.



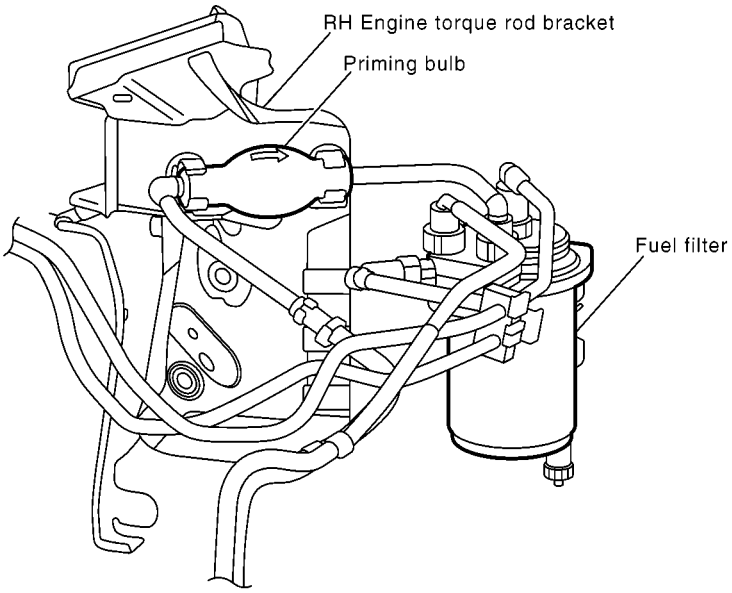
FUEL FILTER

PFP:16400

Removal and Installation

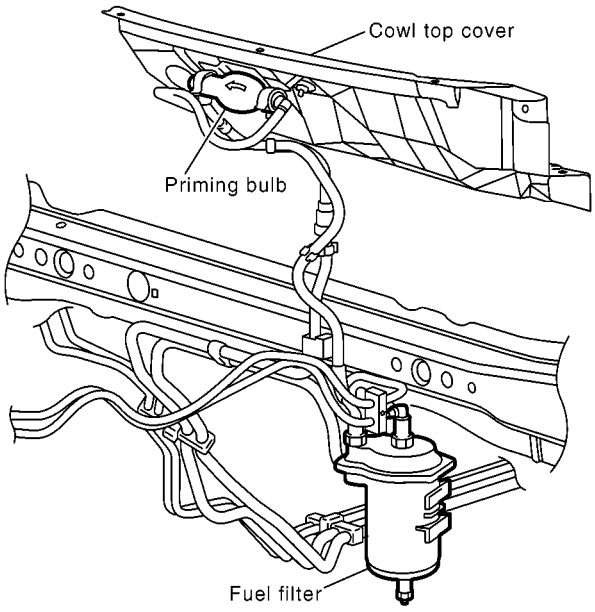
EBS01C80

LHD models



MBIB1064E

RHD models



MBIB1065E

Water Draining from Fuel Filter

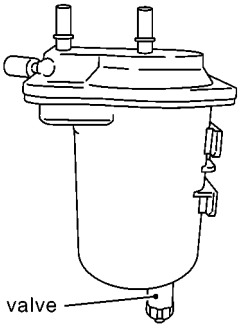
EBS01C81

DRAINING WATER (RHD)

CAUTION:

Before carrying out any work, wait for the fuel temperature is dropped.

Open drain valve at the bottom of fuel filter.



MBIB0530E

DRAINING WATER (LHD)

Refer to EM-105, "PRECAUTIONS" , EC-K9K-2, “DIESEL EQUIPMENT”.

1. Remove right fender protector. Refer to EI-10, "COWL TOP" .
2. Remove foam insulator.
3. Open drain valve at the bottom of fuel filter.

CAUTION:
Put a shop cloth under the drain valve, to avoid the water and fuel spill on ABS actuator.

FUEL FILTER CHECK

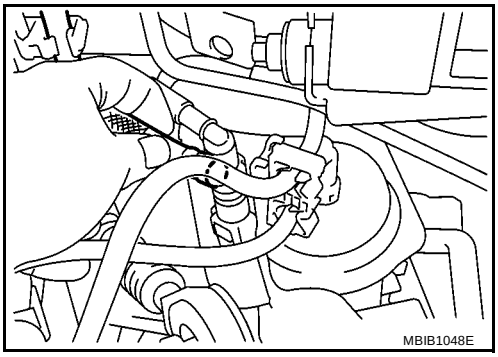
Check fuel filter for fuel leakage, damage and other abnormal signs.

Changing Fuel Filter

EBS01C82

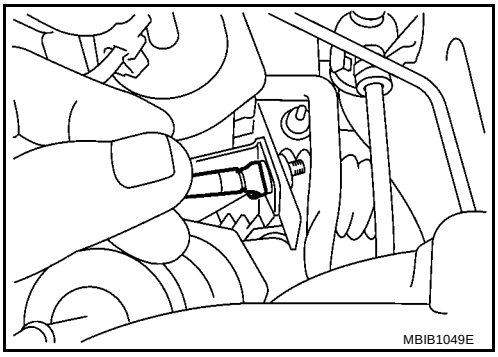
REMOVAL (RHD)

1. Remove quick connectors in the following procedures.
   - Pinch quick connector square-parts with your fingers, and pull out the quick connector by hand.
   - If quick connector and tube on vehicle are stuck, push and pull several times until they move, and pull out.


MBIB1048E

2. Remove fuel filter from fuel filter bracket.

CAUTION:
Do not spill the fuel during removal. If the fuel is spill, immediately wipe it off. Be especially careful to prevent the fuel from adhering to the insulators of the engine mounts.


MBIB1049E

REMOVAL (LHD)

1. Remove Cowl Top. Refer to EI-10, "COWL TOP" .
2. Remove priming bulb from priming bulb bracket.
3. Remove fuel filter from fuel filter bracket.
4. Remove quick connectors as shown.

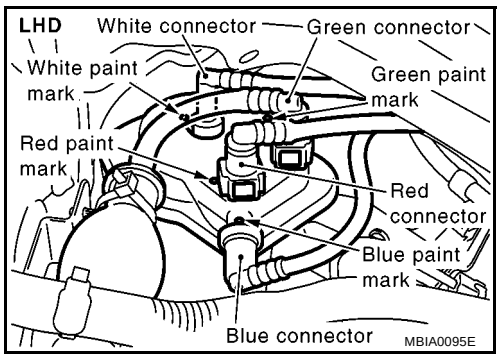
CAUTION:
Put a shop cloth under the drain valve, to avoid the water and fuel spill on ABS actuator. Be especially careful to prevent any damage.

INSTALLATION

- Install in the reverse order of removal.

- To install fuel filter connectors, respect paint marks on fuel filter as shown.
- After installation, operate the priming bulb vertically, if it is possible, to perform air bleeding.
  Refer to FL-16, "Bleeding Fuel Filter" .

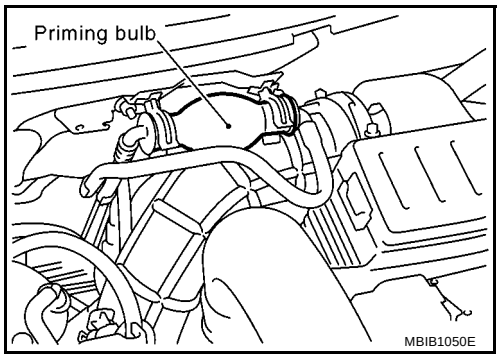
  CAUTION:
  Do not bend or twist the fube during installation and removal.



Bleeding Fuel Filter

EBS01C83

1. Prime the circuit using the priming bulb.
2. Perform engine cranking with repeating several times until engine starting.

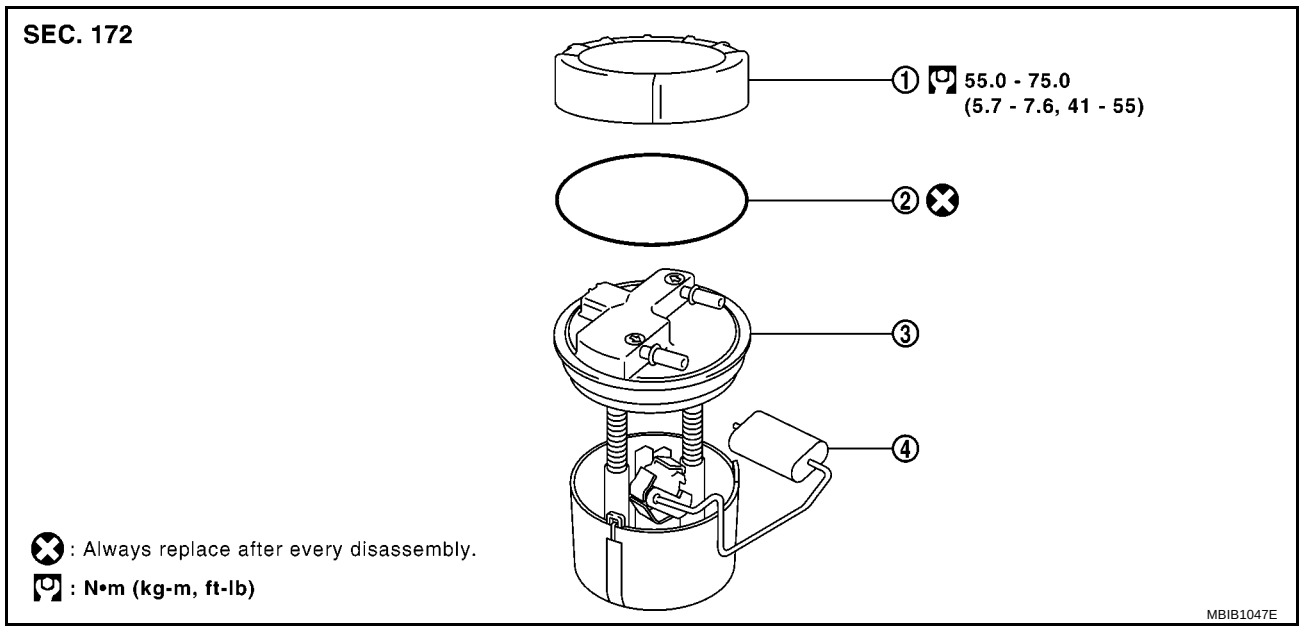


FUEL LEVEL SENSOR UNIT

PFP:17042

Removal and Installation

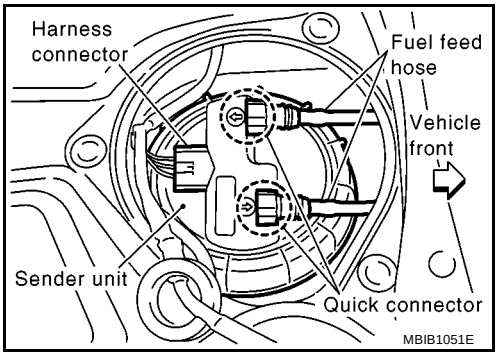
EBS01C84



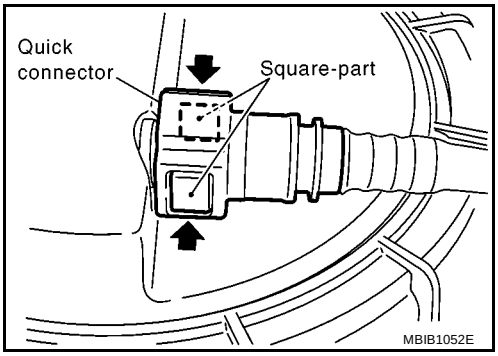
1. Rock ring
2. O-ring
3. Fuel level sensor unit
4. Float arm

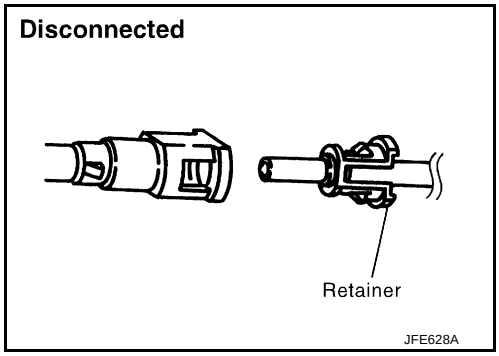
REMOVAL

1. Disconnect battery ground cable.
2. Open fuel filler lid and filler cap to release the pressure inside the fuel tank.
3. Remove rear seat cushion. Refer to SE-11, "REAR SEAT" .
4. Remove inspection hole cover under the rear seat.
5. Disconnect electrical connector.
6. Disconnect the quick connectors.



- Hold the connector while pushing in tabs, and pull out the tube.





CAUTION:

- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**
- **Only when the tube is replaced, remove the remaining retainer.**
- **When the tube is replaced, also replace the retainer with a new one.**

Retainer color:

Red (Feed hose side)

White (Return hose side)

7. Using lock ring wrench [SST: KV993G0010], remove lock ring.

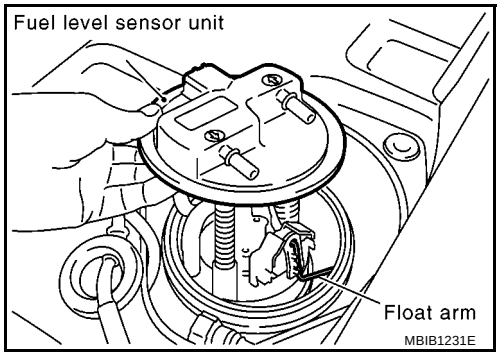
CAUTION:

Rotate SST while pressing fuel level sensor unit as spring reaction force is applied from fuel tank inside to up ward.

8. Remove fuel level sensor unit.

CAUTION:

- **Be careful not to bend the float arm when removing.**
- **Handle them carefully without subjecting them to impacts such as dropping.**



INSTALLATION

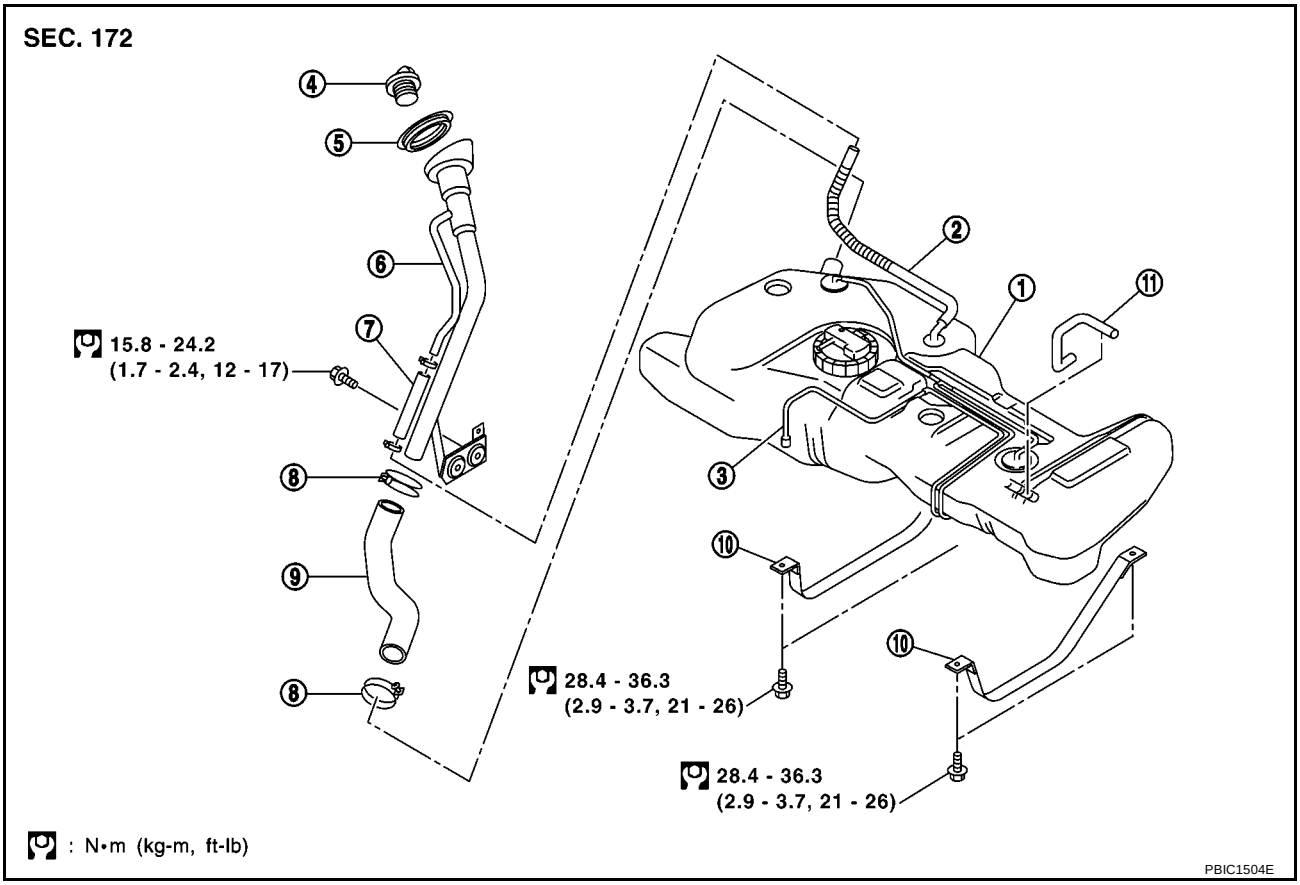
Install in the reverse order of removal.

FUEL TANK

PFP:17202

Removal and Installation

EBS01C85



1. Fuel tank
2. Vent hose
3. EVAP tube
4. Fuel filler cap
5. Grommet
6. Fuel filler tube
7. Vent hose
8. Clamp
9. Fuel filler hose
10. Mounting band
11. EVAP hose

REMOVAL

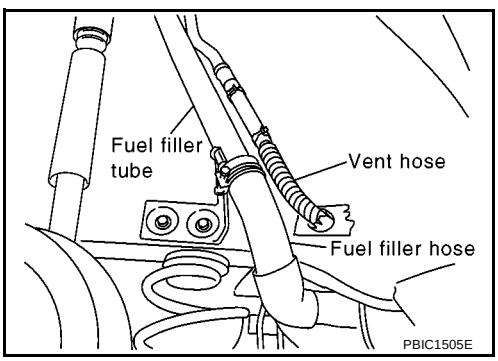
1. Remove RH rear wheel.
2. Perform steps 1 to 7 of FL-17, "REMOVAL" in “FUEL LEVEL SENSOR UNIT”.

   CAUTION:

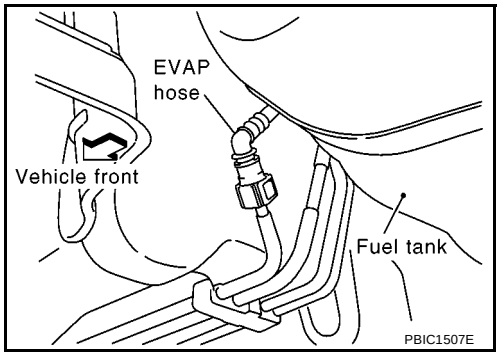
   If fuel tank bottom face is not level, and remaining fuel level is high, tank position becomes unstable, causing a danger. Drain fuel further than that in step 1 of the referenced procedure until tank can be held by hand even if the balance is lost.
3. Remove center muffler and main muffler. Refer to EX-3, "EXHAUST SYSTEM" .
4. Remove vehicle side insulator on upper center muffler and main muffler.
5. Move parking brake cable from the lower face of fuel tank. Then remove clips for parking brake cable.
6. Disconnect fuel filler hose on fuel tank side.

   CAUTION:

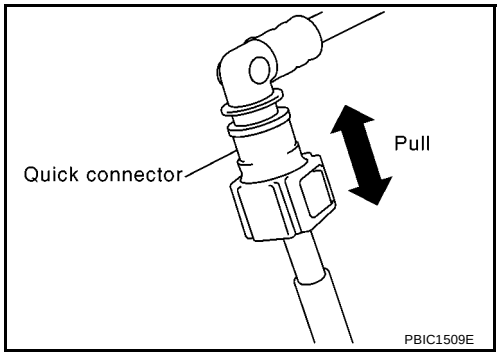
   Do not remove fuel filler hose at fuel filler tube side, preventing to interfere with suspension due to dislocation when installing. When removing at fuel filler tube side necessarily, put mating marks, and remove.



7. Remove vent hose at RH rear wheelwell side.
8. Remove EVAP hose at front side of fuel tank.



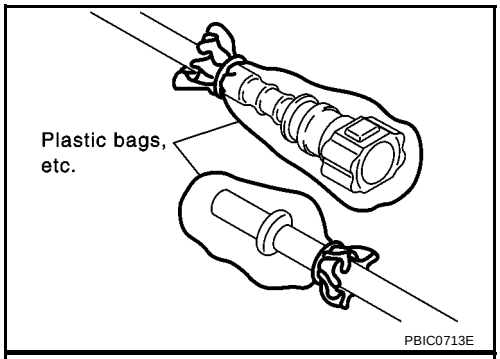
- Remove quick connector in the following procedures.
  - Pinch quick connector square-parts with your fingers, and pull out the quick connector by hand.
  - If quick connector and tube on vehicle are stuck, push and pull several times until they move, and pull out.



CAUTION:

- **The tube can be removed when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to remove the quick connector.**
- **Keep the resin tube away from heat. Be especially careful when welding near the tube.**
- **Prevent acid liquid such as battery electrolyte etc. from getting on the resin tube.**
- **Do not bend or twist the tube during installation and removal.**

- To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.



CAUTION:

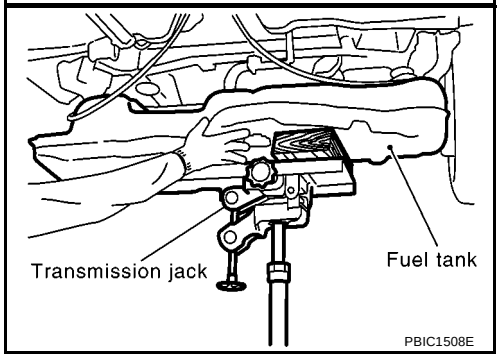
Do not insert plug, preventing damage on O-ring in quick connector.

9. Support center of fuel tank with suitable transmission jack.

CAUTION:

Securely support the fuel tank with a piece of wood.

10. Remove RH/LH mounting band.
11. Lower suitable transmission jack carefully to remove fuel tank while holding it by hand. Perform the following works at the same time.
    - Pull out vent hose from through hole of vehicle.
    - Avoid interference with tank by pulling parking brake cable by hand.



CAUTION:

Tank may be in an unstable condition because of the shape of fuel tank bottom. Do not rely on jack too much. Be sure to hold tank securely.

INSTALLATION

Install in the reverse order of removal which being careful of the following.

Installation of Fuel Tank Mounting Band

- Install it by referring to the identification stamp mark “R” and “L” on the end.

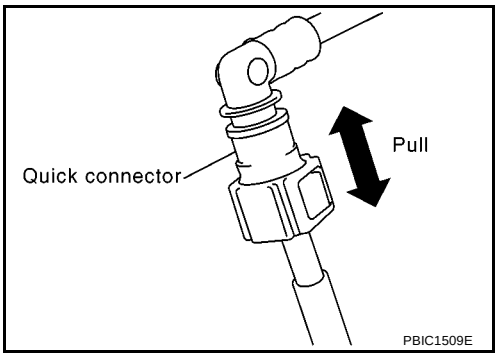
Installation of fuel Filler Hose

- Insert filler hose into mating side part by 35 mm (1.38 in), and secure it with clamp.
- When installing clamp, do not allow clamp to contact the bulge (bump) part of the tube.
- Tighten the clamp of filler hose so that the remaining length becomes 5 - 9 mm (0.20 - 0.35 in) [or tightening torque: 1.3 - 3.7 N·m (0.13 - 0.38 kg-m, 12 - 32 in-lb].

Installation of EVAP Hose

- Connect quick connector in the following procedures.

1. Check connections for damage or foreign material.
2. Align the mating side connection part with the center of shaft, and insert connector straight until it clicks.
3. After connecting, pull out quick connector by hand. Make sure connections are secure.



Installation of Vent Hose

- Push vent hose into through hole of vehicle.
- Insert vent hose into vent rubber hose, and secure it with clamp.

INSPECTION AFTER INSTALLATION

Make sure there is no fuel leakage at connections in the following procedure.

- Start engine, rev it up and make sure there is no fuel leakage at connections.

SECTION FSU
FRONT SUSPENSION

CONTENTS

PRECAUTIONS 2
Cautions 2
Precautions for Brake System 2
PREPARATION 3
Special Service Tools 3
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 4
NVH Troubleshooting Chart 4
FRONT SUSPENSION ASSEMBLY 5
Components 5
On-Vehicle Inspection and Service 6
LOOSENESS, BACKLASH, AND DAMAGE OF MOUNTING PARTS AND CONNECTIONS 6
Wheel Alignment 6
DESCRIPTION 6
PRELIMINARY INSPECTION 6
INSPECTION OF CAMBER, CASTER, AND KINGPIN INCLINATION ANGLES 6
STEERING ANGLE INSPECTION 7
COIL SPRING AND SHOCK ABSORBER 8
Removal and Installation 8
REMOVAL 8
INSTALLATION 8
Disassembly and Assembly 8
DISASSEMBLY 8
INSPECTION AFTER DISASSEMBLY 9
ASSEMBLY 9
TRANSVERSE LINK 10
Removal and Installation 10
REMOVAL 10
INSPECTION AFTER REMOVAL 10
INSTALLATION 10
STABILIZER BAR 11
Removal and Installation 11
REMOVAL 11
INSPECTION AFTER REMOVAL 12
INSTALLATION 12
FRONT SUSPENSION MEMBER 13
Removal and Installation 13
REMOVAL 13
INSPECTION AFTER REMOVAL 13
INSTALLATION 14
SERVICE DATA AND SPECIFICATIONS (SDS) 15
Wheel Alignment 15
FOR CR ENGINES: 15
FOR K9K ENGINES: 15
Ball Joint 15
FOR CR ENGINES: 15
FOR K9K ENGINES: 15
Tightening Torque 15

PRECAUTIONS

PFP:00001

Cautions

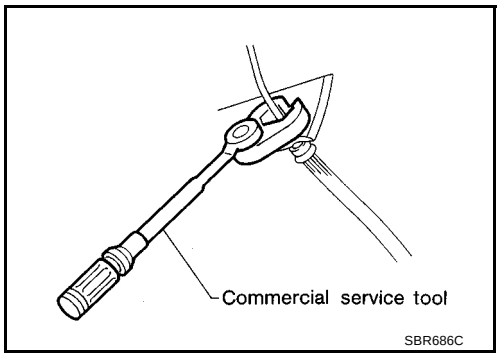
EES000ZW

- When installing rubber bushings, final tightening must be carried out under unladen conditions with tires on flat, level ground. Oil will shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
- “Unladen condition” means that fuel, coolant and lubricant are full and ready for drive. However, spare tire, jack, and hand tools should be unloaded.
- After installing the removed suspension parts, always check wheel alignment and adjust if necessary.
- Replace the caulking nut with a new one. Install a new nut without wiping the oil off before tightening.

Precautions for Brake System

EES000ZX

- When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
  *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- Use flare nut wrench when removing or installing brake tubes.
- After installing removed suspension parts, check wheel alignment and adjust if necessary.
- Always torque brake lines when installing.

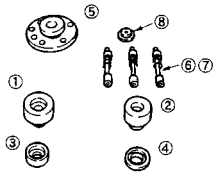
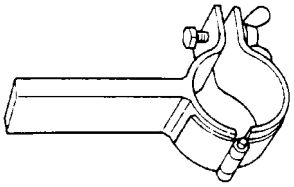


PREPARATION

PFP:00002

Special Service Tools

EES000ZY

Description	Application
CCK gauge attachment KV991040S1 1 KV99104020 Adapter A 2 KV99104030 Adapter B 3 KV99104040 Adapter C 4 KV99104050 Adapter D 5 KV99104060 Plate 6 KV99104070 Guide bolt 7 KV99104080 Spring 8 KV99104090 Center plate  ZZA1167D	Measuring wheel alignment
Strut attachment ST35652000  ZZA0807D	Disassembling and assembling strut

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EES000ZZ

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

			Reference page	Refer to FSU-5, "FRONT SUSPENSION ASSEMBLY"	Refer to FSU-8, "COIL SPRING AND SHOCK ABSORBER"	—	—	—	Refer to FSU-5, "FRONT SUSPENSION ASSEMBLY"	Refer to FSU-6, "Wheel Alignment"	Refer to FSU-11, "STABILIZER BAR"	NVH in RAX and RSU section.	NVH in WT section.	NVH in WT section.	NVH in FAX section.	NVH in BR section.	NVH in PS section.
			Possible cause and SUSPECTED PARTS	Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	FRONT SUSPENSION	Noise		×	×	×	×	×	×			×	×	×	×	×	×
		Shake		×	×	×	×		×			×	×	×	×	×	×
		Vibration		×	×	×	×	×				×	×		×		×
		Shimmy		×	×	×	×			×		×	×	×		×	×
		Judder		×	×	×						×	×	×		×	×
		Poor quality ride or handling		×	×	×	×	×		×	×	×	×	×			

×: Applicable

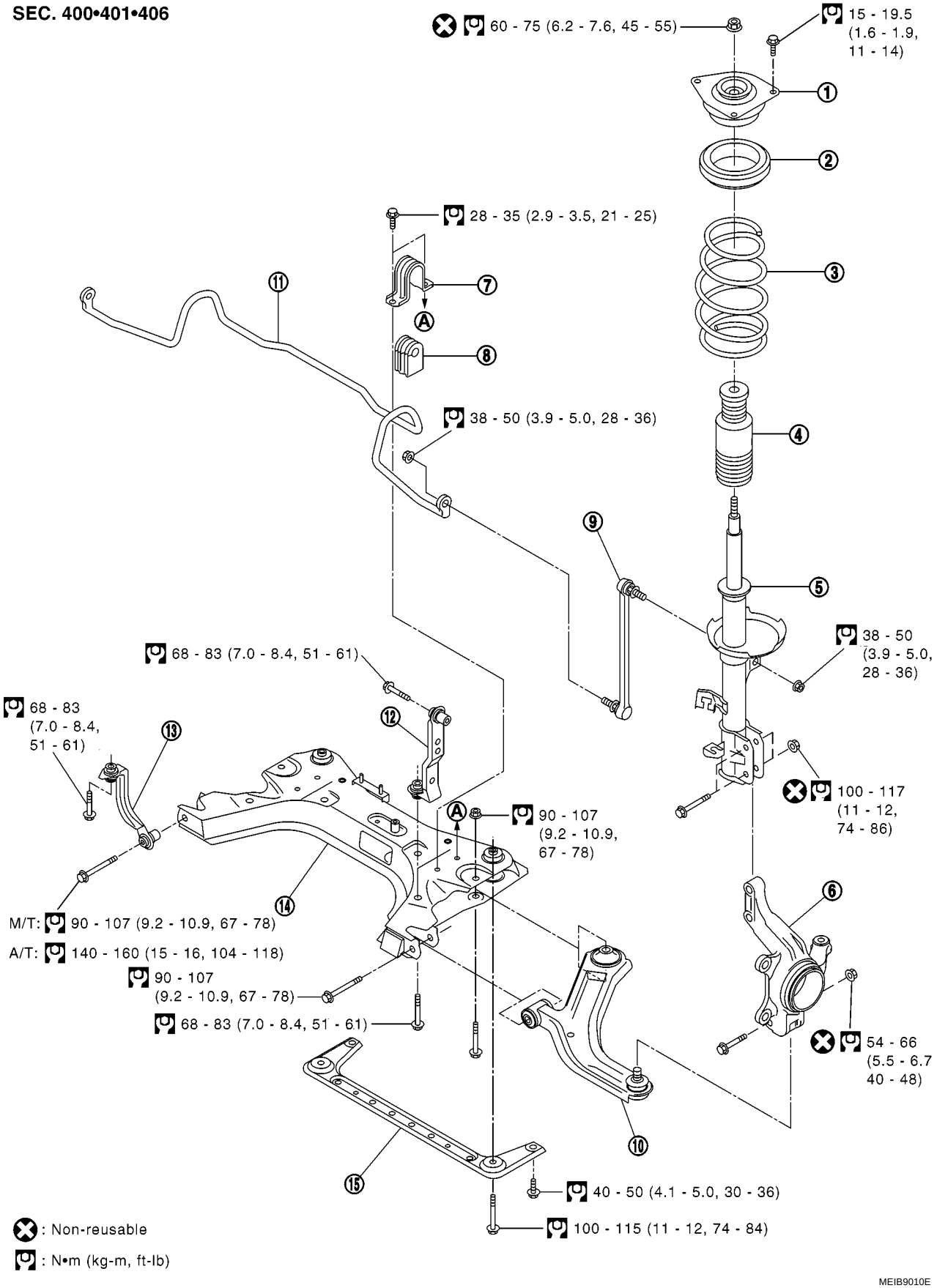
FRONT SUSPENSION ASSEMBLY

PFP:54010

Components

EES001T8

SEC. 400•401•406



1. Strut mounting insulator
2. Strut mounting bearing
3. Coil spring
4. Bound bumper
5. Strut
6. Knuckle
7. Clamp
8. Bushing
9. Connecting rod
10. Transverse link
11. Stabilizer
12. Upper link (A/T models only)
13. Upper link
14. Suspension member
15. Suspension member stay

On-Vehicle Inspection and Service

EES00101

LOOSENESS, BACKLASH, AND DAMAGE OF MOUNTING PARTS AND CONNECTIONS

Lift the vehicle, and inspect as follows:

- Check mounting point of each component for looseness, backlash, and damage.
- Check end play of the lower ball joint.

1. Attach a dial gauge so that the contact rests on the brake caliper.
2. Set front wheels in a straight-ahead position. Do not depress brake pedal.
3. Measure axial end play by placing an iron pry bar or something similar between transverse link and steering knuckle.

Standard

Axial end play : 0 mm (0 in)

CAUTION:

Be careful not to damage ball joint boot.

4. If axial end play is outside the standard, remove transverse link and check lower ball joint.

Wheel Alignment

EES00102

DESCRIPTION

- Measure wheel alignment under unladen conditions. “Unladen conditions” means that fuel, coolant, and lubricant are full. However, spare tire, jack, and hand tools should be unloaded.

PRELIMINARY INSPECTION

1. Check the tires for improper air pressure and wear.
2. Check road wheels for runout.
3. Check wheel bearing axial end play.
4. Check lower ball joint axial end play.
5. Check strut operation.
6. Check each mounting point of axle and suspension for looseness and deformation.
7. Check each link and arm for cracks, deformation, and other damage.
8. Check the vehicle posture.

INSPECTION OF CAMBER, CASTER, AND KINGPIN INCLINATION ANGLES

- Camber, caster, and kingpin inclination angles cannot be adjusted.
- Before inspection, mount front wheels onto turning radius gauge. Mount rear wheels onto a stand that has same height so the vehicle will remain horizontal.

1. Measure camber, caster and kingpin inclination of both right and left wheels with a suitable alignment gauge.

Camber, caster and kingpin inclination:

For CR engines:

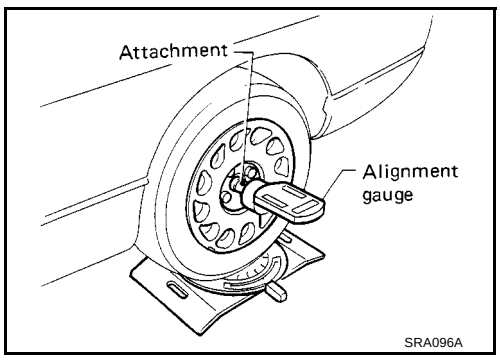
Camber : -0°51′ - 0°39′ (-0.85° - 0.65°)

Caster : 3°42′ - 5°12′ (3.70° - 5.20°)

For K9K engines:

Camber : -0°51′ - 0°39′ (-0.85° - 0.65°)

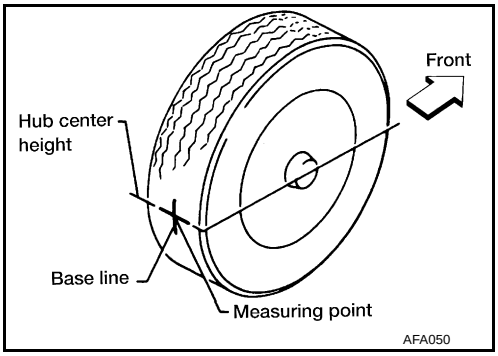
Caster : 3°36′ - 5°06′ (3.60° - 5.10°)



2. If camber, caster or kingpin inclination is not within specification, inspect front suspension parts. Replace dam-aged or worn out parts.

Toe-in

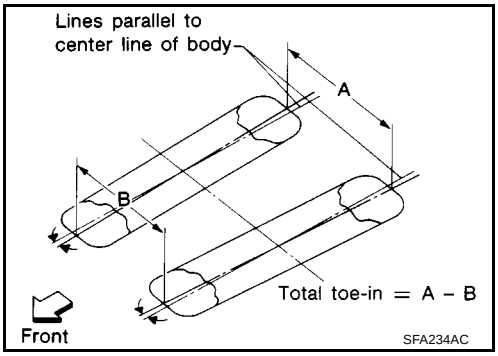
Measure toe-in using the following procedure.



WARNING:

- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of the vehicle before pushing it.**

1. Bounce front of vehicle up and down to stabilize the posture.
2. Push the vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of tread (rear side) of both tires at the same height as hub center. These are measuring points.



4. Measure distance “A” (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180degrees (1/2 turn).

If the wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.

6. Measure distance “B” (front side).

Total toe-in: In 2 - 0 mm (0.08 - 0 in)

STEERING ANGLE INSPECTION

1. Set wheels in straight-ahead position. Move vehicle to set front wheels on turning radius gauge.
2. Turn steering wheel fully to right and left, and measure steering angle. Refer to PS-13, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

COIL SPRING AND SHOCK ABSORBER

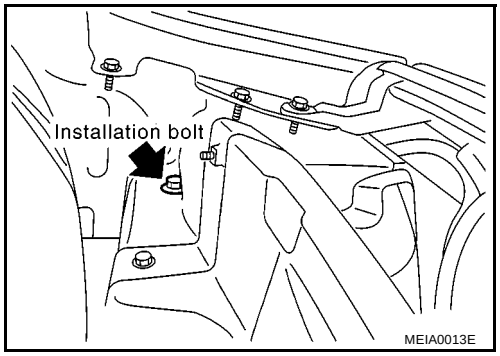
PFP:54302

Removal and Installation

EES00103

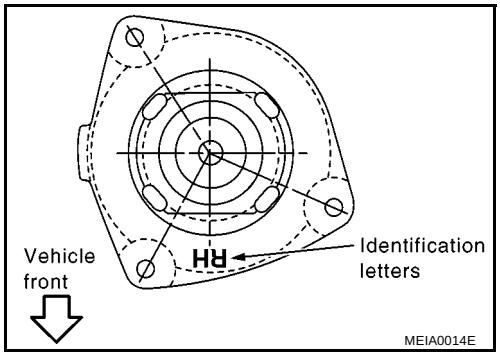
REMOVAL

1. Raise vehicle and remove tire.
2. Remove cowl top cover. Refer to EI-10, "COWL TOP" .
3. Remove electrical wires of ABS wheel sensor from strut. Refer to BRC-44, "WHEEL SENSORS" .
4. Remove brake hose lock plate. Refer to BR-11, "BRAKE PIPING AND HOSE" .
5. Remove stabilizer connecting rod.
6. Remove nuts and bolts securing steering knuckle to strut.
7. Remove upper bolts of the strut and remove strut from the vehicle.



INSTALLATION

- Refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" for tightening torque. Tighten in the reverse order of removal.
- Make sure the identification letters on strut mounting insulator face toward vehicle front. Then install strut.



Disassembly and Assembly

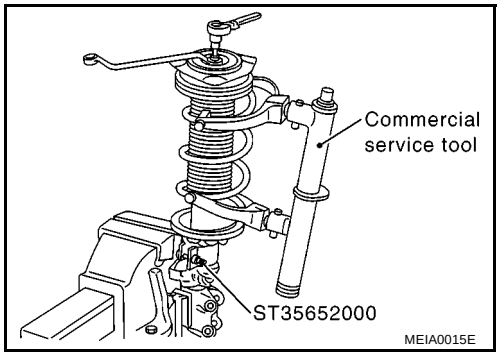
EES00104

DISASSEMBLY

1. Install strut attachment (SST) to strut and fix it in a vise.

   CAUTION:
   When installing strut attachment (SST), wrap a shop cloth around strut to protect it from damage.
2. Slightly loosen piston rod lock nut.

   CAUTION:
   Do not remove piston rod lock nut completely. If it is removed completely, coil spring jumps out and may cause serious damage or injury.
3. Compress coil spring using a spring compressor (commercial service tool).



   CAUTION:
   Start compressing the coil spring after making sure that the spring compressor is completely attached to the coil spring.
4. After making sure coil spring is free between strut mounting bearing and lower seats at the end of Step 3, remove piston rod lock nut.
5. Remove small parts on strut.
   - Remove strut mounting insulator and strut mounting bearing. Remove coil spring from strut.

6. Remove bound bumper.
7. Gradually release spring compressor (commercial service tool), and remove coil spring.

INSPECTION AFTER DISASSEMBLY

Strut Inspection

- Check the strut for deformation, cracks, and damage, and replace if necessary.
- Check piston rod for damage, uneven wear, and distortion, and replace if necessary.
- Check connections and packing for oil leakage, and replace if necessary.

Insulator and Rubber Parts Inspection

Check strut mounting insulator for cracks and rubber parts for wear. Replace them if necessary.

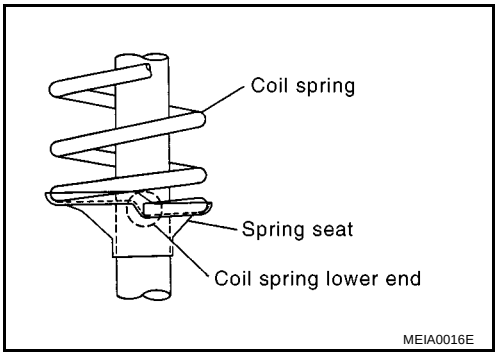
Coil Spring Inspection

Check coil spring for cracks, wear, and damage. Replace if necessary.

ASSEMBLY

1. Compress coil spring using a spring compressor (commercial service tool), and install it onto the strut.

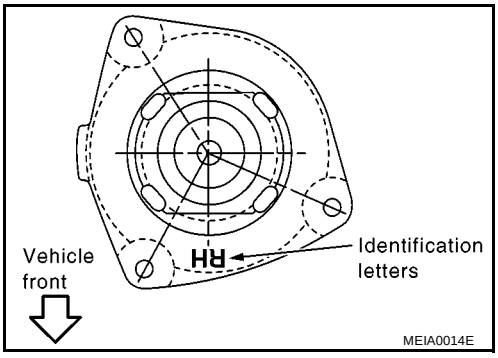
   CAUTION:
   - **Face the small diameter side (there is identification mark in 1.25 rotations) of coil spring downward. Align lower end to spring seat as shown in the figure.**
   - **Start compressing the coil spring after making sure that the spring compressor is completely attached to the coil spring.**



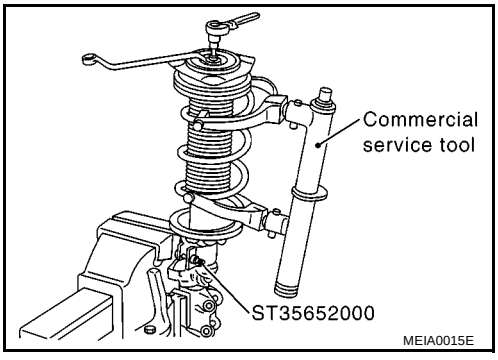
2. Connect bound bumper to strut piston rod.
3. Install small parts to the strut.
   - Attach strut mounting insulator, strut mounting bearing. Position piston rod lock nut.

   CAUTION:
   Do not reuse piston rod lock nut.
4. Be sure the identification letters on strut mounting insulator are positioned as shown.
5. Be sure coil spring is properly set in strut mounting bearing. Gradually release spring compressor (commercial service tool).
6. Tighten piston rod lock nut to the specified torque.

   Tightening torque : 60 - 75 N·m (6.2 - 7.6 kg-m, 45 - 55 ft-lb)



7. Remove strut attachment (SST).



TRANSVERSE LINK

PFP:54500

Removal and Installation

EES00105

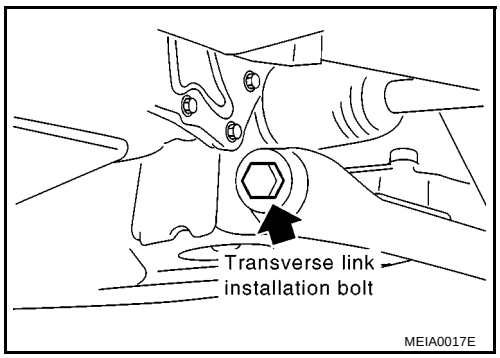
REMOVAL

1. Raise vehicle and remove tire.
2. Remove nuts and bolts of transverse link ball joint, and remove transverse link from steering knuckle.
3. Remove transverse link nuts and bolts, and remove transverse link from suspension member.

   NOTE:
   When removing LH transverse link (A/T models), lower the suspension member in order to remove bolts to avoid contacting and releasing the mounting bolts on vehicle front. Remove suspension member.

a. Set jack under suspension member.

b. Loosen RH upper link mounting bolt, LH upper link mounting bolt (suspension member side), suspension member mounting bolts (left/right). Lower the suspension member in order to remove transverse link mounting bolts.



INSPECTION AFTER REMOVAL

Visual Inspection

Check transverse link and bushing for deformation, cracks, and other damage, and replace entire transverse link assembly if necessary.

Ball Joint Inspection

- Manually move ball stud to confirm it moves smoothly with no binding.

Oscillating Torque Inspection

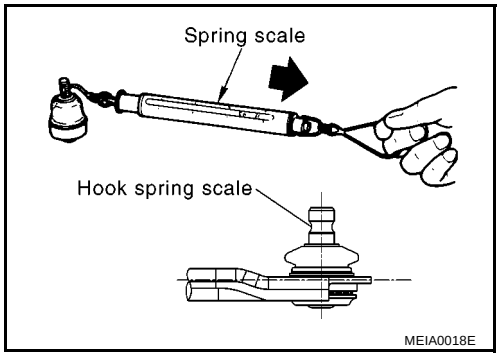
CAUTION:
Before measuring, move the ball joint at least ten times by hand to check for smooth movement.

- Hook the spring scale at the cutout on ball stud, and make sure the spring scale measurement value is within the standard when ball stud begins moving.

  Tensile force : 0.5 - 4.9 N·m (0.05 - 0.5 kg-m, 5 - 43 in-lb)

  Spring balance measurement : 15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)

- If value is outside the standard, replace transverse link.



Axial End Play Inspection

- Move the tip of the ball joint in the axial direction to check for looseness.

  Axial end play : 0 mm (0 in)

- If any looseness is noted, replace transverse link assembly as a single unit.

INSTALLATION

- Refer to FSU-5, "Components" for tightening torque. Tighten in the reverse order of removal.
- Fully tighten transverse link mounting nuts and bolts under unladen condition with tires on level ground.
- After installation, check wheel alignment. Refer to FSU-6, "Wheel Alignment" .

STABILIZER BAR

PFP:54611

Removal and Installation

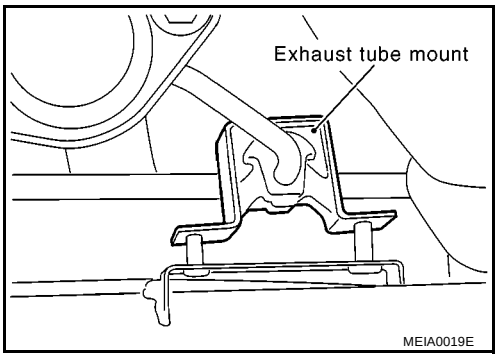
EES00106

REMOVAL

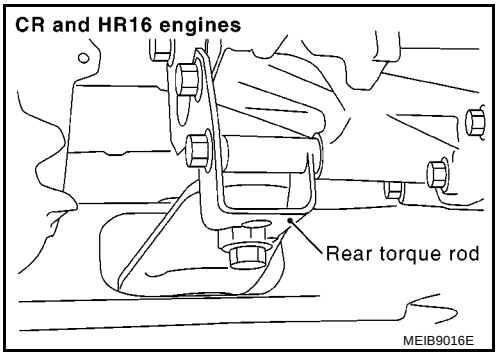
1. Raise vehicle and remove tire.
2. Remove the attachment nut on the stabilizer connecting rod and remove the stabilizer connecting rod.
3. Remove tie-rod from steering knuckle. If it is difficult to remove tie-rod, remove it with a ball joint remover (commercial service tool).

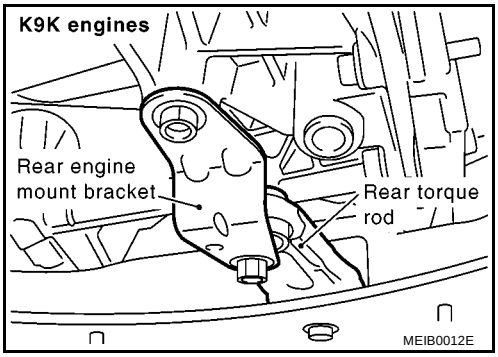
   CAUTION:

   To prevent damage to threads and to prevent ball joint remover (commercial service tool) from coming off, temporarily tighten lock nuts.
4. Remove exhaust tube mount (A/T models). Refer to AT-430, "Removal and Installation"



5. Remove transaxle rear torque rod. Refer to MT-7, "REMOVAL AND INSTALLATION" (with JH3 transaxle) or MT-37, "REMOVAL AND INSTALLATION" (with JR5 transaxle) for M/T models, AT-430, "Removal and Installation" for A/T models.

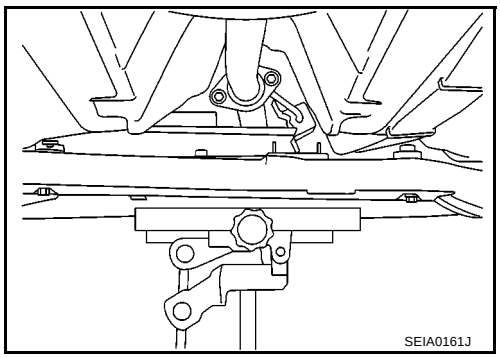




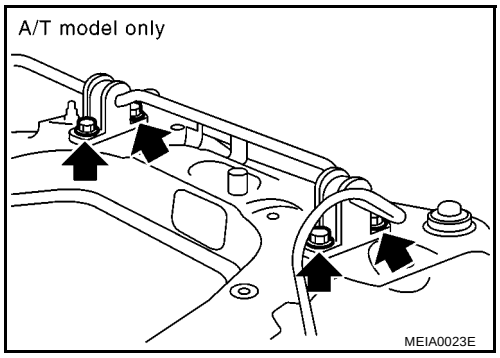
6. Remove rear side bolt of suspension member stay.
7. Set jack under suspension member.
8. Remove bolts of suspension member and suspension member stay.

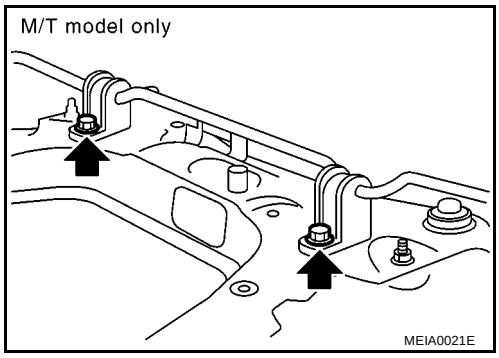
9. Lower suspension member in order to remove stabilizer mounting bolts.

CAUTION:
Be careful not to lower it too far. (Do not overload the links.)



10. Remove stabilizer bolt and remove clamp and bushing.
11. Remove stabilizer from the vehicle.



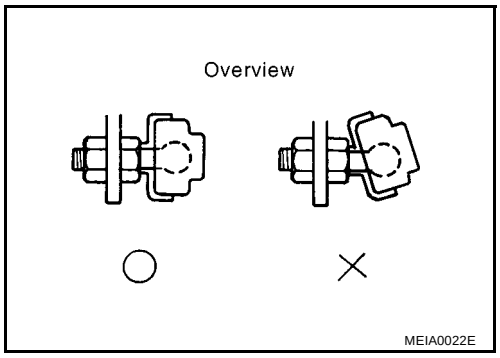


INSPECTION AFTER REMOVAL

Check stabilizer, connecting rod, bushing and clamp for deformation, cracks and damage. Replace if necessary.

INSTALLATION

- Refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" for tightening torque. Tighten in the reverse order of removal.
- Because the stabilizer uses the pillow ball type connecting rod, position the ball joint with the case on the pillow ball head parallel to the stabilizer.



FRONT SUSPENSION MEMBER

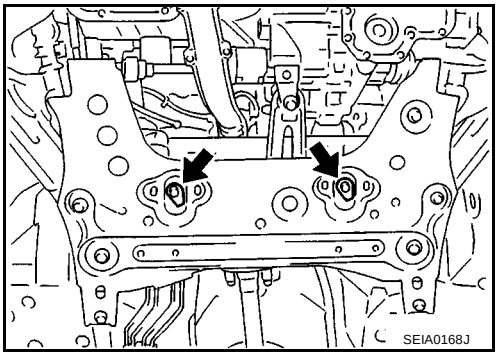
PFP:54401

Removal and Installation

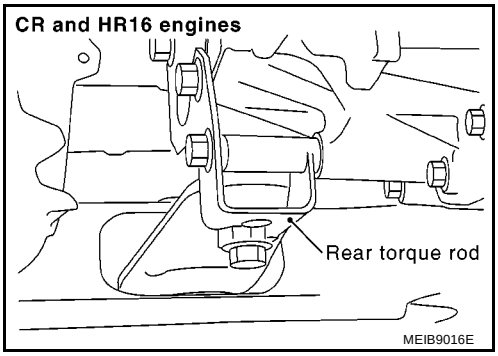
EES00107

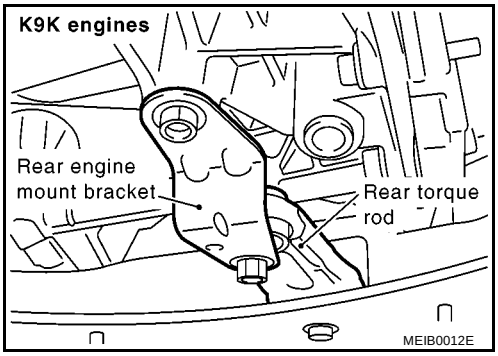
REMOVAL

1. Raise vehicle and remove tire.
2. Remove stabilizer connecting rod.
3. Remove nuts and bolts of transverse link ball joint, and remove transverse link from steering knuckle.
4. Remove steering gear mounting nuts and bolts. Separate steering gear from suspension member.

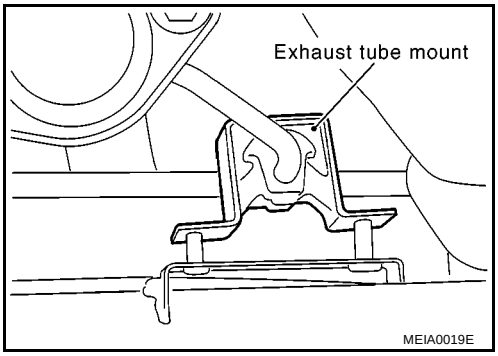


5. Remove transaxle rear torque rod. Refer to MT-7, "REMOVAL AND INSTALLATION" (with JH3 transaxle) or MT-37, "REMOVAL AND INSTALLATION" (with JR5 transaxle) for M/T models, AT-430, "Removal and Installation" for A/T models.





6. Remove exhaust tube mount (A/T models). Refer to EX-4, "REMOVAL" .
7. Remove body side bolt of upper link.
8. Set a jack under suspension member, and remove suspension member mounting bolts. Remove upper link, transverse link and stabilizer as a set.
9. Remove upper link, transverse link and stabilizer from the suspension member.



INSPECTION AFTER REMOVAL

Check suspension member for deformed parts, cracks, or any other damage. Replace if necessary.

INSTALLATION

- Refer to FSU-5, "FRONT SUSPENSION ASSEMBLY" for tightening torque. Tighten in the reverse order of removal.
- After finishing work, perform final tightening of each part under unladen condition with tires on level ground. Check wheel alignment. Refer to FSU-6, "Wheel Alignment" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Alignment

EES00108

FOR CR ENGINES:

Drive type	2WD
Camber	-0°51’ - 0°39’ (-0.85° - 0.65°)
Caster	3°42’ - 5°12’ (3.70° - 5.20°)
Kingpin offset	9°03’ - 10°33’ (9.05° - 10.55°)
Toe-in	In 2 - 0 mm (0.08 - 0 in)

FOR K9K ENGINES:

Drive type	2WD
Camber	-0°51’ - 0°39’ (-0.85° - 0.65°)
Caster	3°36’ - 5°06’ (3.60° - 5.10°)
Kingpin offset	9°03’ - 10°33’ (9.05° - 10.55°)
Toe-in	In 2 - 0 mm (0.08 - 0 in)

Ball Joint

EES00109

FOR CR ENGINES:

Axial end play	0mm (0 in)
Sliding torque	0.5 - 4.9 N·m (0.05 - 0.5 kg-m, 5 - 43 in-lb)
Spring scale measurement (ball stud cutout)	15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)

FOR K9K ENGINES:

Axial end play	0mm (0 in)
Sliding torque	0.5 - 4.9 N·m (0.05 - 0.50 kg-m, 5 - 43 in-lb)
Spring scale measurement (ball stud cutout)	15.4 - 150.8 N (1.6 - 15.4 kg, 3.5 - 33.9 lb)

Tightening Torque

EES0010A

Unit: N·m (kg-m, ft-lb)

<table>
<tr><td rowspan="3">Transverse link to suspension member</td><td colspan="2">Front</td><td rowspan="2">Rear</td></tr>
<tr><td>M/T</td><td>A/T</td></tr>
<tr><td>90 - 107 (9.2 - 10.9, 67 - 78)</td><td>Right: 140 - 160 (15 - 16, 104 - 118)
Left: 90 - 107 (9.2 - 10.9, 67 - 78)</td><td>Rear: 90 - 107 (9.2 - 10.9, 67 - 78)</td></tr>
<tr><td>Steering knuckle to Transverse link</td><td colspan="3">54 - 66 (5.5 - 6.7, 40 - 48)</td></tr>
<tr><td>Stabilizer connecting rod to Strut</td><td colspan="3">38 - 50 (3.9 - 5.0, 28 - 36)</td></tr>
<tr><td>Strut mounting insulator to Body</td><td colspan="3">15 - 19.5 (1.6 - 1.9, 11 - 14)</td></tr>
<tr><td>Strut piston rod lock nut</td><td colspan="3">60 - 75 (6.2 - 7.6, 45 - 55)</td></tr>
<tr><td>Strut to Steering knuckle</td><td colspan="3">100 - 117 (11 - 12, 74 - 86)</td></tr>
<tr><td>Upper link to Body</td><td colspan="3">68 - 83 (7.0 - 8.4, 51 - 61)</td></tr>
<tr><td rowspan="3">Upper link to Suspension member</td><td colspan="2">Right</td><td rowspan="2">Left</td></tr>
<tr><td>M/T</td><td>A/T</td></tr>
<tr><td>90 - 107 (9.2 - 10.9, 67 - 78)</td><td>140 - 160 (15 - 16, 104 - 118)</td><td>90 - 107 (9.2 - 10.9, 67 - 78)</td></tr>
<tr><td>Suspension member to Body</td><td colspan="3">100 - 115 (11 - 12, 74 - 84)</td></tr>
<tr><td>Suspension member stay to Body (rear)</td><td colspan="3">40 - 50 (4.1 - 5.0, 30 - 36)</td></tr>
<tr><td>Suspension member to Stabilizer clamp</td><td colspan="3">28 - 35 (2.9 - 3.5, 21 - 25)</td></tr>
</table>

SECTION GI
GENERAL INFORMATION

CONTENTS

PRECAUTIONS 3
Description 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for NATS (NISSAN ANTI-THEFT SYSTEM) 3
General Precautions 4
Precautions for Three Way Catalyst 5
Precautions for Fuel 5
GASOLINE ENGINE (REGULAR GASOLINE) 5
GASOLINE ENGINE (PREMIUM GASOLINE) 5
DIESEL ENGINE 5
Precautions for Multiport Fuel Injection System or Engine Control System 6
Precautions for Turbocharger (If Equipped) 6
Precautions for Hoses 6
HOSE REMOVAL AND INSTALLATION 6
HOSE CLAMPING 7
Precautions for Engine Oils 7
HEALTH PROTECTION PRECAUTIONS 7
ENVIRONMENTAL PROTECTION PRECAUTIONS 8
Precautions for Air Conditioning 8
HOW TO USE THIS MANUAL 9
Description 9
Terms 9
Units 9
Contents 9
Components 9
SYMBOLS 10
How to Follow Trouble Diagnoses 10
DESCRIPTION 10
HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES 11
HARNESS WIRE COLOR AND CONNECTOR NUMBER INDICATION 12
KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES 13
How to Read Wiring Diagrams 14
CONNECTOR SYMBOLS 14
SAMPLE/WIRING DIAGRAM - EXAMPL - 16
DESCRIPTION 17
Abbreviations 22
SERVICE INFORMATION FOR ELECTRICAL INCIDENT 24
How to Perform Efficient Diagnosis for an Electrical Incident 24
WORK FLOW 24
INCIDENT SIMULATION TESTS 24
CIRCUIT INSPECTION 27
Control Units and Electrical Parts 32
PRECAUTIONS 32
SMJ INSTALLATION 33
CONSULT-II CHECKING SYSTEM 34
Description 34
Function and System Application 34
Nickel Metal Hydride Battery Replacement 34
Checking Equipment 35
CONSULT-II Start Procedure 35
CONSULT-II Data Link Connector (DLC) Circuit 36
INSPECTION PROCEDURE 37
LIFTING POINT 38
Special Service Tools 38
Garage Jack and Safety Stand 38
2-pole Lift 39
Board-on Lift 40
TOW TRUCK TOWING 41
Tow Truck Towing 41
TOWING AN AUTOMATIC TRANSAXLE MODEL OR H·CVT MODEL WITH FOUR WHEELS ON GROUND 41
TOWING AN AUTOMATIC TRANSAXLE MODEL OR H·CVT MODELS WITH REAR WHEELS RAISED (WITH FRONT WHEELS ON GROUND) 41
Vehicle Recovery (Freeing a stuck vehicle) 42
TIGHTENING TORQUE OF STANDARD BOLTS ... 43
Tightening Torque Table 43
IDENTIFICATION INFORMATION 44

Model Variation 44
IDENTIFICATION NUMBER 46
IDENTIFICATION PLATE 47
ENGINE SERIAL NUMBER (CR ENGINE) 47
ENGINE IDENTIFICATION (K9K ENGINE) 47
AUTOMATIC TRANSAXLE NUMBER 48
Dimensions 48
Wheels & Tires 48
TERMINOLOGY 49
ISO 15031-2 Terminology List 49

PRECAUTIONS

PFP:00001

Description

EAS000PE

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EAS000PF

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions for NATS (NISSAN ANTI-THEFT SYSTEM)

EAS000PG

NATS will immobilize the engine if someone tries to start it without the registered key of NATS.
Both of the originally supplied ignition key IDs have been NATS registered.
The security indicator is located on the instrument panel. The indicator blinks when the immobilizer system is functioning.
Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system.

- When NATS detects trouble, the security indicator lamp lights up while ignition switch is in "ON" position. This lighting up indicates that the anti-theft is not functioning, so prompt service is required.
- When servicing NATS (trouble diagnoses, system initialization and additional registration of other NATS ignition key IDs), CONSULT-II hardware and CONSULT-II NATS software is necessary.
  Regarding the procedures of NATS initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS.

Therefore, CONSULT-II NATS software (program card and operation manual) must be kept strictly confidential to maintain the integrity of the anti-theft function.

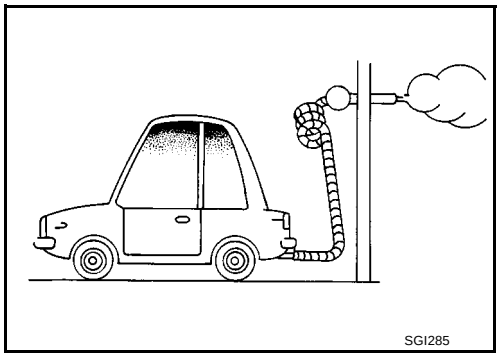
- When servicing NATS (trouble diagnoses, system initialization and additional registration of other NATS ignition key IDs), it may be necessary to re-register original key identification. Therefore, be sure to receive all keys from vehicle owner. A maximum of four or five key IDs can be registered into NATS.
- When failing to start the engine first time using the key of NATS, start as follows.

1. Leave the ignition key in "ON" position for approximately 5 seconds.
2. Turn ignition key to "OFF" or "LOCK" position and wait approximately 5 seconds.
3. Repeat step 1 and 2 again.
4. Restart the engine while keeping the key separate from any others on key-chain.

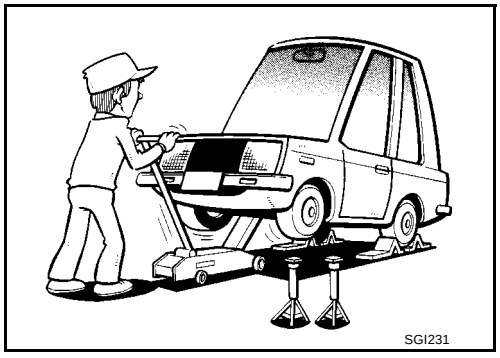
General Precautions

EAS000PH

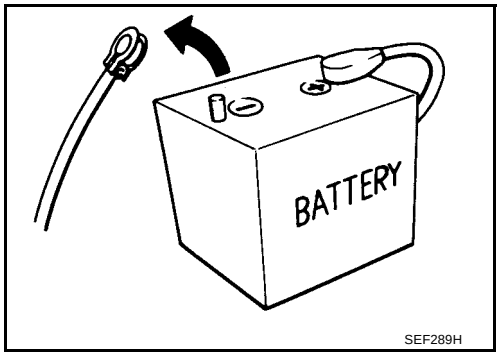
- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.


SGI285

- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.

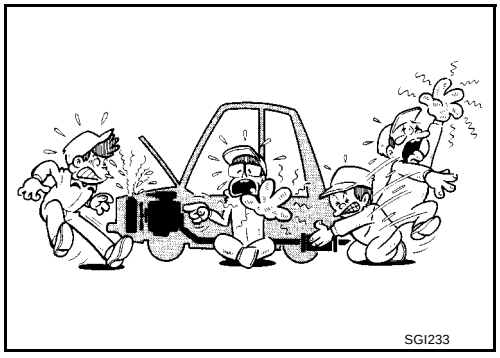

SGI231

- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.



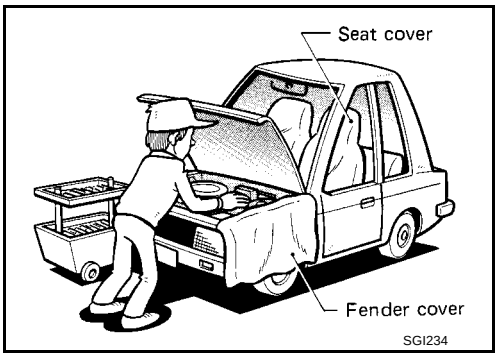
SEF289H

- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.


SGI233

- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.

- Use approved bonding agent, sealants or their equivalents when required.
- Use tools and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leaks.
- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



WARNING:
To prevent ECM from storing the diagnostic trouble codes, do not carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

Precautions for Three Way Catalyst

EAS000PI

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.

- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Precautions for Fuel

EAS000PJ

GASOLINE ENGINE (REGULAR GASOLINE)

- Three way catalyst equipped models ... use unleaded gasoline with an octane rating of at least 91 RON (research octane number).

  CAUTION:
  Do not use leaded gasoline. Using leaded gasoline will damage the three way catalyst.
- Except for the above models ... use unleaded or leaded gasoline with an octane rating of at least 88 RON (research octane number).
  Use unleaded gasoline if instructed on the fuel filler lid.

GASOLINE ENGINE (PREMIUM GASOLINE)

Use premium unleaded gasoline with an octane rating of at least 95 RON (research octane number). If premium unleaded gasoline is not available, regular unleaded gasoline with an octane rating of at least 91 RON (research octane number) can be used. However, for maximum vehicle performance, the use of premium unleaded gasoline is recommended.

CAUTION:
Do not use leaded gasoline. Using leaded gasoline will damage the three way catalyst. Using a fuel other than that specified could adversely affect the emission control devices and systems, and could also affect the warranty coverage validity.

DIESEL ENGINE

- For Europe model; use diesel fuel of at least 50 cetane.
- Except for Europe model; use diesel fuel of at least 45 cetane.

If two types of diesel fuel are available, use summer or winter fuel properly according to the following temperature conditions.

- Above -7°C (20°F) ⋯ Summer type diesel fuel.
- Below -7°C (20°F) ⋯ Winter type diesel fuel.

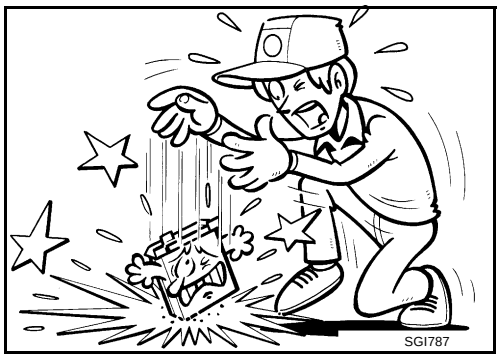
CAUTION:

- **Do not use home heating oil, gasoline or other alternate fuels in your diesel engine. The use of those can cause engine damage.**
- **Do not use summer fuel at temperature below -7°C (20°F). The cold temperature will cause wax to form in the fuel. As a result, it may prevent the engine from running smoothly.**
- **Do not add gasoline or other alternate fuels to diesel fuel.**

Precautions for Multiport Fuel Injection System or Engine Control System

EAS000PK

- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

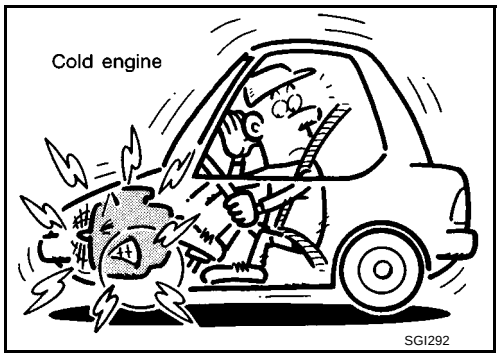

SGI787

Precautions for Turbocharger (If Equipped)

EAS000PL

The turbocharger turbine revolves at extremely high speeds and becomes very hot. Therefore, it is essential to maintain a clean supply of oil flowing through the turbocharger and to follow all required maintenance instructions and operating procedures.

- Always use the recommended oil. Follow the instructions for proper time to change the oil and proper oil level.
- Avoid accelerating engine to a high rpm immediately after starting.
- If engine had been operating at high rpm for an extended period of time, let it idle for a few minutes prior to shutting if off.



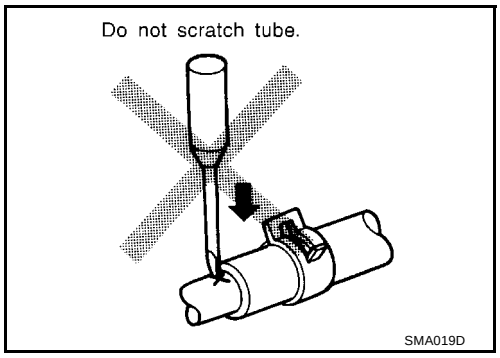
SGI292

Precautions for Hoses

EAS000PM

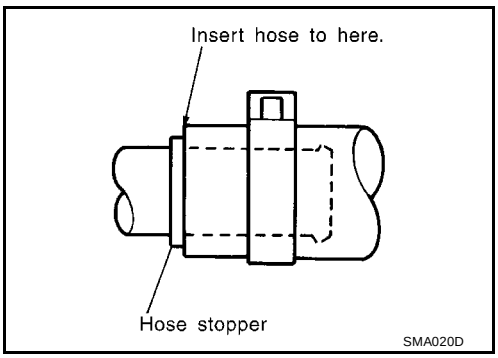
HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.



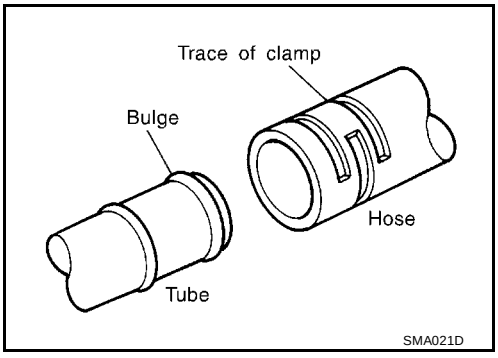
SMA019D

- To reinstall the rubber hose securely, make sure that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

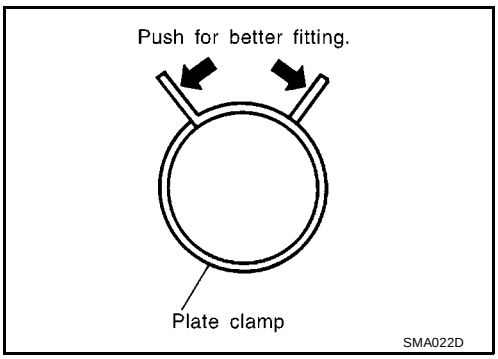


HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Precautions for Engine Oils

EAS000PN

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.

- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

ENVIRONMENTAL PROTECTION PRECAUTIONS

For the service site in UK, burning used engine oil in small space heaters or boilers can be recommended only for units of approved design. The heating system must meet the requirements of HM Inspectorate of Pollution for small burners of less than 0.4 MW. If in doubt check with the appropriate local authority and/or manufacturer of the approved appliance.
Dispose of used oil and used oil filters through authorized waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the local authority for advice on disposal facilities.
It is illegal to pour used oil on to the ground, down sewers or drains, or into water sources.
The regulations concerning pollution vary between regions.

Precautions for Air Conditioning

EAS000PO

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to ATC/MTC section “HFC-134a (R-134a) Service Procedure”, “REFRIGERANT LINES” for specific instructions.

HOW TO USE THIS MANUAL

PFP:00008

Description

EAS000PP

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

EAS000PQ

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value:Tolerance at inspection and adjustment.
  Limit value:The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

EAS000PR

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  “Example”

Outer Socket Lock Nut : 59 - 78 N-m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

Contents

EAS000PS

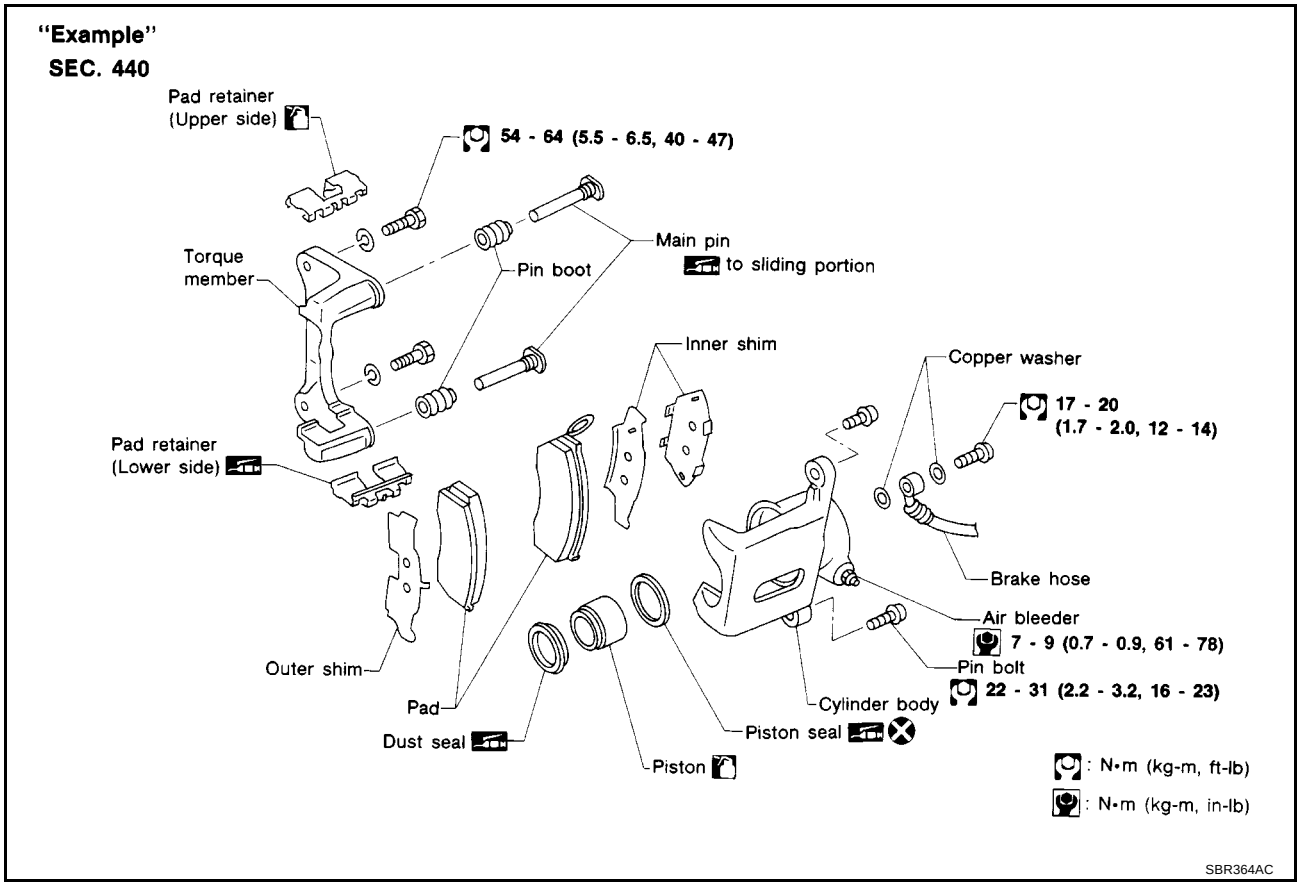
- **ALPHABETICAL INDEX** is provided at the end of this manual so that you can rapidly find the item and page you are searching for.
- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

Components

EAS000PT

- **THE LARGE ILLUSTRATIONS** are exploded views (See the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.

The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG** .



SYMBOLS

SYMBOL	DESCRIPTION
	Tightening torque
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.
	Should be lubricated with oil.
	Sealing point
	Checking point
	Always replace after every disassembly.
P	Apply petroleum jelly.
ATF	Apply ATF.
★	Select with proper thickness.
☆	Adjustment is required.

How to Follow Trouble Diagnoses

EAS000PU

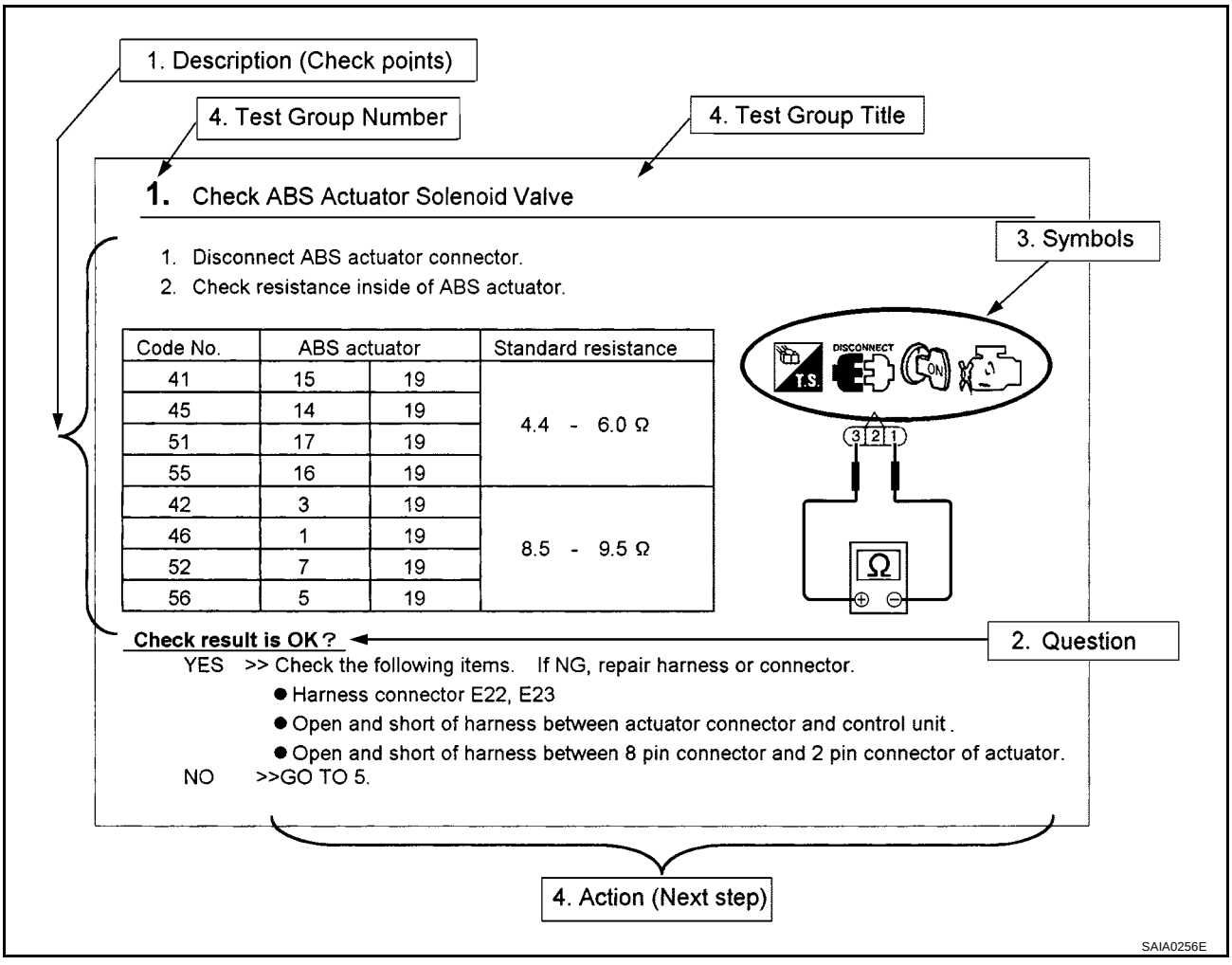
DESCRIPTION

NOTICE:

Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

1. **Before performing trouble diagnoses, read the “Preliminary Check”, the “Symptom Chart” or the “Work Flow”.**
2. **After repairs, re-check that the problem has been completely eliminated.**
3. **Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.**
4. **Refer to the Circuit Diagram for quick pinpoint check.**
   If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
5. **When checking circuit continuity, ignition switch should be OFF.**
6. **Before checking voltage at connectors, check battery voltage.**
7. **After accomplishing the Diagnostic Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.**

HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES



1. **Work and diagnostic procedure**
   Start to diagnose a problem using procedures indicated in enclosed test groups.
2. **Questions and required results**
   Questions and required results are indicated in bold type in test group.
   The meaning of are as follows:

   a. Battery voltage → 11 - 14V or approximately 12V

   b. Voltage : Approximately 0V → Less than 1V

3. **Symbol used in illustration**

Symbols included in illustrations refer to measurements or procedures. Before diagnosing a problem, familiarize yourself with each symbol. Refer to "Connector Symbols" in GI Section and "KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES" below.

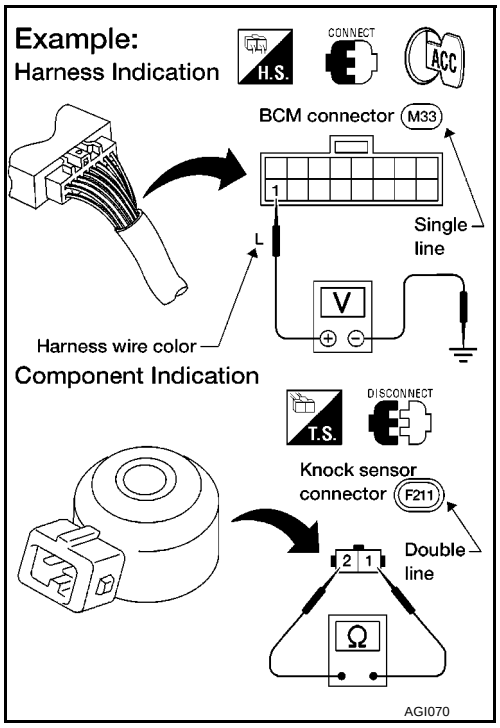
4. **Action items**
   Next action for each test group is indicated based on result of each question. Test group number is shown in the left upper portion of each test group.

HARNESS WIRE COLOR AND CONNECTOR NUMBER INDICATION

There are two types of harness wire color and connector number indication.

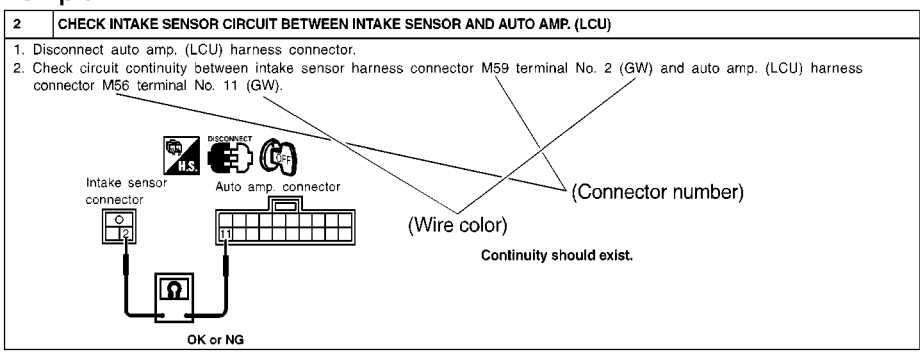
TYPE 1: Harness Wire Color and Connector Number are Shown in Illustration

- Letter designations next to test meter probe indicate harness wire color.
- Connector numbers in a single circle (e.g. M33) indicate harness connectors.
- Connector numbers in a double circle (e.g. F211) indicate component connectors.

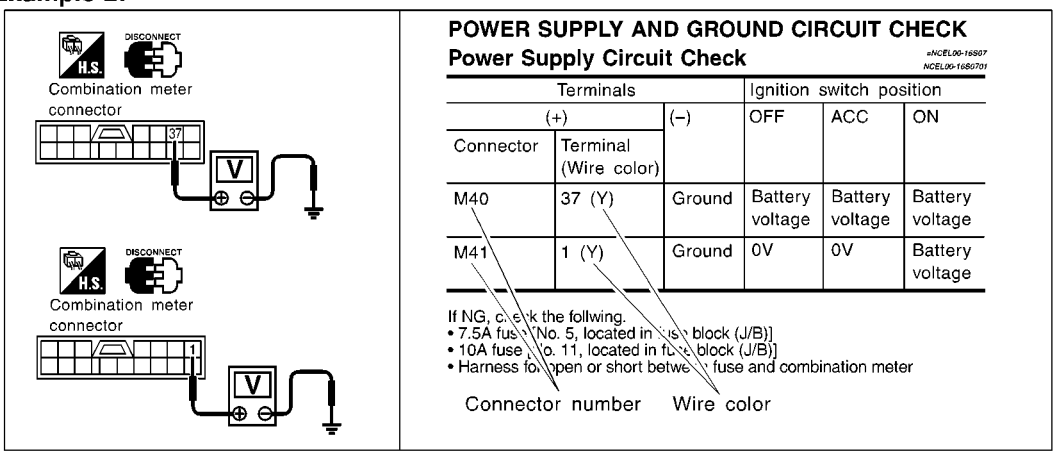


TYPE 2: Harness Wire Color and Connector Number are Shown in Text

Example 1:



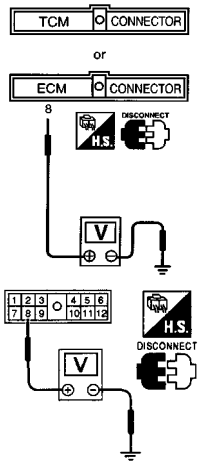
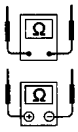
Example 2:



SGI144A

KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES

Symbol	Symbol explanation	Symbol	Symbol explanation
DISCONNECT	Check after disconnecting the connector to be measured.	GST	Procedure with Generic Scan Tool (GST, OBD-II scan tool)
CONNECT	Check after connecting the connector to be measured.	NO TOOLS	Procedure without CONSULT, CONSULT-II or GST
	Insert key into ignition switch.	A/C	A/C switch is “OFF”.
	Remove key from ignition switch.	A/C	A/C switch is “ON”.
OFF	Turn ignition switch to “OFF” position.		REC switch is “ON”.
ON	Turn ignition switch to “ON” position.		REC switch is “OFF”.
ST	Turn ignition switch to “START” position.		Fan switch is “ON”. (At any position except for “OFF” position)
OFF ACC	Turn ignition switch from “OFF” to “ACC” position.		Fan switch is “OFF”.
ACC OFF	Turn ignition switch from “ACC” to “OFF” position.	FUSE BAT	Apply positive voltage from battery with fuse directly to components.

Symbol	Symbol explanation	Symbol	Symbol explanation
	Turn ignition switch from “OFF” to “ON” position.		Drive vehicle.
	Turn ignition switch from “ON” to “OFF” position.		Disconnect battery negative cable.
	Do not start engine, or check with engine stopped.		Depress brake pedal.
	Start engine, or check with engine running.		Release brake pedal.
	Apply parking brake.		Depress accelerator pedal.
	Release parking brake.		Release accelerator pedal.
	Check after engine is warmed up sufficiently.		Pin terminal check for SMJ type ECM and TCM connectors. **For details regarding the terminal arrangement, refer to the “ELECTRICAL UNITS” electrical reference page at the end of the manual.**
	Voltage should be measured with a voltmeter.		
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT-II		
	Procedure without CONSULT-II		

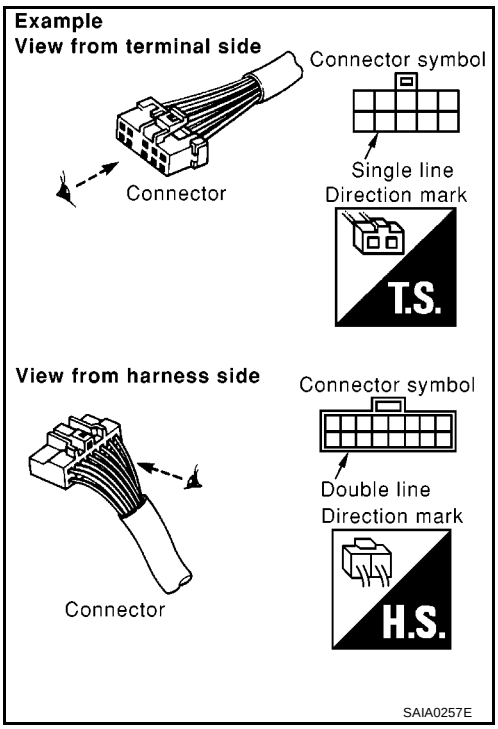
How to Read Wiring Diagrams

EAS000PV

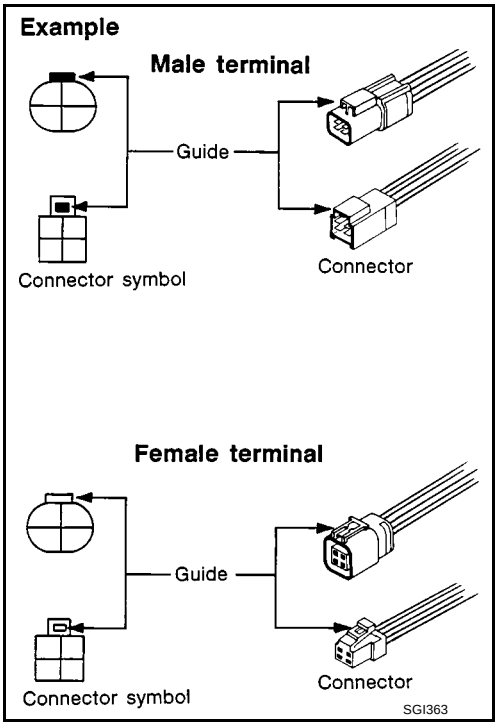
CONNECTOR SYMBOLS

Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, “Description”, “HARNESS CONNECTOR”.

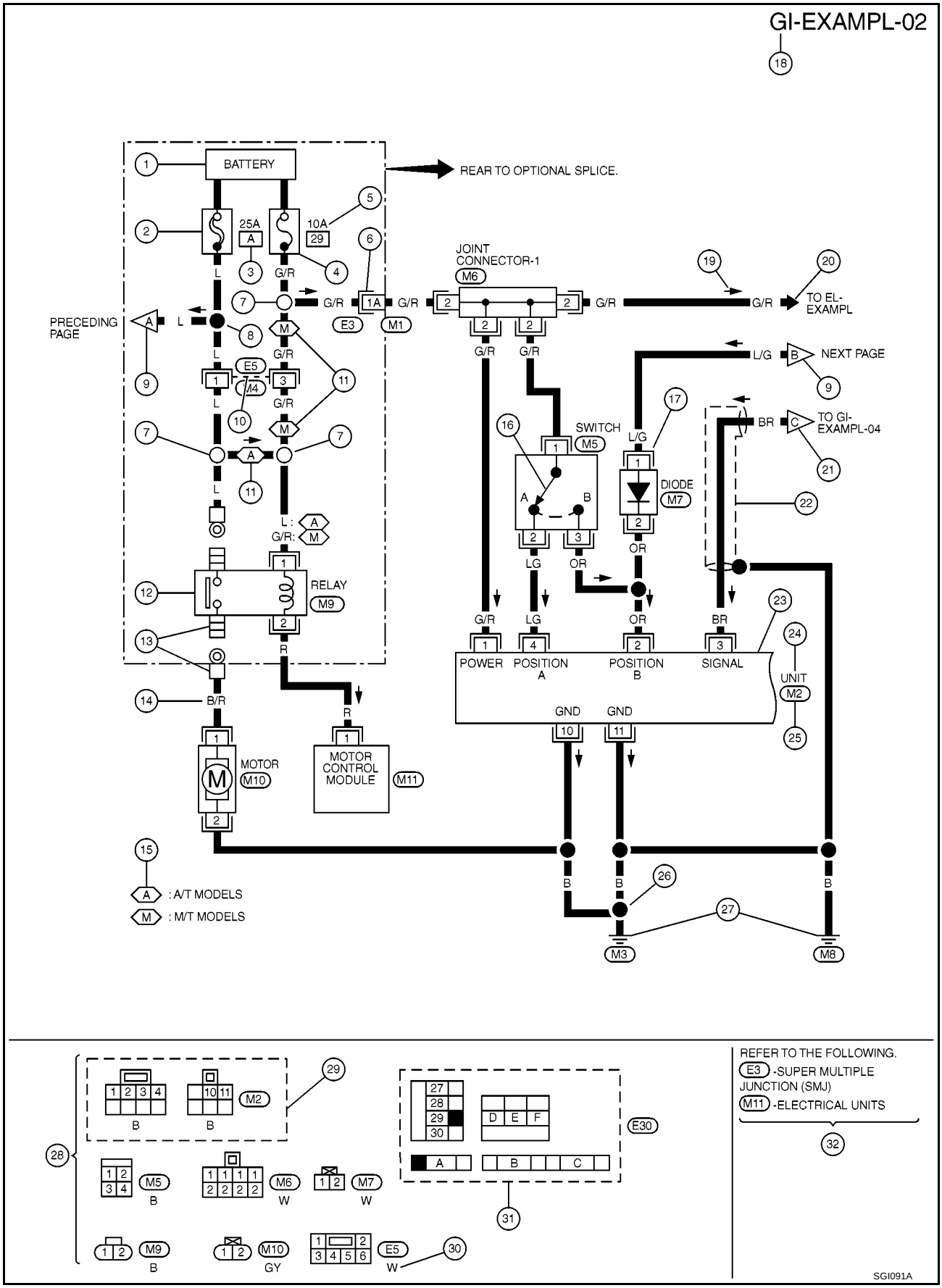


- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.

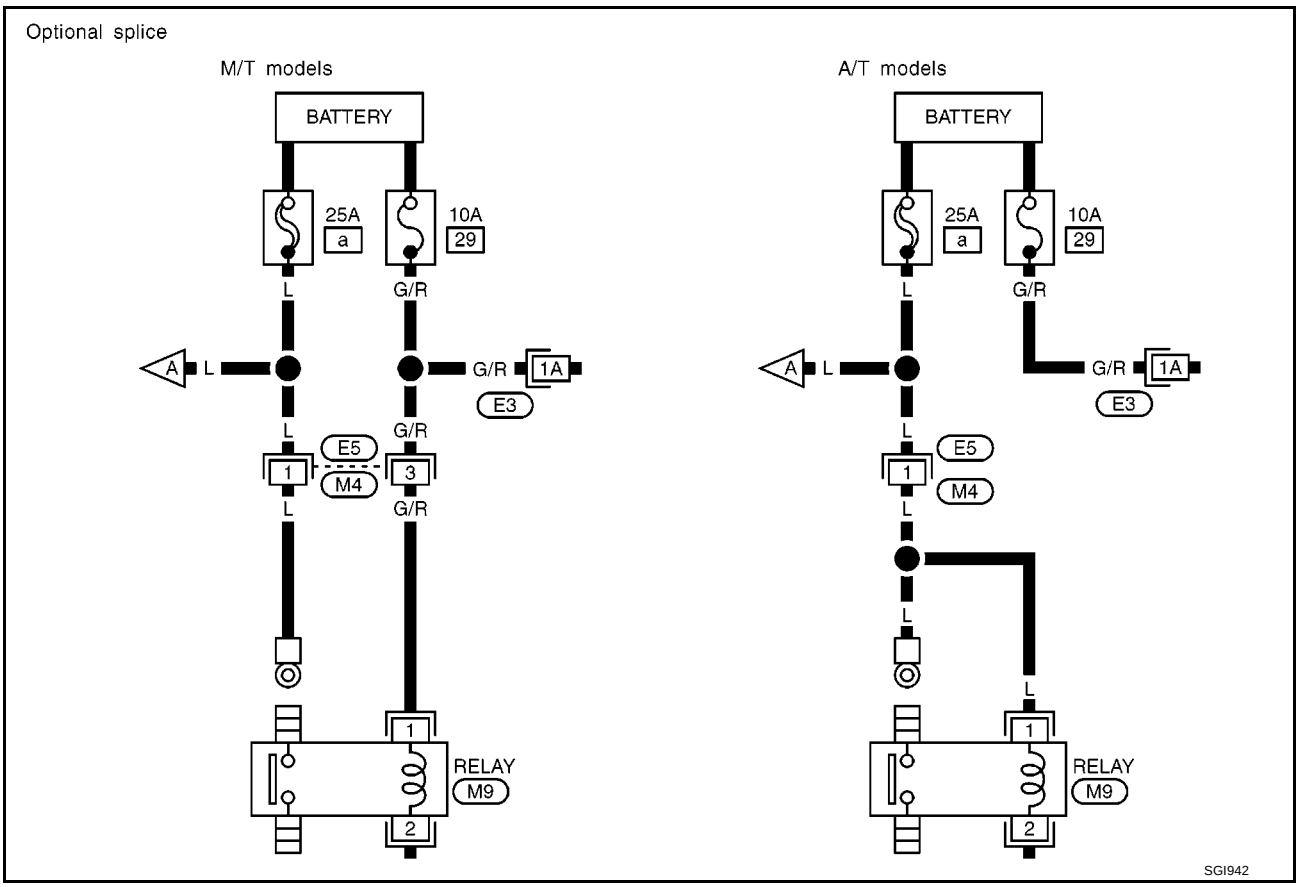


SAMPLE/WIRING DIAGRAM - EXAMPL -

- For detail, refer to following “DESCRIPTION”.



Optional Splice



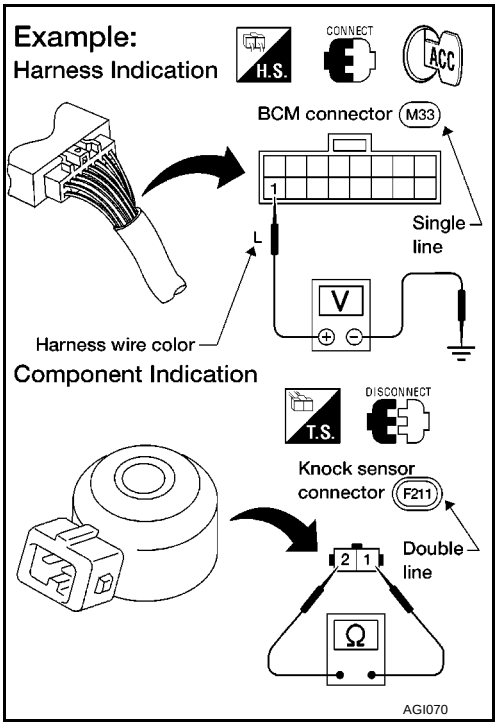
DESCRIPTION

Number	Item	Description
1	Power condition	● This shows the condition when the system receives battery positive voltage (can be operated).
2	Fusible link	● The double line shows that this is a fusible link. ● The open circle shows current flow in, and the shaded circle shows current flow out.
3	Fusible link/fuse location	● This shows the location of the fusible link or fuse in the fusible link or fuse box. For arrangement, refer to PG section, POWER SUPPLY ROUTING.
4	Fuse	● The single line shows that this is a fuse. ● The open circle shows current flow in, and the shaded circle shows current flow out.
5	Current rating	● This shows the current rating of the fusible link or fuse.
6	Connectors	● This shows that connector E3 is female and connector M1 is male. ● The G/R wire is located in the 1A terminal of both connectors. ● Terminal number with an alphabet (1A, 5B, etc.) indicates that the connector is SMJ connector. Refer to PG section, SMJ (SUPER MULTIPLE JUNCTION).
7	Optional splice	● The open circle shows that the splice is optional depending on vehicle application.
8	Splice	● The shaded circle shows that the splice is always on the vehicle.
9	Page crossing	● This arrow shows that the circuit continues to an adjacent page. ● The A will match with the A on the preceding or next page.
10	Common connector	● The dotted lines between terminals show that these terminals are part of the same connector.
11	Option abbreviation	● This shows that the circuit is optional depending on vehicle application.
12	Relay	● This shows an internal representation of the relay. For details, refer to PG section, STANDARDIZED RELAY.
13	Connectors	● This shows that the connector is connected to the body or a terminal with bolt or nut.

Number	Item	Description
14	Wire color	● This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
15	Option description	● This shows a description of the option abbreviation used on the page.
16	Switch	● This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
17	Assembly parts	● Connector terminal in component shows that it is a harness incorporated assembly.
18	Cell code	● This identifies each page of the wiring diagram by section, system and wiring diagram page number.
19	Current flow arrow	● Arrow indicates electric current flow, especially where the direction of standard flow (vertically downward or horizontally from left to right) is difficult to follow. ● A double arrow “ ↔ ” shows that current can flow in either direction depending on circuit operation.
20	System branch	● This shows that the system branches to another system identified by cell code (section and system).
21	Page crossing	● This arrow shows that the circuit continues to another page identified by cell code. ● The C will match with the C on another page within the system other than the next or preceding pages.
22	Shielded line	● The line enclosed by broken line circle shows shield wire.
23	Component box in wave line	● This shows that another part of the component is also shown on another page (indicated by wave line) within the system.
24	Component name	● This shows the name of a component.
25	Connector number	● This shows the connector number. ● The letter shows which harness the connector is located in. ● Example: **M** : main harness. For detail and to locate the connector, refer to PG section "Main Harness", “Harness Layout”. A coordinate grid is included for complex harnesses to aid in locating connectors.
26	Ground (GND)	● The line spliced and grounded under wire color shows that ground line is spliced at the grounded connector.
27	Ground (GND)	● This shows the ground connection. For detailed ground distribution information, refer to "Ground Distribution" in PG section.
28	Connector views	● This area shows the connector faces of the components in the wiring diagram on the page.
29	Common component	● Connectors enclosed in broken line show that these connectors belong to the same component.
30	Connector color	● This shows a code for the color of the connector. For code meaning, refer to wire color codes, Number 14 of this chart.
31	Fusible link and fuse box	● This shows the arrangement of fusible link(s) and fuse(s), used for connector views of "POWER SUPPLY ROUTING" in PG section. The open square shows current flow in, and the shaded square shows current flow out.
32	Reference area	● This shows that more information on the Super Multiple Junction (SMJ) and Joint Connectors (J/C) exists on the PG section. Refer to "Reference Area" for details.

Harness Indication

- Letter designations next to test meter probe indicate harness (connector) wire color.
- Connector numbers in a single circle M33 indicate harness connectors.



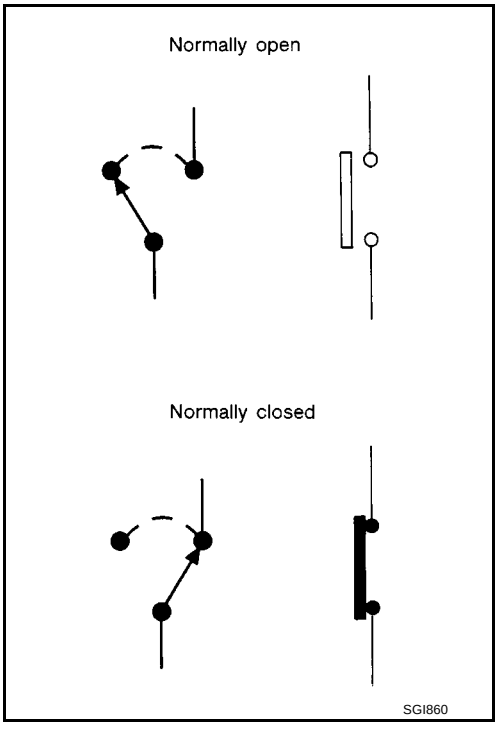
Component Indication

Connector numbers in a double circle F211 indicate component connectors.

Switch Positions

Switches are shown in wiring diagrams as if the vehicle is in the “normal” condition.
A vehicle is in the “normal” condition when:

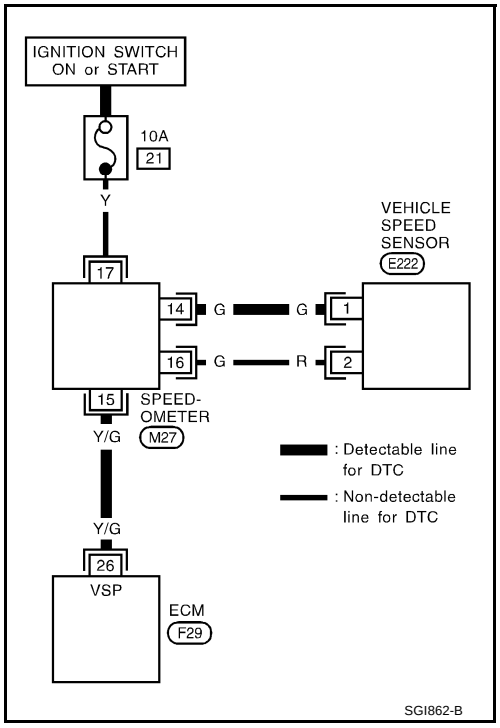
- ignition switch is “OFF”,
- doors, hood and trunk lid/back door are closed,
- pedals are not depressed, and
- parking brake is released.



Detectable Lines and Non-Detectable Lines

In some wiring diagrams, two kinds of lines, representing wires, with different weight are used.

- A line with regular weight (wider line) represents a “detectable line for DTC (Diagnostic Trouble Code)”. A “detectable line for DTC” is a circuit in which ECM can detect its malfunctions with the on board diagnostic system.
- A line with less weight (thinner line) represents a “non-detectable line for DTC”. A “non-detectable line for DTC” is a circuit in which ECM cannot detect its malfunctions with the on board diagnostic system.



Multiple Switch

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.
- The switch diagram is used in wiring diagrams.

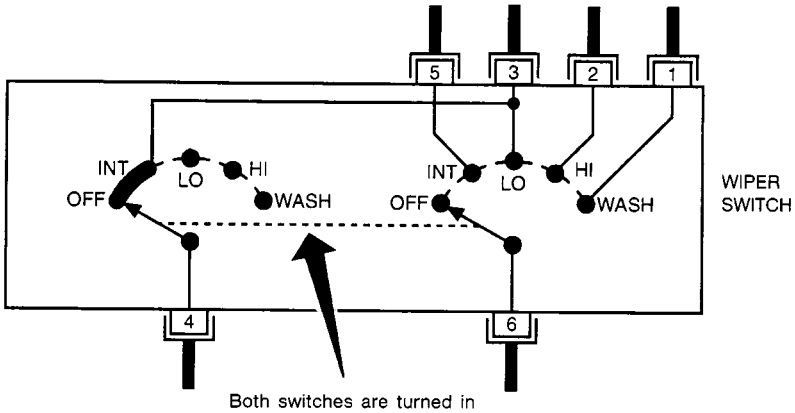
Example

(SWITCH CHART)

WIPER SWITCH

	OFF	INT	LO	HI	WASH
1					○
2				○	
3	○	○	○		
4	○	○			
5		○			
6		○	○	○	○

(SWITCH DIAGRAM)



Continuity circuit of wiper switch

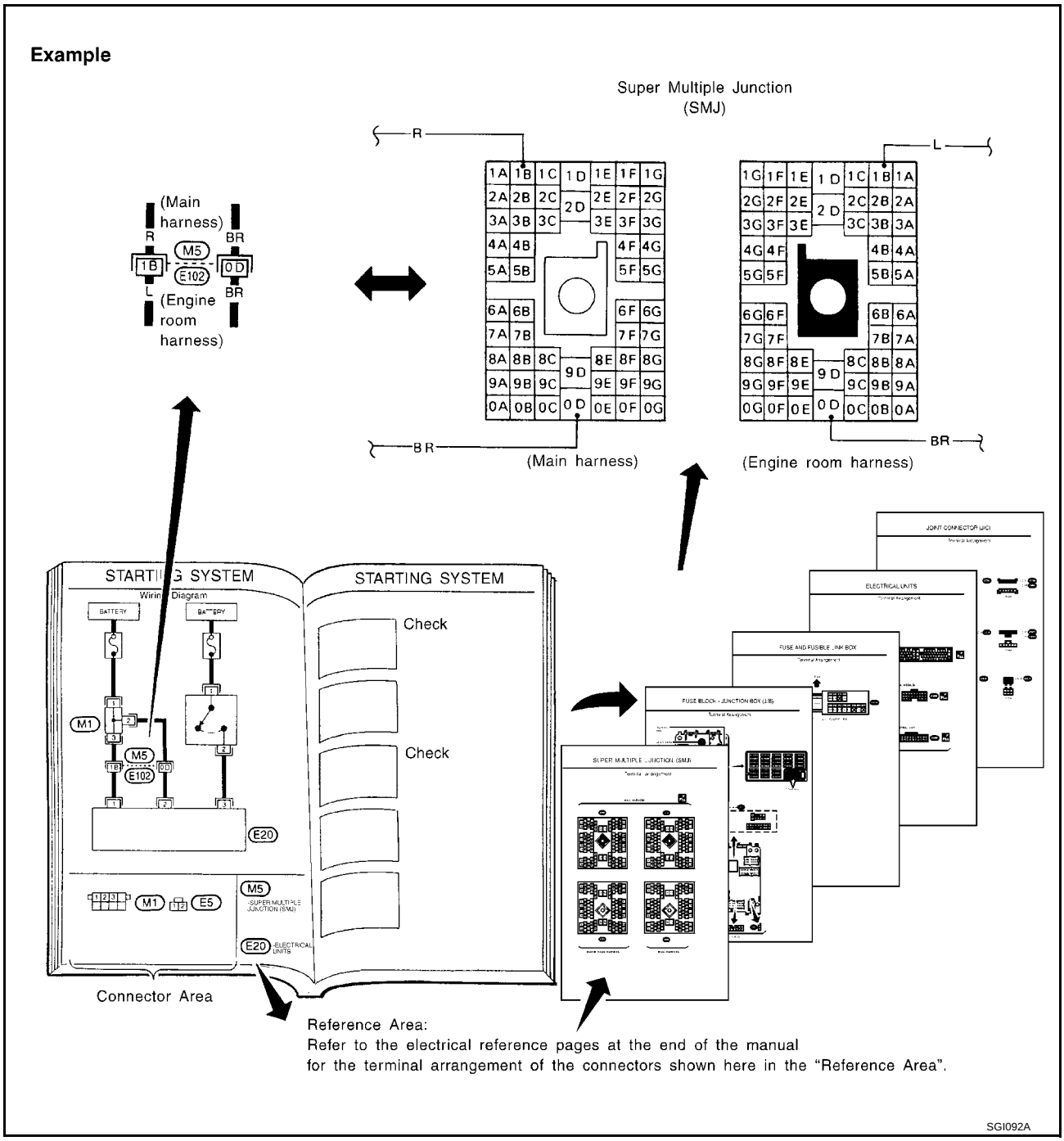
SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

SGI875

Reference Area

The Reference Area of the wiring diagram contains references to additional electrical reference pages at the end of the manual. If connector numbers and titles are shown in the Reference Area of the wiring diagram, these connector symbols are not shown in the Connector Area.

Example



Abbreviations

EAS000PW

The following **ABBREVIATIONS** are used:

ABBREVIATION	DESCRIPTION
A/C	Air Conditioner
A/T	Automatic Transaxle/Transmission
ATF	Automatic Transmission Fluid
D_1	Drive range 1st gear
D_2	Drive range 2nd gear

ABBREVIATION	DESCRIPTION
D_3	Drive range 3rd gear
D_4	Drive range 4th gear
FR, RR	Front, Rear
LH, RH	Left-Hand, Right-Hand
M/T	Manual Transaxle/Transmission
OD	Overdrive
P/S	Power Steering
SAE	Society of Automotive Engineers, Inc.
SDS	Service Data and Specifications
SST	Special Service Tools
2WD	2-Wheel Drive
2_2	2nd range 2nd gear
2_1	2nd range 1st gear
1_2	1st range 2nd gear
1_1	1st range 1st gear

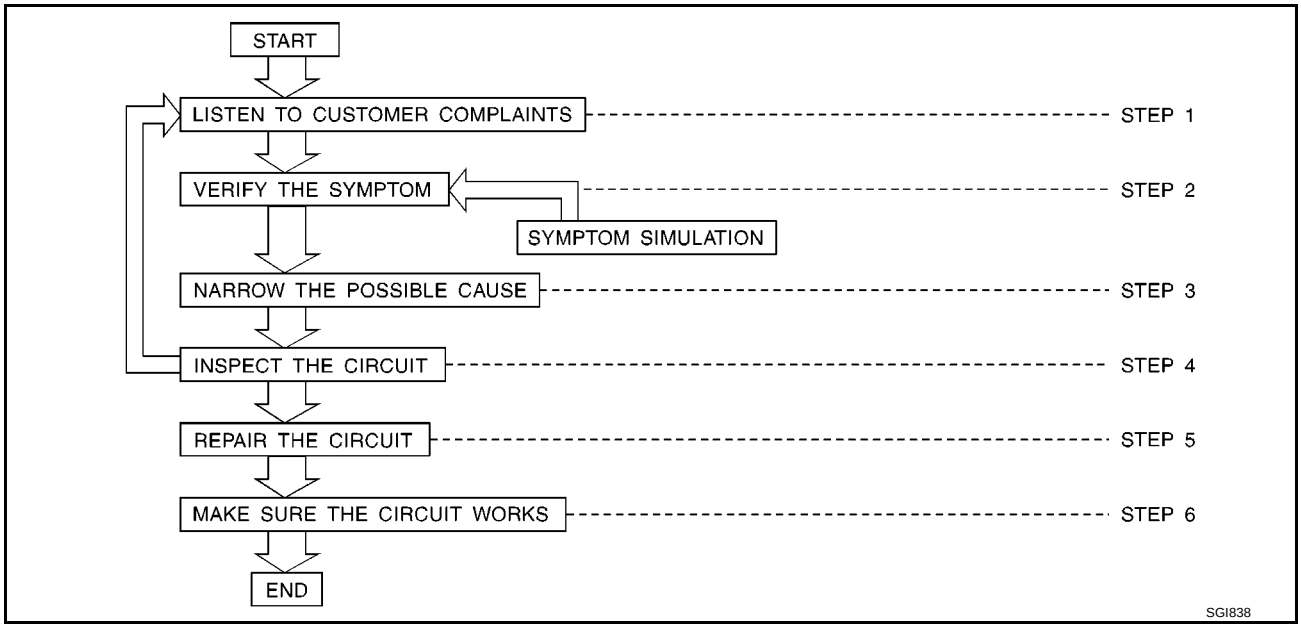
SERVICE INFORMATION FOR ELECTRICAL INCIDENT

PFP:00000

How to Perform Efficient Diagnosis for an Electrical Incident

EAS000PX

WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: ● Power Supply Routing ● System Operation Descriptions ● Applicable Service Manual Sections ● Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Layouts.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. Make sure you have not inadvertently created a new incident during your diagnosis or repair steps.	

INCIDENT SIMULATION TESTS

Introduction

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The following section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:

- Vehicle vibration

- Heat sensitive
- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

Vehicle Vibration

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

CONNECTORS & HARNESS

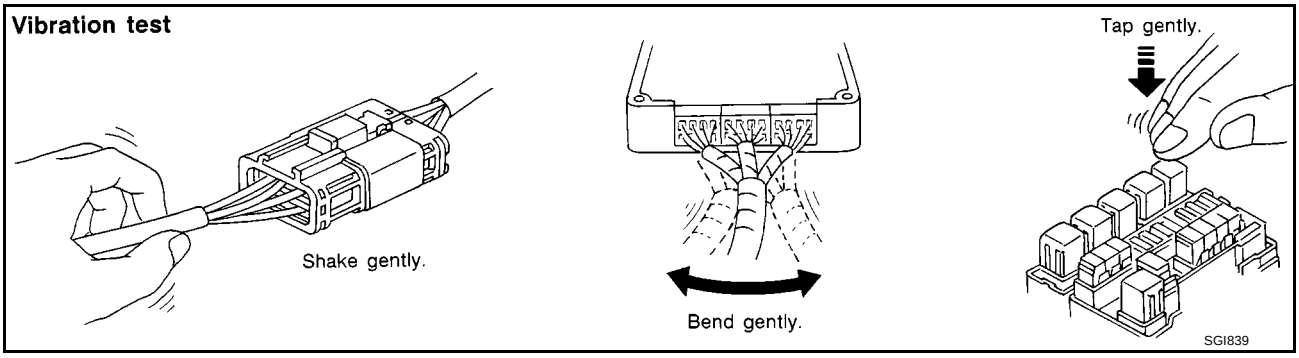
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

HINT

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

SENSORS & RELAYS

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



ENGINE COMPARTMENT

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

BEHIND THE INSTRUMENT PANEL

An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

UNDER SEATING AREAS

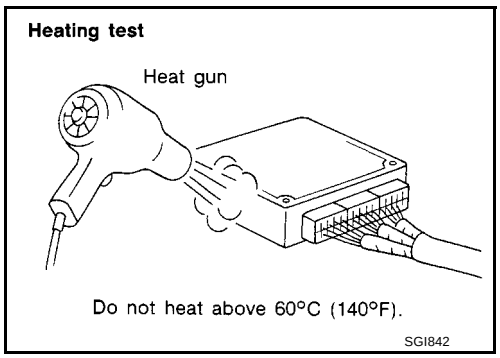
An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

Heat Sensitive

The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.

To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.

Do not heat components above 60°C (140°F). If incident occurs while heating the unit, either replace or properly insulate the component.

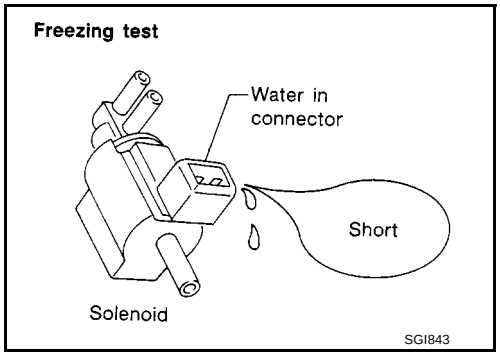


Freezing

The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.

There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Make sure it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.

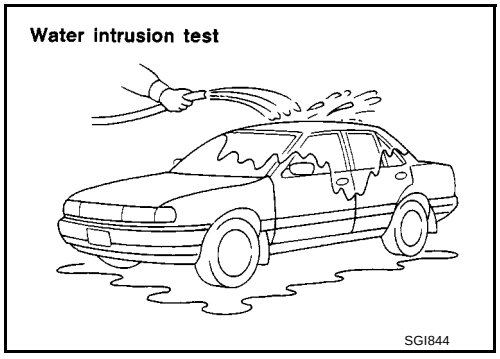
The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.



Water Intrusion

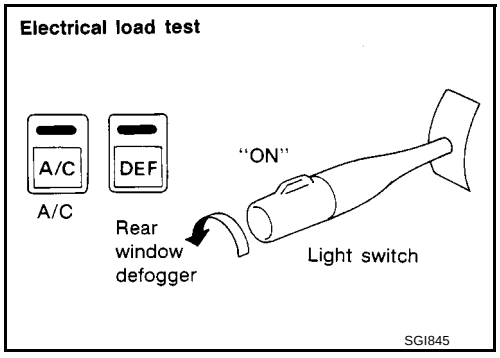
The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.

Do not spray water directly on any electrical components.



Electrical Load

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



Cold or Hot Start Up

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

CIRCUIT INSPECTION

Introduction

In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thorough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

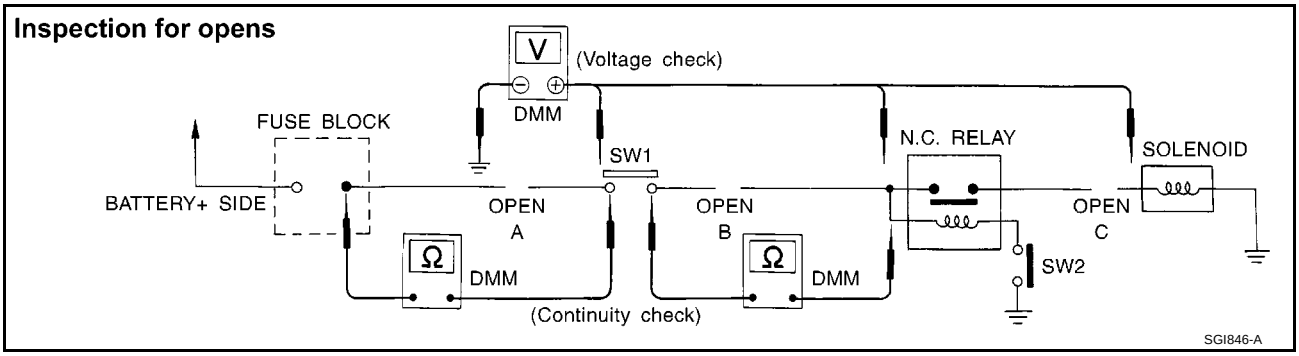
OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	● SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	● SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

NOTE:
Refer to “How to Check Terminal” to probe or check terminal.

Testing for “Opens” in the Circuit

Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.

Inspection for opens



CONTINUITY CHECK METHOD
The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Make sure to always start with the DMM at the highest resistance level.
To help in understanding the diagnosis of open circuits, please refer to the previous schematic.

- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

VOLTAGE CHECK METHOD

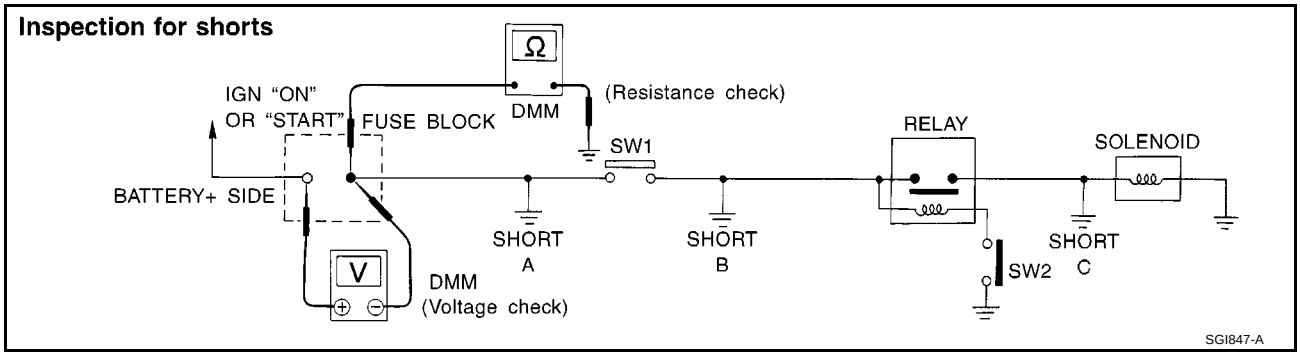
To help in understanding the diagnosis of open circuits please refer to the previous schematic.
In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.

- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage; open is further down the circuit than SW1.
  no voltage; open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage; open is further down the circuit than the relay.
  no voltage; open is between SW1 and relay (point B).
- Close the relay and probe at the solenoid.
  voltage; open is further down the circuit than the solenoid.
  no voltage; open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

Testing for "Shorts" in the Circuit

To simplify the discussion of shorts in the system, please refer to the following schematic.



RESISTANCE CHECK METHOD

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity; short is between fuse terminal and SW1 (point A).
  no continuity; short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between SW1 and the relay (point B).
  no continuity; short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between relay and solenoid (point C).
  no continuity; check solenoid, retrace steps.

VOLTAGE CHECK METHOD

- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition key to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between fuse block and SW1 (point A).

no voltage; short is further down the circuit than SW1.

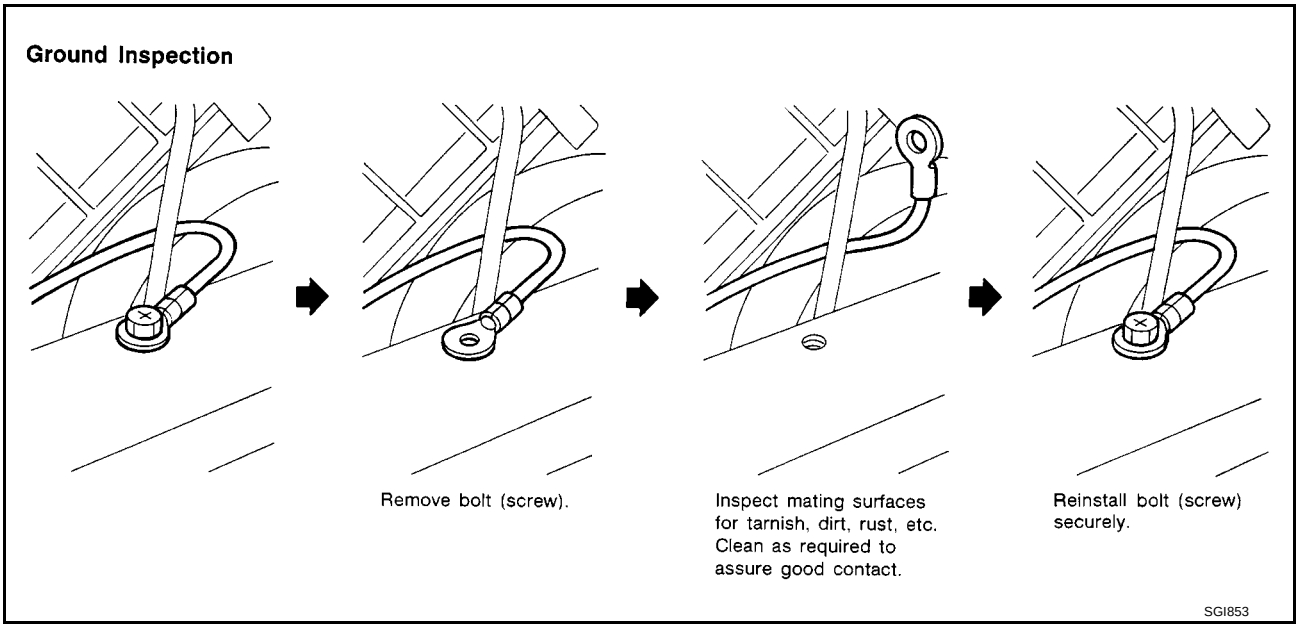
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between SW1 and the relay (point B).
  no voltage; short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage; short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage; retrace steps and check power to fuse block.

Ground Inspection

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to “Ground Distribution” in PG section.



Voltage Drop Tests

Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.
Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.
Unwanted resistance can be caused by many situations as follows:

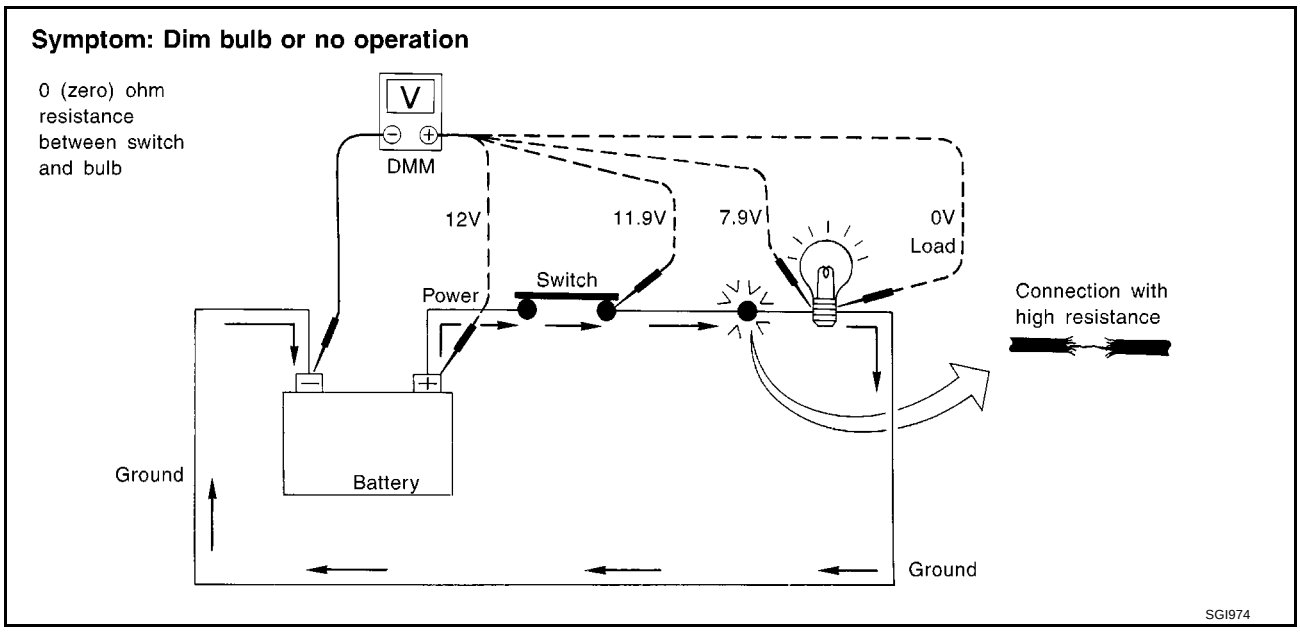
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.

If repairs are needed always use wire that is of the same or larger gauge.

MEASURING VOLTAGE DROP — ACCUMULATED METHOD

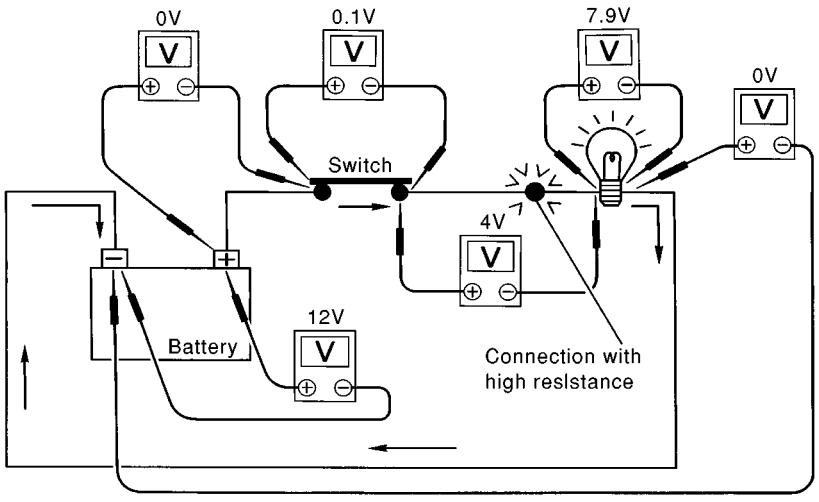
- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.



MEASURING VOLTAGE DROP — STEP-BY-STEP

The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
Circuits in the “Computer Controlled System” operate on very low amperage.
The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
The step by step voltage drop test can identify a component or wire with too much resistance.



1. Connect the DMM as shown, starting at the battery and working your way around the circuit.
2. An unusually large voltage drop will indicate a component or wire that needs to be repaired, As you can see the illustration above, the poor connection causes a 4 volt drop.

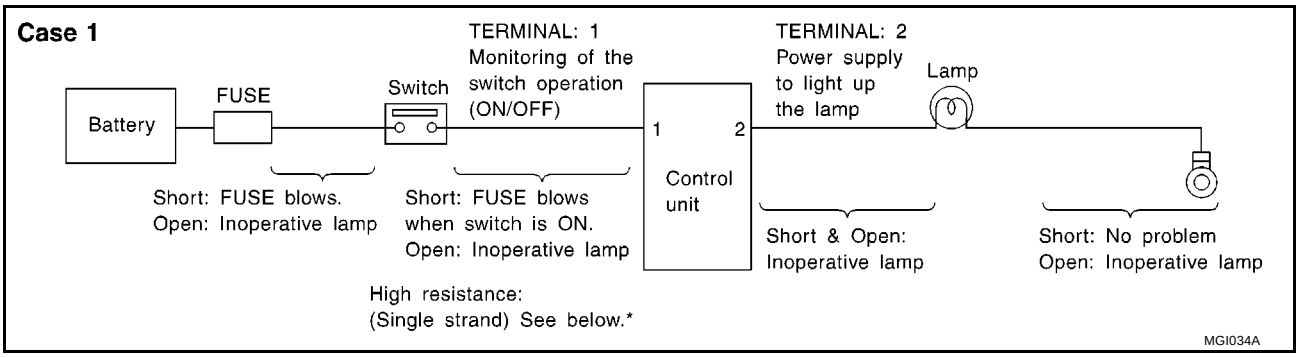
The chart that follows illustrates some maximum allowable voltage drops. These values are given as a guideline, the exact value for each component may vary.

COMPONENT	VOLTAGE DROP
Wire	negligible < .001 volts
Ground Connections	Approx. 0.1 volts
Switch Contacts	Approx. 0.3 volts

SAIA0258E

Control Unit Circuit Test

System Description:When the switch is ON, the control unit lights up the lamp.

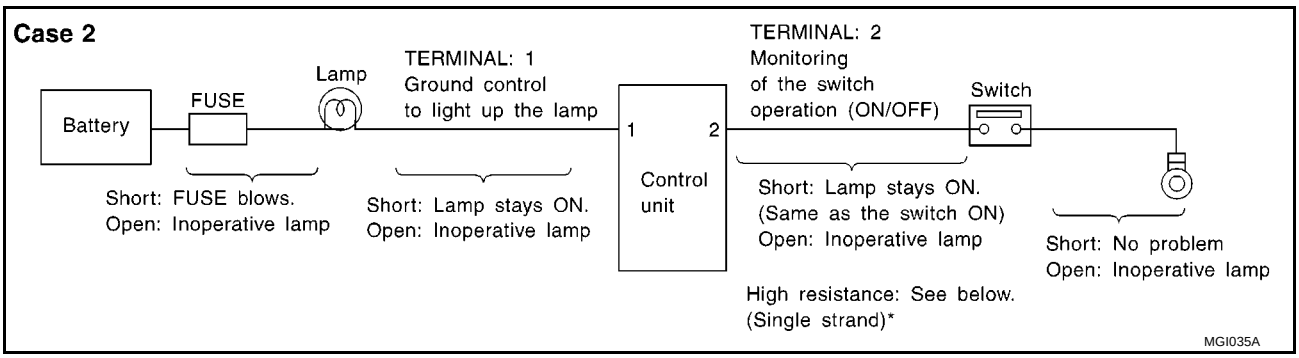


INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Switch	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
		Switch OFF	Approx. 0	Approx. 0
2	Lamp	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
		Switch OFF	Approx. 0	Approx. 0

The voltage value is based on the body ground.

*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.



INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Lamp	Switch ON	Approx. 0	Battery voltage (Inoperative lamp)
		Switch OFF	Battery voltage	Battery voltage
2	Switch	Switch ON	Approx. 0	Higher than 0 Approx. 4 (Example)
		Switch OFF	Approx. 5	Approx. 5

The voltage value is based on the body ground.

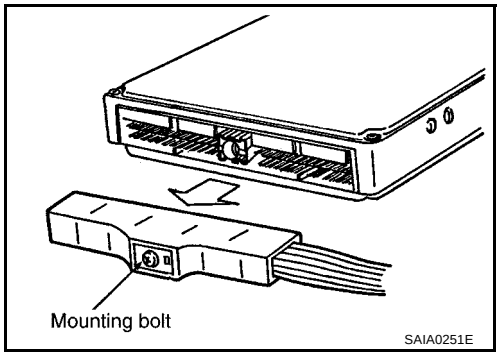
*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

Control Units and Electrical Parts

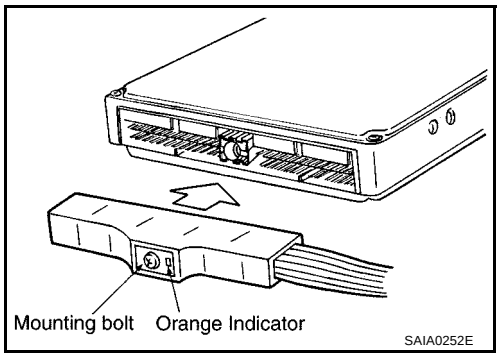
EAS000PY

PRECAUTIONS

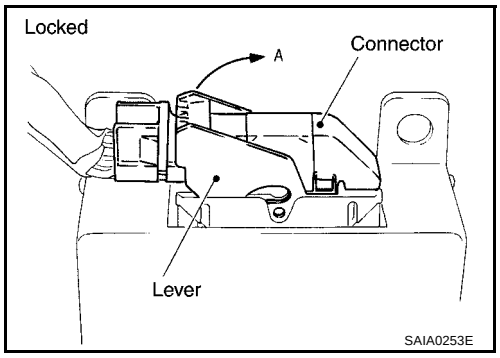
- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.
- If a connector is installed by tightening bolts, loosen bolt mounting it, then take it out by hand.



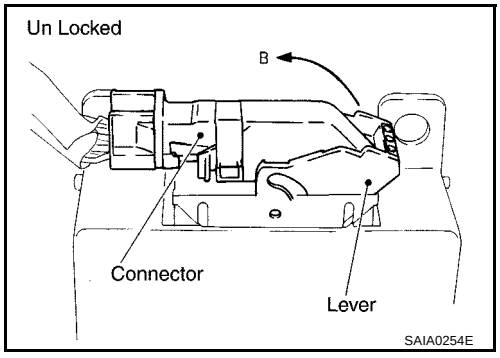
- Before installing a connector, make sure the terminal is not bent or damaged, and then correctly connect it.
  When installing a connector by tightening bolts, fix it by tightening the mounting bolt until the painted projection of the connector becomes even with the surface.



- For removal of the lever type connector, pull the lever up to the direction pointed to by the arrow A in the figure, and then remove the connector.

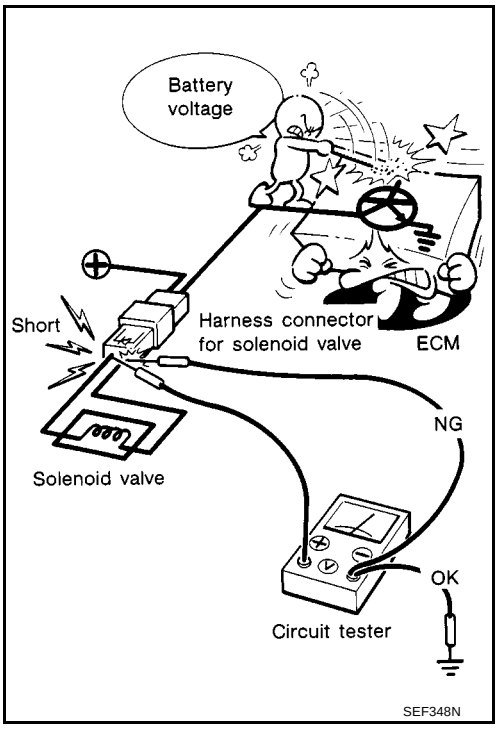


- For installation of the lever type connector, pull down the lever to the direction pointed by the arrow B in the figure, and then push the connector until a clicking noise is heard.



- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.

- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.



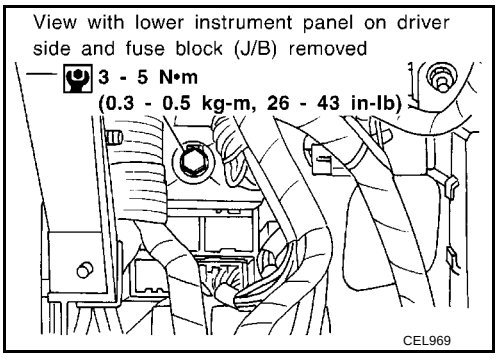
SMJ INSTALLATION

To install SMJ, tighten bolts until orange “fulltight” mark appears and then retighten to specified torque as required.

SMJ :3 - 5 N·m (0.3 - 0.5 kg-m, 26 - 43 in-lb)

CAUTION:

Do not overtighten bolts, otherwise, they may be damaged.



CONSULT-II CHECKING SYSTEM

PFP:00000

Description

EAS000PZ

- CONSULT-II is a hand-held type tester. When it is connected with a diagnostic connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.
- Refer to “CONSULT-II Software Operation Manual” for more information.

Function and System Application

EAS000Q0

Diagnostic test mode	Function	ENGINE	A/T	AIR BAG	ABS (Including ESP)	EPS	IPDM E/R	BCM	INTELLIGENT KEY	NATS*1
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	x	–	–	–	–	–	x	x	x
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	x	x	x	x	x	x	x	x	x
Trouble diagnostic record	Current self-diagnostic results and all trouble diagnostic records previously stored can be read.	–	–	x	–	–	–	–	–	–
Data monitor	Input/Output data in the ECU can be read.	x	x	–	x	x	x	–	x	x
CAN diagnosis support monitor	Indicates the communication condition of CAN communication line.	x	x	–	x	x	x	x	x	–
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECUs and also shifts some parameters in a specified range.	x	–	–	x	x	x	x	x	–
DTC & SRT confirmation	The results of SRT (System Readiness Test) and the self-diagnosis status/result can be confirmed.	x*2	–	–	–	–	–	–	–	–
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	–	x	–	–	–	–	–	–	–
ECU part number	ECU part number can be read.	x	x	–	x	x	–	x	x	–
ECU discriminated No.	Classification number of a replacement ECU can be read to prevent an incorrect ECU from being installed.	–	–	x	–	–	–	–	–	–
Function test	Conducted by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	x*2	x	x	x	–	–	–	–	–
Control unit initialization	All registered ignition key IDs in NATS components can be initialized and new IDs can be registered.	–	–	–	–	–	–	–	–	x
Self-function check	ECU checks its own NATS communication interface.	–	–	–	–	–	–	–	–	x
Configuration	The vehicle configuration can be read and written on brand-new BCM and IPDM E/R	–	–	–	–	–	x	x	–	–

x: Applicable
*1: Nissan Anti-Theft System
*2: Petrol engine models

Nickel Metal Hydride Battery Replacement

EAS000Q1

CONSULT-II contains a nickel metal hydride battery. When replacing the battery obey the following:

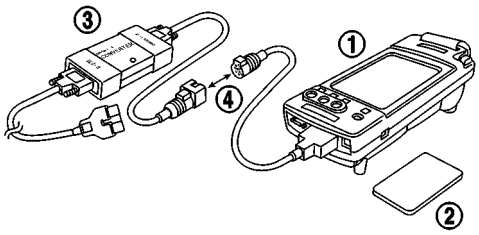
WARNING:

Replace the nickel metal hydride battery with Genuine CONSULT-II battery only. Use of another battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble or dispose of in fire.
Keep the battery out of reach of children and discard used battery conforming to the local regulations.

Checking Equipment

EAS000Q2

When ordering the following equipment, contact your NISSAN distributor.

Tool name	Description
NISSAN CONSULT-II 1. CONSULT-II unit (Tester internal soft: Resident version 3.3.0) and accessories 2. Program card AED03B and AEN02C (For NATS) To confirm the best combination of these softwares, refer to CONSULT-II Operation Manual. 3. CONSULT-II CONVERTER 4. “CONSULT-II Pigtail” Cable	 SAIA0363E

NOTE:

- The CONSULT-II must be used in conjunction with a program card. CONSULT-II does not require loading (Initialization) procedure.
- Be sure the CONSULT-II is turned off before installing or removing a program card.

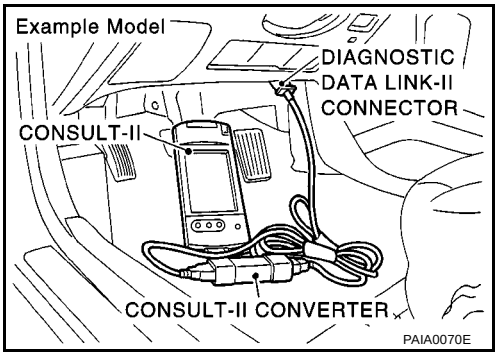
CAUTION:

- **If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carries out CAN communication.**
- **If CONVERTER is not connected with CONSULT-II, vehicle occur the “FAIL-SAFE MODE” which is “LIGHT UP the HEADLIGHT” and/or “Cooling FAN ROTATING” when CONSULT-II is started.**
- **Previous CONSULT-II “I” and “Y” DLC-I and DLC-II cables should NOT be used anymore because their DDL connector pins can be damaged during cable swapping.**

CONSULT-II Start Procedure

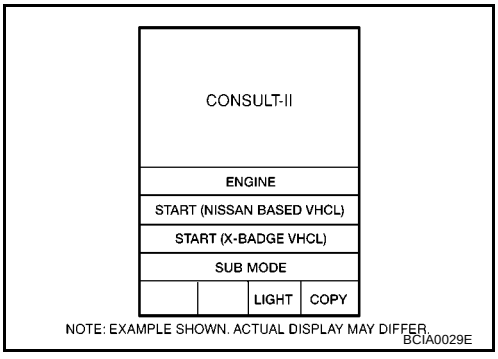
EAS000SG

1. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector.



PAIA0070E

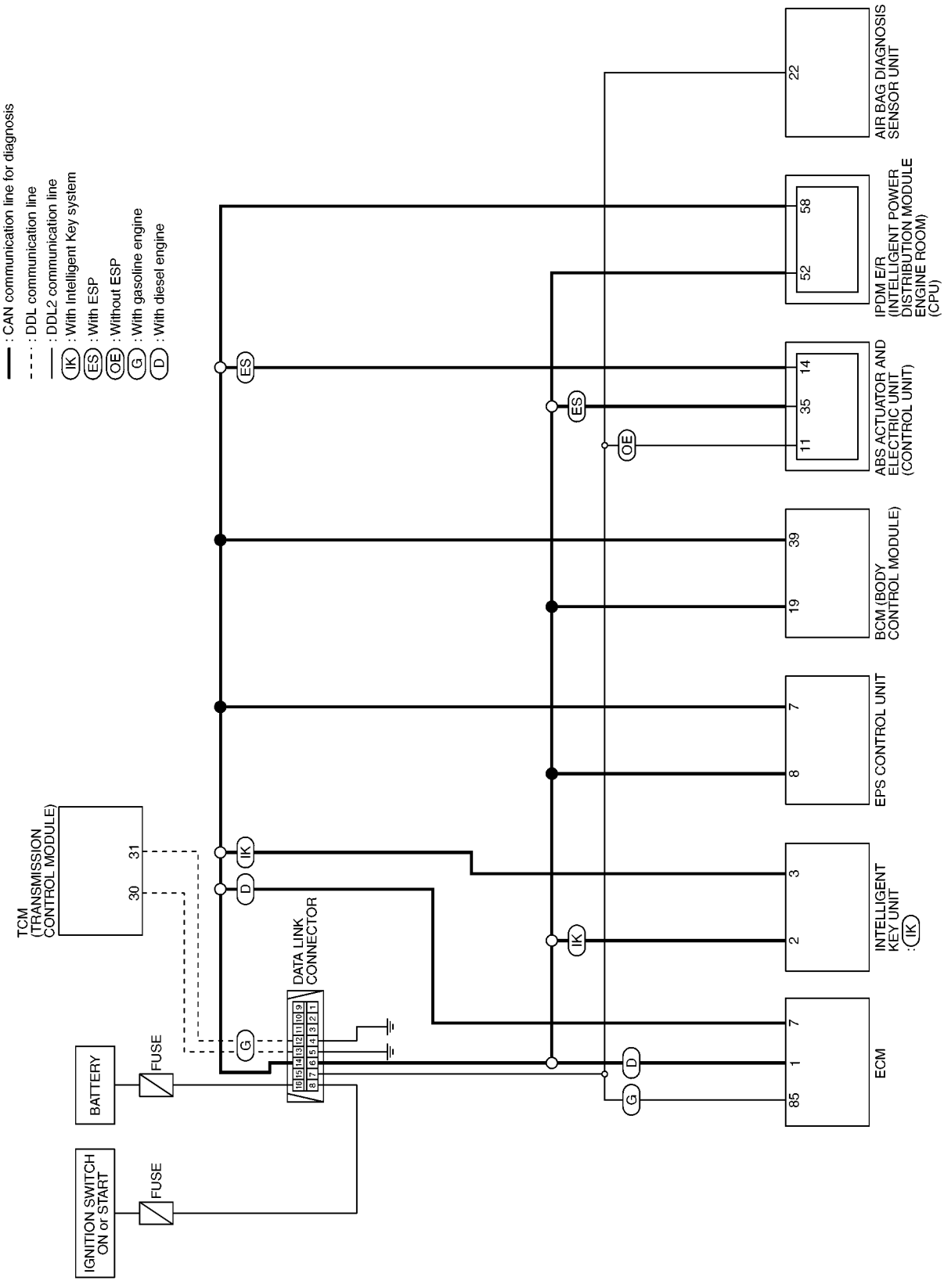
2. When the ignition switch OFF, turn on the ignition switch.
3. Touch “START(NISSAN BASED VECL)” or “System Shortcut” (eg: Engine) on the screen.



BCIA0029E

CONSULT-II Data Link Connector (DLC) Circuit

EAS0014U



MAWA0011E

INSPECTION PROCEDURE

If the CONSULT-II cannot diagnose the system properly, check the following items.

Symptom	Check item
CONSULT-II cannot access any system.	● CONSULT-II DLC power supply circuit (Terminal 8) and ground circuit (Terminal 4) (For detailed circuit, refer to “MIL & Data Link Connectors Wiring Diagram” in EC section.) ● CONSULT-II DLC cable and CONSULT-II CONVERTER
CONSULT-II cannot access individual system. (Other systems can be accessed.)	● CONSULT-II program card (Check the appropriate CONSULT-II program card for the system. Refer to “Checking Equipment”.) ● Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system.) ● Open or short circuit between the system and CONSULT-II DLC (For detailed circuit, refer to wiring diagram for each system.) ● Open or short circuit CAN communication line. Refer to LAN-4, "Precautions When Using CONSULT-II" .

NOTE:

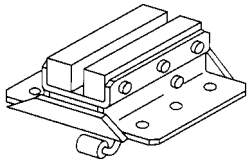
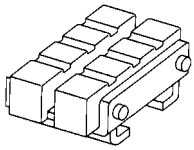
The DDL1 and DDL2 circuits from DLC pins 12, 13, 14 and 15 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT-II access to other systems.

LIFTING POINT

PFP:00000

Special Service Tools

EAS000Q4

Tool number Tool name	Description
LM4086-0200 Board on lift attachment	 S-NT001
LM4519-0000 Safety stand attachment	 S-NT002

CAUTION:

- **Every time the vehicle is lifted up, maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine, transmission, suspension etc.), support a jack up point on the rear side garage jack with a mission jack or equivalent.**
- **Since the vehicle's center of gravity changes when removing main parts on the rear side (rear axle, suspension, etc.), support a jack up point on the front side garage jack with a mission jack or equivalent.**
- **Be careful not to smash or do not do anything that would affect piping parts.**

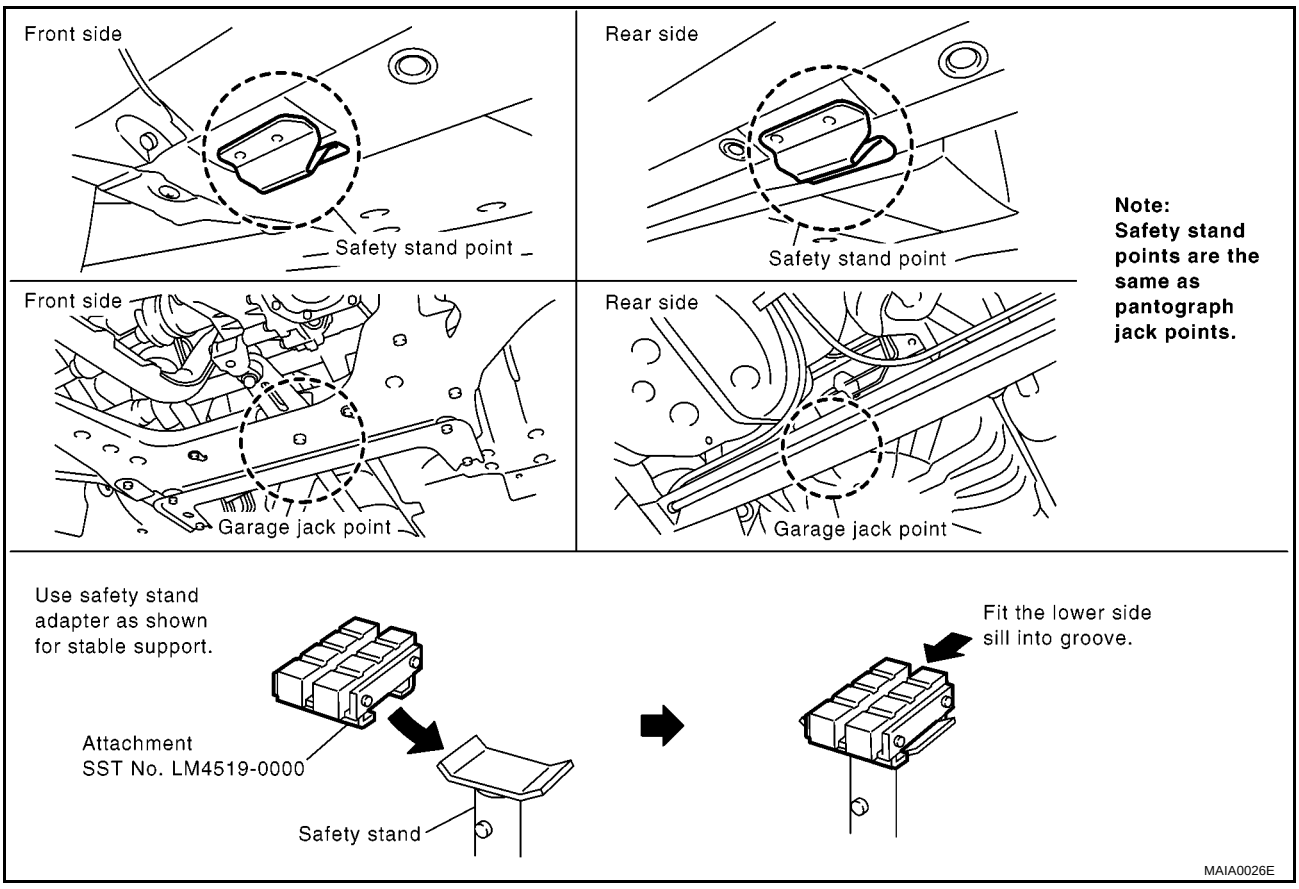
Garage Jack and Safety Stand

EAS000Q5

WARNING:

- **Park the vehicle on a level surface when using the jack. Make sure to avoid damaging pipes, tubes, etc. under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands when you have to get under the vehicle.**

- **Place wheel chocks at both front and back of the wheels on the ground.**



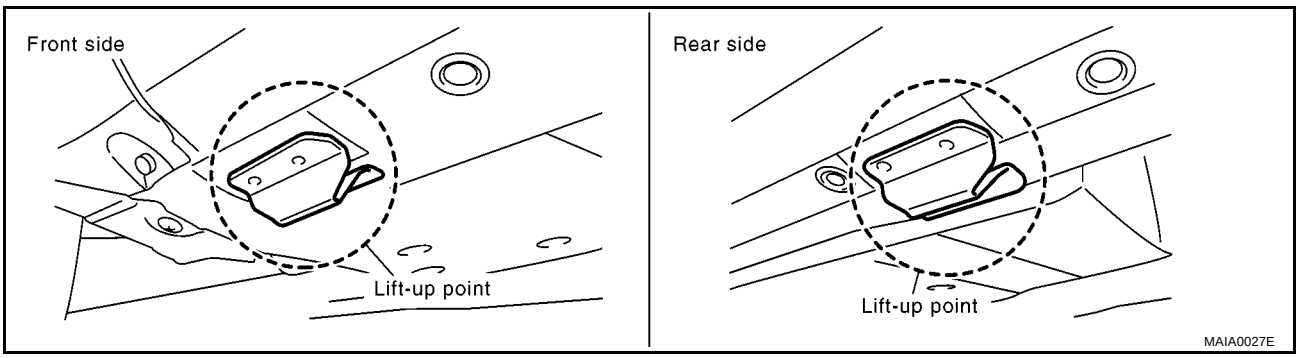
2-pole Lift

EAS000Q6

WARNING:

When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.

When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.



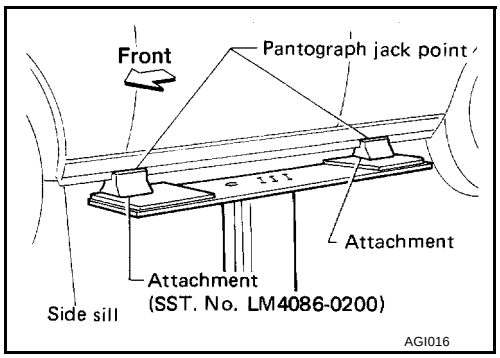
Board-on Lift

EAS000Q7

CAUTION:

Make sure vehicle is empty when lifting.

- **The board-on lift attachment (LM4086-0200) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**



TOW TRUCK TOWING

PFP:00000

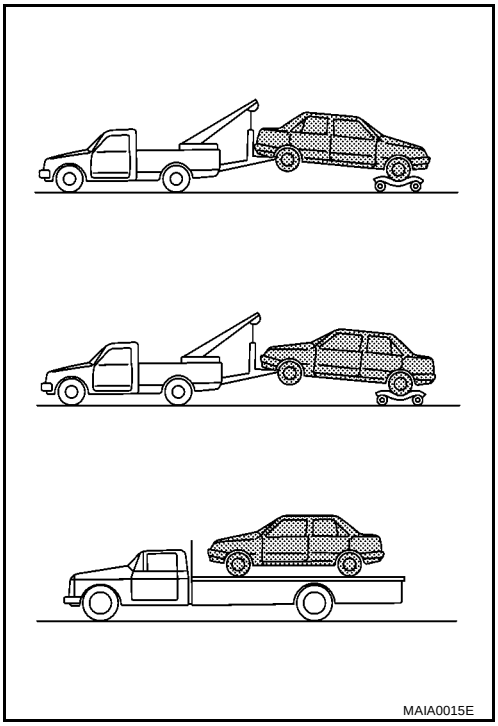
Tow Truck Towing

EAS000Q8

CAUTION:

- **All applicable local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, make sure that the transmission, steering system and power train are in good order. If any unit is damaged, dollies must be used.**
- **Never tow an automatic transmission model or H·CVT model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transmission.**

NISSAN recommends that towing dollies be used when towing your vehicle beplaced on a flat bed truck as illustrated.



TOWING AN AUTOMATIC TRANSAXLE MODEL OR H·CVT MODEL WITH FOUR WHEELS ON GROUND

Observe the following restricted towing speeds and distances.

Speed : Below 50 km/h (30 MPH)

Distance : Less than 65 km(40 miles)

CAUTION:

Never tow an automatic transaxle model from the rear (i.e., backward) with four wheels on the ground as this may cause serious and expensive damage to the transaxle.

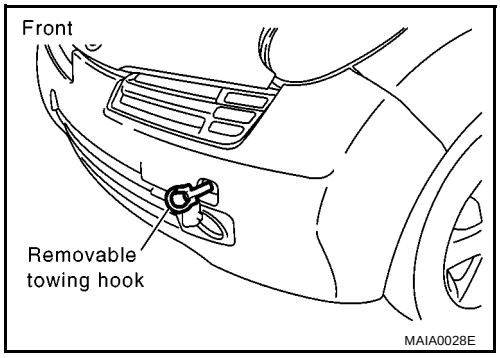
TOWING AN AUTOMATIC TRANSAXLE MODEL OR H·CVT MODELS WITH REAR WHEELS RAISED (WITH FRONT WHEELS ON GROUND)

Never tow an automatic transaxle model with rear wheels raised (with front wheels on ground) as this may cause serious and expensive damage to the transaxle. If it is necessary to tow it with rear wheels raised, always use a towing dolly under the front wheels.

Vehicle Recovery (Freeing a stuck vehicle)

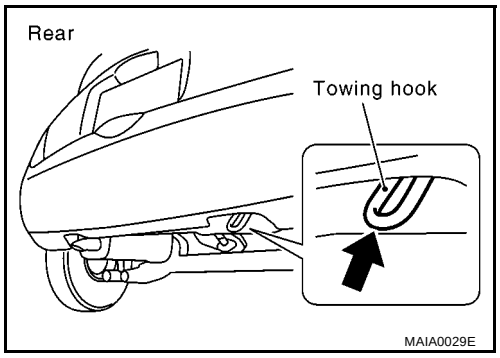
EAS000Q9

- Use the towing hook only, not other parts of the vehicle. Otherwise, the vehicle body will be damaged.
- Use the towing hook only to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle for a long distance using only the towing hook.
- The towing hook is under tremendous force when used to free a stuck vehicle. Always pull the cable straight out from the front or rear of the vehicle. Never pull on the hook at an angle.
- Stand clear of a stuck vehicle.



WARNING:

- **Do not spin the tires at high speed. This could cause them to explode and result in serious injury. Parts of the vehicle could also overheat and be damaged.**
- **Install removable towing hook securely using wheel nut wrench.**



TIGHTENING TORQUE OF STANDARD BOLTS

PFP:00000

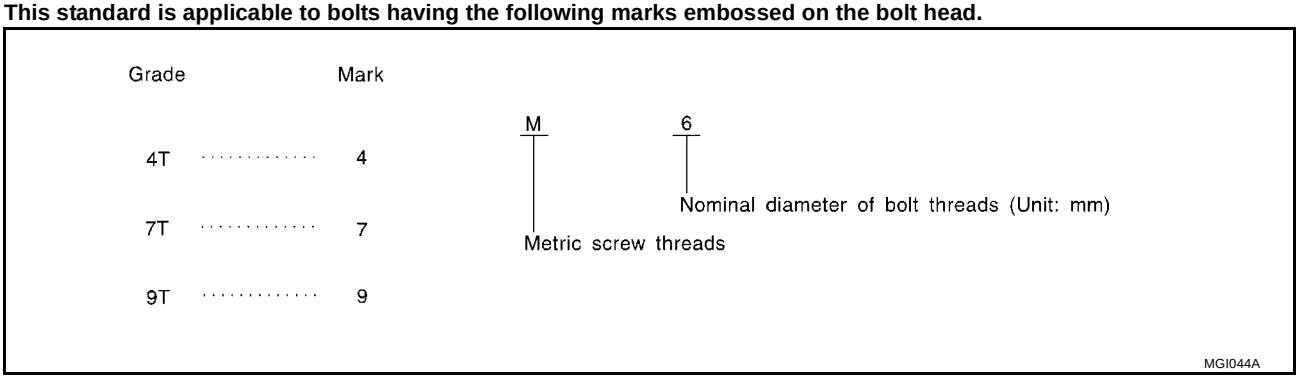
EAS000QA

Tightening Torque Table

Grade	Bolt size	Bolt diameter * mm	Pitch mm	Tightening torque (Without lubricant)							
				Hexagon head bolt				Hexagon flange bolt			
				N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	1.25	13.5	1.4	10	—	17	1.7	13	—
			1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	1.5	28	2.9	21	—	35	3.6	26	—
			1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	1.75	45	4.6	33	—	55	5.6	41	—
			1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	1.25	22	2.2	16	—	28	2.9	21	—
			1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	1.5	45	4.6	33	—	55	5.6	41	—
			1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	1.75	80	8.2	59	—	100	10	74	—
			1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	1.25	28	2.9	21	—	35	3.6	26	—
			1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	1.5	55	5.6	41	—	80	8.2	59	—
			1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	1.75	100	10	74	—	130	13	96	—
			1.25	100	10	74	—	130	13	96	—
	M14	14.0	1.5	170	17	125	—	210	21	155	—

*: Nominal diameter

1. **Special parts are excluded.**
2. **This standard is applicable to bolts having the following marks embossed on the bolt head.**



IDENTIFICATION INFORMATION

PFP:00010

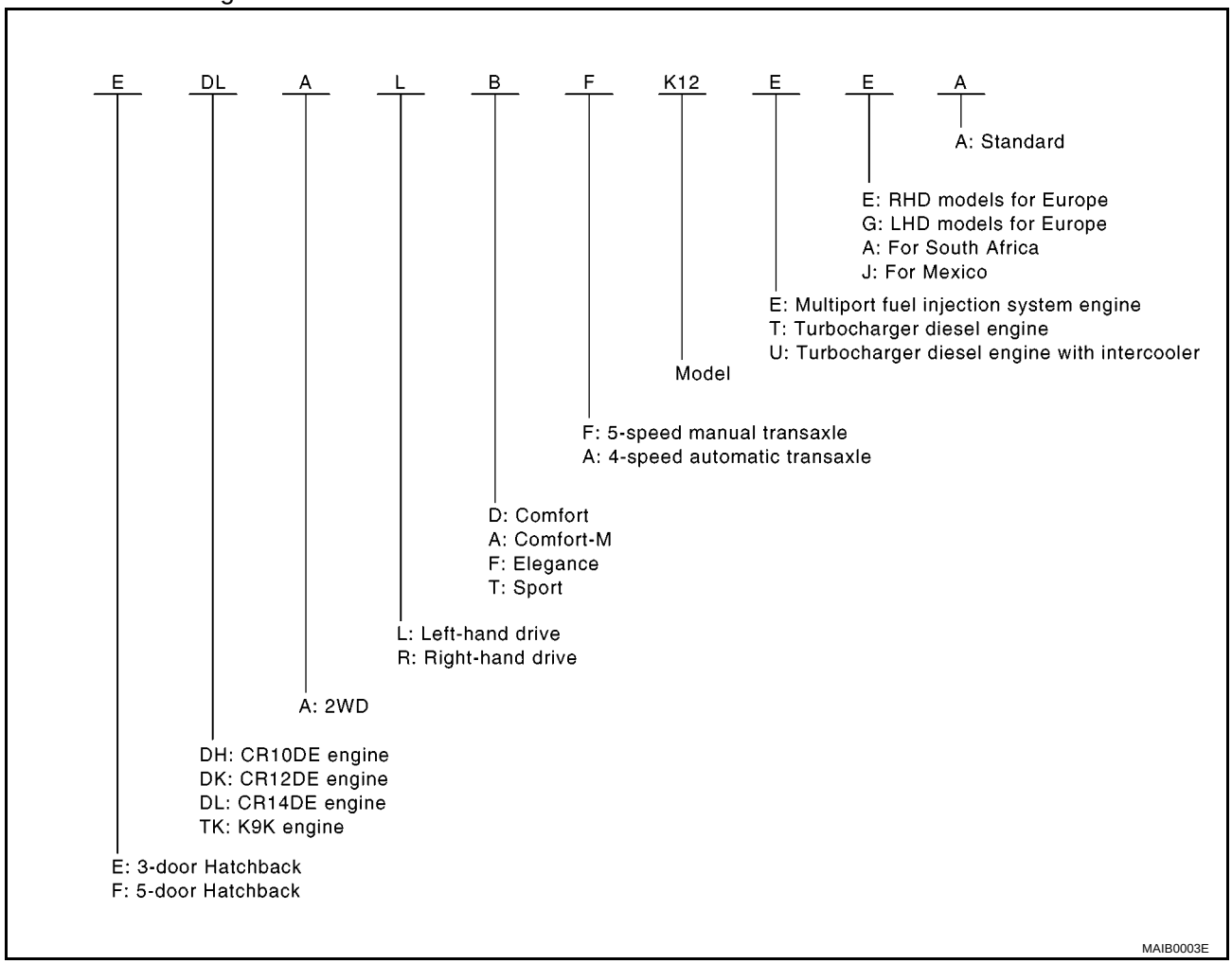
Model Variation

SMA for VIN >SJN**AK12U1073798

EAS000QB

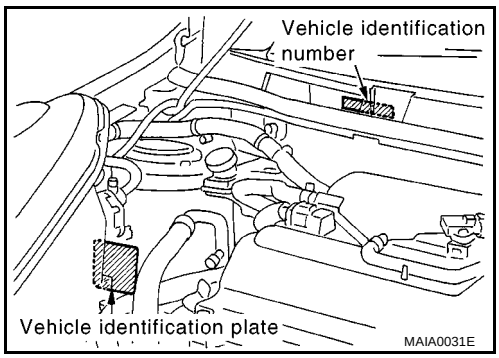
Body	Destination	RHD	LHD	Engine	Transaxle	Grade
3-door H/B	Europe	EDHARAF-EEA	EDHALAF-EGA	CR10DE	JH3	Comfort-M
		EDKARDF-EEA	EDKALDF-EGA	CR12DE	JH3	Comfort
		—	EDKALAF-EGA			Comfort-M
		EDKARFF-EEA	EDKALFF-EGA			Elegance
		EDKARTF-EEA	EDKALTF-EGA			Sport
		EDKARDA-EEA	EDKALDA-EGA		RE4F03B	Comfort
		EDKARFA-EEA	EDKALFA-EGA			Elegance
		EDLARFF-EEA	EDLALFF-EGA	CR14DE	JH3	Elegance
		EDLARTF-EEA	EDLALTF-EGA			Sport
		EDLARFA-EEA	EDLALFA-EGA		RE4F03B	Elegance
		—	EDLALTA-EGA			Sport
		ETKARDF-TEA	ETKALDF-TGA	K9K	JH3	Comfort
		ETKARFF-TEA	ETKALFF-TGA			Elegance
		—	ETKALTF-TGA			Sport
		ETKARDF-UEA	ETKALDF-UGA		JR5	Comfort
		ETKARFF-UEA	ETKALFF-UGA			Elegance
		ETKARTF-UEA	ETKALTF-UGA			Sport
5-door H/B		FDHARAF-EEA	FDHALAF-EGA	CR10DE	JH3	Comfort-M
		FDKARDF-EEA	FDKALDF-EGA	CR12DE	JH3	Comfort
		—	FDKALAF-EGA			Comfort-M
		FDKARFF-EEA	FDKALFF-EGA			Elegance
		FDKARTF-EEA	FDKALTF-EGA			Sport
		FDKARDA-EEA	FDKALDA-EGA		RE4F03B	Comfort
		FDKARFA-EEA	FDKALFA-EGA			Elegance
		FDLARFF-EEA	FDLALFF-EGA	CR14DE	JH3	Elegance
		FDLARTF-EEA	FDLALTF-EGA			Sport
		FDLARFA-EEA	FDLALFA-EGA		RE4F03B	Elegance
		—	FDLALTA-EGA			Sport
		FTKARDF-TEA	FTKALDF-TGA	K9K	JH3	Comfort
		FTKARFF-TEA	FTKALFF-TGA			Elegance
		—	FTKALTF-TGA			Sport
		FTKARDF-UEA	FTKALDF-UGA		JR5	Comfort
		FTKARFF-UEA	FTKALFF-UGA			Elegance
		FTKARTF-UEA	FTKALTF-UGA			Sport
	South africa	FDLARDF-EAA	—	CR14DE	JH3	Comfort
		FDLARFF-EAA	—			Elegance
	Mexico	—	FDLALDF-EJA			Comfort

Prefix and suffix designations:

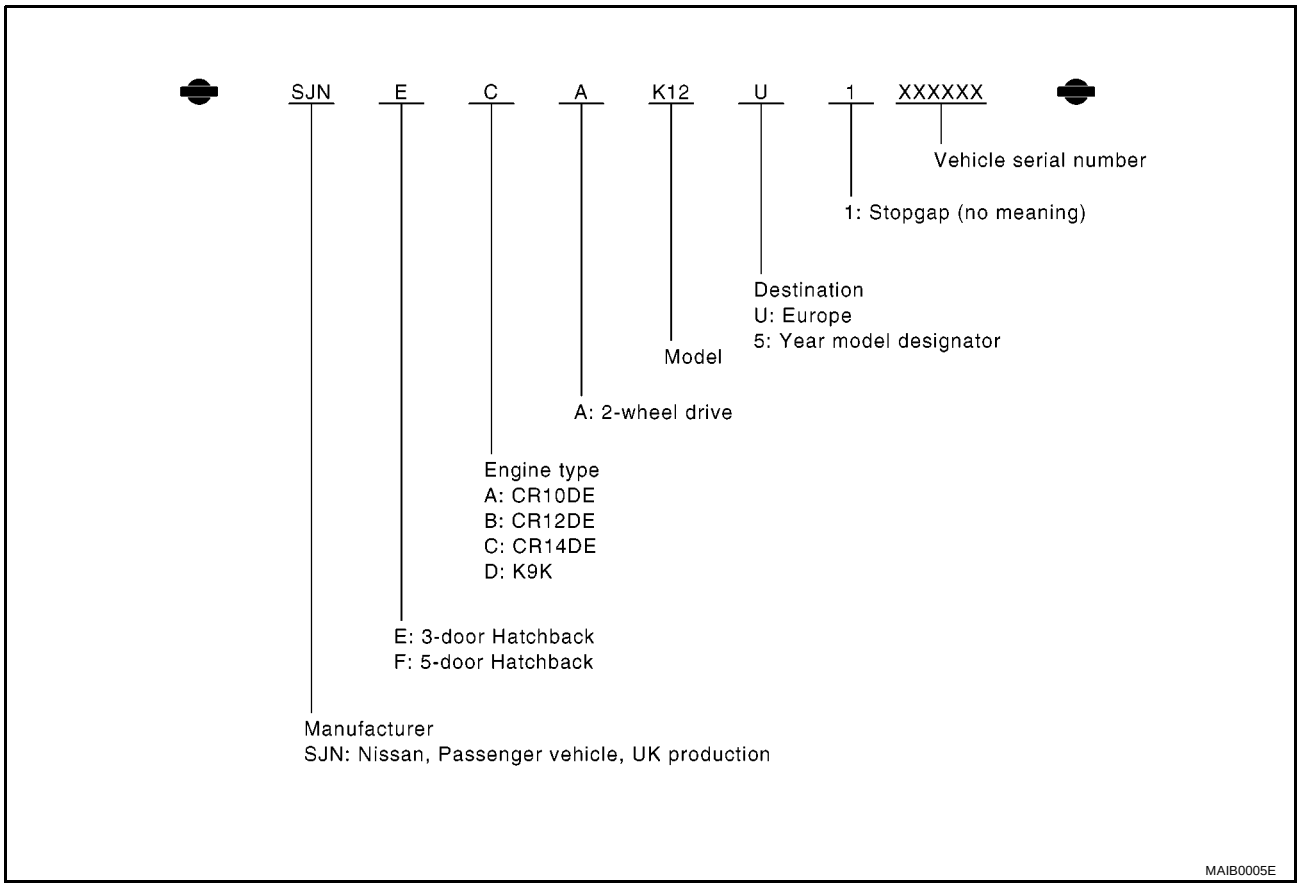


IDENTIFICATION NUMBER

SMA for VIN >SJN**AK12U1073798

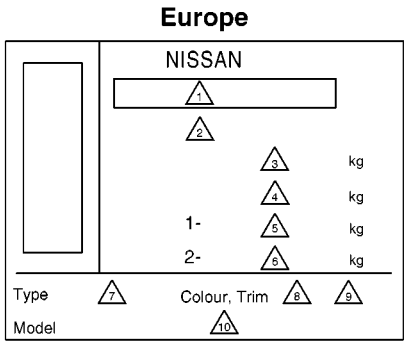


VEHICLE IDENTIFICATION NUMBER ARRANGEMENT



IDENTIFICATION PLATE

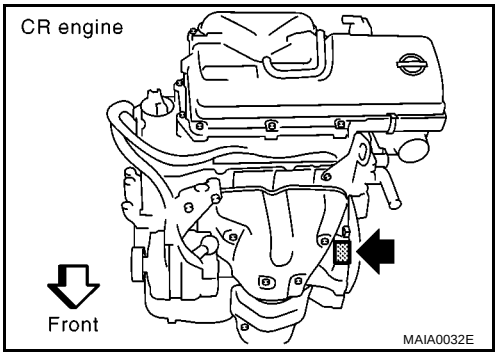
SMA for VIN >SJN**AK12U1073798



1 Type approval number (Models for Europe with Euro-OBD system) Blank (Models for Europe without Euro-OBD system)
2 Vehicle identification number (Chassis number)
3 Gross vehicle weight
4 Gross combination weight Gross vehicle weight + Gross trailing capacity (Weight)
5 Gross axle weight (Front)
6 Gross axle weight (Rear)
7 Vehicle type
8 Body color code
9 Trim color code
10 Model

MAIA0040E

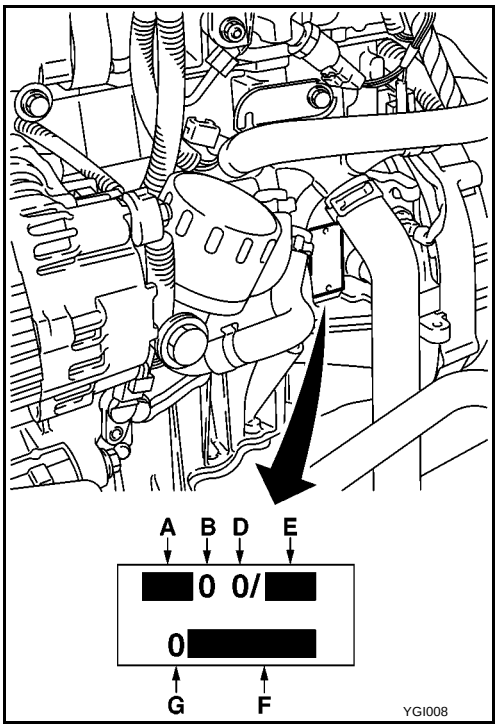
ENGINE SERIAL NUMBER (CR ENGINE)



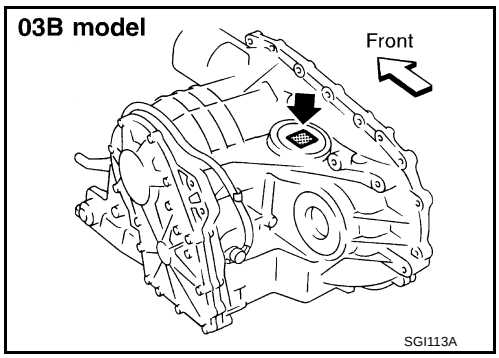
ENGINE IDENTIFICATION (K9K ENGINE)

Identification is engraved on the cylinder block which carries:

- A: engine type,
- B: engine type approval letter,
- D: Renault code,
- E: engine suffix,
- F: engine fabrication number,
- G: engine assembly plant.



AUTOMATIC TRANSAXLE NUMBER



Dimensions

EAS000QC

Unit: mm (in)

	3 door & 5 door Hatchback
Overall length	3,715 (146.26)
Overall width	1,660 (65.35)
Overall height	1,540 (60.63)
Front tread	1,470 (57.87)*1 , 1460 (57.48)*2
Rear tread	1,455 (57.28)*1 , 1,445 (56.89)*2
Wheelbase	2,432 (95.75)

*1: Road wheel offset / 40 mm (1.57 in)
*2: Road wheel offset / 50 mm (1.97 in)

Wheels & Tires

EAS000QD

	Conventional	Spare
Road wheel size/offset mm (in)	14 × 5JJ Steel/40 (1.57) 15 × 5JJ Steel/50 (1.97) 15 × 5.5JJ Aluminum/50 (1.97)	Conventional
Tire size	175/60R15 175/65R15 165/70R14	Conventional

TERMINOLOGY

PFP:00011

ISO 15031-2 Terminology List

EAS000QE

All emission related terms used in this publication in accordance with ISO 15031-2 are listed. Accordingly, new terms, new acronyms/abbreviations and old terms are listed in the following chart.

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Air cleaner	ACL	Air cleaner
Barometric pressure	BARO	***
Barometric pressure sensor-BCDD	BAROS-BCDD	BCDD
Camshaft position	CMP	***
Camshaft position sensor	CMPS	Crank angle sensor
Canister	***	Canister
Carburetor	CARB	Carburetor
Charge air cooler	CAC	Intercooler
Closed loop	CL	Closed loop
Closed throttle position switch	CTP switch	Idle switch
Clutch pedal position switch	CPP switch	Clutch switch
Continuous fuel injection system	CFI system	***
Continuous trap oxidizer system	CTOX system	***
Crankshaft position	CKP	***
Crankshaft position sensor	CKPS	***
Data link connector	DLC	***
Data link connector for CONSULT-II	DLC for CONSULT-II	Diagnostic connector for CONSULT-II
Diagnostic test mode	DTM	Diagnostic mode
Diagnostic test mode selector	DTM selector	Diagnostic mode selector
Diagnostic test mode I	DTM I	Mode I
Diagnostic test mode II	DTM II	Mode II
Diagnostic trouble code	DTC	Malfunction code
Direct fuel injection system	DFI system	***
Distributor ignition system	DI system	Ignition timing control
Early fuel evaporation-mixture heater	EFE-mixture heater	Mixture heater
Early fuel evaporation system	EFE system	Mixture heater control
Electrically erasable programmable read only memory	EEPROM	***
Electronic ignition system	EI system	Ignition timing control
Engine control	EC	***
Engine control module	ECM	ECCS control unit
Engine coolant temperature	ECT	Engine temperature
Engine coolant temperature sensor	ECTS	Engine temperature sensor
Engine modification	EM	***
Engine speed	RPM	Engine speed
Erasable programmable read only memory	EPROM	***
Evaporative emission canister	EVAP canister	Canister
Evaporative emission system	EVAP system	Canister control solenoid valve
Exhaust gas recirculation valve	EGR valve	EGR valve

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Exhaust gas recirculation control-BPT valve	EGRC-BPT valve	BPT valve
Exhaust gas recirculation control-solenoid valve	EGRC-solenoid valve	EGR control solenoid valve
Exhaust gas recirculation temperature sensor	EGRT sensor	Exhaust gas temperature sensor
EGR temperature sensor		
Flash electrically erasable programmable read only memory	FEEPROM	***
Flash erasable programmable read only memory	FEPROM	***
Flexible fuel sensor	FFS	***
Flexible fuel system	FF system	***
Fuel pressure regulator	***	Pressure regulator
Fuel pressure regulator control solenoid valve	***	PRVR control solenoid valve
Fuel trim	FT	***
Heated Oxygen sensor	HO2S	Exhaust gas sensor
Idle air control system	IAC system	Idle speed control
Idle air control valve-air regulator	IACV-air regulator	Air regulator
Idle air control valve-auxiliary air control valve	IACV-AAC valve	Auxiliary air control (AAC) valve
Idle air control valve-FICD solenoid valve	IACV-FICD solenoid valve	FICD solenoid valve
Idle air control valve-idle up control solenoid valve	IACV-idle up control solenoid valve	Idle up control solenoid valve
Idle speed control-FI pot	ISC-FI pot	FI pot
Idle speed control system	ISC system	***
Ignition control	IC	***
Ignition control module	ICM	***
Indirect fuel injection system	IFI system	***
Intake air	IA	Air
Intake air temperature sensor	IAT sensor	Air temperature sensor
Knock	***	Detonation
Knock sensor	KS	Detonation sensor
Malfunction indicator lamp	MIL	Check engine light
Manifold absolute pressure	MAP	***
Manifold absolute pressure sensor	MAPS	***
Manifold differential pressure	MDP	***
Manifold differential pressure sensor	MDPS	***
Manifold surface temperature	MST	***
Manifold surface temperature sensor	MSTS	***
Manifold vacuum zone	MVZ	***
Manifold vacuum zone sensor	MVZS	***
Mass air flow sensor	MAFS	Air flow meter
Mixture control solenoid valve	MC solenoid valve	Air-fuel ratio control solenoid valve
Multiport fuel injection System	MFI system	Fuel injection control

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Nonvolatile random access memory	NVRAM	***
On board diagnostic system	OBD system	Self-diagnosis
Open loop	OL	Open loop
Oxidation catalyst	OC	Catalyst
Oxidation catalytic converter system	OC system	***
Oxygen sensor	O2S	Exhaust gas sensor
Park position switch	***	Park switch
Park/neutral position switch	PNP switch	Park/neutral switch Inhibitor switch Neutral position switch
Periodic trap oxidizer system	PTOX system	***
Positive crankcase ventilation	PCV	Positive crankcase ventilation
Positive crankcase ventilation valve	PCV valve	PCV valve
Powertrain control module	PCM	***
Programmable read only memory	PROM	***
Pulsed secondary air injection control solenoid valve	PAIRC solenoid valve	AIV control solenoid valve
Pulsed secondary air injection system	PAIR system	Air induction valve (AIV) control
Pulsed secondary air injection valve	PAIR valve	Air induction valve
Random access memory	RAM	***
Read only memory	ROM	***
Scan tool	ST	***
Secondary air injection pump	AIR pump	***
Secondary air injection system	AIR system	***
Sequential multiport fuel injection system	SFI system	Sequential fuel injection
Service reminder indicator	SRI	***
Simultaneous multiport fuel injection system	***	Simultaneous fuel injection
Smoke puff limiter system	SPL system	***
Supercharger	SC	***
Supercharger bypass	SCB	***
System readiness test	SRT	***
Thermal vacuum valve	TVV	Thermal vacuum valve
Three way catalyst	TWC	Catalyst
Three way catalytic converter system	TWC system	***
Three way + oxidation catalyst	TWC + OC	Catalyst
Three way + oxidation catalytic converter system	TWC + OC system	***
Throttle body	TB	Throttle chamber SPI body
Throttle body fuel injection system	TBI system	Fuel injection control
Throttle position	TP	Throttle position
Throttle position sensor	TPS	Throttle sensor
Throttle position switch	TP switch	Throttle switch
Torque converter clutch solenoid valve	TCC solenoid valve	Lock-up cancel solenoid Lock-up solenoid

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Transmission control module	TCM	A/T control unit
Turbocharger	TC	Turbocharger
Vehicle speed sensor	VSS	Vehicle speed sensor
Volume air flow sensor	VAFS	Air flow meter
Warm up oxidation catalyst	WU-OC	Catalyst
Warm up oxidation catalytic converter system	WU-OC system	***
Warm up three way catalyst	WU-TWC	Catalyst
Warm up three way catalytic converter system	WU-TWC system	***
Wide open throttle position switch	WOTP switch	Full switch

***: Not applicable

SECTION GW

GLASSES, WINDOW SYSTEM & MIRRORS

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions 3
WINDSHIELD GLASS 4
Removal and Installation 4
REMOVAL 4
INSTALLATION 6
SIDE WINDOW GLASS 8
Removal and Installation 8
REMOVAL 8
INSTALLATION 8
BACK DOOR WINDOW GLASS 10
Removal and Installation 10
REMOVAL 10
INSTALLATION 11
REAR WINDOW DEFOGGER 14
Component Parts and Harness Connector Location 14
System Description 14
CAN Communication 16
SYSTEM DESCRIPTION 16
CAN Communication Unit 16
TYPE 1/TYPE 2 17
TYPE 3/TYPE 4 20
TYPE 5/TYPE 6 22
TYPE 7/TYPE 8 25
TYPE 9/TYPE 10 27
Schematic – DEF – 30
Wiring Diagram –DEF– 31
WITHOUT ESP 31
WITH ESP 34
Terminal and Reference Value for BCM 37
Terminal and Reference Value for IPDM E/R 37
Work Flow 37
CONSULT-II Inspection Procedure 38
DATA MONITOR 39
ACTIVE TEST 39
Trouble Diagnoses Symptom Chart 40
BCM Power Supply and Ground Circuit Check 40
Rear Window Defogger Switch Circuit Check / With Auto A/C 42
Rear Window Defogger Switch Circuit Check / Without Auto A/C 43
Rear Window Defogger Power Supply Circuit Check 45
Rear Window Defogger Circuit Check 46
Door Mirror Defogger Power Supply Circuit Check 47
Driver Side Door Mirror Defogger Circuit Check 48
Passenger Side Door Mirror Defogger Circuit Check 49
Filament Check 50
Filament Repair 51
REPAIR EQUIPMENT 51
REPAIRING PROCEDURE 51
POWER WINDOW SYSTEM 52
Component Parts and Harness Connector Location 52
System Description 52
FRONT DRIVER SIDE DOOR 53
FRONT PASSENGER SIDE DOOR 53
Wiring Diagram – WINDOW – 55
WITHOUT ESP 55
WITHOUT ESP 57
Terminal and Reference Value for BCM 59
Work Flow 59
Trouble Diagnosis Symptom Chart 59
BCM Power Supply and Ground Circuit Check 60
Power Window Switch Power Supply and Ground Circuit Check 61
Power Window Main Switch Check 62
Front Power Window Motor (Driver Side) Check (LHD models) 63
Front Power Window Motor (Driver Side) Check (RHD models) 63
Front Power Window Motor (Passenger Side) Check 64
Front Power Window Switch (Passenger Side) Check 65
Front Power Window Switch (Passenger Side) Circuit Check (LHD models) 66

Front Power Window Switch (Passenger Side) Circuit Check (RHD models) 67
Front Power Window Switch (Passenger Side) Power Supply Check 68
FRONT DOOR GLASS AND REGULATOR 69
Removal and Installation 69
REMOVAL 69
INSTALLATION 70
INSPECTION AFTER REMOVAL 71
SETTING AFTER INSTALLATION (DRIVER'S SIDE ONLY) 71
FITTING INSPECTION 71
REAR DOOR GLASS AND REGULATOR 72
Removal and Installation 72
REMOVAL 72
INSPECTION AFTER REMOVAL 73
INSTALLATION 74
FITTING INSPECTION 74
DOOR MIRROR 75
Wiring Diagram — MIRROR — LHD Models 75
Wiring Diagram — MIRROR — RHD Models 76
Removal and Installation 77
REMOVAL 77
INSTALLATION 77
Disassembly and Assembly 78
DISASSEMBLY 79
ASSEMBLY 79
INSIDE MIRROR 80
Removal and Installation 80
REMOVAL 80
INSTALLATION 80

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004PK

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions

EIS004PL

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

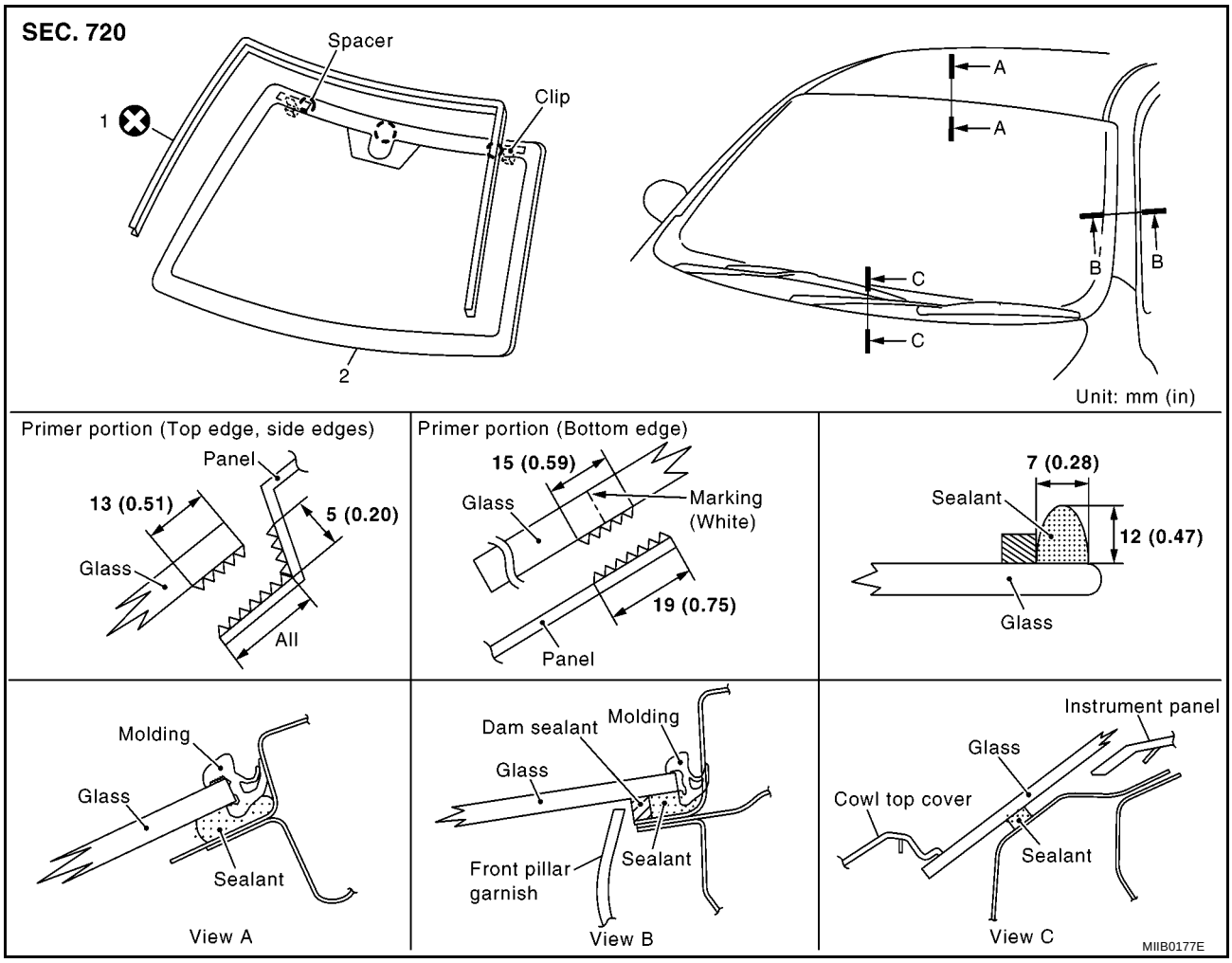
- Do not use any organic solvent, such as thinner or benzine.

WINDSHIELD GLASS

PFP:72712

Removal and Installation

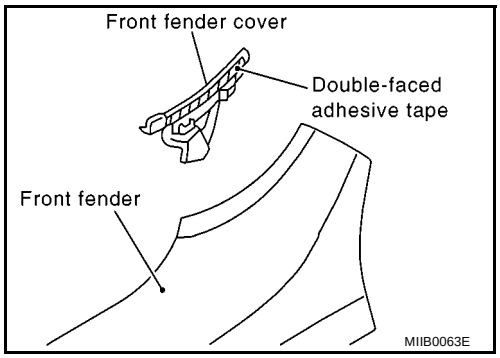
EIS004K7



1. Windshield molding
2. Windshield glass

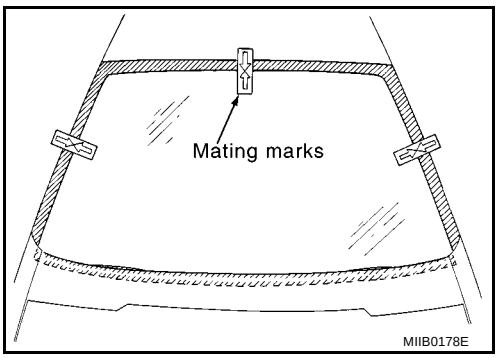
REMOVAL

1. Remove headliner. Refer to EI-24, "HEADLINER" .
2. Remove cowl top cover. Refer to EI-10, "COWL TOP" .
3. Peel off double-sided tape and remove front fender covers (LH/RH) from front fenders (LH/RH).



4. Apply protective tape around windshield glass to protect the painted surface from damage.
5. Guiding a cutter knife along glass, cut the surface of moldings.
6. With pliers, draw out all the remaining molding left in flanged area of body to remove it completely from adhering surface on glass.

- When re-using the windshield glass, put match marks on body and glass.



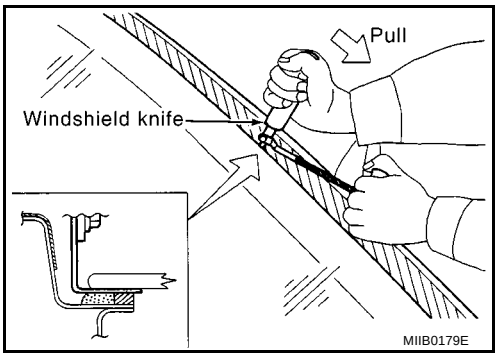
7. Cut adhesive.
   - Depending on the tool in use, follow the procedures below:

   CAUTION:
   If windshield glass is reused, do not use a windshield knife. (It may scratch glass surface.)

a. With a windshield knife (when replacing glass).

i. To smoothly cut with windshield knife, apply soapy water onto the adhesive on the body side surrounding the windshield.

ii. Insert windshield knife into the bonded area. Cut adhesive by pulling the knife, keeping the tip parallel to glass edge.



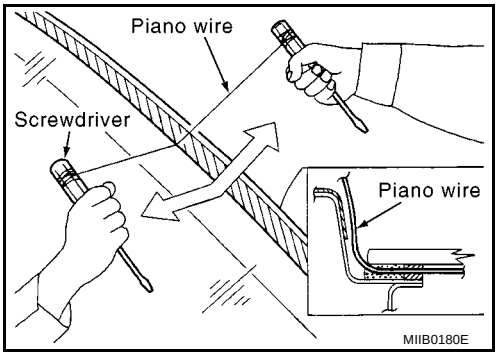
b. With a piano wire (when reusing glass)

i. Working from inside cabin, drill a through hole in the adhesive with a drill or pick.

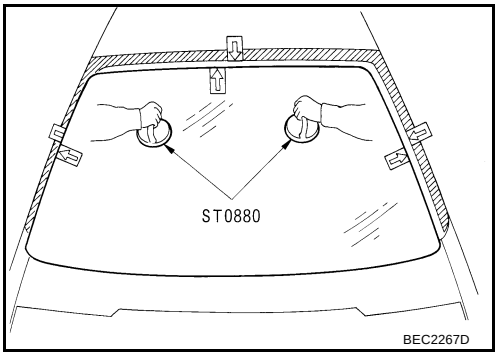
ii. From inside the passenger room, pass a piano wire through the hole and tie both ends to screwdrivers or similar tools.

iii. With two persons, one holding one end of the piano wire outside the vehicle while the other holding the other end inside the vehicle, pulling the wire alternately to cut off the adhesive.

CAUTION:
- **Do not press piano wire excessively against glass edge.**
- **Put a copper plate to keep the piano wire clear of plastic parts such as the instrument panel.**



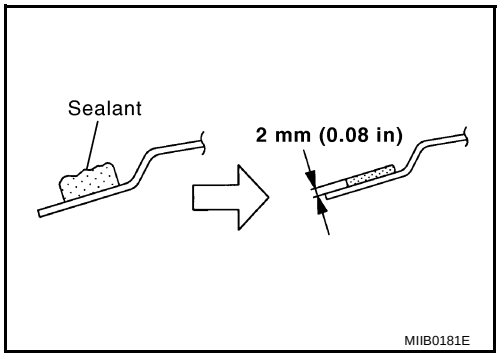
8. Use rubber suction cups (SST) to remove glass from the vehicle.



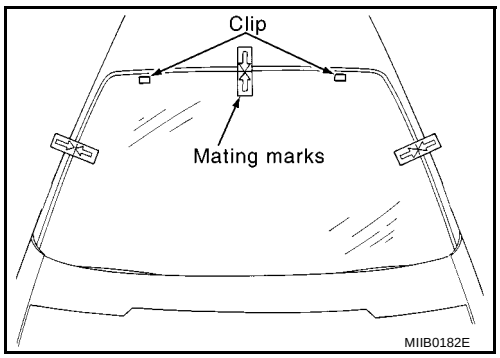
INSTALLATION

1. Using a knife or spatula, trim the adhesive (sealant) remaining on body down to approximately 2 mm thick so that the contour becomes smooth.

   CAUTION:
   If bonded area on body is scratched, be sure to repair it with a 2-component urethane. Do not use lacquer.



2. Put the clip in the panel hole.
3. When installing new glass, mount glass onto the vehicle and paint mating marks on body and glass, then remove glass again.
4. When reusing glass, use a knife or spatula to remove the remaining adhesive (sealant) and smooth out the surface.
5. Clean bonded area on glass with white gasoline.



6. Apply primer G along the entire circumference of glass.

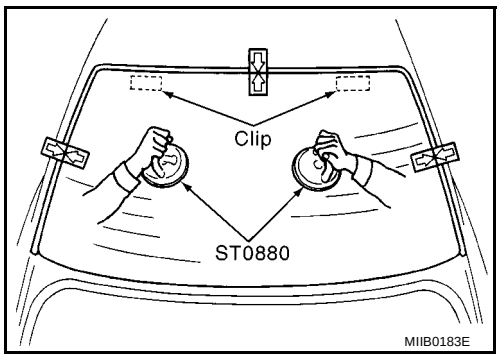
   CAUTION:
   There are 2 types of primer. Never confuse the application methods.
   Primer M: for painted surfaces
   Primer G: for glass

   NOTE:
   The essential function of primers is to strengthen adhesion between glass and painted surface.

7. Apply primer M on areas where adhesive contacts on the side of vehicle body.

   CAUTION:
   - **If primer M adheres to a painted surface other than bonding area, or if it overflows, quickly remove it with white gasoline.**
   - **Place a copper plate to keep primer M clear of the instrument panel.**

8. After applying primers, apply the adhesive along the entire circumference of the glass as shown in the figure, and within the time specified in the instructions for the adhesive.
   - Open adhesive by cutting off the nozzle tip and set it in a sealant gun.
9. After setting rubber suction cups (SST) to glass, align mating marks on body and glass. Install glass to the body.
10. Press entire surface of glass lightly to fit it completely.
11. Remove protective tape.
12. Using a spatula, repair any adhesive overflow or shortage to make the surface smooth.

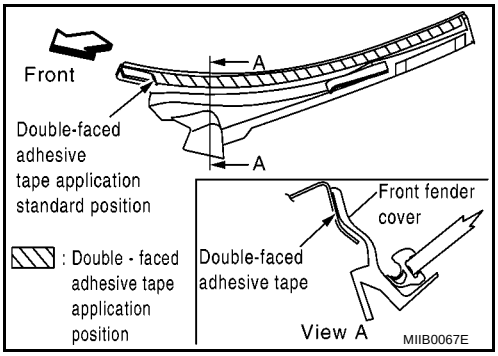


13. Position windshield moldings and allow their adhesion. Refer to EI-13, "WINDSHIELD MOLDING" .

    CAUTION:
    - **Be sure to install windshield molding before adhesive hardens.**
    - **After installing glass, keep door windows open and avoid driving vehicle until adhesive has completely cured.**

14. Check for water leaks.
15. Remove double-sided tape from front fender cover and apply primer (Sumitomo 3M K520) to double-sided tape application position shown in the figure. Then apply new double-sided tape and install front fender.

Double-sided adhesive tape **: Part equivalent to Sumitomo 3M-5571 (t: 0.8)**



16. Install cowl top cover. Refer to EI-10, "COWL TOP" .
17. Install headliner. Refer to EI-24, "HEADLINER" .

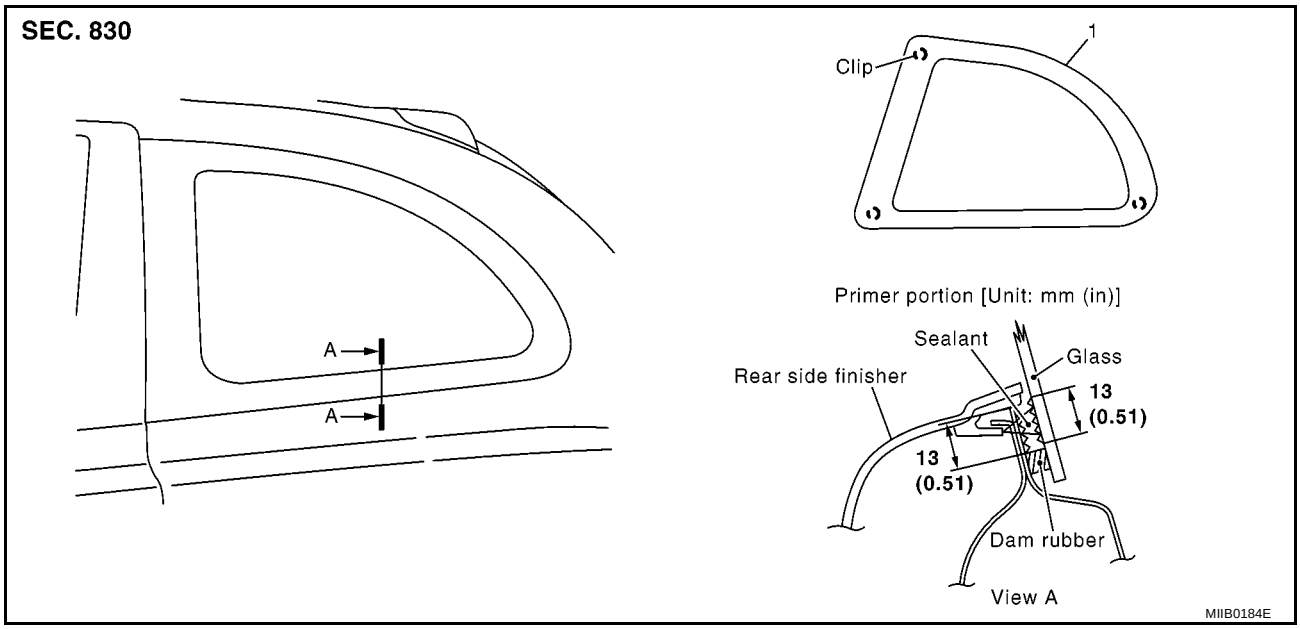
SIDE WINDOW GLASS

PFP:83300

Removal and Installation

SMA for VIN >SJN**AK12U1174013

EIS004K8

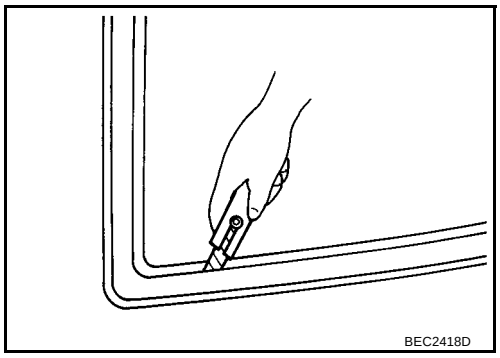


1. Side window glass

REMOVAL

1. Remove rear side finisher and lock pillar upper garnish. Refer to EI-20, "Removal and Installation (3-Door)" .
2. Apply protective tape on body panel along the circumference side window glass to protect coated surfaces from damage.
3. For the side window glass vehicle front side, open front door, and from outside of vehicle insert cutter knife between side window glass and lock pillar panel and cut adhesive parallel to glass.
4. For side window glass adhesion areas other than the above, working from inside vehicle, insert cutter knife between side door window glass and body panel. Guide cutter edge along glass to cut off adhesive.

   CAUTION:
   Cut carefully so that the tip end of cutter knife does not contact painted surface.
5. Remove glass out of vehicle, unclipping.

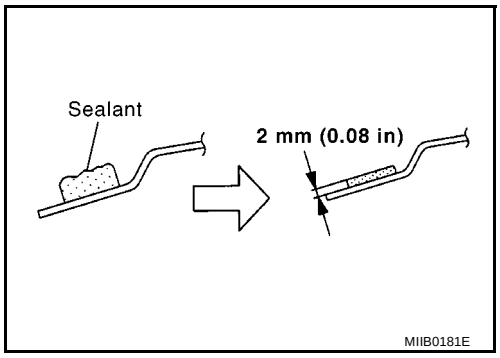


INSTALLATION

1. With a knife, scrape off adhesive remaining on the vehicle body to as thin and flat as 2 mm.

CAUTION:
If scratches are made on vehicle-side bonding surface, be sure to repair it. Always use 2-component type urethane paint. Do not use lacquer type paint.

2. Using a knife or spatula to remove the remaining adhesive and smooth out the surface. (When glass is reused)
3. Clean bonded area on glass with white gasoline.
4. Apply primer G along the entire circumference of glass.



CAUTION:
As 2 primers will be used, they must be used exactly as specified.
Primer M: for painted surfaces

Primer G: for glass

NOTE:

The essential function of primers is to strengthen adhesion between the glass and painted surface primer.

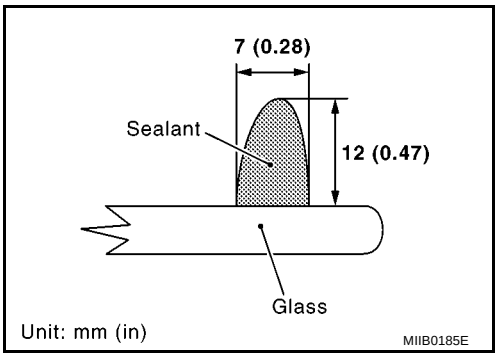
5. Apply primer M on areas where adhesive contacts on the side of vehicle body.

CAUTION:

If primer M adheres to a painted surface other than bonding area, or if it overflows, quickly remove it with white gasoline.

6. After applying primers, apply the adhesive along the entire circumference of the glass as shown in the figure, and within the time specified in the instructions for the adhesive.

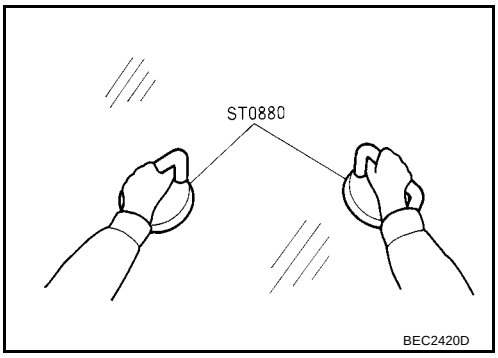
- Open adhesive by cutting off the nozzle tip and set it in a sealant gun.



7. After setting rubber suction cups (SST) to glass, align mating marks on body and glass. Install glass to the body.
8. Press entire surface of glass lightly to fit it completely.
9. Remove protective tape.
10. Using a spatula, go over areas with excessive or insufficient adhesive and neatly smooth the surface.

    CAUTION:

    After installing glass, keep door windows open and avoid driving vehicle until adhesive has completely cured.
11. Check for water leaks.
12. Install rear side finisher and lock pillar upper garnish. Refer to EI-16, "DOOR FINISHER" .

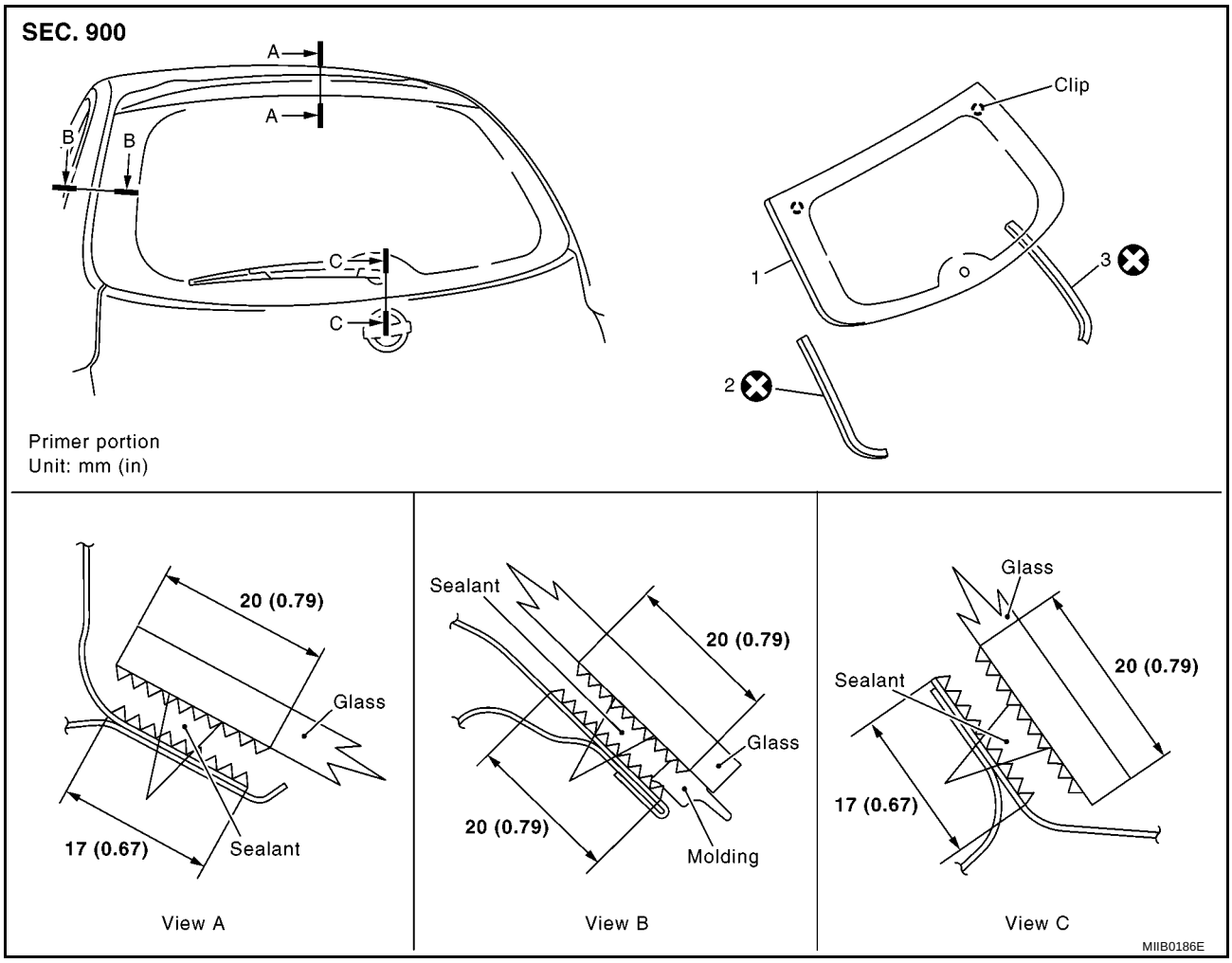


BACK DOOR WINDOW GLASS

PFP:90300

Removal and Installation

EIS004K9



1. Back door window glass
2. Back door window molding (LH side)
3. Back door window molding (RH side)

REMOVAL

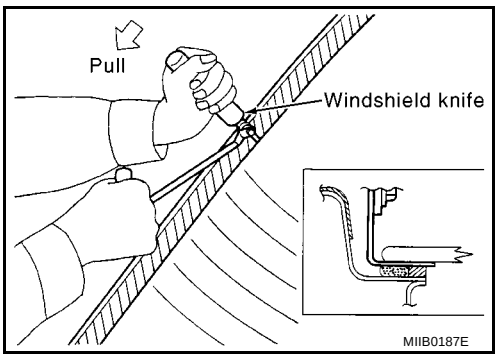
1. Remove back door finisher. Refer to EI-18, "BACK DOOR TRIM" .
2. Remove high mounted stop lamp. Refer to LT-182, "Bulb Replacement" .
3. Remove rear wiper arm and rear wiper motor. Refer to WW-106, "Removal and Installation of Rear Wiper Arm" and WW-107, "Removal and Installation of Rear Wiper Motor" .
4. Disconnect rear window defogger connector.
5. Apply protective tape around windshield glass to protect the painted surface from damage.
6. Cut adhesive.
   - Depending on the tool in use, follow the procedures below:

   CAUTION:
   When reusing the glass, do not use the windshield knife. (Because it will damage the glass)

a. With a windshield knife (when replacing glass).

i. For smooth movement of windshield knife, apply soapy water around bonded area on glass hatch panel.

ii. Insert windshield knife into the bonded area from passenger room side. Cut adhesive by pulling the knife, keeping the tip parallel to glass edge.



b. With a piano wire (when reusing glass)

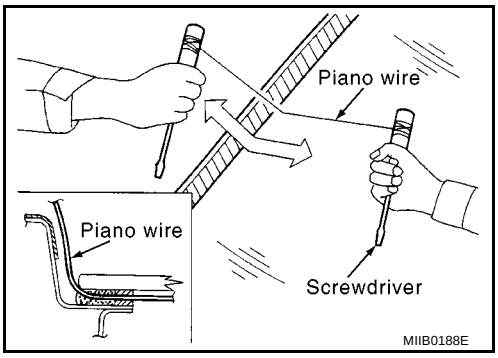
i. Working from inside the passenger room, make a hole in the adhesive with the cutter.

ii. From inside the passenger room, pass a piano wire through the hole and tie both ends to screwdrivers or similar tools.

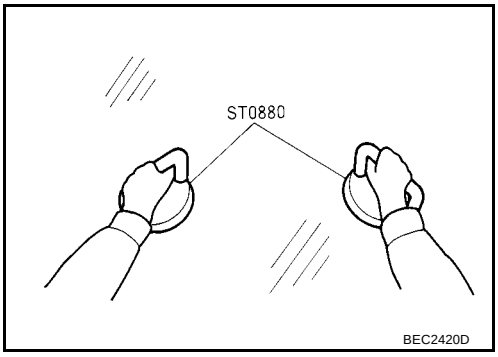
iii. With two persons, one holding one end of the piano wire outside the vehicle while the other holding the other end inside the vehicle, pulling the wire alternately to cut off the adhesive.

CAUTION:

- **Do not press piano wire excessively against glass edge.**



7. Unclip and remove glass from the vehicle with rubber suction cups (SST).



INSTALLATION

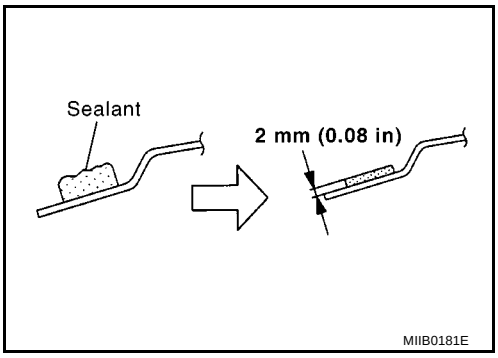
1. Using a knife or spatula, trim the bond remaining on body down to approximately 2 mm thick so that the contour becomes smooth.

   CAUTION:

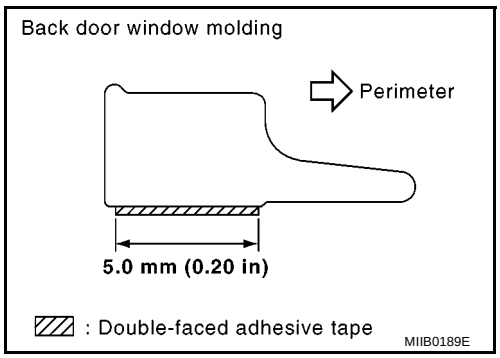
   If scratches or flaws are made on the body surface in the width of adhesion, be sure to repair them with 2-liquid type urethane paint. Do not use lacquer type paint.

2. When reusing glass, use a knife or spatula to remove the remaining adhesive and smooth out the surface.

3. With white gasoline, clean the glass surface where adhesive is applied and the surrounding areas.



4. Bond the back door window molding to the perimeter of the glass using double-sided tape. (Bond aligning double-sided tape bonded area to glass edge.)



5. Apply primer G along the entire circumference of glass.

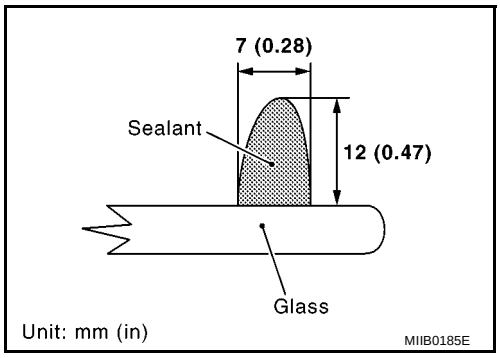
CAUTION:
As 2 primers will be used, they must be used exactly as specified.
Primer M: for painted surfaces
Primer G: for glass

NOTE:
The essential function of primers is to strengthen adhesion between the glass and painted surface primer.

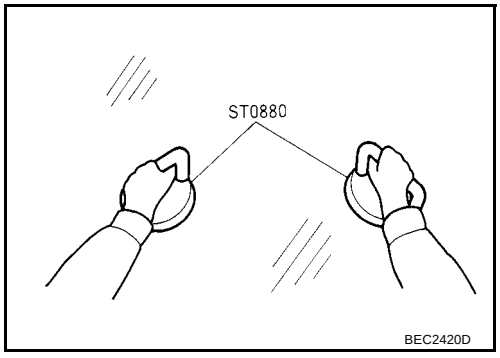
6. Apply primer M on areas where adhesive contacts on the side of vehicle body.

CAUTION:
If primer M adheres to a painted surface other than bonding area, or if it overflows, quickly remove it with white gasoline.

7. After applying primers, apply the adhesive along the entire circumference of the glass as shown in the figure, and within the time specified in the instructions for the adhesive.
   - Open adhesive by cutting off the nozzle tip and set it in a sealant gun.



8. After setting rubber suction cups (SST) to glass, align the clips with the holes on the body panel and install.



9. Press entire surface of glass lightly to fit it completely.
10. Remove protective tape.
11. Using a spatula, repair any adhesive overflow or shortage and make the surface smooth.

CAUTION:
After installing glass, keep door windows open and avoid driving vehicle until adhesive has completely cured.

12. Check for water leaks.
13. Connect rear window defogger connector.

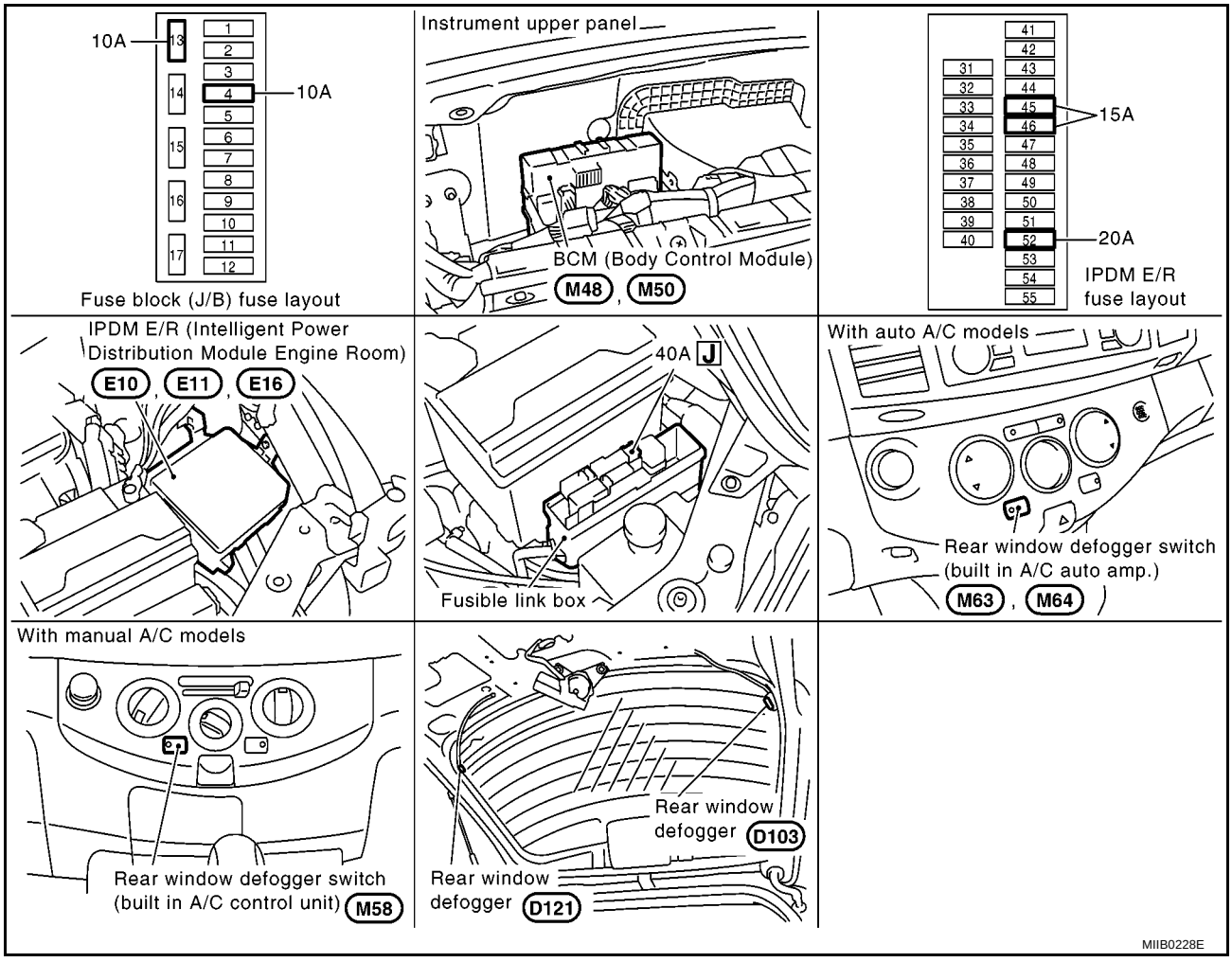
14. Install rear wiper arm and rear wiper motor. Refer to WW-106, "Removal and Installation of Rear Wiper Arm" and WW-107, "Removal and Installation of Rear Wiper Motor" .
15. Install high-mounted stop lamp. Refer to LT-182, "Bulb Replacement" .
16. Install back door finisher. Refer to EI-18, "BACK DOOR TRIM" .

REAR WINDOW DEFOGGER

PFP:25350

Component Parts and Harness Connector Location

EIS004KA



System Description

EIS004KB

The rear window defogger system is controlled by BCM (Body Control Module) and IPDM E/R (Intelligent Power Distribution Module Engine Room).
The rear window defogger operates only for approximately 15 minutes.
Power is at all times supplied

- through 15A fuse [No. 45, and 46, located in the IPDM E/R]
- to rear window defogger relay
- through 20A fuse [No. 52, located in the fuse block (J/B)]
- to IPDM E/R
- through 40A fusible link [letter **J** , located in the fuse block (J/B)]
- to BCM terminal 74 and 79.

With the ignition switch turned to ON or START position,
Power is supplied

- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to BCM terminal 24, and
- to A/C auto amp terminal 2 (with auto A/C) or
- to heater control panel terminal 4 (without auto A/C).

Ground is supplied

- to BCM terminal 2 and 70
- through body grounds M19, and M20.

- to A/C auto amp terminal 14 (with auto A/C) or
- to heater control panel terminal 10 (without auto A/C)
- through body grounds M19 and M20.
- to internal CPU of IPDM E/R terminal 3 and 54
- through body grounds E25, E26 and E40.

When rear window defogger switch is turned to ON,
Ground is supplied

- to BCM terminal 4
- through A/C auto amp terminal 17 (with auto A/C) or
- through heater control panel terminal 9 (without auto A/C)
- through A/C auto amp terminal 14 (with auto A/C) or
- through heater control panel terminal 10 (without auto A/C)
- through body grounds M19 and M20.

Then rear window defogger switch is illuminated.
Then BCM recognizes that rear window defogger switch is turned to ON.
Then it sends rear window defogger switch signals to IPDM E/R via DATA LINE (CAN-H, CAN-L).
When IPDM receives rear window defogger switch signals,
Ground is supplied

- to rear window defogger relay terminal
- through internal CPU of IPDM E/R terminal
- through internal CPU of IPDM E/R and IPDM E/R terminal 54
- through body grounds E25, E26 and E40.

and then rear window defogger relay is energized.
When rear window defogger relay is turned ON,
Power is supplied,

- through rear window defogger relay terminals
- through IPDM E/R terminal 8
- to rear window defogger terminal 1.

Rear window defogger terminal 2, is grounded through body ground D202.
With power and ground supplied, rear window defogger filaments heat and defog the rear window.
When rear window defogger relay is turned to ON,
Power is supplied (with mirror defogger)

- through rear window defogger relay terminal
- through IPDM E/R terminal 8
- through 10A fuse [No. 13, located in the fuse block (J/B)]
- to door mirror defogger (Driver side and passenger side) terminal 6.

Door mirror defogger (Driver side and passenger side) terminal 5 is grounded through body grounds M19 and M20.
With power and ground supplied, door mirror defogger filaments heat and defog the mirror.

CAN Communication

EIS00AOW

SYSTEM DESCRIPTION

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

CAN Communication Unit

EIS00AOX

Go to CAN system, when selecting your car model from the following table.

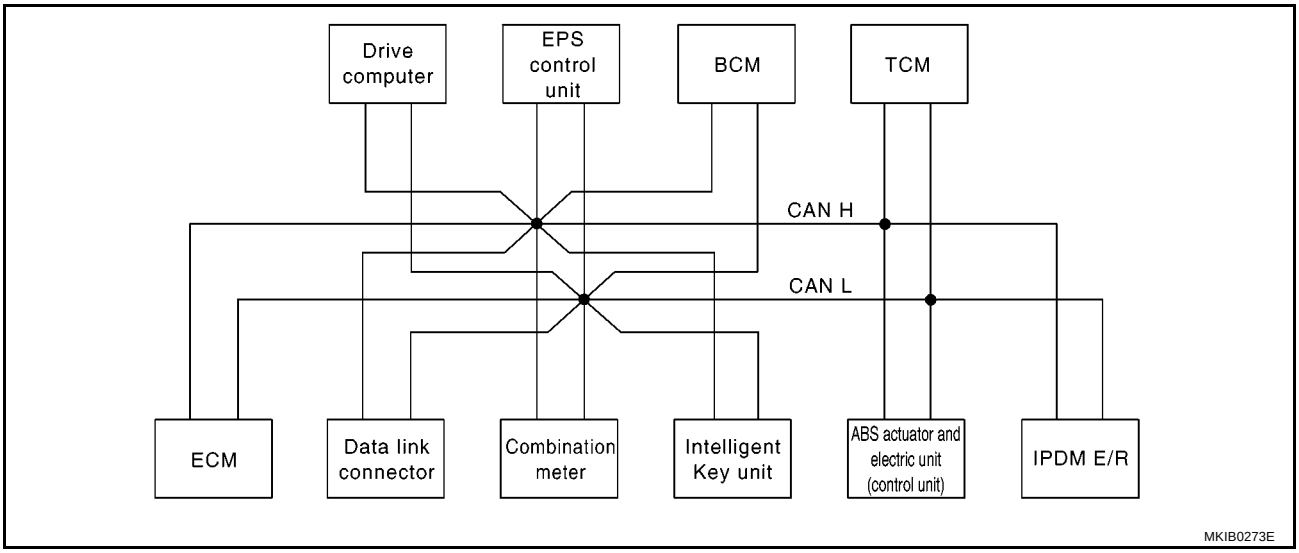
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	GW-17, "TYPE 1/TYPE 2"				GW-20, "TYPE 3/TYPE 4"				GW-22, "TYPE 5/TYPE 6"				GW-25, "TYPE 7/TYPE 8"				GW-27, "TYPE 9/TYPE 10"			

×: Applicable

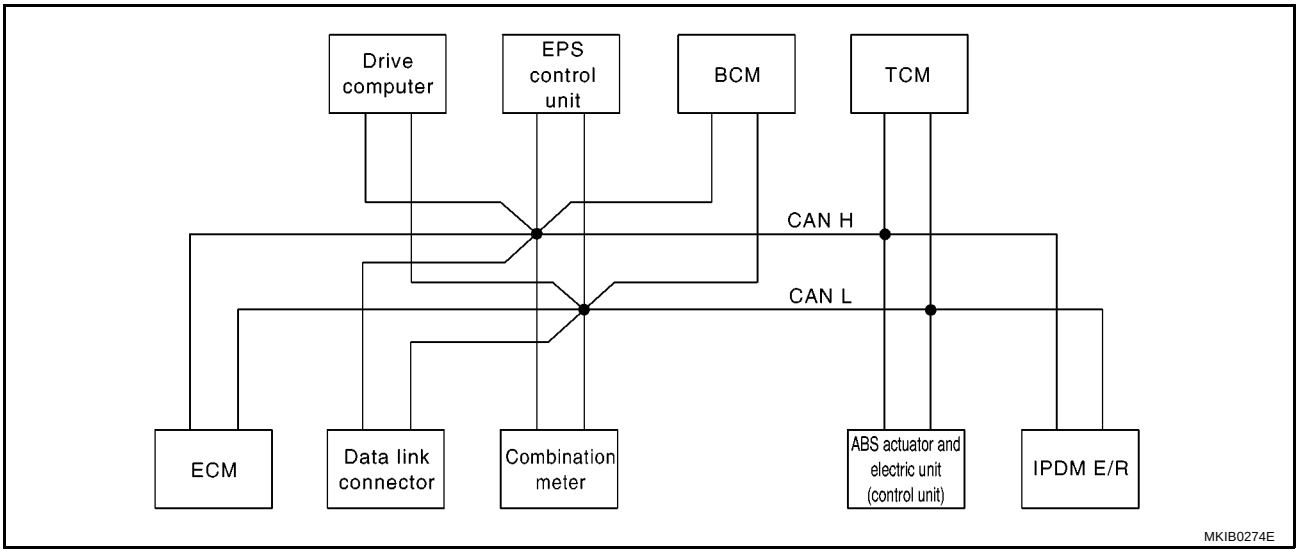
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

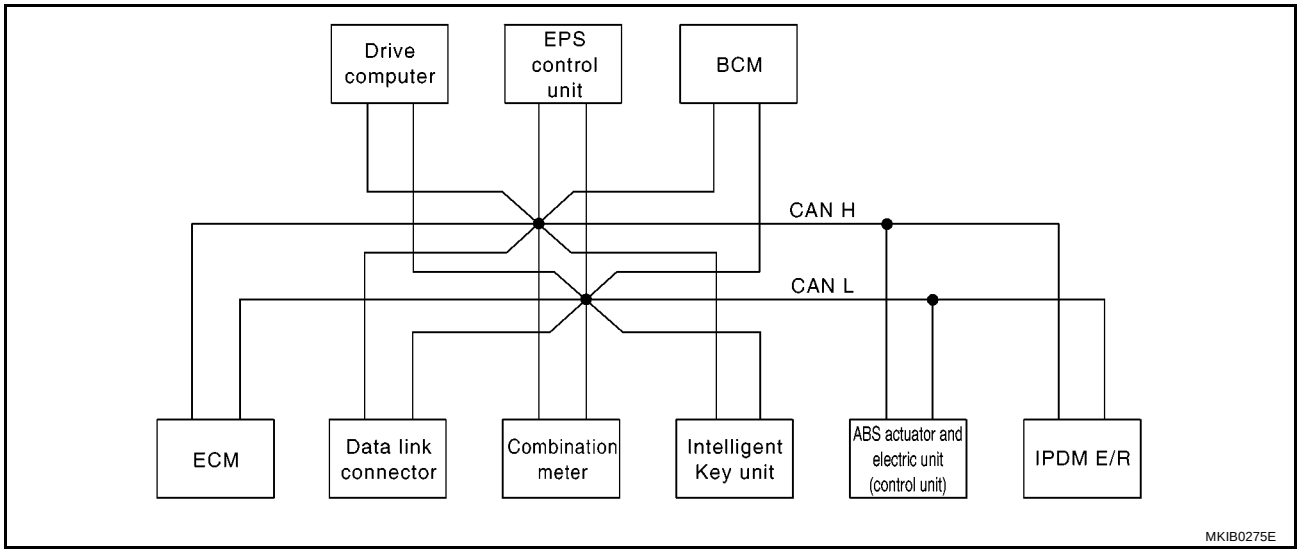
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

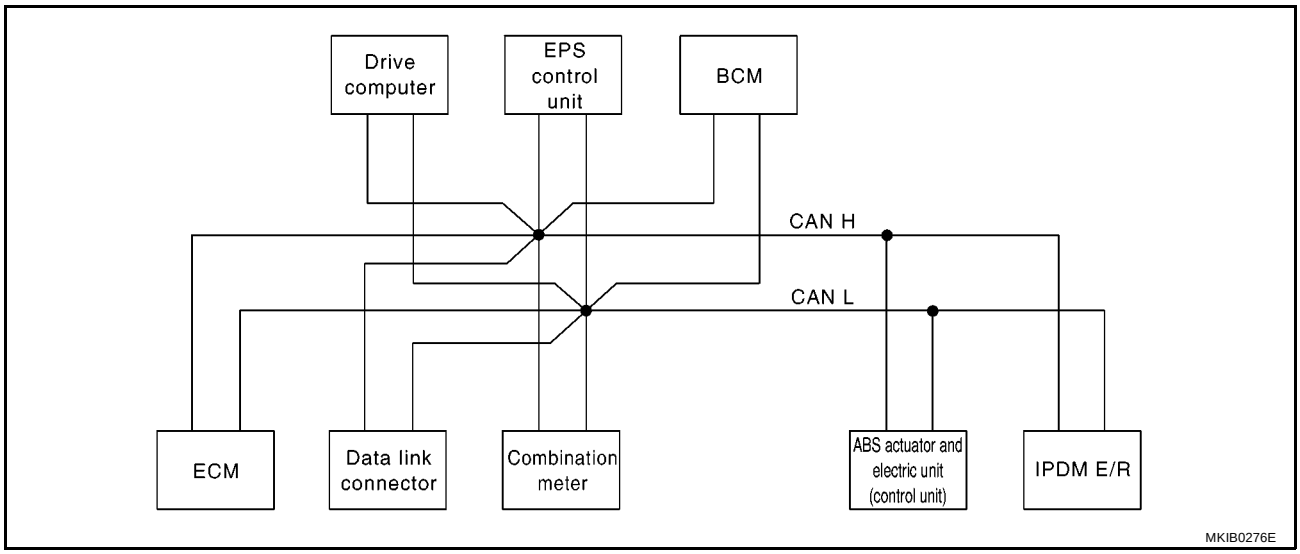
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

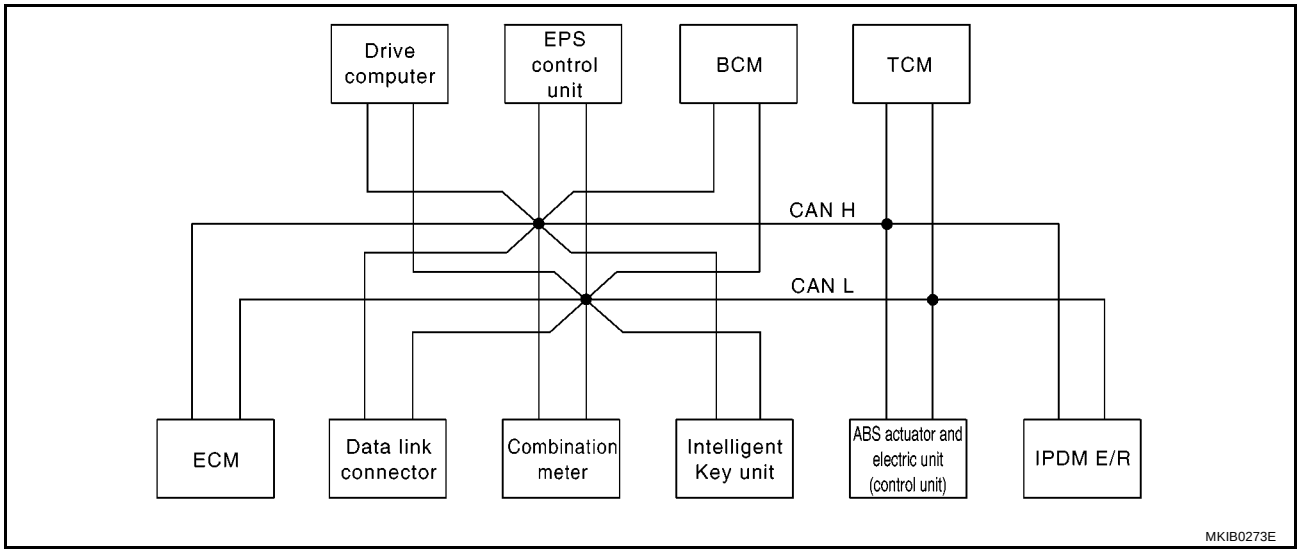
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

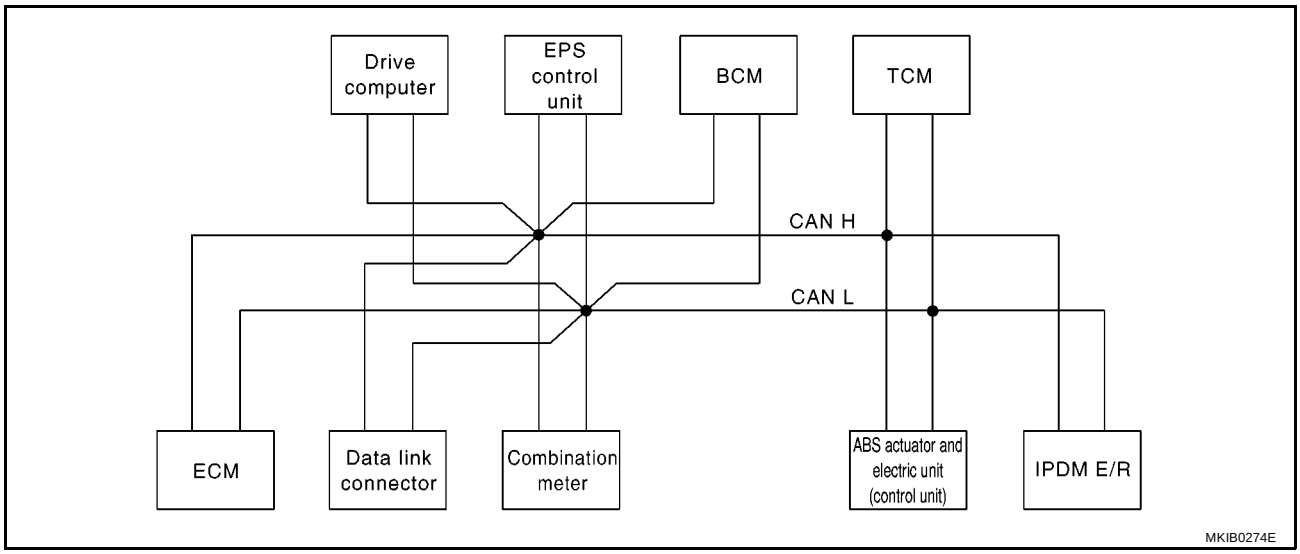
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

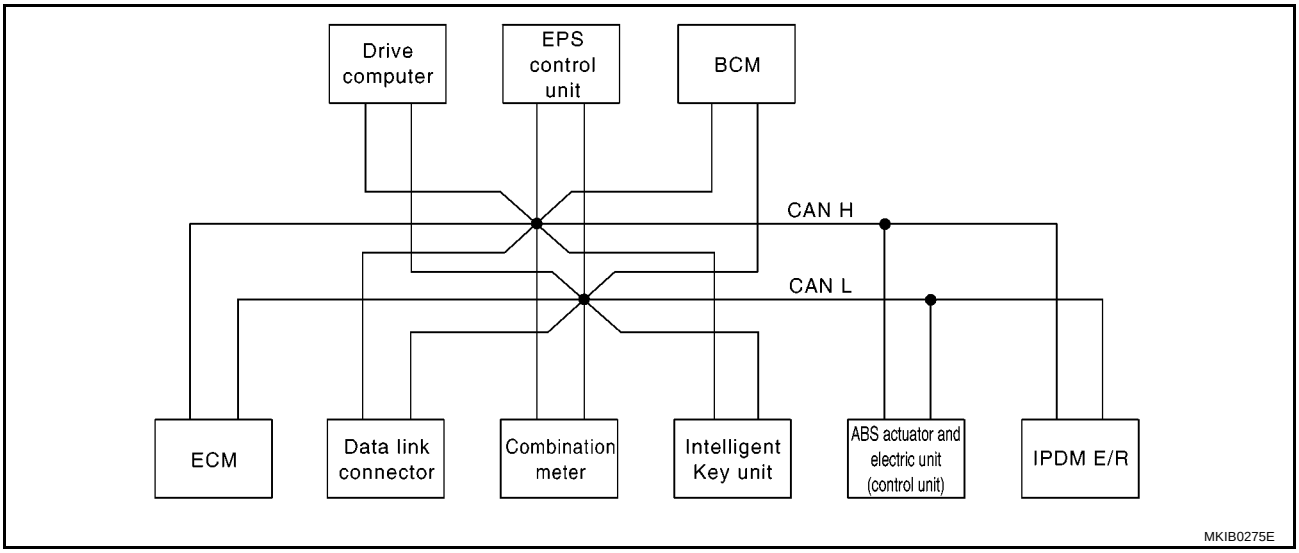
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

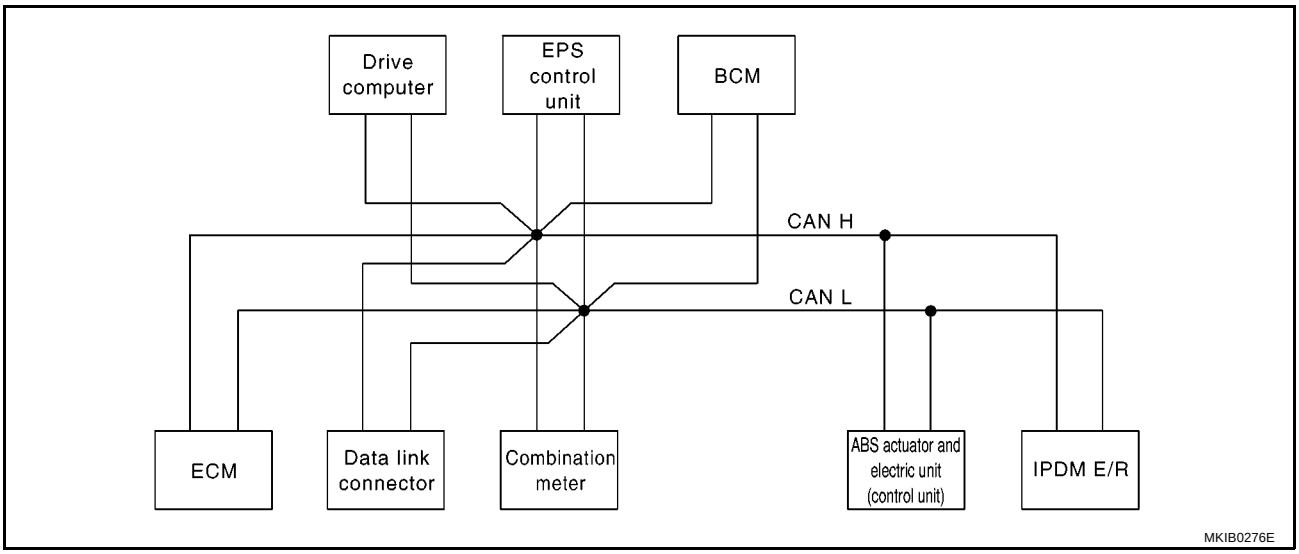
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

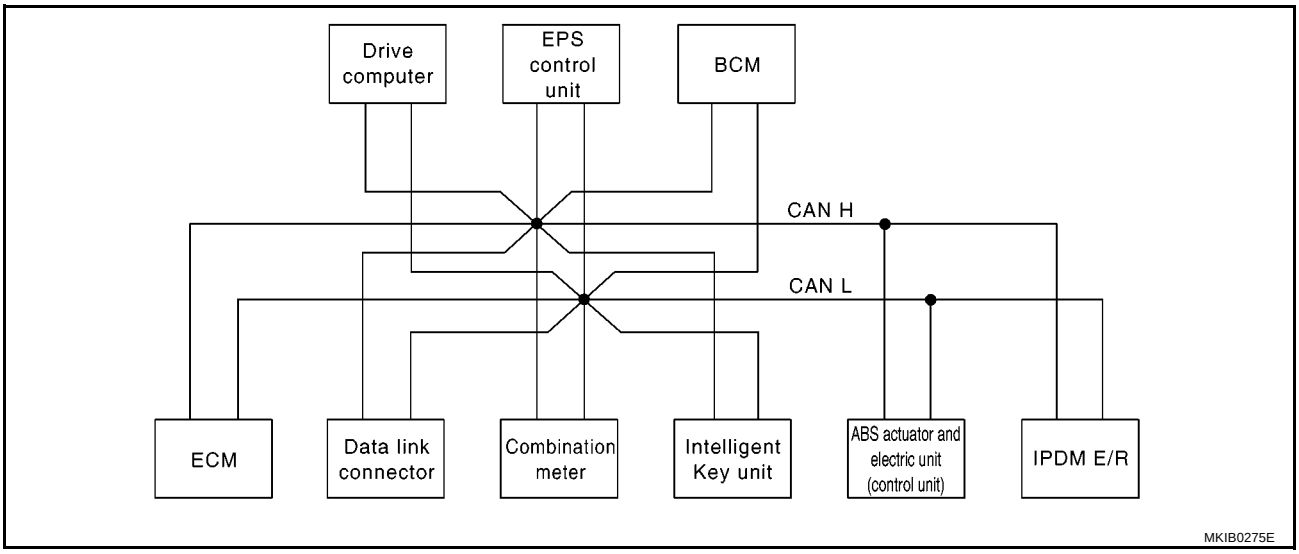
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

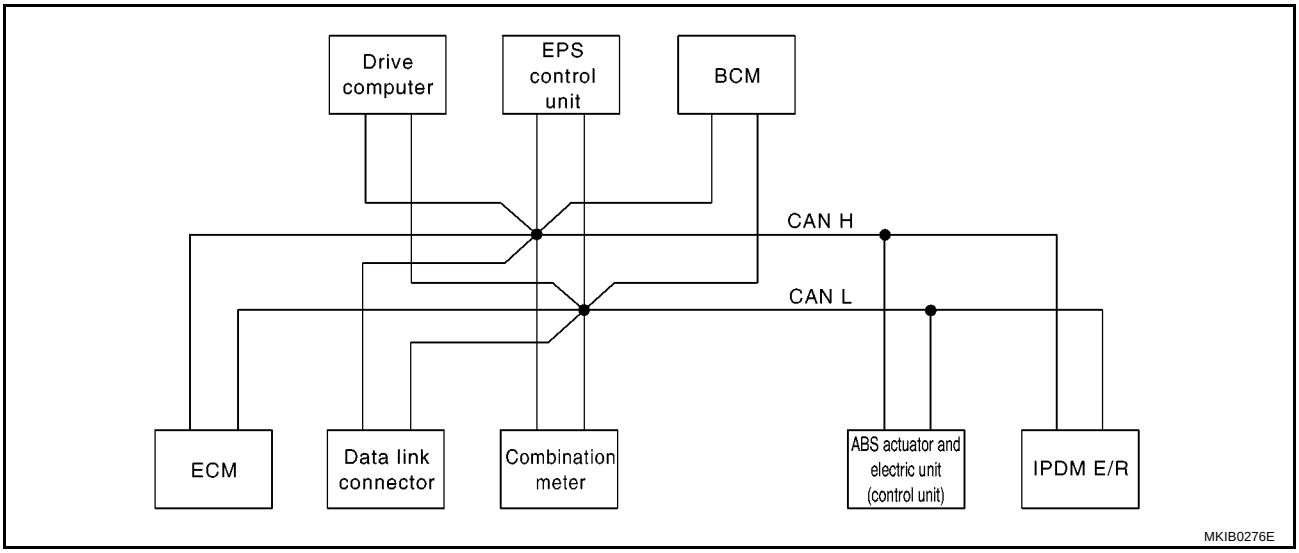
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

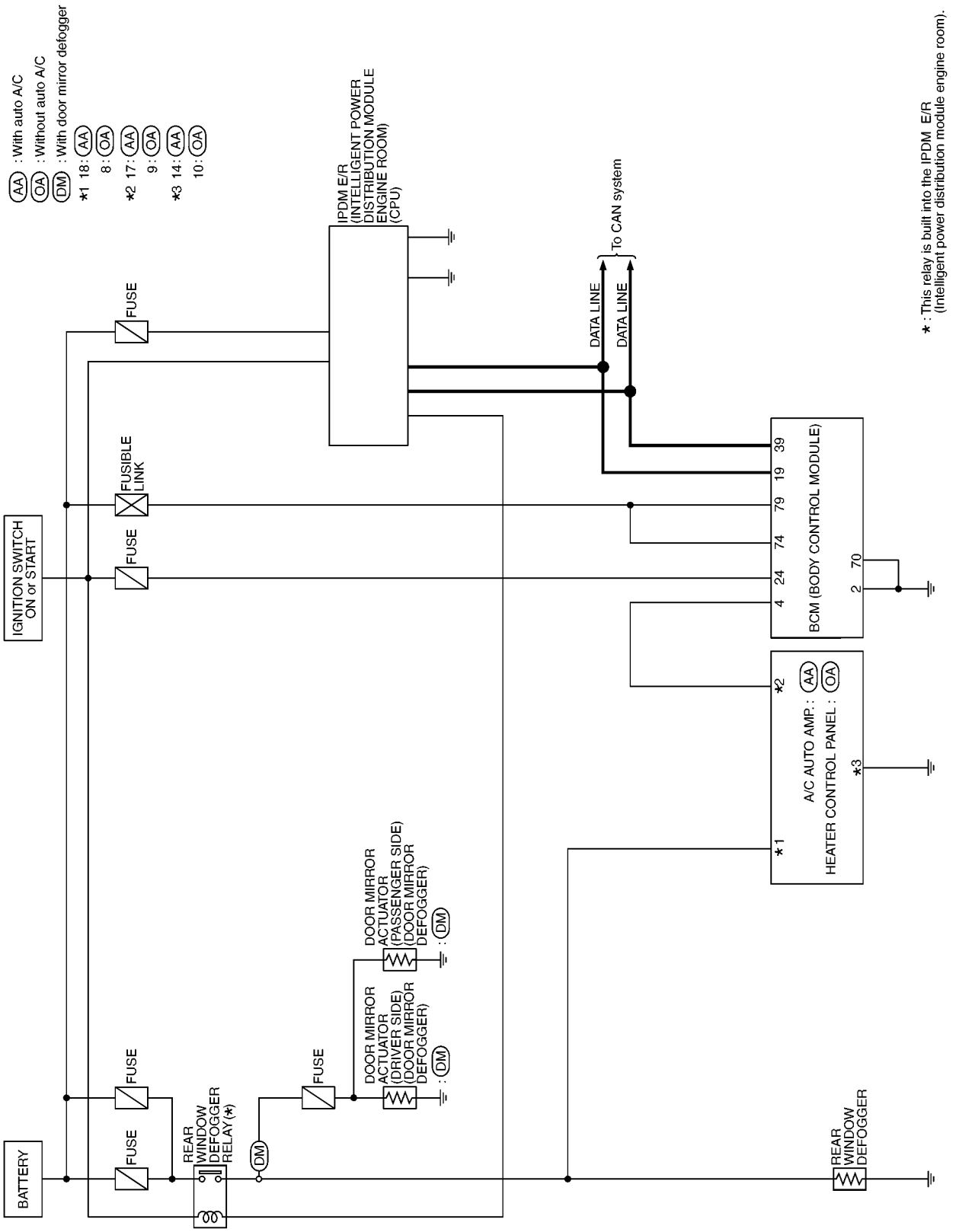
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic – DEF –

EIS004KD



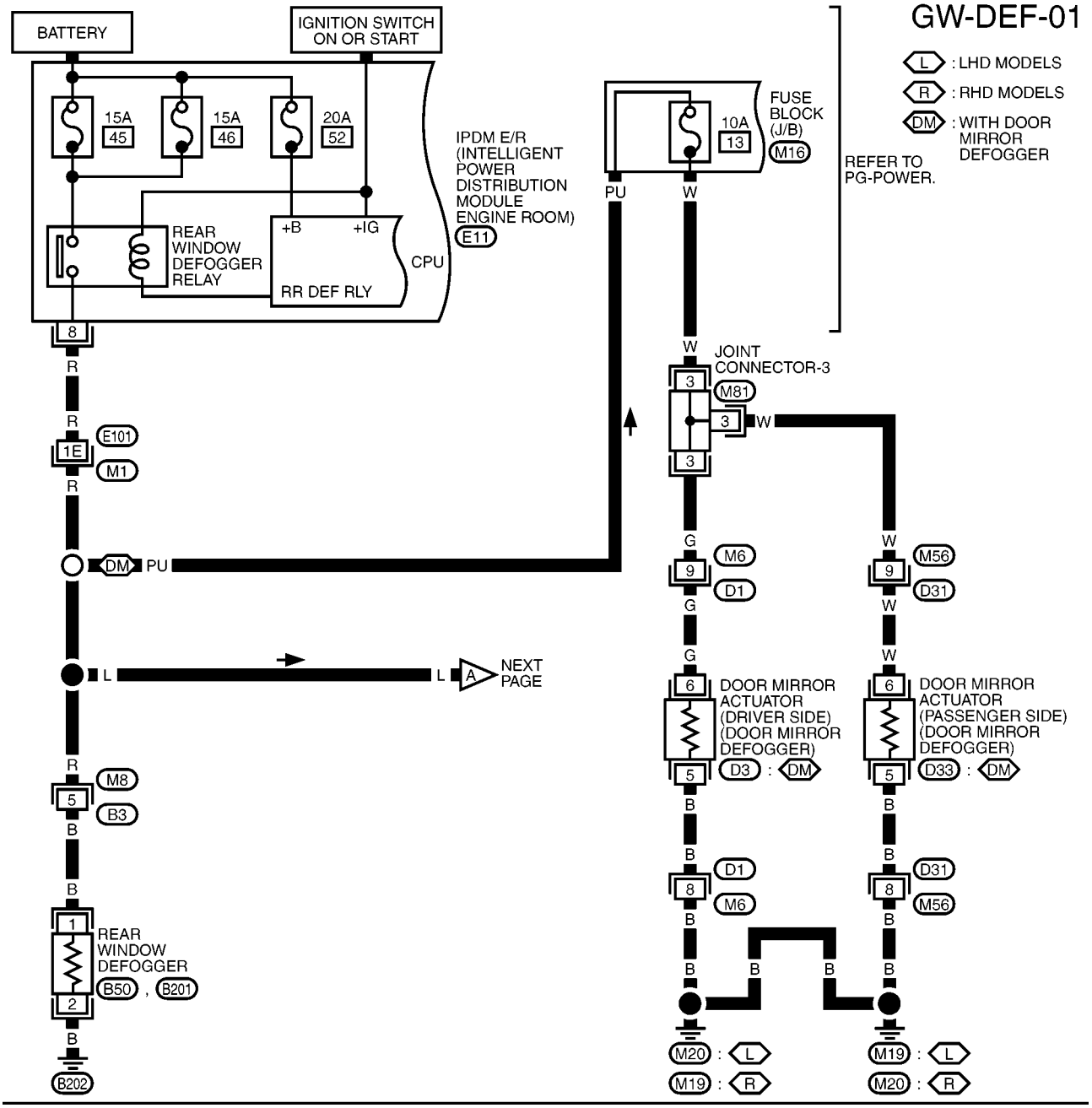
MKWA1387E

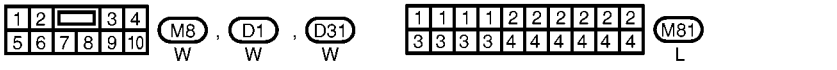
Wiring Diagram –DEF–

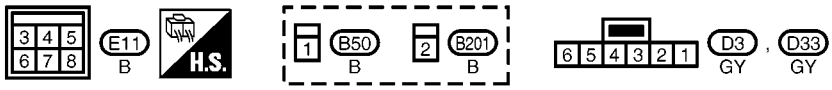
WITHOUT ESP

EIS004KE

SMA for VIN >SJN**AK12U1309269

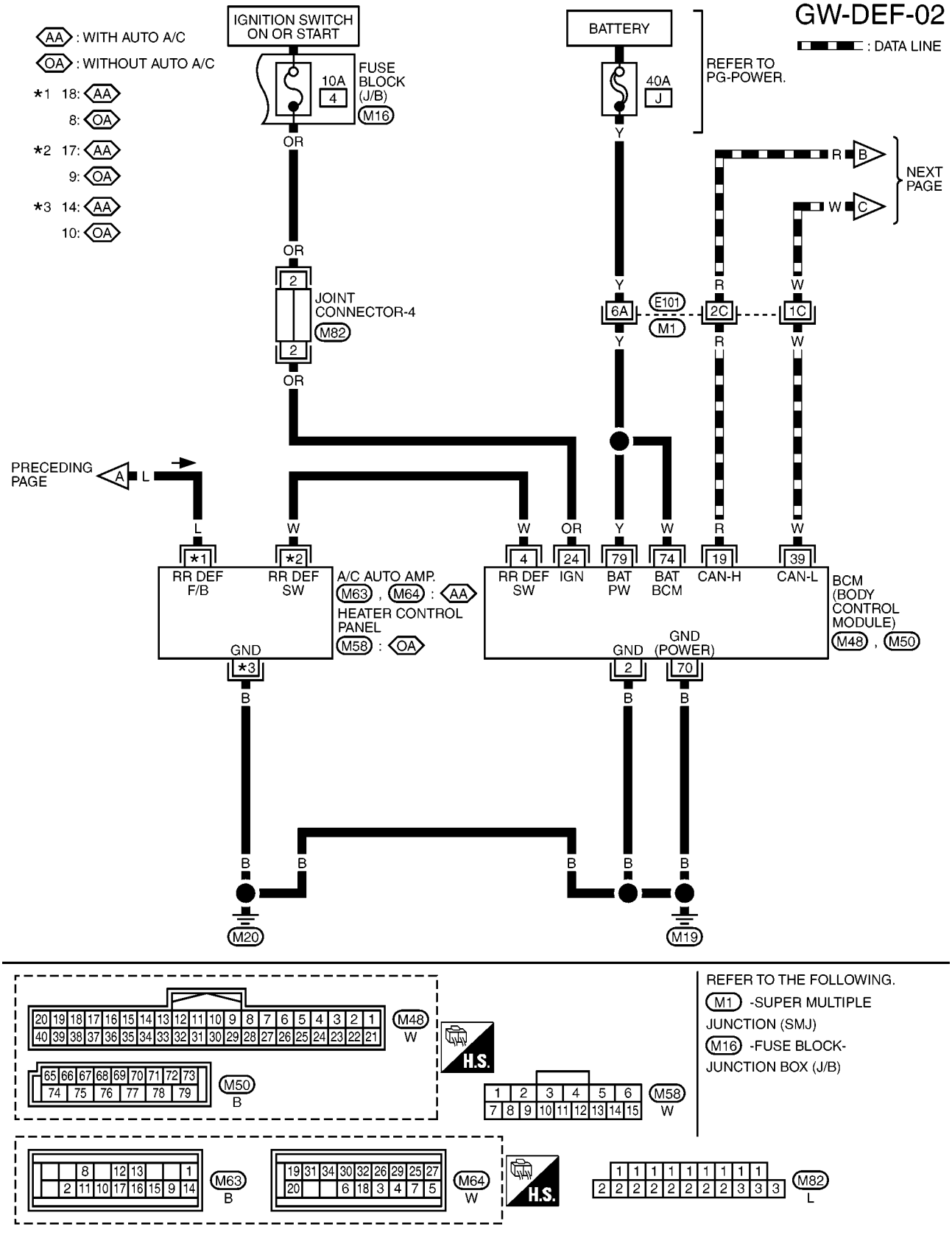




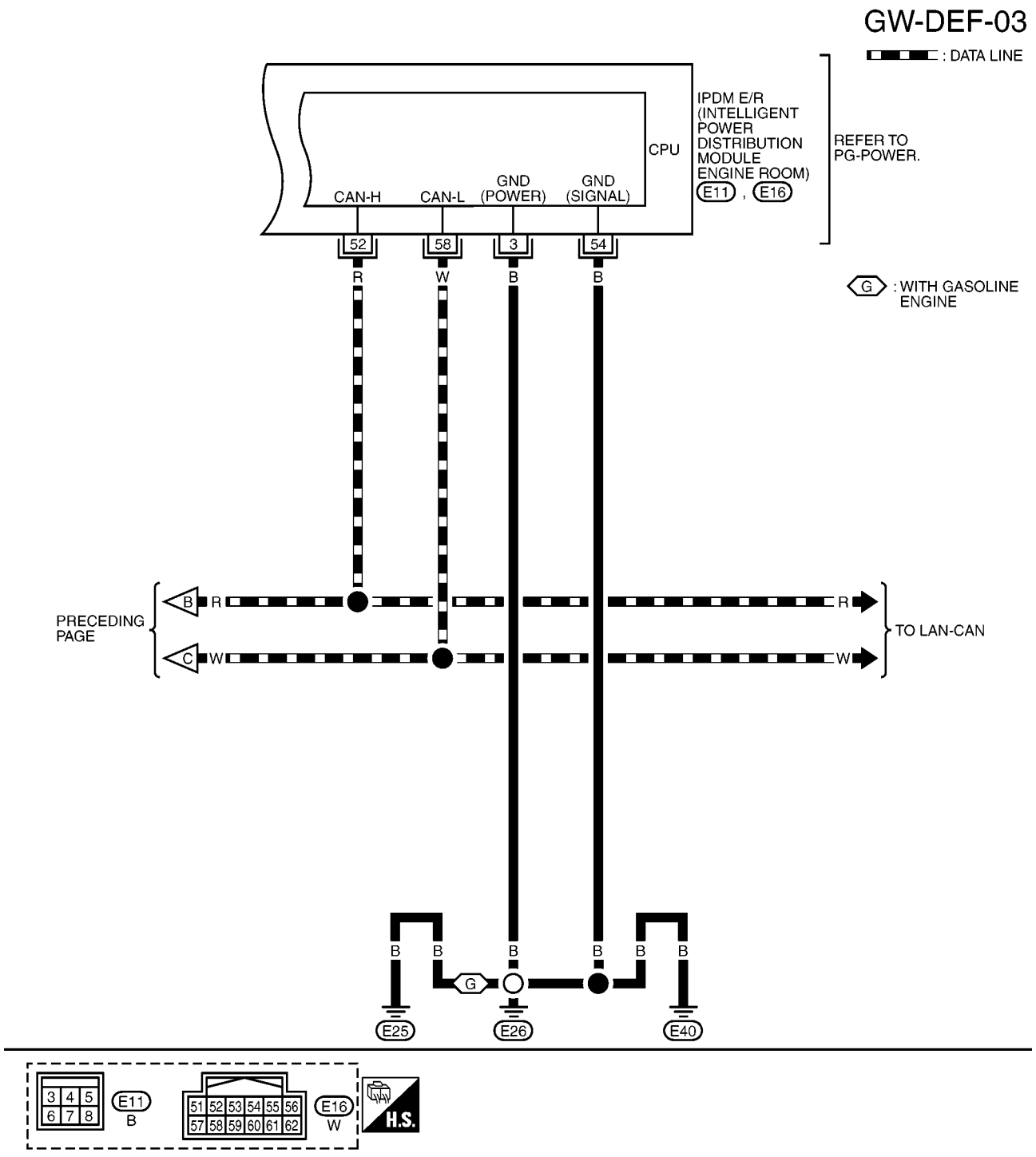


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1388E


GW-DEF-02
: DATA LINE
AA : WITH AUTO A/C
OA : WITHOUT AUTO A/C
*1 18: AA
8: OA
*2 17: AA
9: OA
*3 14: AA
10: OA
IGNITION SWITCH ON OR START
FUSE BLOCK (J/B) M16
10A 4
BATTERY
40A J
REFER TO PG-POWER.
NEXT PAGE
JOINT CONNECTOR-4 M82
E101
M1
PRECEDING PAGE
RR DEF F/B
RR DEF SW
A/C AUTO AMP. M63 , M64 : AA
HEATER CONTROL PANEL M58 : OA
RR DEF SW
IGN
BAT PW
BAT BCM
CAN-H
CAN-L
BCM (BODY CONTROL MODULE) M48 , M50
GND
GND (POWER)
M20
M19
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M48 W
M50 B
M58 W
M63 B
M64 W
M82 L
H.S.

MKWA1830E

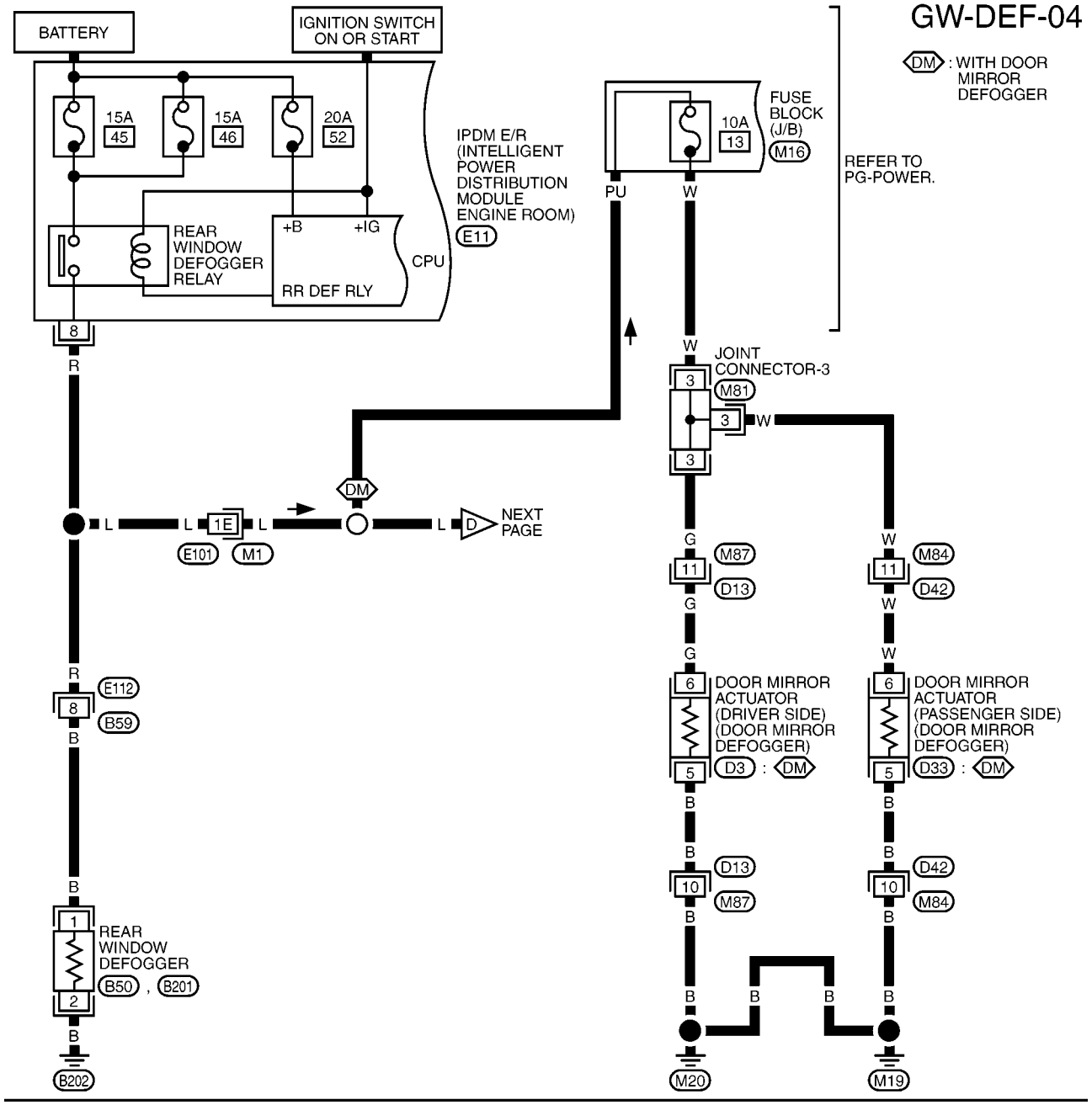

GW-DEF-03
: DATA LINE
IPDM E/R
(INTELLIGENT
POWER
DISTRIBUTION
MODULE
ENGINE ROOM)
E11 , E16
CPU
CAN-H
CAN-L
GND
(POWER)
GND
(SIGNAL)
52
58
3
54
R
W
B
B
REFER TO
PG-POWER.
G : WITH GASOLINE
ENGINE
PRECEDING
PAGE
B R
C W
R
W
TO LAN-CAN
B B B B B B
G
E25
E26
E40
3 4 5
6 7 8
E11
B
51 52 53 54 55 56
57 58 59 60 61 62
E16
W
H.S.

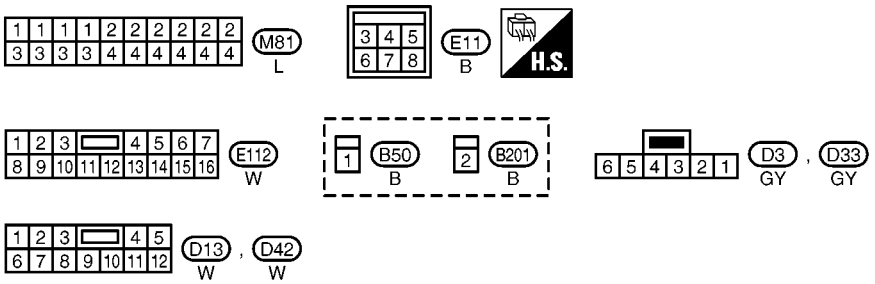
MKWA1390E

WITH ESP

SMA for VIN >SJN**AK12U1309269

GW-DEF-04



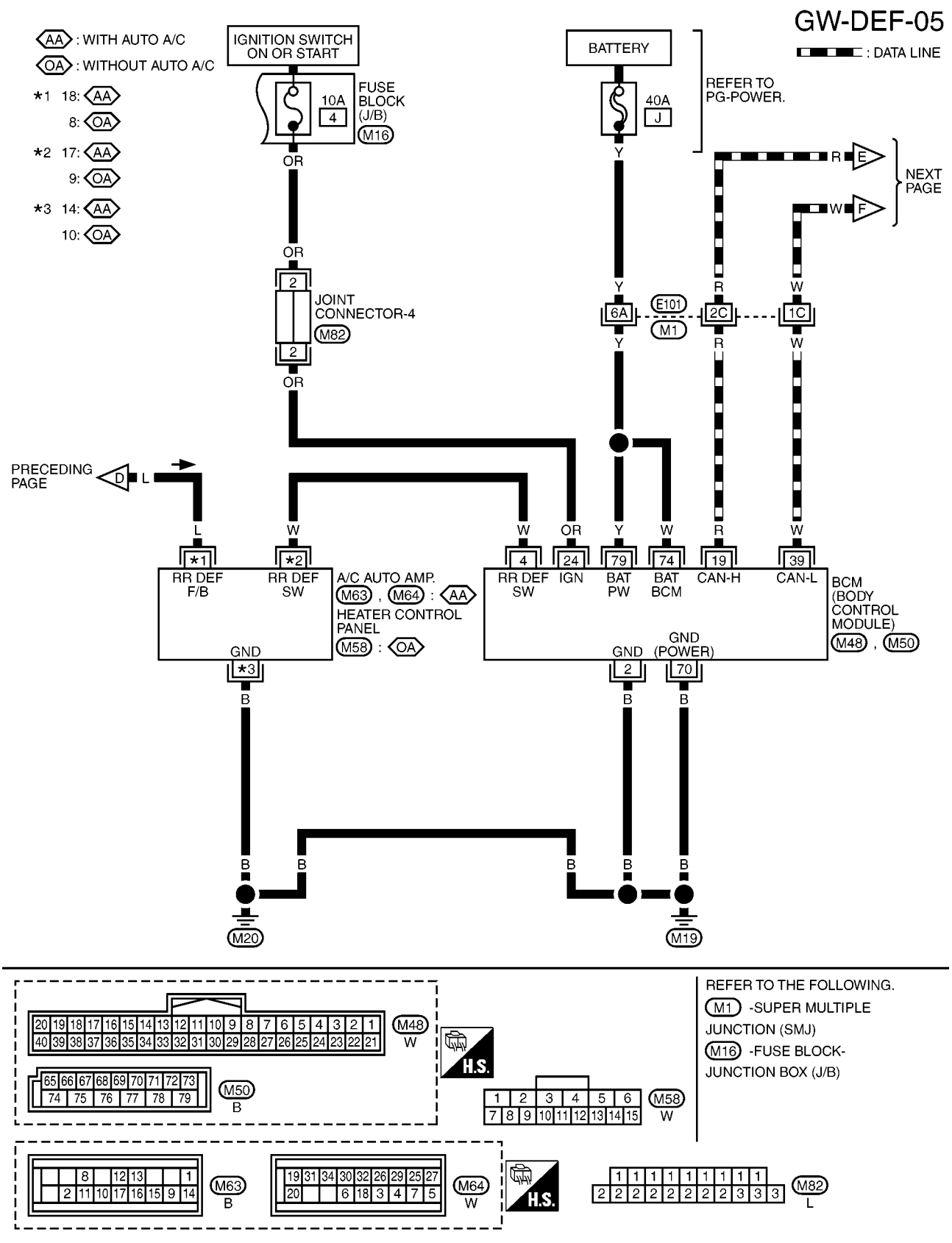


REFER TO THE FOLLOWING.

M1 -SUPER MULTIPLE JUNCTION (SMJ)

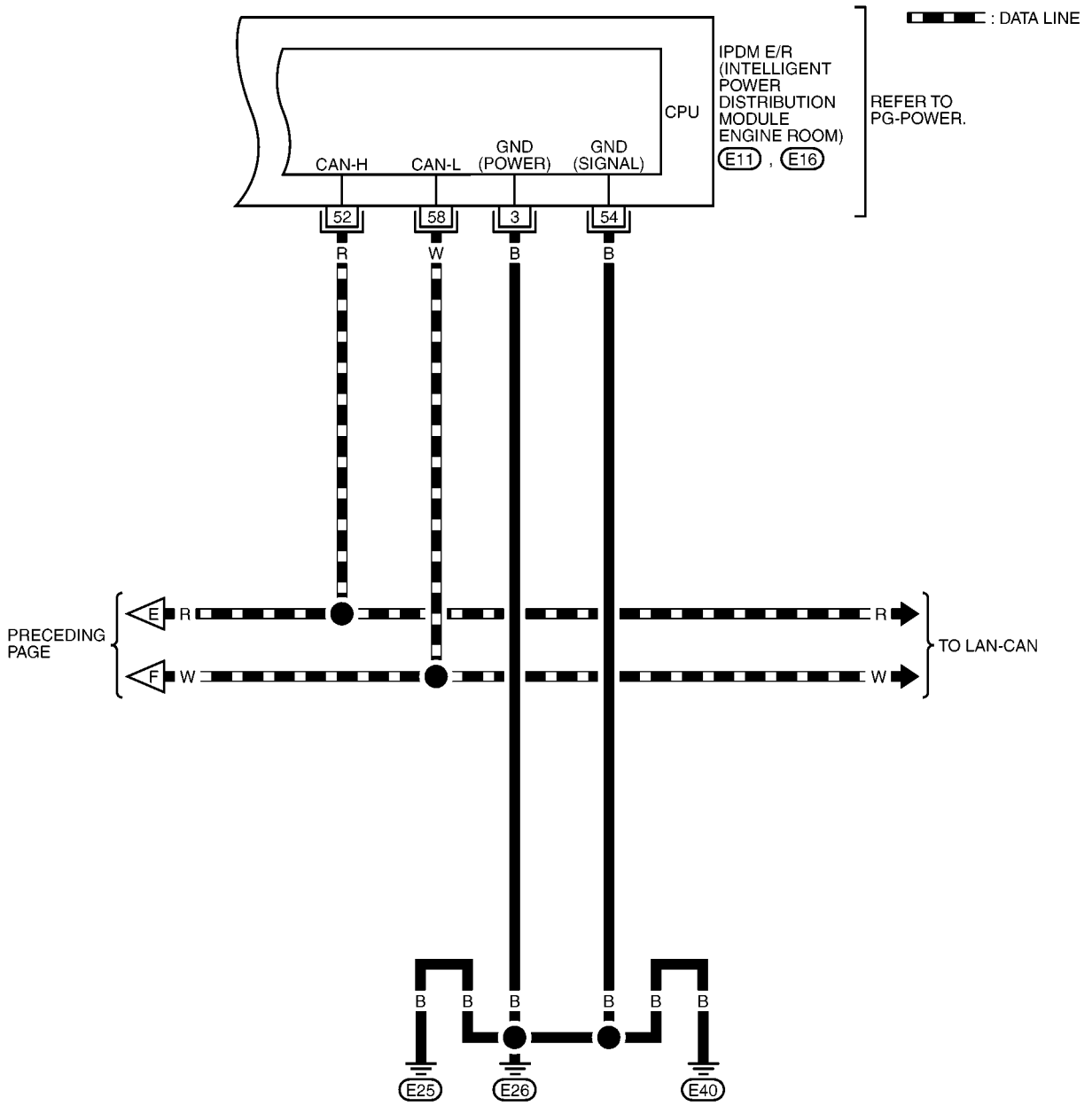
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

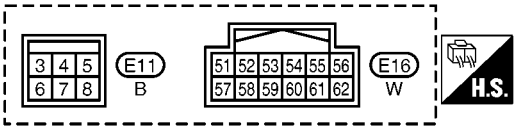
MKWA1831E


GW-DEF-05
: DATA LINE
AA : WITH AUTO A/C
OA : WITHOUT AUTO A/C
*1 18: AA
8: OA
*2 17: AA
9: OA
*3 14: AA
10: OA
IGNITION SWITCH ON OR START
FUSE BLOCK (J/B) M16
10A 4
BATTERY
40A J
REFER TO PG-POWER.
NEXT PAGE
JOINT CONNECTOR-4 M82
E101
M1
PRECEDING PAGE
RR DEF F/B
RR DEF SW
A/C AUTO AMP. M63, M64 : AA
HEATER CONTROL PANEL M58 : OA
GND
RR DEF SW
IGN
BAT PW
BAT BCM
CAN-H
CAN-L
BCM (BODY CONTROL MODULE) M48, M50
GND (POWER)
M20
M19
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M48 W
M50 B
M58 W
M63 B
M64 W
M82 L
H.S.

MKWA1832E

GW-DEF-06





MKWA1833E

Terminal and Reference Value for BCM

EIS004KF

Terminal	Wire color	Item	Condition	Voltage (V) (Approx.)
2	B	Ground	—	0
4	W	Rear window defogger switch signal	When rear window defogger switch is pressed.	0
			When rear window defogger switch is OFF.	5
19	R	CAN- H	—	—
24	OR	Ignition switch ON or START	Ignition switch (ON or START position)	Battery voltage
39	W	CAN- L	—	—
70	B	Ground	—	0
79	Y	BAT power supply	—	Battery voltage

Terminal and Reference Value for IPDM E/R

EIS004KG

Terminal	Wire color	Item	Condition	Voltage (V) (Approx.)
3	B	Ground (Power)	—	0
8	R	Rear window defogger relay output signal	When rear window defogger switch is ON.	Battery voltage
			When rear window defogger switch is OFF.	0
52	R	CAN- H	—	—
54	B	Ground (Signal)	—	0
58	W	CAN- L	—	—

Work Flow

EIS004KH

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to GW-14, "System Description" .
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to GW-40, "Trouble Diagnoses Symptom Chart" .
4. Does rear window defogger operate normally? YES: GO TO 5, NO: GO TO 3.
5. INSPECTION END.

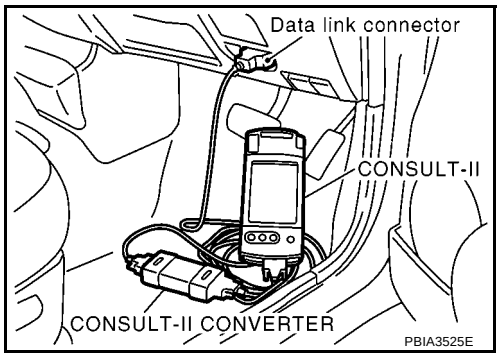
CONSULT-II Inspection Procedure

EIS004KI

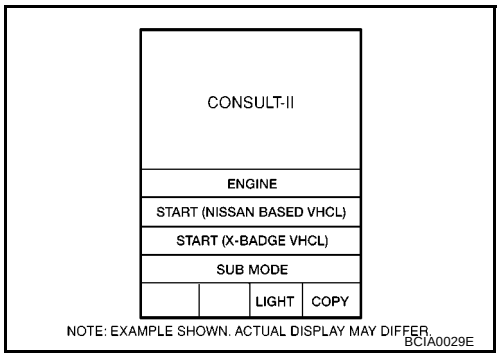
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunction might be detected in self-diagnosis depending on control unit which carry out CAN communication.

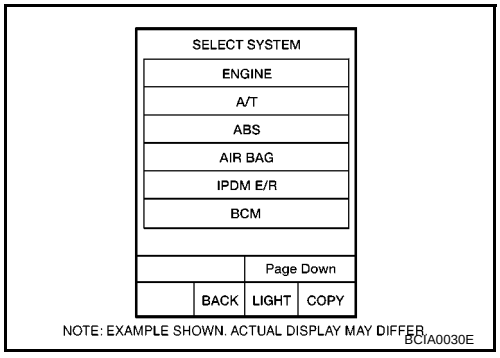
1. Turn ignition switch “OFF”.
2. Connect “CONSULT-II” and CONSULT-II CONVERTER to data link connector.



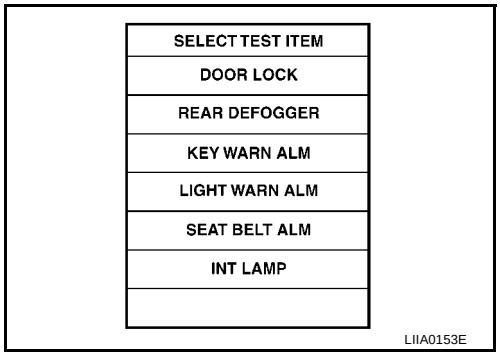
3. Turn ignition switch “ON”.
4. Touch “START (NISSAN BASED VHCL)”.



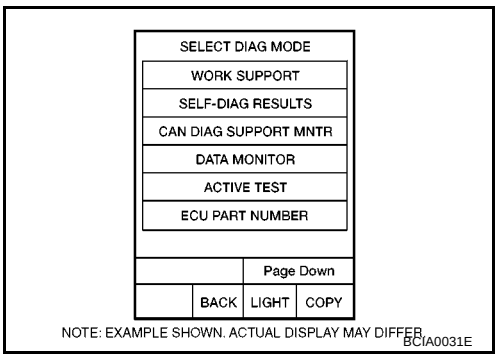
5. Touch “BCM”.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “REAR DEFOGGER”.



7. Select diagnosis mode,“DATA MONITOR” and “ACTIVE TEST”.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0031E

DATA MONITOR
Display Item List

Monitor item “Operation”		Content
REAR DEF SW	“ON / OFF”	Displays “Press (ON) / others (OFF)” status determined with the rear window defogger switch.
IGN ON SW	“ON / OFF”	Displays “IGN SW ON (ON) / OFF (OFF)” status determined with the ignition switch signal.
ENGINE STATUS	“STOP / STALL / RUN / CRA ”	Displays “Engine stop (STOP) / engine stall (STALL) / engine running (RUN) / engine cranking (CRA) ” as judged from engine status.

ACTIVE TEST
Display Item List

Test item	Content
REAR DEFOGGER	Gives a drive signal to the rear window defogger to activate it.

Trouble Diagnoses Symptom Chart

EIS004KJ

- Check that other systems using the signal of the following systems operate normally.

Symptom	Diagnoses / service procedure	Refer to page
Rear window defogger and door mirror defogger do not operate. (With door mirror defogger)	1. BCM power supply and ground circuit check.	GW-40
	2. IPDM E/R auto active test check.	PG-42
	3. Rear window defogger switch circuit check (with auto A/C).	GW-42
	3. Rear window defogger switch circuit check (without auto A/C).	GW-43
	4. Rear window defogger power supply circuit check.	GW-45
	5. Replace IPDM E/ R.	PG-52
Rear window defogger does not operated. (without door mirror defogger)	1. BCM power supply and ground circuit check.	GW-40
	2. IPDM E/R auto active test check.	PG-42
	3. Rear window defogger switch circuit check (with auto A/C).	GW-42
	3. Rear window defogger switch circuit check (without auto A/C).	GW-43
	4. Rear window defogger power supply circuit check.	GW-45
	5. Rear window defogger circuit check.	GW-46
	6. Filament check.	GW-50
	7. Replace IPDM E/ R.	PG-52
Rear window defogger does not operate but both of door mirror defoggers operate.(With door mirror defogger)	1. Rear window defogger circuit check.	GW-46
	2. Filament check.	GW-50
Both of door mirror defoggers do not operated but rear window defogger operate. (With door mirror defogger)	1. Door mirror defogger power supply circuit check.	GW-47
Driver side door mirror defogger does not operated. (With door mirror defogger)	1. Driver side door mirror defogger circuit check.	GW-48
Passenger side door mirror defogger does not operated. (With door mirror defogger)	1. Passenger side door mirror defogger circuit check.	GW-49

BCM Power Supply and Ground Circuit Check

EIS004KK

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT-II, then perform the each trouble diagnosis of malfunction system indicated “SELF-DIAG RESULTS” of “BCM”, Refer to BCS-22, "CONSULT-II Function (BCM)" .

1. FUSE INSPECTION

- Check 10A fuse [No.4, located in fuse block (J/B)]
- Check 40A fusible link (letter **J** located in the fuse and fusible link box).

NOTE:
Refer to GW-14, "Component Parts and Harness Connector Location" .

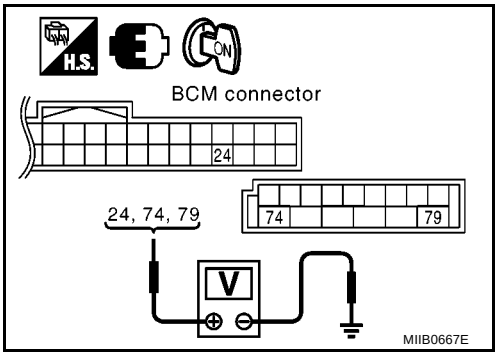
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between BCM connector M48, M50 terminal 24, 74, 79 and ground.

24 (OR) – Ground :Battery voltage.
74 (W) – Ground :Battery voltage.
79 (Y) – Ground :Battery voltage.



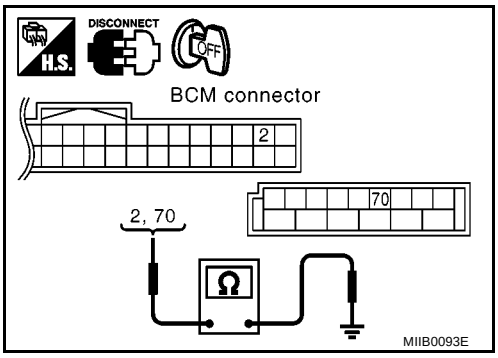
OK or NG

OK >> GO TO 3.
NG >> Check BCM power supply circuit for open or short.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector M48, M50 terminal 2, 70 and ground.

2 (B) – Ground :Continuity should exist.
70 (B) – Ground :Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Check BCM ground circuit for open or short.

Rear Window Defogger Switch Circuit Check / With Auto A/C

EIS004KL

1. CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

With CONSULT-II

Check (“REAR DEF SW”, “IGN ON SW”) in DATA MONITOR mode with CONSULT-II. Refer to GW-39 .

When engine is running

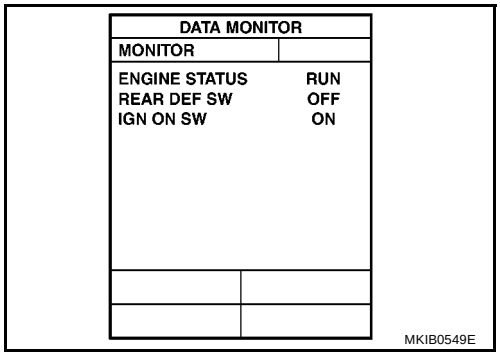
ENGINE STATUS :RUN

When rear defogger switch is turned to ON

REAR DEF SW :ON

When ignition switch is turned to ON

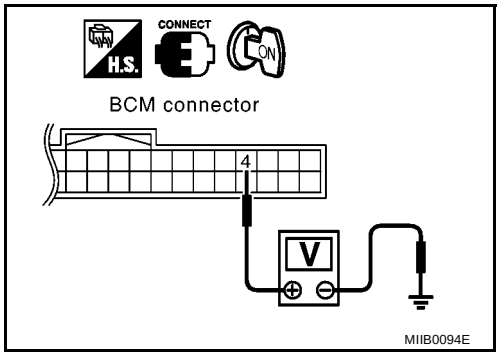
IGN ON SW :ON



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between BCM connector ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M48	4 (W)	Ground	Rear window defogger switch is pressed.	0
			Rear window defogger switch is OFF.	5



OK or NG

OK >> Rear window defogger switch check is OK.

NG >> GO TO 2.

2. CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and A/C auto amp connector.
3. Check continuity between BCM connector M48 terminal 4 and A/C auto amp connector M63 terminal 17.

4 (W) – 17 (W) :Continuity should exist

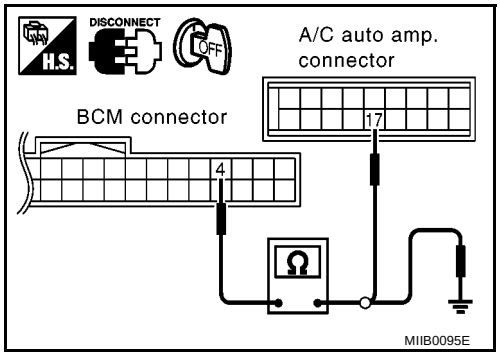
4. Check continuity between BCM connector M48 terminal 4 and ground

4 (W) – Ground :Continuity should not exist

OK or NG

OK >> GO TO 3.

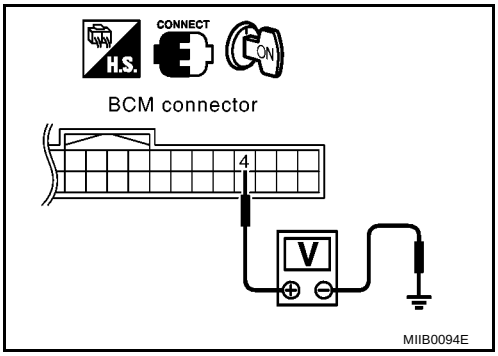
NG >> Repair or replace harness between BCM and A/C auto amp.



3. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector M48 terminal 4 and ground.

4 (W) – Ground :Approx. 5



OK or NG

OK >> Replace rear window defogger switch. Refer to ATC-63, "Removal and Installation"

NG >> Replace BCM.

Rear Window Defogger Switch Circuit Check / Without Auto A/C

EIS004OV

1. CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

With CONSULT-II

Check (“REAR DEF SW”, “IGN ON SW”) in DATA MONITOR mode with CONSULT-II. Refer to GW-39 .

When engine is running

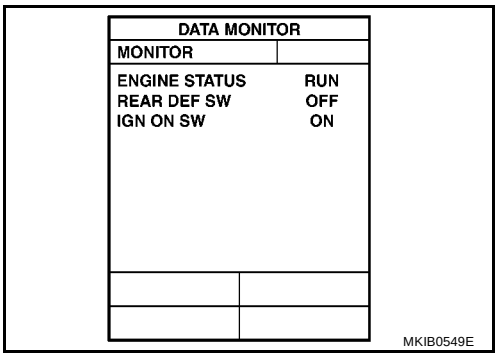
ENGINE STATUS :RUN

When rear defogger switch is turned to ON

REAR DEF SW :ON

When ignition switch is turned to ON

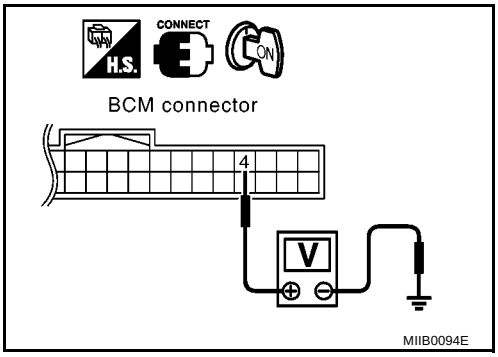
IGN ON SW :ON



Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between BCM connector ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
M48	4 (W)	Ground	Rear window defogger switch is pressed.	0
			Rear window defogger switch is OFF.	5



OK or NG

OK >> Rear window defogger switch check is OK.

NG >> GO TO 2.

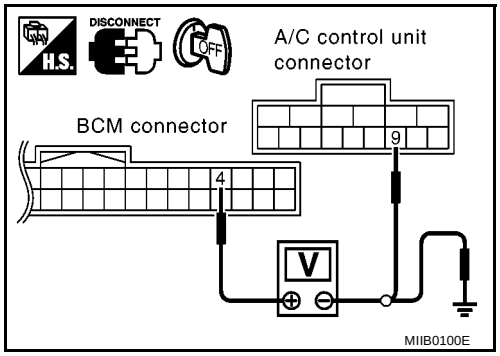
2. CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and heater control panel connector.
3. Check continuity between BCM connector M48 terminal 4 and heater control panel connector M58 terminal 9.

4 (W) – 9 (W) :Continuity should exist

4. Check continuity between BCM connector M48 terminal 4 and ground

4 (W) – Ground :Continuity should not exist



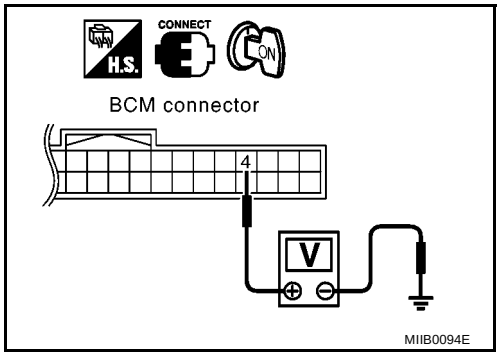
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness between BCM and heater control panel.

3. CHECK BCM OUTPUT SIGNAL

1. Connect BCM connector.
2. Turn ignition switch ON.
3. Check voltage between BCM connector M48 terminal 4 and ground.

4 (W) – Ground :Approx. 5



OK or NG

OK >> Replace heater control panel. Refer to MTC-43, "Removal and Installation"
NG >> Replace BCM.

Rear Window Defogger Power Supply Circuit Check

EIS004KM

1. CHECK FUSE

Check if any of the following fuses for IPDM E/R are blown.

COMPONENT PARTS	TERMINAL NO. (SIGNAL)	AMPERE	FUSE NO.
IPDM E/R	3 (BAT power supply)	15A	#45
		15A	#46

NOTE:

Refer to GW-14, "Component Parts and Harness Connector Location" .

OK or NG

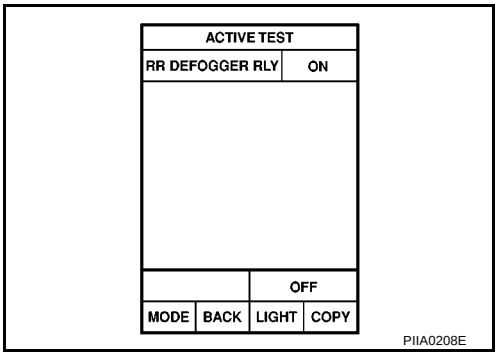
OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse, refer to GW-14, "Component Parts and Harness Connector Location" .

2. CHECK REAR WINDOW DEFOGGER RELAY

Check rear window defogger relay in “ACTIVE TEST” mode with CONSULT-II. Refer to

Do you hear of the operation sound of rear window defogger relay.



OK or NG

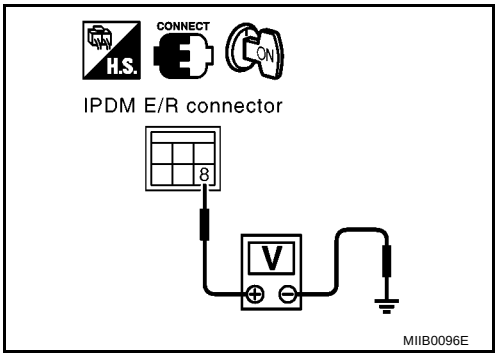
OK >> GO TO 3.

NG >> Replace IPDM E/R.

3. CHECK REAR WINDOW DEFOGGER RELAY OUTPUT SIGNAL

1. Turn rear window defogger switch ON.
2. Check voltage between IPDM E/R connector E11 terminal 8 and ground.

8 (R) – Ground : Battery voltage



OK or NG

OK >> Rear window defogger power supply circuit check is OK.

NG >> Check connector for damage and loose connection.

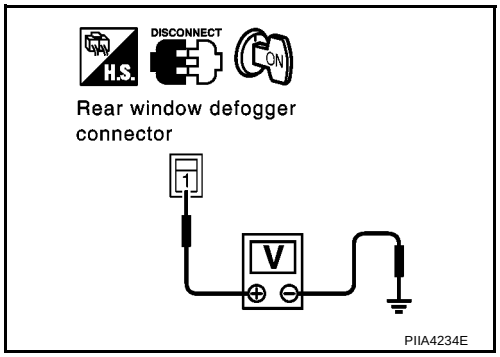
Rear Window Defogger Circuit Check

EIS004KN

1. CHECK REAR WINDOW DEFOGGER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear window defogger connector.
3. Turn ignition switch ON.
4. Check voltage between rear window defogger connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
B50	1 (B)	Ground	Rear window defogger switch ON.	Battery voltage
			Rear window defogger switch OFF.	0



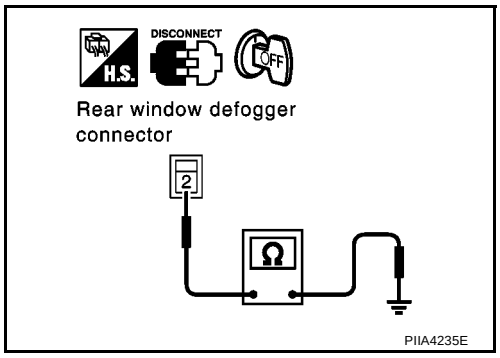
OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK REAR WINDOW DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between rear window defogger connector B201 terminal 2 and ground.

2(B) – Ground :Continuity should exist



OK or NG

OK >> Check filament, Refer to GW-50, "Filament Check"
- If filament is OK.
  Check the condition of the harness and the connector.
- If filament is NG.
  Repair filament.

NG >> Repair or replace harness between rear window defogger and ground.

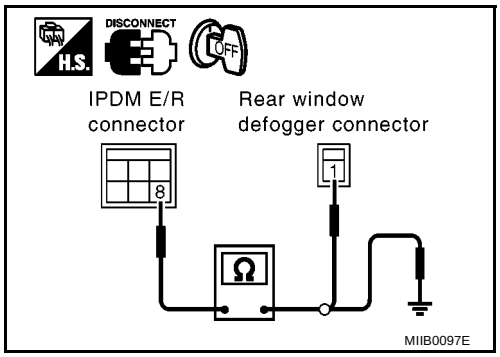
3. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R connector E11 terminal 8 and rear window defogger connector B50 terminal 1.

8 (R) – 1 (B) :Continuity should exist.

4. Check continuity between IPDM E/R connector E11 terminal 8 and ground.

8 (R) – Ground :Continuity should not exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

Door Mirror Defogger Power Supply Circuit Check

EIS004KO

1. CHECK FUSE

Check if any of the following fuse for Fuse block (J/B) are blown.

COMPONENT PARTS	AMPERE	FUSE NO.
Fuse block (J/B)	10A	#13

NOTE:

Refer to GW-14, "Component Parts and Harness Connector Location" .

OK or NG

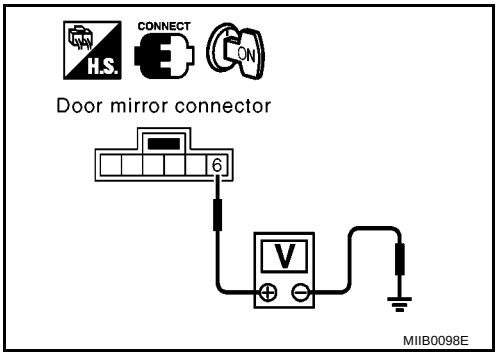
OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse, refer to GW-14, "Component Parts and Harness Connector Location" .

2. CHECK DOOR MIRROR DEFOGGER POWER SUPPLY CIRCUIT 1

1. Turn ignition switch ON.
2. Check voltage between door mirror connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
D3 (driver side)	6 (G)	Ground	Rear window defogger switch ON	Battery voltage
D33 (passenger side)	6 (W)		Rear window defogger switch OFF	0



OK or NG

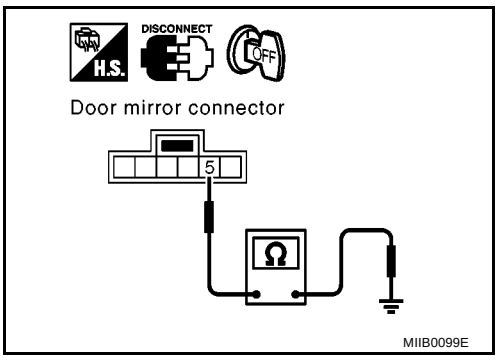
OK >> GO TO 3.

NG >> Check harness between IPDM E/R and door mirror.

3. CHECK DOOR MIRROR DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror connector.
3. Check continuity between door mirror connector D3 (driver side), D33 (passenger side) terminal 5 and ground.

5 (B) – Ground :Continuity should exist.



OK or NG

OK >> INSPECTION END.

NG >> Repair or replace harness.

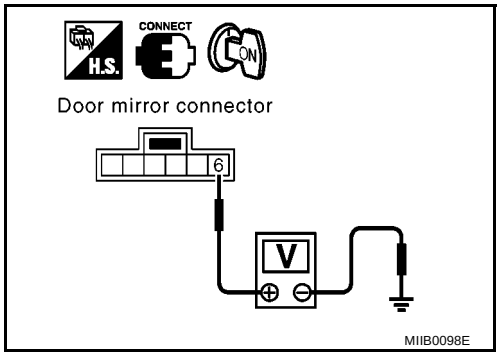
Driver Side Door Mirror Defogger Circuit Check

EIS004KP

1. CHECK DOOR MIRROR DEFOGGER POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between door mirror (driver side) connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
D3	6 (G)	Ground	Rear window defogger switch ON	Battery voltage
			Rear window defogger switch OFF.	0



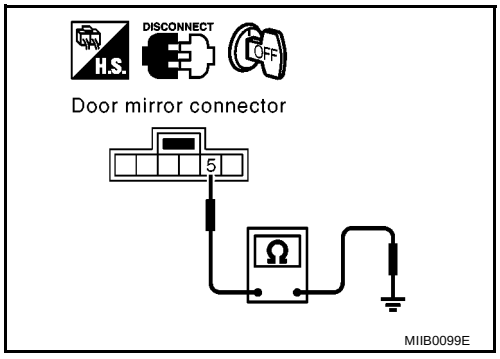
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness between fuse block (J/B) and door mirror (driver side).

2. CHECK DOOR MIRROR DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror (driver side) connector.
3. Check continuity between door mirror (driver side) connector D3 terminal 5 and ground.

5 (B) – Ground : Continuity should exist.



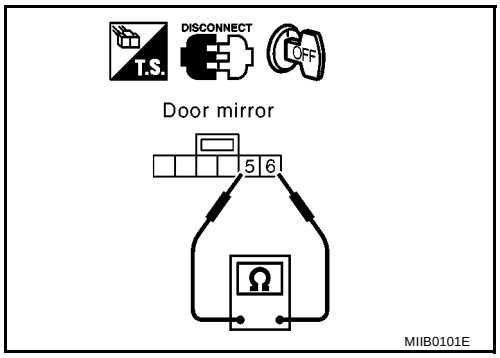
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between door mirror (driver side) and ground.

3. CHECK DOOR MIRROR DEFOGGER

Check continuity between each door mirror connector D3 (driver side) terminal 5 and 6.

5 – 6 :Continuity should exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace door mirror (driver side).

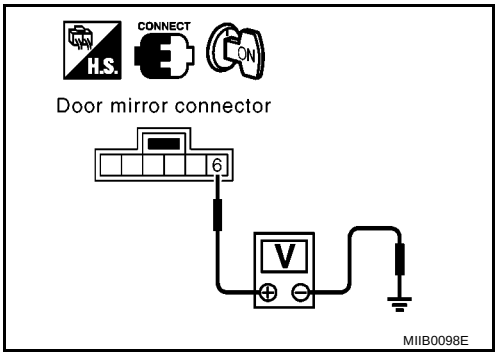
Passenger Side Door Mirror Defogger Circuit Check

EIS004KQ

1. CHECK DOOR MIRROR DEFOGGER POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between door mirror (passenger side) connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(–)		
D33	6 (W)	Ground	Rear window defogger switch ON	Battery voltage
			Rear window defogger switch OFF	0



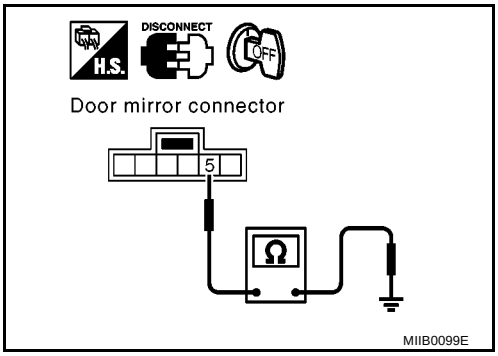
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness between fuse block (J/B) and door mirror (passenger side).

2. CHECK DOOR MIRROR DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door mirror (passenger side) connector.
3. Check continuity between door mirror (passenger side) connector D33 terminal 5 and ground.

5 (B) – Ground : Continuity should exist.



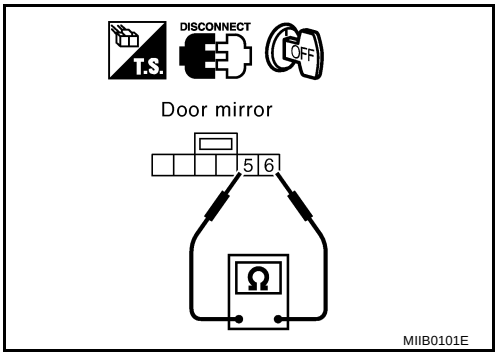
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness between door mirror (passenger side) and ground.

3. CHECK DOOR MIRROR DEFOGGER

Check continuity between each door mirror connector D33 (passenger side) terminal 5 and 6.

5 – 6 :Continuity should exist.



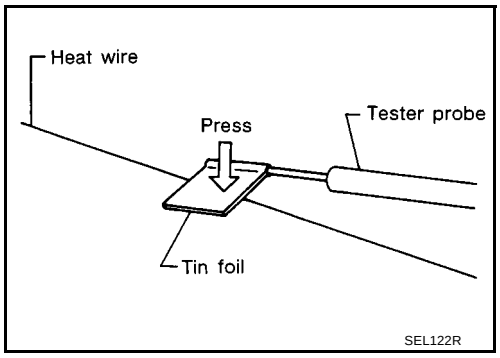
OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace door mirror (passenger side).

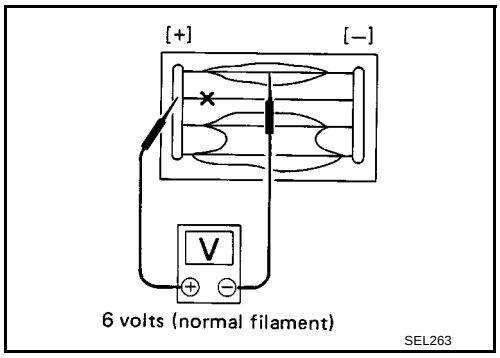
Filament Check

EIS004KR

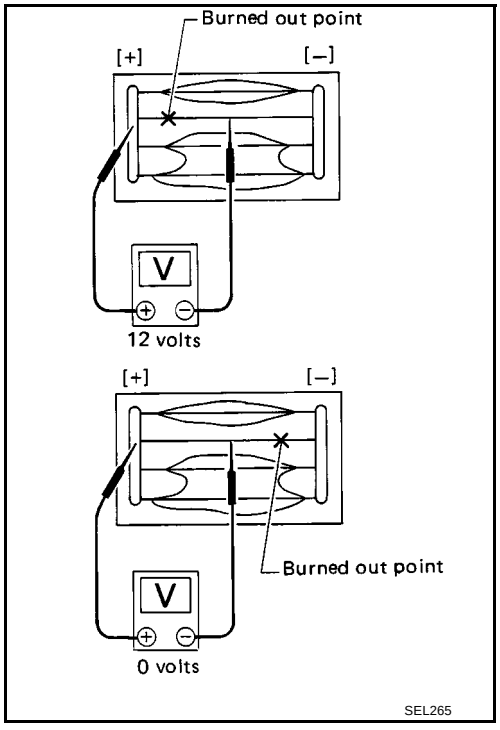
1. When measuring voltage, wrap tin foil around the top of the negative probe. Then press the foil against the wire with your finger.



2. Attach probe circuit tester (in Volt range) to middle portion of each filament.



3. If a filament is burned out, circuit tester registers 0 or battery voltage.
4. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.



Filament Repair

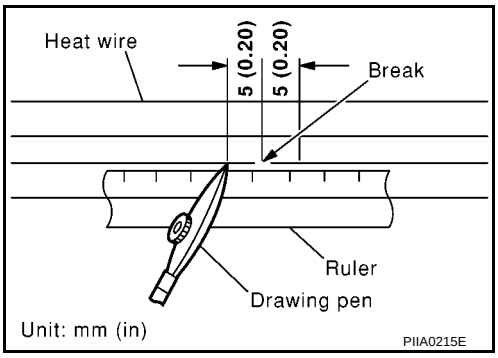
EIS004KS

REPAIR EQUIPMENT

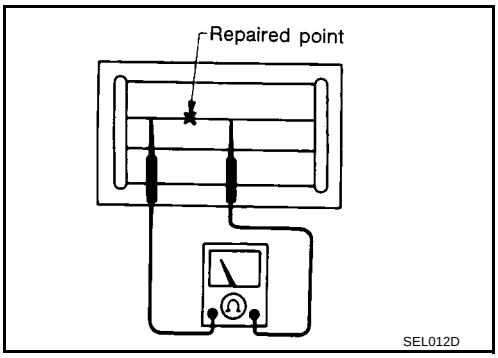
- Conductive silver composition (Dopant No. 4817 or equivalent)
- Ruler 30 cm (11.8 in) long
- Drawing pen
- Heat gun
- Alcohol
- Cloth

REPAIRING PROCEDURE

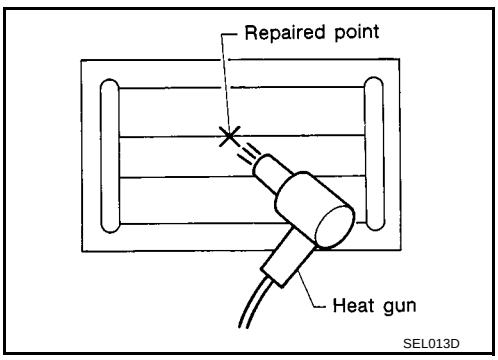
1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.
   Shake silver composition container before use.
3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.



4. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.
   Do not touch repaired area while test is being conducted.



5. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet.
   If a heat gun is not available, let the repaired area dry for 24 hours.

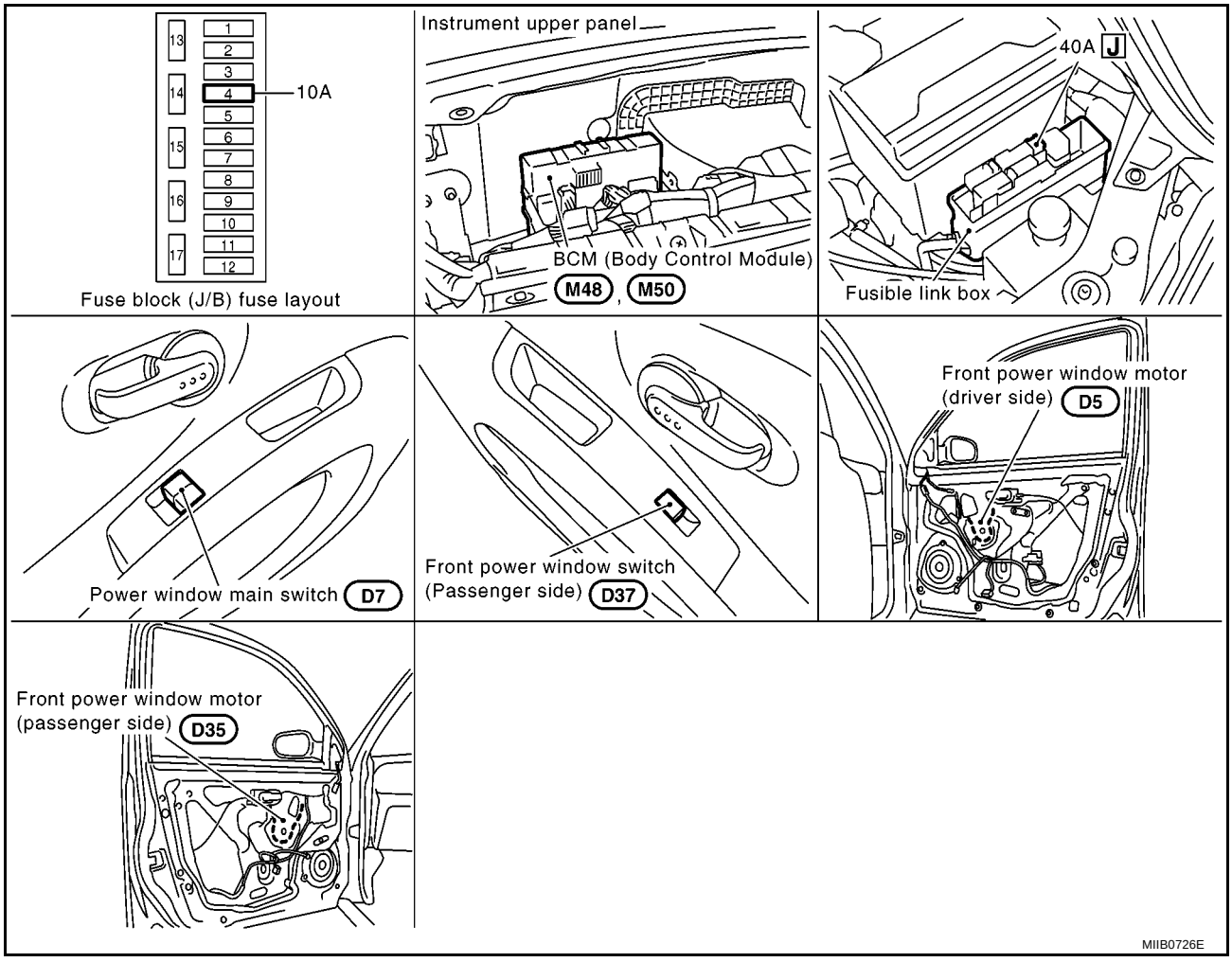


POWER WINDOW SYSTEM

PFP:25401

Component Parts and Harness Connector Location

EIS004PM



System Description

EIS004PN

Power is supplied at all time

- from 40A fusible link (letter **J** , located in the fuse and fusible link box)
- to BCM terminal 74 and 79.

With ignition switch in ON or START position,
Power is supplied

- through 10A fuse [No.4,located in the fuse block (J/B)]
- to BCM terminal 24.
- through BCM terminal 78
- to power window main switch terminal 5
- to front power window switch (passenger side) terminal 1.

Ground supplied

- to BCM terminal 2 and 70
- through body grounds M19 and M20.

FRONT DRIVER SIDE DOOR

Ground is supplied

- to power window main switch terminal 7
- through body grounds M19 and 20.

Window Up

When the driver side switch in the power window main switch is pressed in the up position,
Power is supplied

- through power window main switch terminal 2 (LHD), 6 (RHD)
- to front power window motor (driver side) terminal 2.

Ground is supplied

- to front power window motor (driver side) terminal 1
- through power window main switch terminal 3 (LHD), 4 (RHD).

Then, the motor raises the window until the switch is released.

Window Down

When the driver side switch in the power window main switch is pressed in the down position
Power is supplied

- through power window main switch terminal 3 (LHD), 4 (RHD)
- to front power window motor (driver side) terminal 1.

Ground is supplied

- to front power window motor (driver side) terminal 2
- through power window main switch terminal 2 (LHD), 6 (RHD).

Then, the motor lowers the window until the switch is released.

FRONT PASSENGER SIDE DOOR

Ground is supplied

- to power window main switch terminal 7
- through body grounds M19 and M20.

Power Window Main Switch Operation

WINDOW UP

When the passenger side switch in power window main switch is pressed in the up position
Power is supplied

- through power window main switch terminal 6 (LHD), 2 (RHD)
- through front power window switch (passenger side) terminal 2
- through front power window switch (passenger side) terminal 5
- to front power window motor (passenger side) terminal 2.

Ground is supplied

- to front power window motor (passenger side) terminal 1
- through front power window switch (passenger side) terminal 4
- through front power window switch (passenger side) terminal 3
- through power window main switch terminal 4 (LHD), 3 (RHD)

Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the passenger side switch in power window main switch is pressed in the down position
Power is supplied

- through power window main switch terminal 4 (LHD), 3 (RHD)
- through front power window switch (passenger side) terminal 3
- through front power window switch (passenger side) terminal 4
- to front power window motor (passenger side) terminal 1.

Ground is supplied

- to front power window motor (passenger side) terminal 2

- through front power window switch (passenger side) terminal 5
- through front power window switch (passenger side) terminal 2
- through power window main switch terminal 6 (LHD), 2(RHD).

Then, the motor lowers the window until the switch is released.

Front Power Window Switch (Passenger Side) Operation

WINDOW UP

When the passenger side switch is pressed in the up position
Power is supplied

- through front power window switch (passenger side) terminal 5
- to front power window motor (passenger side) terminal 2.

Ground is supplied

- to front power window motor terminal 1
- through front power window switch (passenger side) terminal 4
- through front power window switch (passenger side) terminal 3
- through power window main switch terminal 4 (LHD), 3 (RHD).

Then, the motor raises the window until the switch is released.

WINDOW DOWN

When the passenger side switch is pressed in the down position
Power is supplied

- through front power window switch (passenger side) terminal 4
- to front power window motor (passenger side) terminal 1.

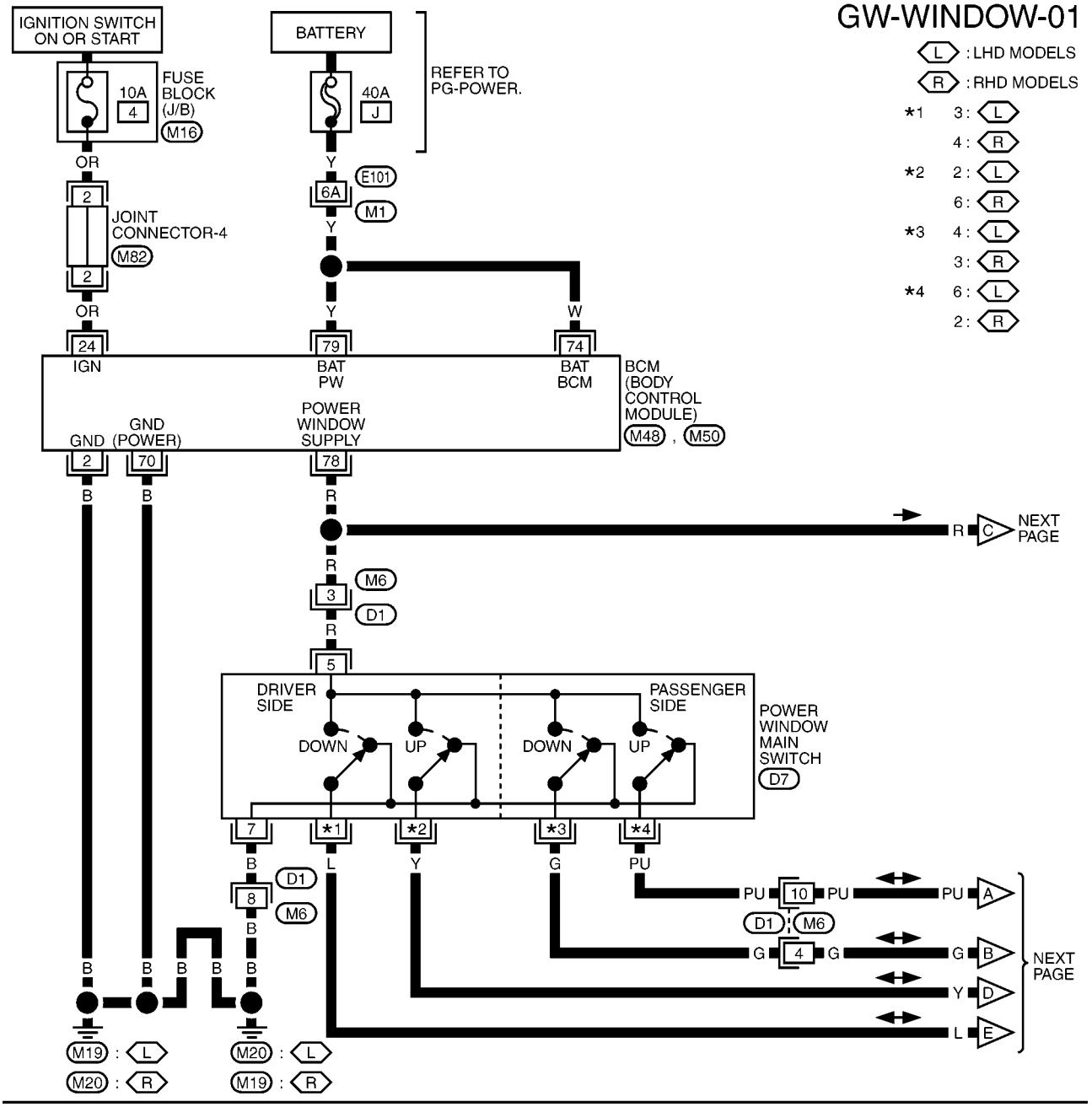
Ground is supplied

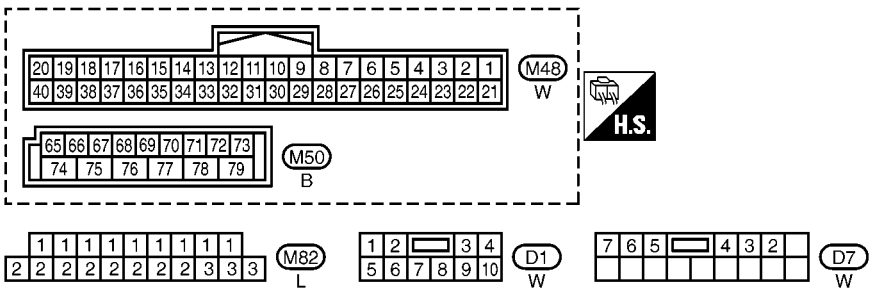
- to front power window motor terminal 2
- through front power window switch (passenger side) terminal 5
- through front power window switch (passenger side) terminal 2
- through power window main switch terminal 6 (LHD), 2 (RHD).

Then, the motor lowers the window until the switch is released.

Wiring Diagram – WINDOW –
WITHOUT ESP

EIS004PP

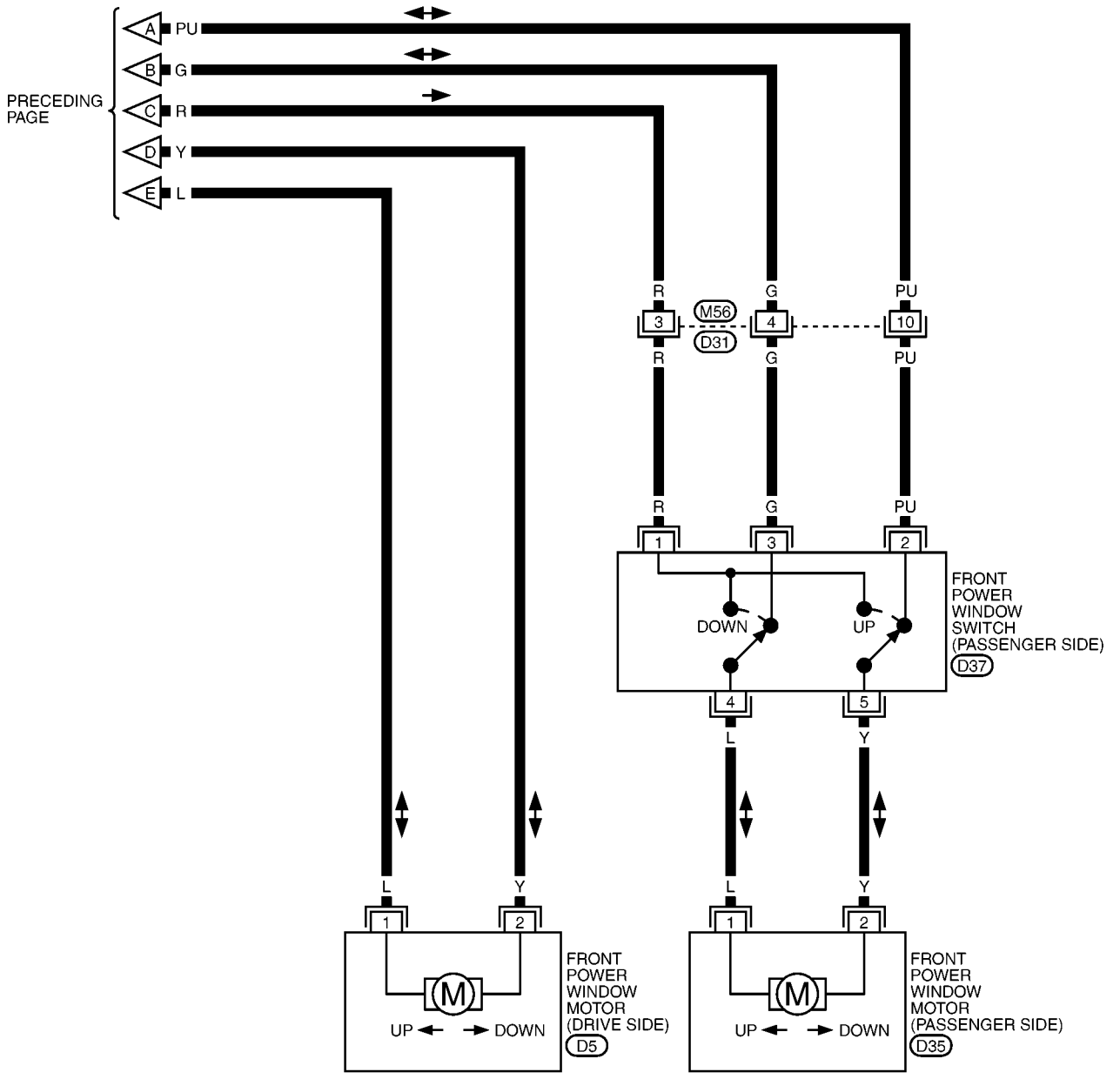


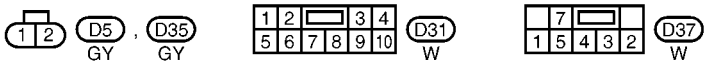


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1391E

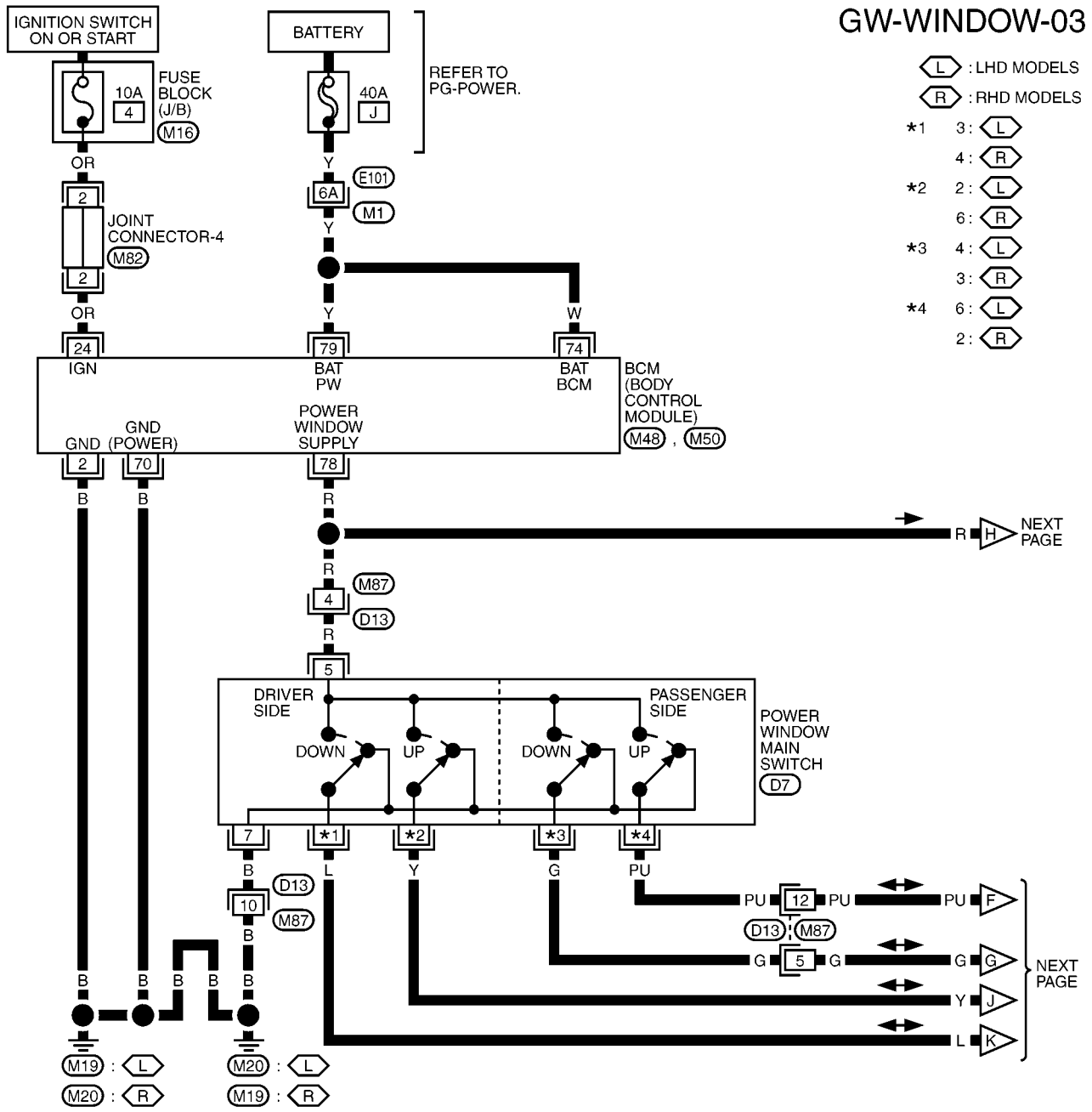
GW-WINDOW-02

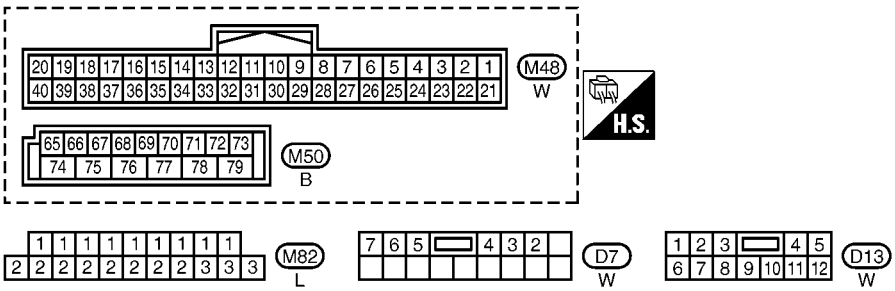




MIWA0341E

WITH ESP

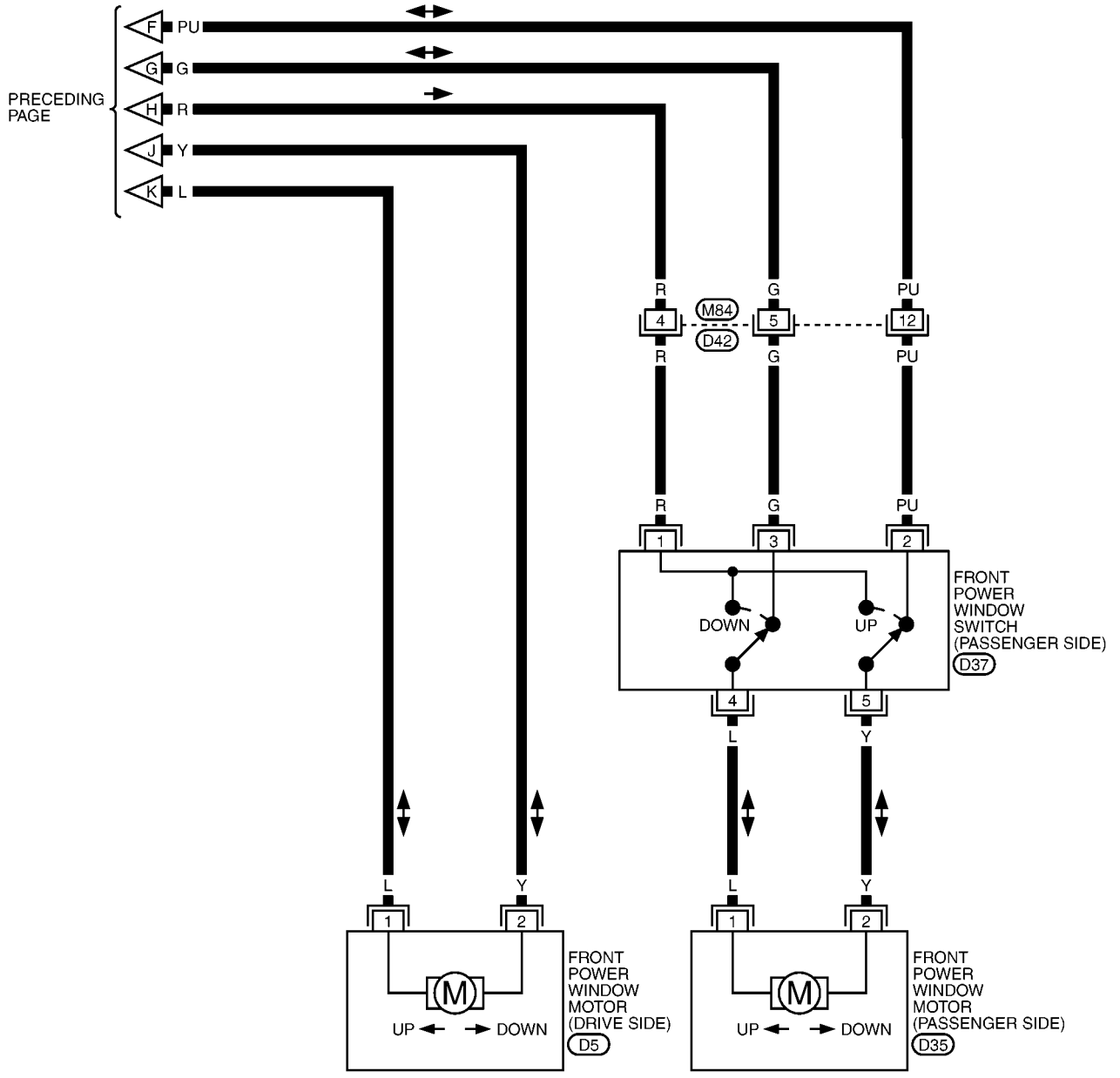


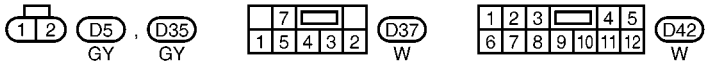


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1834E

GW-WINDOW-04





MIWA0342E

Terminal and Reference Value for BCM

EIS004PS

Terminal	Wire color	Item	Condition	Voltage (V) (Approx.)
2	B	Ground	—	0
24	OR	Ignition switch (ON or START)	Ignition switch (ON or START position)	Battery voltage
70	B	Ground (power)	—	0
74	W	Battery power supply (BCM)	—	Battery voltage
78	R	Power window power supply	Ignition switch (ON or START position)	Battery voltage
			Other than above	0
79	Y	Battery power supply (power window)	—	Battery voltage

Work Flow

EIS004PT

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to GW-52, "System Description"
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to GW-59, "Trouble Diagnosis Symptom Chart"
4. Does power window system operate normally? Yes, GO TO 5, If No, GO TO 3.
5. INSPECTION END

Trouble Diagnosis Symptom Chart

EIS004PV

Symptom	Repair order	Refer to page
None of the power windows can be operated using any switch.	1. BCM power supply and ground circuit check	GW-60
	2. Power window switch power supply and ground circuit check	GW-61
	3. Power window main switch check	GW-62
Driver side power window alone does not operate.	1. Power window motor (driver side) check (LHD models)	GW-63
	1. Power window motor (driver side) check (RHD models)	GW-63
	2. Replace power window main switch	EI-16
Passenger side power window alone does not operate.	1. Front power window motor (passenger side) check	GW-64
	2. Front power window switch (passenger side) check	GW-65
	3. Front power window switch (passenger side) circuit check (LHD models)	GW-66
	3. Front power window switch (passenger side) circuit check (RHD models)	GW-67
	4. Replace power window main switch	EI-16
Passenger side power window does not operate using front power window switch (passenger side), but power window main switch can be operate.	1. Front power window switch (passenger side) power supply check	GW-68
	2. Front power window switch (passenger side) check	GW-65

BCM Power Supply and Ground Circuit Check

EIS004QL

First perform the “SELF-DIAG RESULTS” in “BCM” with CONSULT-II, then perform the each trouble diagnosis of malfunction system indicated “SELF-DIAG RESULTS” of “BCM”, Refer to BCS-22, "CONSULT-II Function (BCM)" .

1. FUSE INSPECTION

- Check 10A fuse [No.4, located in fuse block (J/B)]
- Check 40A fusible link (letter **J** located in the fuse and fusible link box).

NOTE:
Refer to GW-52, "Component Parts and Harness Connector Location" .

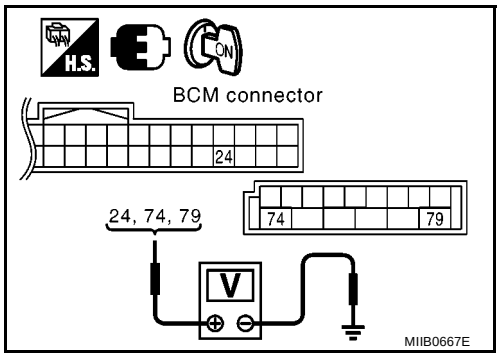
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between BCM connector M48, M50 terminal 24, 74, 79 and ground.

24 (OR) – Ground :Battery voltage.
74 (W) – Ground :Battery voltage.
79 (Y) – Ground :Battery voltage.



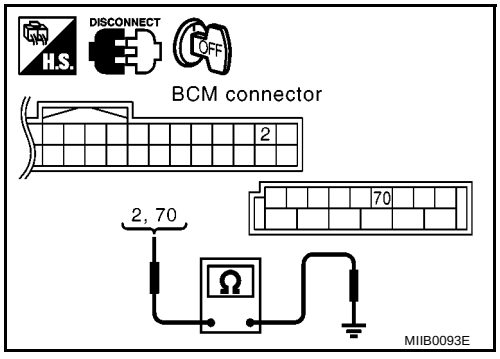
OK or NG

OK >> GO TO 3.
NG >> Check BCM power supply circuit for open or short.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between BCM connector M48, M50 terminal 2, 70 and ground.

2 (B) – Ground :Continuity should exist.
70 (B) – Ground :Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Check BCM ground circuit for open or short.

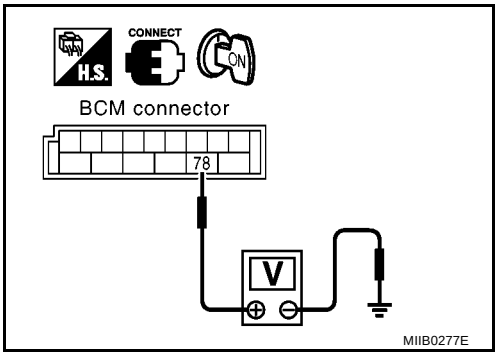
Power Window Switch Power Supply and Ground Circuit Check

EIS004PX

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between BCM connector M50 terminals 78 and ground.

78 (R) – Ground : Battery voltage



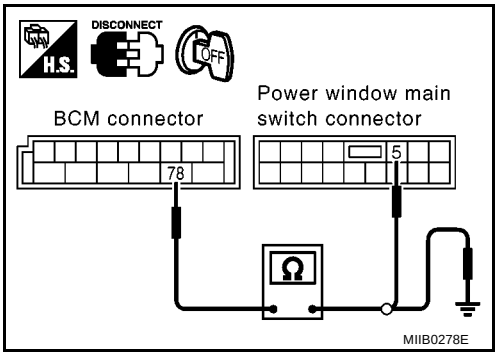
OK or NG

OK >> GO TO 2.
NG >> Replace BCM.

2. CHECK GROUND CIRCUIT

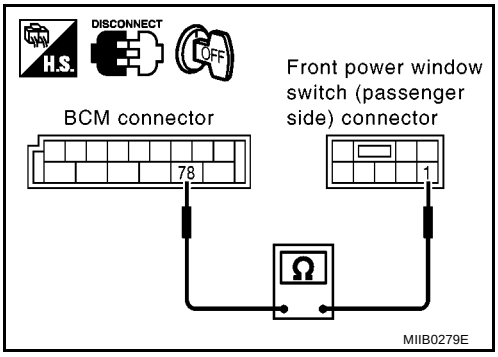
1. Turn ignition switch OFF.
2. Disconnect BCM, power window main switch and front power window switch (passenger side) connector.
3. Check continuity between BCM connector M50 terminal 78 and power window main switch connector D7 terminal 5, and ground.

78 (R) – 5 (R) : Continuity should exist.
78 (R) – Ground : Continuity should not exist.



4. Check continuity between BCM connector M50 terminal 78 and front power window switch (passenger side) connector D37 terminal 1.

78 (R) – 1 (R) : Continuity should exist.



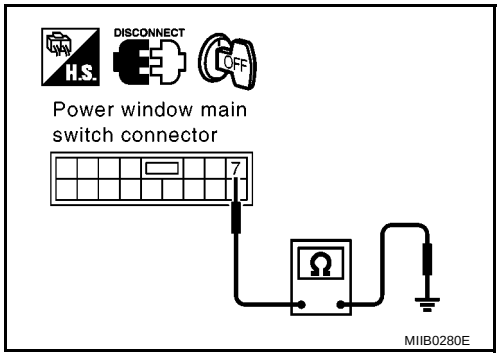
OK or NG

OK >> GO TO 3
NG >> Repair or replace harness.

3. CHECK GROUND CIRCUIT

Check continuity between power window main switch connector D7 terminal 7 and ground.

7 (B) – Ground : Continuity should exist.



OK or NG

OK >> Power window switch power supply and ground circuit is OK.

NG >> Repair or replace harness.

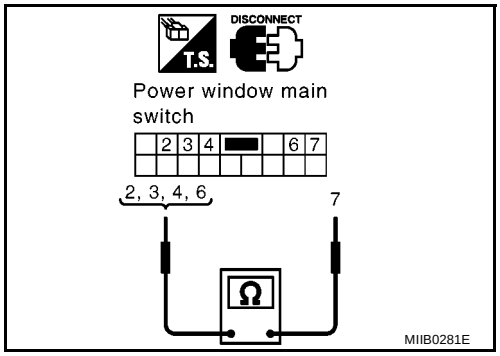
Power Window Main Switch Check

EIS004QM

1. CHECK POWER WINDOW MAIN SWITCH

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector.
3. Check continuity between power window main switch 2, 3, 4, 6 and 7.

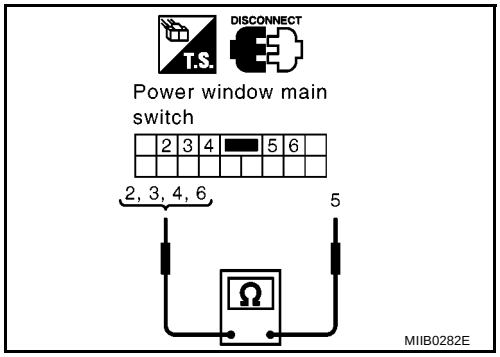
2 – 7 : Continuity should exist.
3 – 7 : Continuity should exist.
4 – 7 : Continuity should exist.
6 – 7 : Continuity should exist.



4. Power window main switch operate, check continuity between power window main switch 2, 3, 4, 6 and 5.

Terminals		Condition	Continuity
2, (6)	5	Driver side UP	Yes
3, (4)		Driver side DOWN	
4, (3)		Passenger side DOWN	
6, (2)		Passenger side UP	

( ) : RHD models



OK or NG

OK >> Power window main switch is OK. Check the condition of the harness and the connector.

NG >> Replace power window main switch.

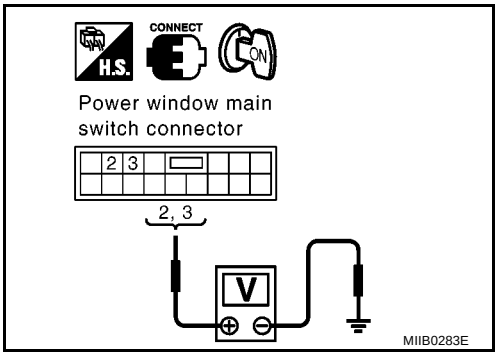
Front Power Window Motor (Driver Side) Check (LHD models)

EIS004QN

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between power window main switch connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	2 (Y)	Ground	Driver side UP	Battery voltage
	3 (L)		Driver side DOWN	



OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

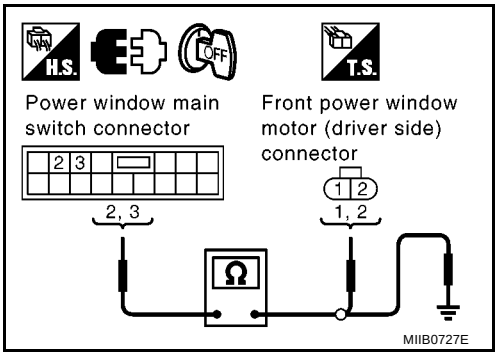
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window motor (driver side) connector.
3. Check continuity between power window main switch connector D7 terminal 2, 3 and front power window motor (driver side) connector D5 terminal 1, 2.

2 (Y) – 2 (Y) : Continuity should exist.
3 (L) – 1 (L) : Continuity should exist.

4. Check continuity between power window main switch connector D7 terminal 2, 3 and ground.

2 (Y) – Ground : Continuity should not exist.
3 (L) – Ground : Continuity should not exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

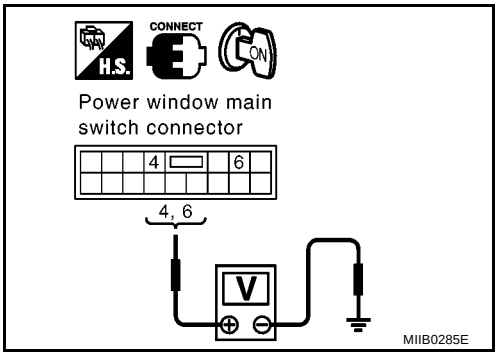
Front Power Window Motor (Driver Side) Check (RHD models)

EIS004QO

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between power window main switch connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	4 (L)	Ground	Driver side DOWN	Battery voltage
	6 (Y)		Driver side UP	



OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

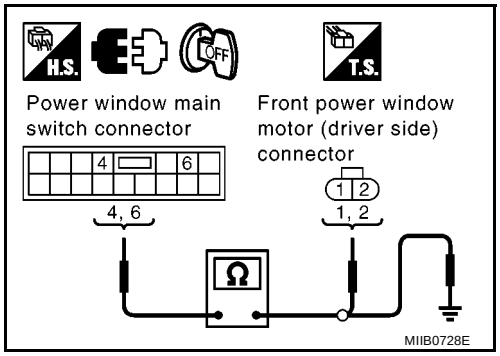
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window motor (driver side) connector.
3. Check continuity between power window main switch connector D7 terminal 4, 6 and front power window motor (driver side) connector D5 terminal 1, 2.

4 (L) – 1 (L) : Continuity should exist.
6 (Y) – 2 (Y) : Continuity should exist.

4. Check continuity between power window main switch connector D7 terminal 4, 6 and ground.

4 (L) – Ground : Continuity should not exist.
6 (Y) – Ground : Continuity should not exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

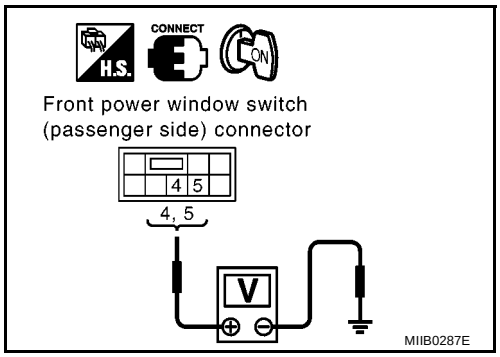
Front Power Window Motor (Passenger Side) Check

EIS004QP

1. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE) OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Power window main switch operate, check voltage between front power window switch (passenger side) connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D37	4 (L)	Ground	Passenger side DOWN	Battery voltage
	5 (Y)		Passenger side UP	



OK or NG

OK >> GO TO 2.
NG >> Further inspection is necessary, Refer to symptom chart.

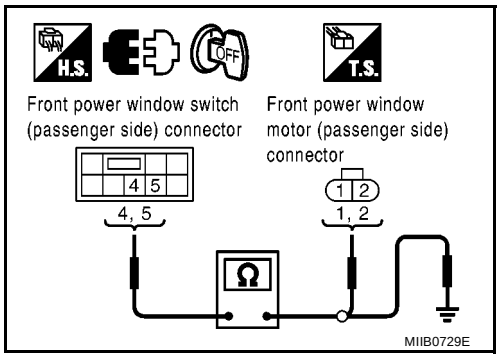
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect front power window switch (passenger side) and front power window motor (passenger side) connector.
3. Check continuity between front power window switch (passenger side) connector D37 terminal 4, 5 and front power window motor (passenger side) connector D35 terminal 1, 2.

4 (L) – 2 (L) : Continuity should exist.
5 (Y) – 1 (Y) : Continuity should exist.

4. Check continuity between front power window switch (passenger side) connector D37 terminal 4, 5 and ground.

4 (L) – Ground : Continuity should not exist.
5 (Y) – Ground : Continuity should not exist.



OK or NG

OK >> Replace front power window motor (passenger side).
NG >> Repair or replace harness.

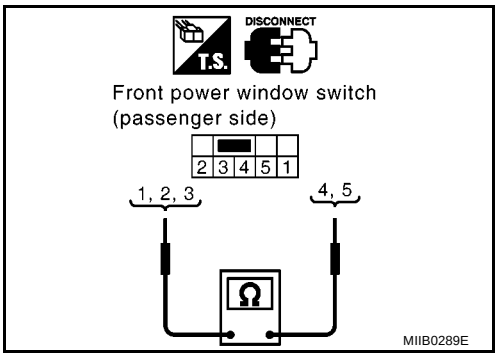
Front Power Window Switch (Passenger Side) Check

EIS004QQ

1. CHECK FRONT POWER WINDOW SWITCH (PASSENGER SIDE)

1. Turn ignition switch OFF.
2. Disconnect front power window switch (passenger side) connector, check continuity between front power window switch (passenger side) terminals.

Terminals		Condition	Continuity
1	5	UP	Yes
1	4	DOWN	
2	5	No operation	
3	4	No operation	



OK or NG

OK >> GO TO 2.
NG >> Replace front power window switch (passenger side).

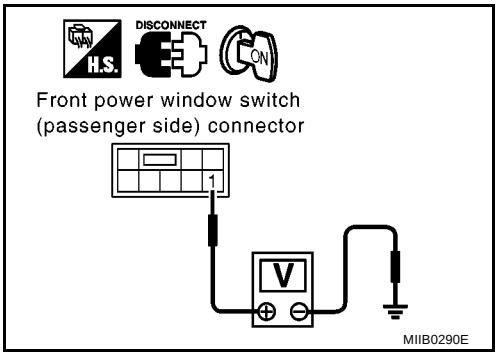
2. CHECK POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between front power window switch (passenger side) connector D37 terminal 1 and ground.

1 (R) – Ground : Battery voltage

OK or NG

OK >> Further inspection is necessary, Refer to symptom chart.
NG >> GO TO 3.



3. CHECK HARNESS CONTINUITY

1. Disconnect BCM connector.
2. Check continuity between BCM connector M50 terminal 78 and front power window switch (passenger side) connector D37 terminal 1.

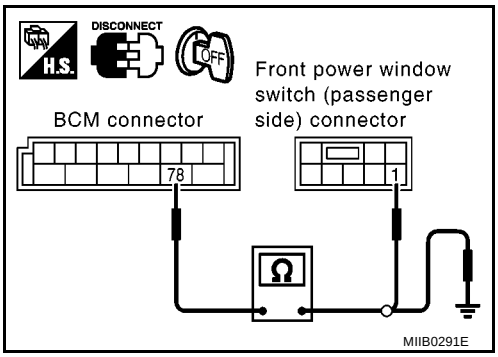
78 (R) – 1 (R) : Continuity should exist.

3. Check continuity between BCM connector M50 terminal 78 and ground.

78 (R) – Ground : Continuity should not exist.

OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.



Front Power Window Switch (Passenger Side) Circuit Check (LHD models)

EIS004QR

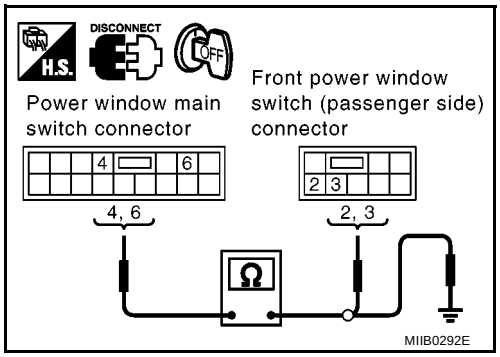
1. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window switch (passenger side) connector.
3. Check continuity between power window main switch connector D7 terminal 4, 6 and front power window switch (passenger side) connector D37 terminal 2, 3.

4 (G) – 3 (G) : Continuity should exist.
6 (PU) – 2 (PU) : Continuity should exist.

4. Check continuity between power window main switch connector D7 terminal 4, 6 and ground.

4 (G) – Ground : Continuity should not exist.
6 (PU) – Ground : Continuity should not exist.



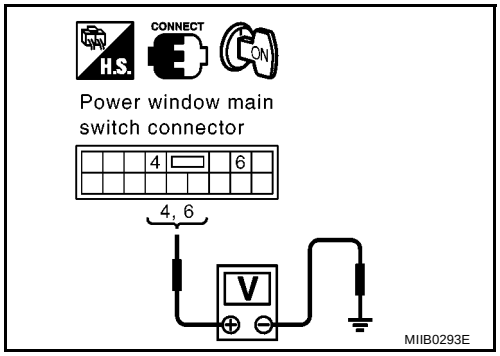
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness.

2. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Connect power window main switch connector.
2. Turn ignition switch ON.
3. Power window main switch operate, check voltage between power window main switch connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	4 (G)	Ground	Passenger side DOWN	Battery voltage
	6 (PU)		Passenger side UP	



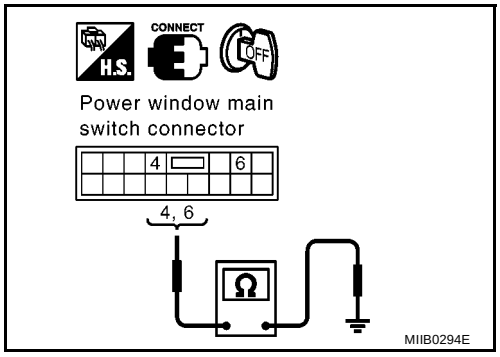
OK or NG

OK >> GO TO 3.
NG >> Replace power window main switch.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between power window main switch connector D7 terminal 4, 6 and ground.

4 (G) – Ground : Continuity should exist.
6 (PU) – Ground : Continuity should exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace power window main switch.

Front Power Window Switch (Passenger Side) Circuit Check (RHD models)

EIS004QS

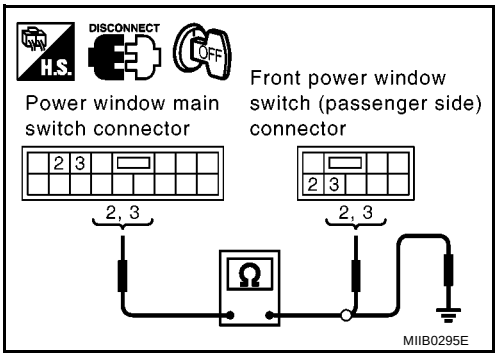
1. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window switch (passenger side) connector.
3. Check continuity between power window main switch connector D7 terminal 2, 3 and front power window switch (passenger side) connector D37 terminal 2, 3.

2 (PU) – 2 (PU) : Continuity should exist.
3 (G) – 3 (G) : Continuity should exist.

4. Check continuity between power window main switch connector D7 terminal 2, 3 and ground.

2 (PU) – Ground : Continuity should not exist.
3 (G) – Ground : Continuity should not exist.



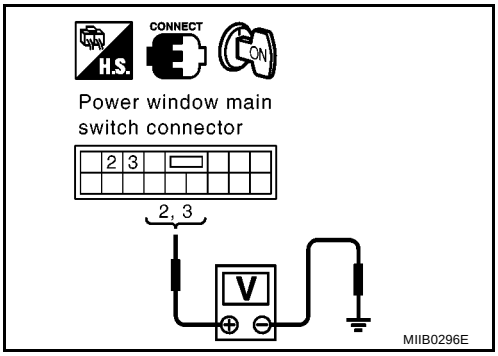
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness.

2. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Connect power window main switch connector.
2. Turn ignition switch ON.
3. Power window main switch operate, check voltage between power window main switch connector and ground.

Connector	Terminals (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	2 (PU)	Ground	Passenger side UP	Battery voltage
	3 (G)		Passenger side DOWN	



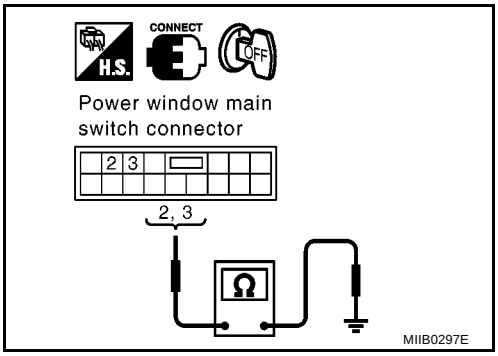
OK or NG

OK >> GO TO 3.
NG >> Replace power window main switch.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between power window main switch connector D7 terminal 2, 3 and ground.

2 (PU) – Ground : Continuity should exist.
3 (G) – Ground : Continuity should exist.



OK or NG

OK >> Check the condition of the harness and the connector.
NG >> Replace power window main switch.

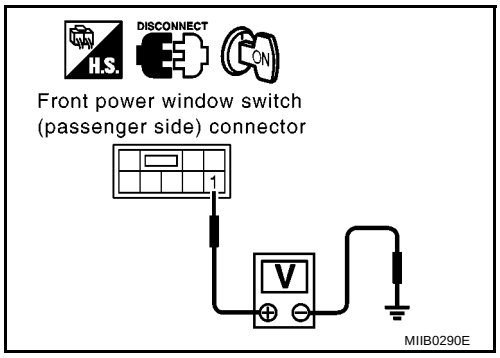
Front Power Window Switch (Passenger Side) Power Supply Check

EIS004QT

1. CHECK POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between front power window switch (passenger side) connector D37 terminal 1 and ground.

1 (R) – Ground : Battery voltage



OK or NG

OK >> Front power window switch (passenger side) power supply is OK.
NG >> GO TO 2.

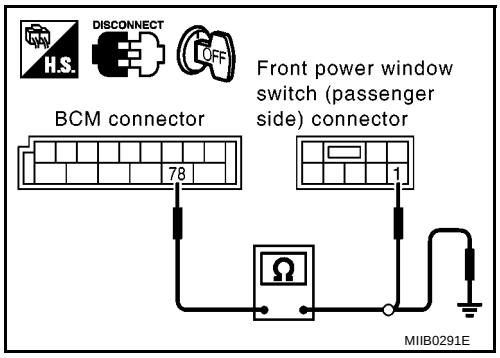
2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect BCM and front power window switch connector.
3. Check continuity between BCM connector M50 terminal 78 and front power window switch (passenger side) connector D37 terminal 1.

78 (R) – 1 (R) : Continuity should exist.

4. Check continuity between BCM connector M50 terminal 78 and ground.

78 (R) – Ground : Continuity should not exist.



OK or NG

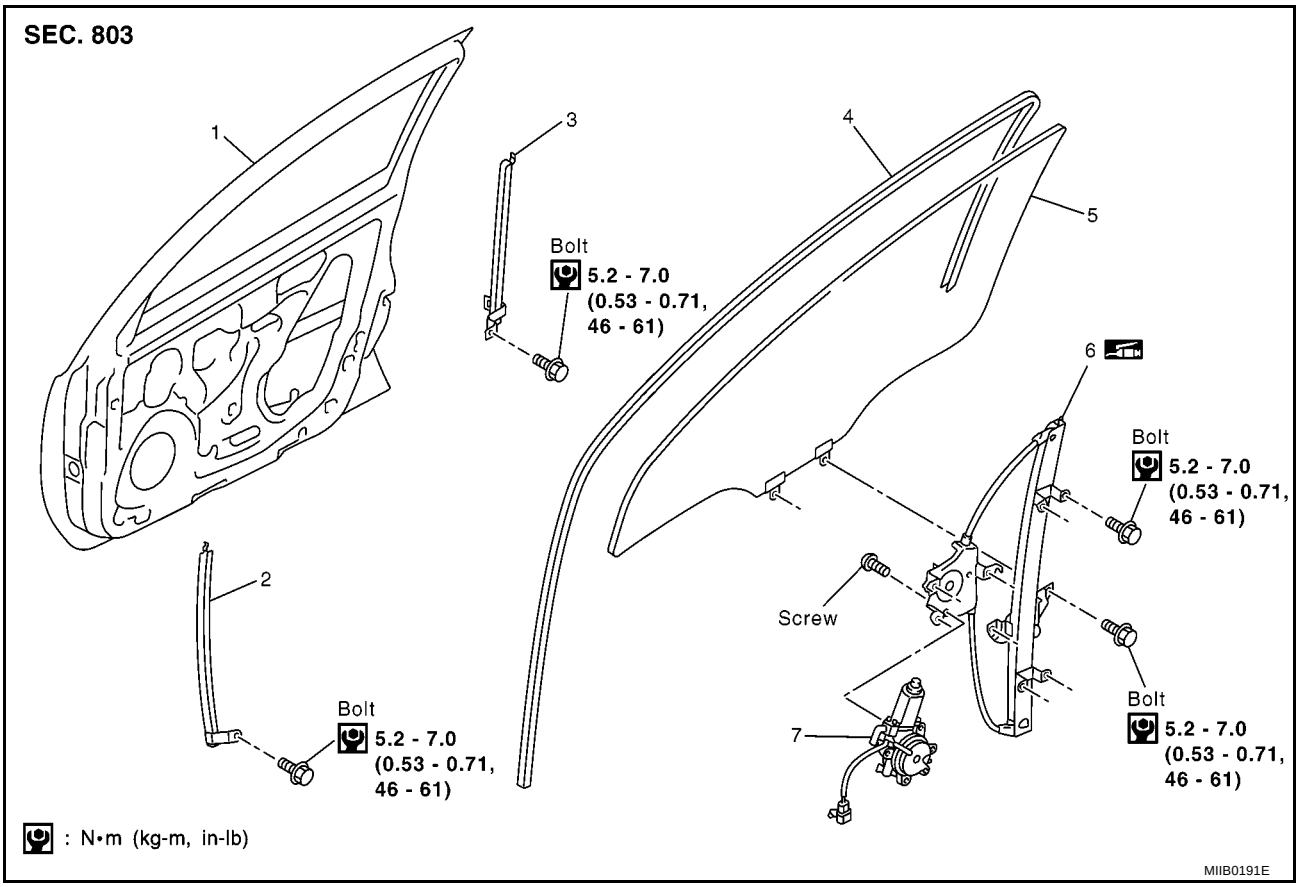
OK >> Check the condition of the harness and the connector.
NG >> Repair or replace harness.

FRONT DOOR GLASS AND REGULATOR

PFP:80300

Removal and Installation

EIS004L8

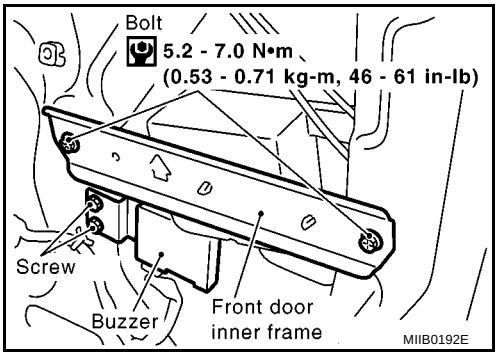


1. Door panel
2. Lower sash (front)
3. Lower sash (rear)
4. Door glass run
5. Door glass
6. Regulator
7. Power window motor

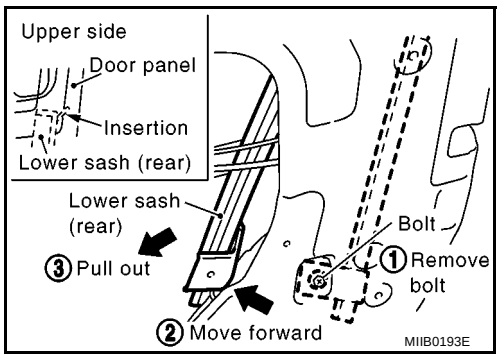
REMOVAL

1. Remove front door finisher. Refer to EI-16, "DOOR FINISHER" .
2. Fully close door glass.
3. Disconnect front speaker harness connector, and then remove sealing screen.

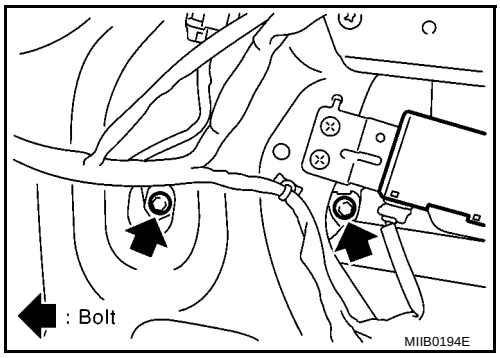
   NOTE:
   If sealing screen is reused, cut butyl tape in a way that leaves it on sealing screen.
4. Remove front door inner frame. (5-door vehicles only)
5. Remove buzzer. (Vehicle with intelligent key system only)



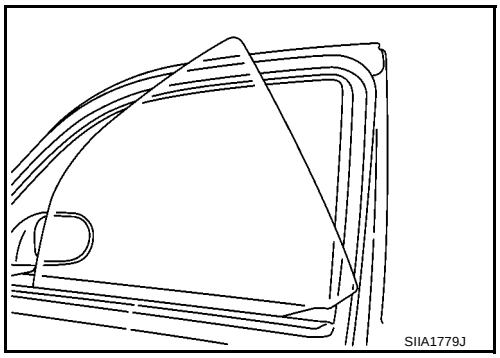
6. Remove lower sash (rear) bolts, move bottom toward front of door panel, pull out top inserted part from door panel, and remove lower sash (rear).



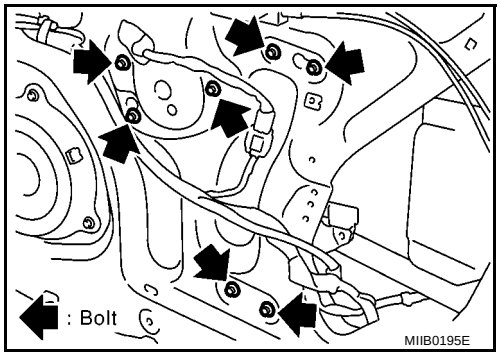
7. While supporting door glass, operate power window switch to raise/lower door glass until glass bolts can be seen.
8. Remove door glass bolts.



9. While holding door glass, raise glass up from rear edge while pulling glass out of sash toward the inside of the door.



10. Remove the power window motor harness connector and bolts, and remove regulator assembly from door panel.



11. Remove lower sash (front) bolts, move bottom toward back of door panel, pull out top insertion part from door panel, and remove lower sash (front).
12. Remove corner cover. Refer to EI-16, "Removal and Installation" .
13. Pull out and remove door glass run from door panel.

INSTALLATION

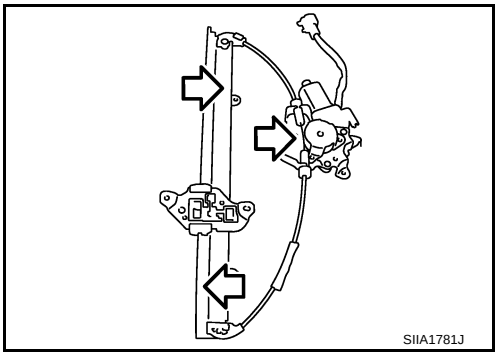
Install in the reverse order of removal.

INSPECTION AFTER REMOVAL

Check the regulator assembly for the following. If a failure is detected, replace or grease it.

- Wire wear
- Regulator assembly deformation
- Grease condition on each sliding part

Apply grease (Nissan MP Special Grease No. 2) to the areas indicted by the arrows in the figure.



SETTING AFTER INSTALLATION (DRIVER'S SIDE ONLY)

Setting Limit Switch

After performing the following work, reset the limit switch (with motor).

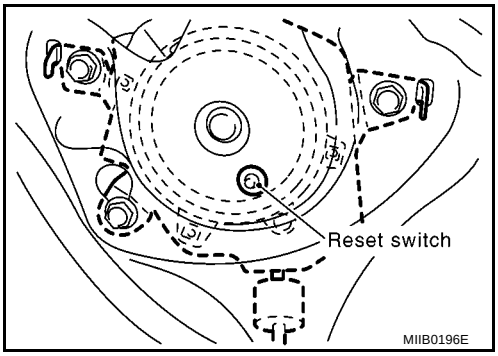
- Removal and Installation of regulator assembly
- Removal and Installation of motor from regulator assembly
- Operation of regulator assembly as an independent unit
- Removal and Installation of glass
- Removal and Installation of door glass run

Reset Operation

After installing each component, follow the steps below:

1. Raise glass to the bottom position.
2. Press and hold the reset switch to lower the window to the bottom dead end.
3. Release the reset switch, check the reset switch returns to the original position, and then raise the window to the top dead end.

   CAUTION:
   Do not raise the window automatically to the top dead end.



FITTING INSPECTION

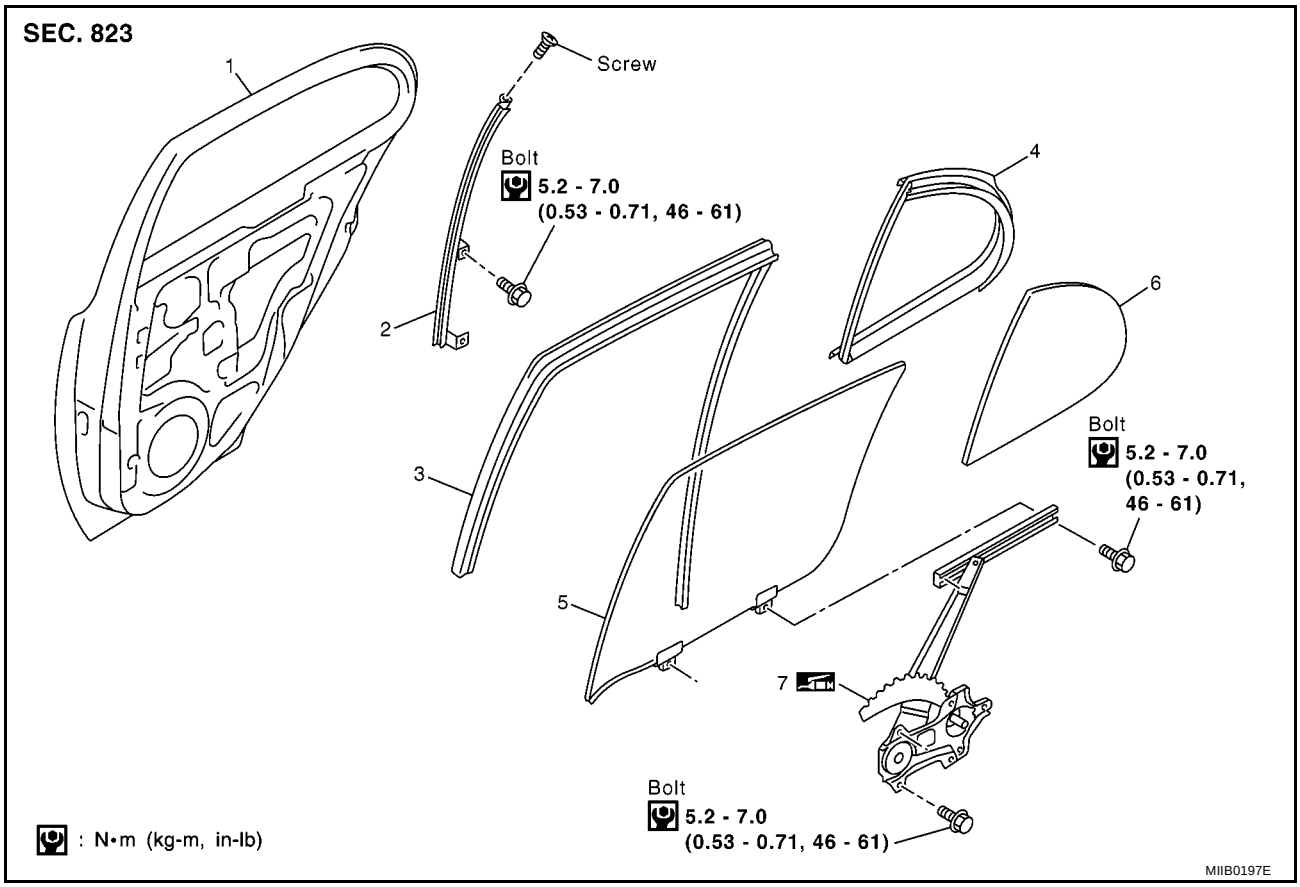
- Make sure glass is securely fit into door glass run groove.
- Lower glass slightly (approximately 10 to 20 mm), and confirm clearance to the sash is parallel. If clearance between glass and sash is not parallel, loosen bolts for regulator assembly, glass, and carrier plate, and then correct glass position.

REAR DOOR GLASS AND REGULATOR

PFP:82300

Removal and Installation

EIS004L9

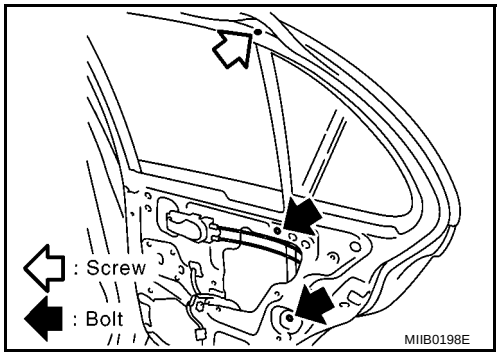


1. Door panel
2. Partition sash
3. Door glass run
4. Partition weather strip
5. Door glass
6. Partition glass
7. Regulator

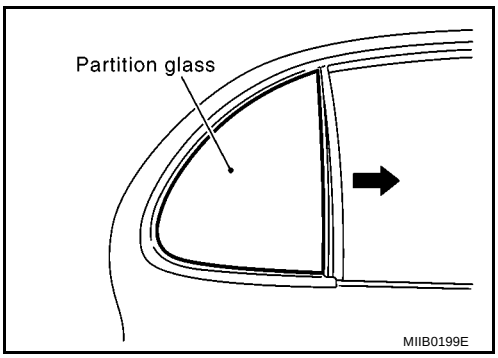
REMOVAL

1. Remove rear door finisher. Refer to EI-16, "DOOR FINISHER" .
2. Remove rear speaker harness connector.
3. Remove sealing screen.

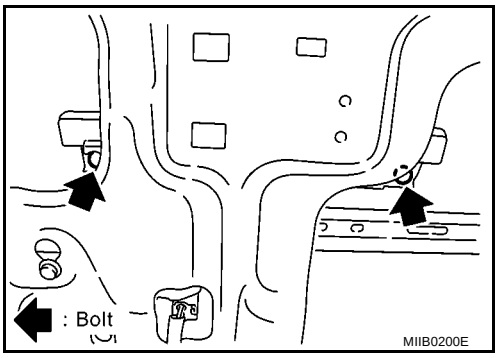
   NOTE:
   If sealing screen is reused, cut butyl tape in a way that leaves it on sealing screen.
4. After removing partition sash bolts screws, pull partition sash straight down, tilt the top forward, and pull up.



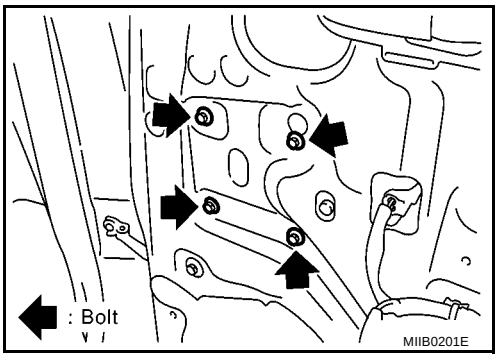
5. Pull out partition glass in the direction shown by the arrows in the figure.



6. While supporting door glass, operate power window switch to raise/lower door glass until glass bolts can be seen.
7. Remove door glass bolts.
8. Pull door glass up to remove it.



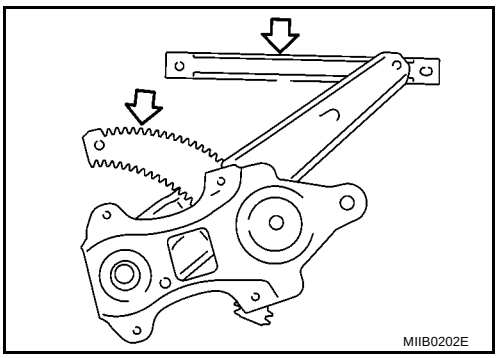
9. Remove regulator assembly bolts to remove assembly out of door panel.



10. Pull out and remove door glass run from door panel.

INSPECTION AFTER REMOVAL

- Check the regulator assembly for the following. If a failure is detected, replace or grease it.
  Gear wear
  Regulator assembly deformation
  Grease condition on each sliding part
- Apply grease (Nissan MP Special Grease No. 2) to the areas indicted by the arrows in the figure.



INSTALLATION

Install in the reverse order of removal.

FITTING INSPECTION

- Make sure the window is seated in the groove of the glass run.
- Lower glass slightly (approximately 10 to 20 mm), and confirm clearance to the sash is parallel. If clearance between glass and sash is not parallel, loosen bolts for regulator assembly, glass, and main channel, and then correct glass position.

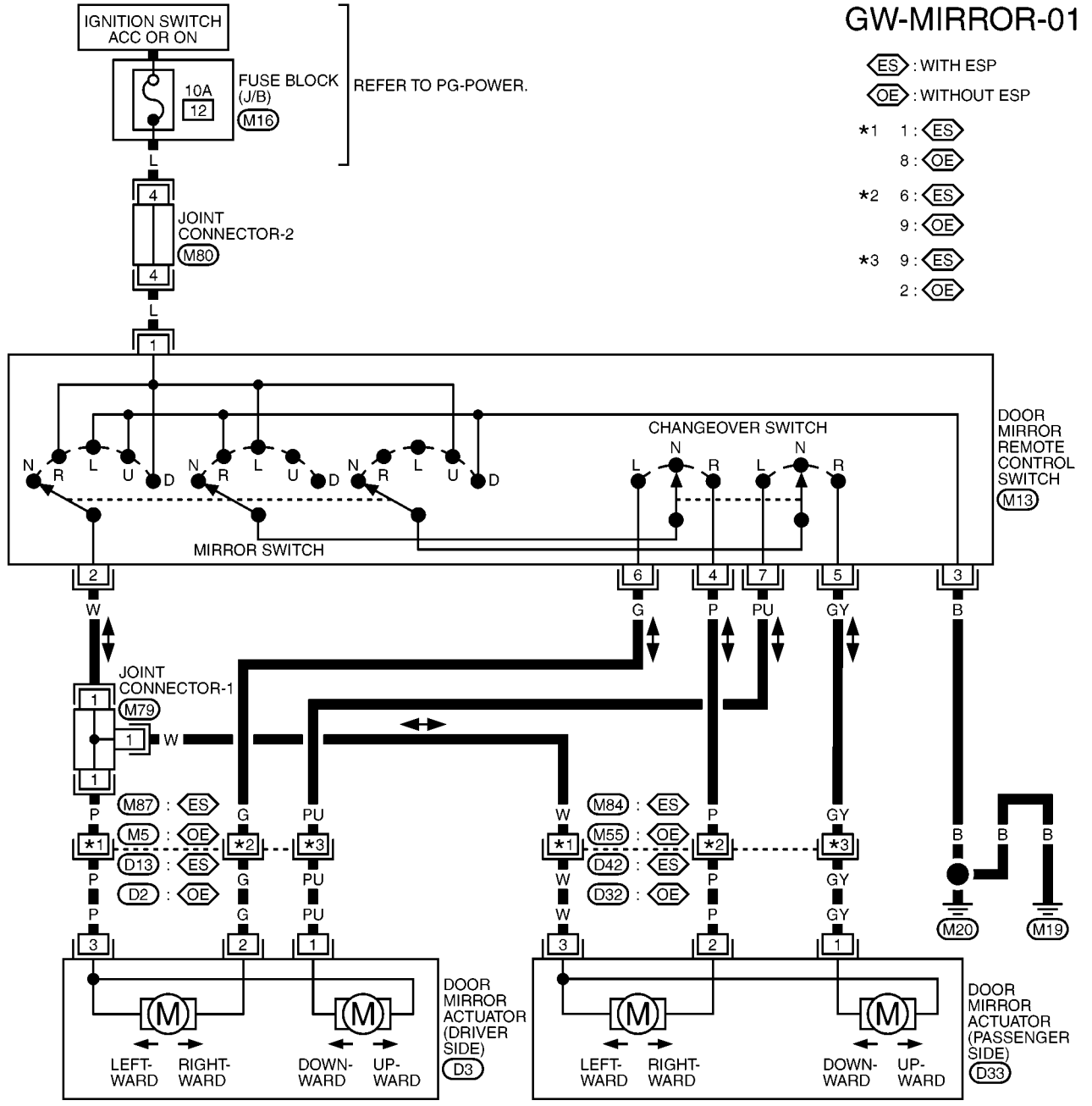
DOOR MIRROR

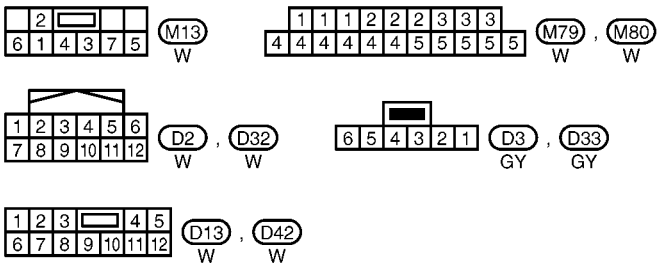
PFP:96301

Wiring Diagram — MIRROR — LHD Models

SMA for VIN >SJN**AK12U1309269

EIS004LB





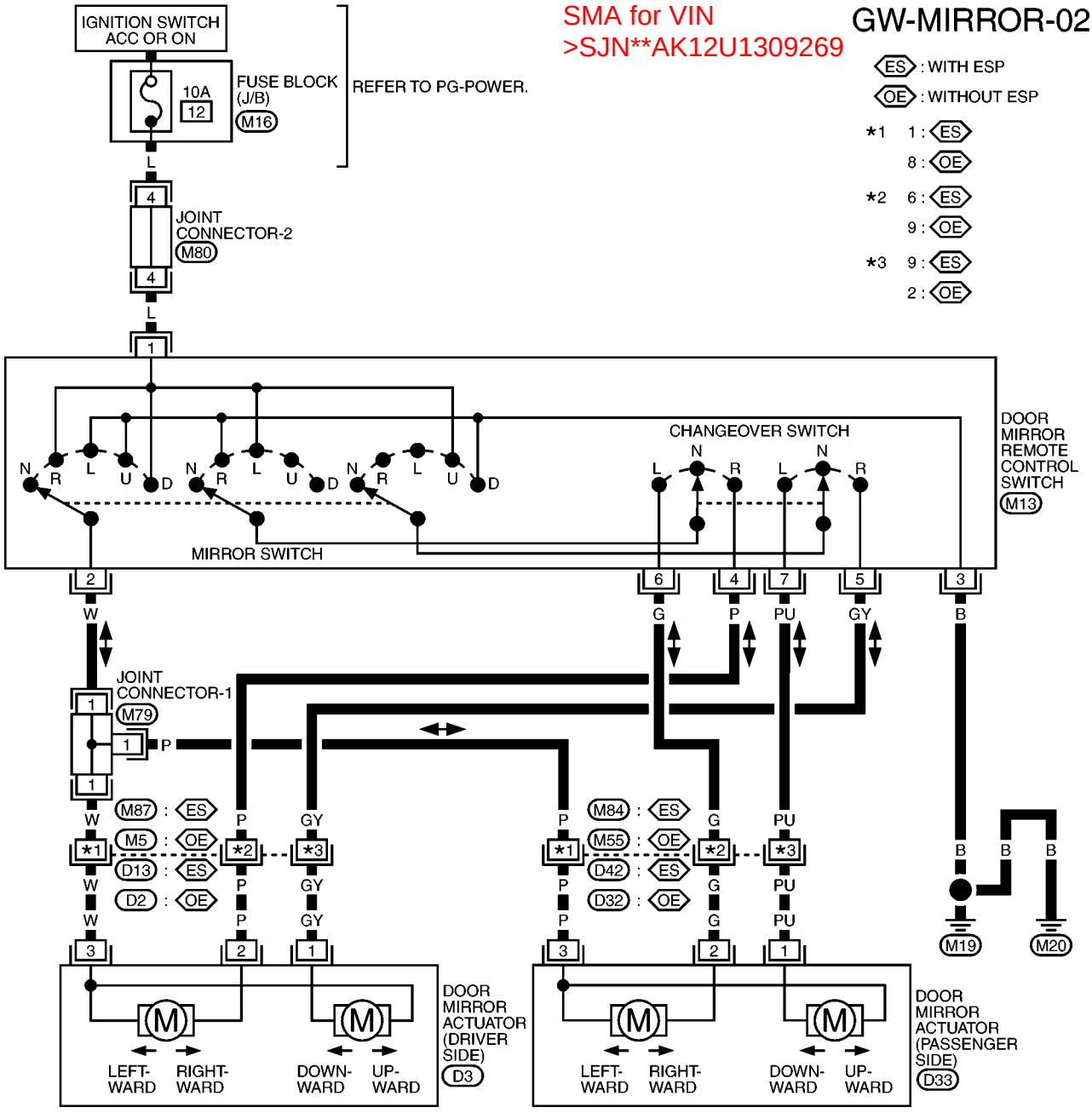
REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

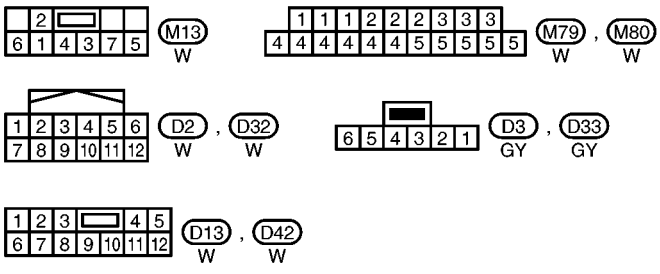
MKWA1836E

Wiring Diagram — MIRROR — RHD Models

EIS00C4A

SMA for VIN
>SJN**AK12U1309269



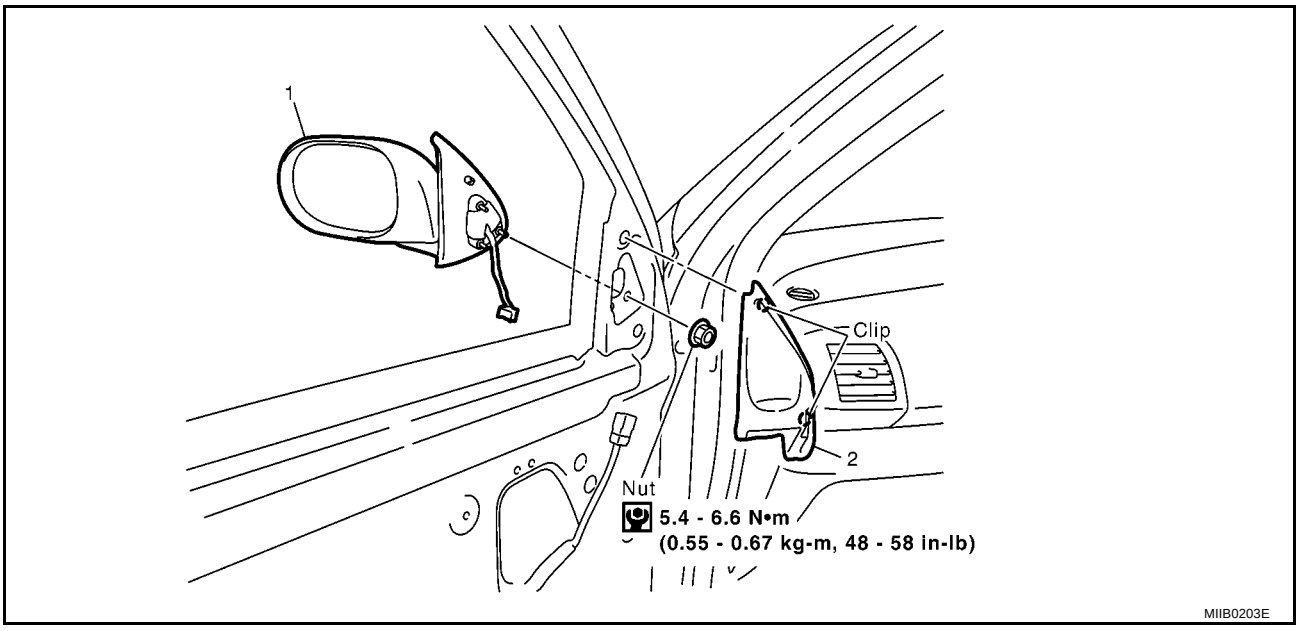


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1837E

Removal and Installation

EIS004LC



1. Door mirror
2. Corner cover

REMOVAL

CAUTION:

Be careful not to damage mirror body.

1. Remove front door finisher. Refer to EI-16, "DOOR FINISHER" .
2. Remove corner cover.
3. Disconnect door mirror harness connector. (Electric door mirrors only)
4. Remove door mirror nuts and door mirror assembly.

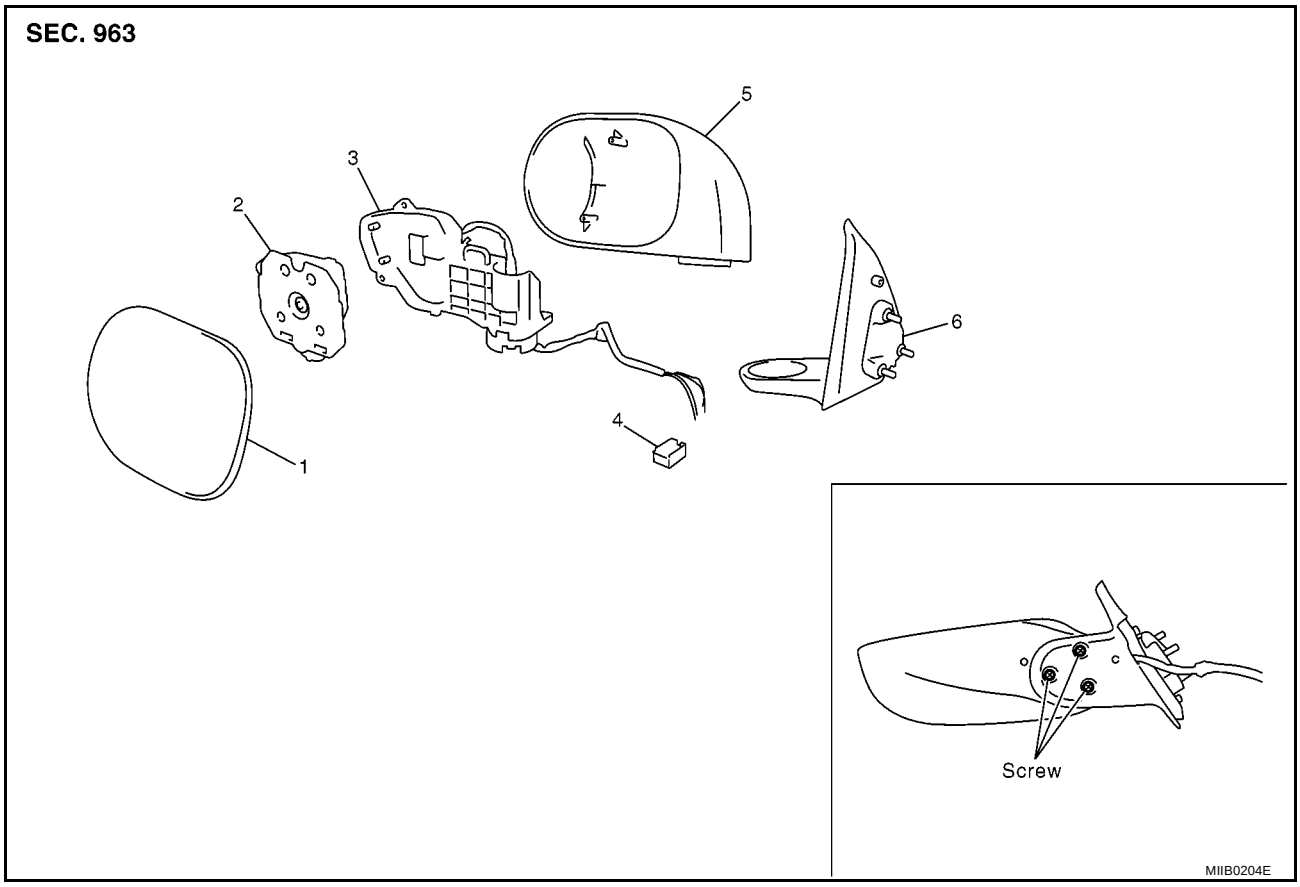
INSTALLATION

Install in the reverse order of removal.

Disassembly and Assembly

EIS004LD

SEC. 963



1. Mirror body (integrated with holder)
2. Power unit
3. Electric unit
4. Connector (electric)
5. Housing
6. Base

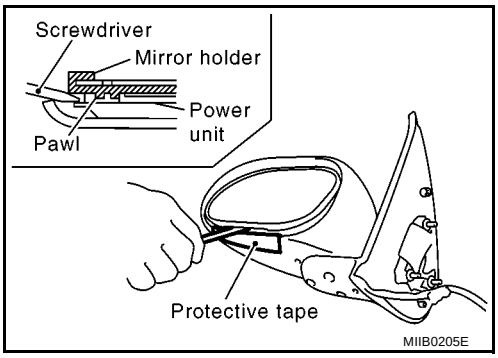
DISASSEMBLY

1. Remove all terminals from the harness connector.

   CAUTION:
   Before pulling out terminal, note connector terminal layout.

2. Turn mirror glass surface upward.
3. Apply protective tape to the housing.
4. As shown in the figure, insert a thin, screwdriver in the concave gap between mirror glass (mirror holder) and power unit to push up tabs (2 locations) on mirror holder to disengage lower part of mirror holder, and remove mirror body.

   CAUTION:
   When pushing up the tabs, do not forcibly push up only 1 concave but try to push up using 2 concave positions.

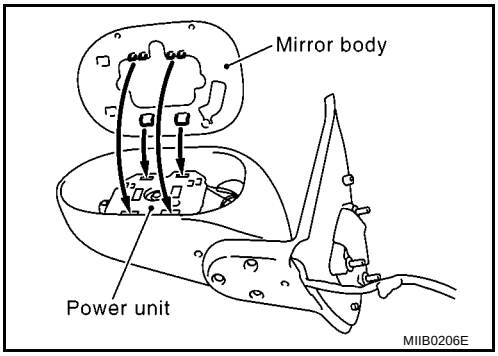


5. Remove base.
6. Remove electric unit.
7. Remove power unit, and disconnect connector.
8. Separate the power unit from the Electric retracting unit.

ASSEMBLY

1. Install power unit to the electric unit.
2. Connect connector to power unit.
3. Install electric unit and base to the housing.
4. Place power unit and mirror body in a horizontal position.
5. Engage upper tabs of mirror glass (mirror holder) with power unit. Then, press lower part of mirror glass down until lower part snaps into place and engages lower tabs.

   CAUTION:
   After finishing work, visually confirm that lower tabs (2) at the bottom of mirror face are securely engaged.



6. Insert harness terminal into connector.

   CAUTION:
   Make sure to insert harness terminal into the correct connector. Do not confuse the locations.

INSIDE MIRROR

PFP:96321

Removal and Installation

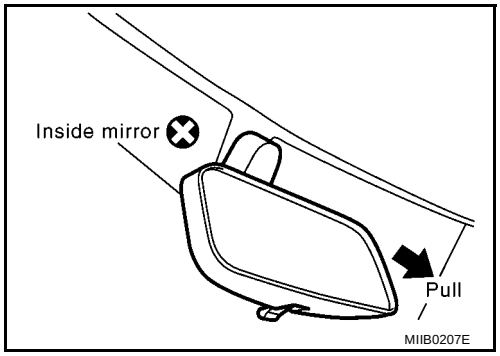
EIS004LE

REMOVAL

Pull the inside mirror forward to remove it.

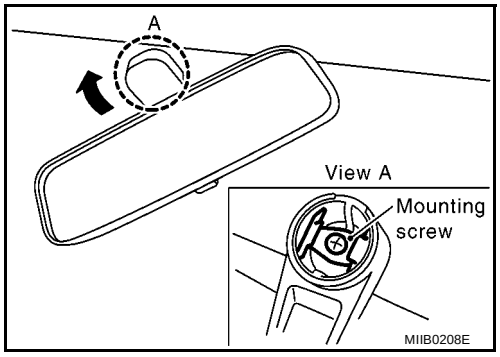
CAUTION:

Do not twist the stay to remove it as this could damage the stay.



INSTALLATION

Rotate the stay 90°C to install it.



SECTION IDX

ALPHABETICAL INDEX

ALPHABETICAL INDEX

A

A/C - Wiring diagram MTC-24, MTC-26
A/C component layout MTC-62
A/C compressor clutch removal and installation MTC-64
A/C compressor precaution ATC-6, MTC-6
A/C compressor special service tool MTC-10
A/C HFC134a (R134a) system precaution ATC-3, MTC-3
A/C HFC134a (R134a) system service tools .. MTC-10
A/C HFC134a system service equipment precaution ... ATC-6, MTC-6
A/C lubricant (R134a) MTC-79
A/C service data specification MTC-79
A/C trouble diagnoses (manual A/C) MTC-17
A/C, M - Wiring diagram MTC-24, MTC-26
A/T fluid checking AT-12, MA-37
A/T fluid replacement AT-12, MA-37
A/T fluid temperature sensor AT-125
A/T shift lock system AT-418
A/T shift lock system - Wiring diagram AT-419
A/T trouble diagnoses AT-54, AT-262
A/T Wiring diagram AT - 1ST AT-138
A/T Wiring diagram AT - 2ND AT-144
A/T Wiring diagram AT - 3RD AT-150
A/T Wiring diagram AT - 4TH AT-156
A/T Wiring diagram AT - BA/FTS AT-198, AT-397
A/T Wiring diagram AT - CAN AT-413
A/T Wiring diagram AT - ENG SS AT-132, AT-402
A/T Wiring diagram AT - FTS AT-122
A/T Wiring diagram AT - LPSV AT-168, AT-407
A/T Wiring diagram AT - MAIN AT-415
A/T Wiring diagram AT - OVRCSV AT-190, AT-387
A/T Wiring diagram AT - PNP/SW AT-116
A/T Wiring diagram AT - SSV/A AT-175, AT-378
A/T Wiring diagram AT - SSV/B AT-180, AT-383
A/T Wiring diagram AT - TCV AT-163, AT-392
A/T Wiring diagram AT - TPS AT-185, AT-373
A/T Wiring diagram AT - VSS A/T AT-128, AT-364
A/T Wiring diagram AT - VSSMTR AT-204, AT-369
A/WIP - Wiring diagram WW-68
ABS - Wiring diagram BRC-13, BRC-16
ABS input/output signal inspection BRC-19
ABS sensor rotor RAX-5
Accelerator pedal position (APP) sensor EC-233, EC-242, EC-376, EC-402, EC-411, EC-426, EC-621, EC-630, EC-713, EC-733, EC-742, EC-757
Accelerator pedal released position learning EC-42, EC-503
Air bag SRS-3, SRS-36, SRS-40, SRS-41, SRS-43
Air bag disposal SRS-49
Air bleeding (hydraulic clutch) CL-7
Air bleeding for brake system BR-10
Air cleaner and air duct EM-123
Air cleaner filter EM-124
Air cleaner filter replacement MA-33
Air conditioner - Wiring diagram MTC-24, MTC-26
Air conditioner cut control EC-27, EC-487
Air mix door control linkage adjustment MTC-55
Alternator SC-15
Angular tightening application EM-105
Antenna AV-15
AP/SEN - Wiring diagram .. EC-149, EC-347, EC-576, EC-684
APPS1 - Wiring diagram EC-244, EC-404, EC-632, EC-735
APPS2 - Wiring diagram EC-378, EC-413, EC-715, EC-744
APPS3 - Wiring diagram EC-235, EC-428, EC-623, EC-759
Audio AV-3
AUDIO - Wiring diagram AV-4
Auto wiper WW-48
Automatic transaxle number GI-48
Automatic transmission fluid replacement MA-37
Axle MA-40

B

Back door trim EI-18
Back door window GW-10
Back window GW-10
BACK/L - Wiring diagram LT-183
Back-up lamp LT-183, LT-186
Basic inspection EC-77, EC-522
Battery SC-5
BCM (Body control module) BCS-3
Blower motor MTC-29, MTC-50
Blower resistor MTC-51
Board computer DI-37
Board-on lift GI-40
Bose speaker amp. AV-3
Brake booster BR-17
Brake fluid change BR-9
Brake fluid level MA-38
Brake fluid level and line check BR-9
Brake hydraulic line BR-11
Brake inspection MA-39
Brake lines and cables inspection MA-38
Brake master cylinder BR-14
Brake pedal BR-6
Brake switch EC-395, EC-726
BRK/SW - Wiring diagram EC-397, EC-728
Bulb specifications LT-255
Bumper, front EI-4
Bumper, rear EI-6

C

Camshaft inspection EM-195
Camshaft position sensor (PHASE) .. EC-267, EC-650
CAN - Wiring diagram EC-131, EC-573, LAN-21, LAN-53, LAN-83, LAN-113, LAN-141, LAN-173, LAN-203, LAN-233, LAN-261, LAN-291
CAN (Controller Area Network) BRC-54, LAN-6, LAN-20, LAN-52, LAN-82, LAN-112, LAN-140, LAN-172, LAN-202, LAN-232, LAN-260, LAN-290

CAN communication EC-29, EC-130, EC-489, EC-572, AT-107, AT-314, AT-412, BRC-54, LAN-6, LAN-20, LAN-52, LAN-82, LAN-112, LAN-140, LAN-172, LAN-202, LAN-232, LAN-260, LAN-290
Canister-See EVAP canister EC-467, EC-843
CD/CHG - Wiring diagram AV-4
CHARGE - Wiring diagram SC-16, SC-17
Charging system SC-15
Chassis and body maintenance MA-36
CIGAR - Wiring diagram WW-116
Circuit breaker PG-17
Closed loop control EC-25, EC-485
Clutch cover CL-10, CL-12
Clutch disc CL-10
Clutch master cylinder CL-8
Clutch pedal CL-5
Coil spring (front) FSU-8
Coil spring (rear) RSU-8
Collision diagnosis SRS-56
Combination meter DI-5
Combination switch LT-187
COMBSW - Wiring diagram LT-192
COMM - Wiring diagram DI-57
Component Location (manual A/C) MTC-20
Compressor clutch removal and installation ... MTC-64
Compressor precaution ATC-6, MTC-6
Compressor special service tool MTC-10
Condenser MTC-71, MTC-72
Connecting rod EM-197
CONSULT for ABS BRC-20
CONSULT for engine EC-101, EC-546
CONSULT for VDC BRC-74
CONSULT general information GI-34
Control unit MTC-43
Control units (terminal arrangement) PG-102
Controller Area Network (CAN) BRC-54, LAN-6, LAN-20, LAN-52, LAN-82, LAN-112, LAN-140, LAN-172, LAN-202, LAN-232, LAN-260, LAN-290
Converter housing installation AT-431, AT-527
COOL/F - Wiring diagram EC-356, EC-693
Coolant mixture ratio MA-20
Coolant replacement MA-30
Cooling circuit (engine)(QG) CO-7
Cooling fan CO-36
Cooling fan motor EC-365, EC-702
Cowl top EI-10
Crankcase ventilation system - See Positive crankcase ventilation EC-468, EC-844
Crankshaft EM-198
Crankshaft position sensor (POS) EC-261, EC-643
Cylinder block EM-199
Cylinder head EM-144
Cylinder head bolt tightening EM-145, EM-191

D

Data link connector EC-462, EC-838
Data link connector for Consult EC-104, EC-548
Daytime light system LT-42
Diagnosis sensor unit SRS-48
Diagnostic trouble code (DTC) for OBD system EC-11, EC-50, EC-472, EC-508
Diagnostic trouble code (DTC) inspection priority chart EC-73, EC-519
Dimensions GI-48
Door glass GW-4, GW-69, GW-72
Door mirror GW-75
Door trim EI-16
Drive belt EM-121
Drive belt inspection MA-30
Drive computer DI-36, DI-57
Drive shaft (front) FAX-10
Driver air bag SRS-36
Dropping resistor (A/T) AT-172, AT-411
DTC work support EC-110
DTRL - Wiring diagram LT-59
Duct and grilles MTC-57

E

ECM input/output signal EC-94, EC-539
ECM power supply EC-125, EC-289, EC-567, EC-660
ECM/PW - Wiring diagram EC-290, EC-661
ECTS - Wiring diagram EC-160, EC-582
Electric throttle control actuator EC-297, EC-299, EC-310, EC-664, EC-667, EC-678
Electrical diagnoses GI-10
Electrical load signal circuit EC-460, EC-836
Electrical unit PG-102
Electrical units location PG-95
Electronic ignition (EI) system EC-26, EC-486
Engine control circuit diagram EC-92, EC-537
Engine control component parts location EC-87, EC-532
Engine control module (ECM) EC-286, EC-657
Engine control system diagram and chart EC-22, EC-482
Engine coolant CO-31
Engine coolant temperature sensor (ECTS) ... EC-158, EC-580
Engine fail-safe system EC-75, EC-520
Engine oil LU-12
Engine oil filter replacement MA-35
Engine oil precautions GI-7
Engine oil replacement MA-34
Engine removal EM-147
Engine room cover EM-119
Engine serial number GI-47
ETC1 - Wiring diagram EC-300, EC-668
ETC2 - Wiring diagram EC-307, EC-675
ETC3 - Wiring diagram EC-311, EC-679
EVAP canister EC-467, EC-843
EVAP canister purge volume control solenoid valve EC-278, EC-464, EC-801, EC-840
EVAP vapor lines inspection(QG) MA-29
EVAP vapor lines inspection(QR) MA-29
Evaporative emission (EVAP) system EC-464, EC-840
Evaporator MTC-74

Exhaust manifold EM-129
Exhaust system inspection EX-3, MA-36
Expansion valve MTC-75

F

F/FOG - Wiring diagram LT-89
F/PUMP - Wiring diagram EC-451, EC-827
Floor trim EI-22
Flow charts GI-24
Fluid temperature sensor (A/T) AT-125
Fluids MA-18
Fluorescent leak detector MTC-76
Flywheel (clutch) CL-12
Freeze frame data EC-51, EC-509
FRO2 - Wiring diagram EC-767, EC-781
Front axle FAX-6
Front bumper EI-4
Front disc brake BR-21
Front fog lamp LT-74
Front passenger air bag SRS-40
Front seat SE-7
Front seat belt SB-3
Front seat belt pre-tensioner SB-2, SB-3, SRS-3
Front side air bag SRS-41
Front suspension FSU-5
Front washer WW-5, WW-48
Front wiper WW-5, WW-48
FUEL - Wiring diagram EC-210, EC-217
Fuel check valve EC-464, EC-840
Fuel cut control (at no load high engine speed) EC-28, EC-488
Fuel filter replacement FL-14
Fuel gauge FL-17, DI-5
Fuel injection system EC-208, EC-215
Fuel line inspection FL-3, MA-33
Fuel line inspection(QG) MA-26
Fuel line inspection(QR) MA-26
Fuel precautions GI-5
Fuel pressure check EC-44, EC-505
Fuel pressure release EC-44, EC-505
Fuel pump EC-450, EC-826
Fuel system FL-13
Fuel tank FL-19
Fuse PG-17
Fuse and fusible link box PG-107
Fusible link PG-17

G

Garage jack and safety stand GI-38
Generator SC-15
Generator - See Alternator SC-15
Generic scan tool (GST) EC-112
Glow plug EM-136
Grease MA-18
Grille - See Exterior EI-8
Ground distribution PG-54

H

H/AIM - Wiring diagram LT-71
H/LAMP - Wiring diagram LT-22
Harness connector PG-99
Harness layout PG-67
Hazard warning lamp LT-121, LT-188
Headlamp LT-6
Headlamp aiming control LT-71
Headlamp washer WW-110
Headlining - See Roof trim EI-24
Heated oxygen sensor 1 .... EC-169, EC-175, EC-185, EC-315, EC-321, EC-591, EC-597, EC-780
Heated oxygen sensor 1 heater EC-136, EC-766
Heated oxygen sensor 2 .... EC-192, EC-199, EC-327, EC-337, EC-603, EC-786
Heated oxygen sensor 2 heater EC-142, EC-771
Heated seat SE-4
HEATER - Wiring diagram MTC-22
Heater system - Wiring diagram MTC-22
Heater unit (heater core) MTC-49
Height (Dimensions) GI-48
HFC134a (R134a) system precaution . ATC-3, MTC-3
HFC134a (R134a) system service procedure . MTC-61
HFC134a (R134a) system service tools MTC-10
HFC134a system service equipment precaution ATC-6, MTC-6
HLC - Wiring diagram WW-111, WW-114
HO2S1 - Wiring diaram EC-171, EC-178, EC-188, EC-593, EC-599
HO2S1H - Wiring diagram EC-138
HO2S2 - Wiring diagram EC-194, EC-202, EC-331, EC-340, EC-605
HO2S2H - Wiring diagram EC-144
Horn WW-114
HORN - Wiring diagram WW-114
How to erase DTC for OBD system EC-59, EC-510
HSEAT - Wiring diagram SE-5

I

IATS - Wiring diagram EC-155
IATSEN - Wiring diagram EC-777
Identification ATC-9, MTC-9
Identification plate GI-47
Idle air volume learning EC-42, EC-503
Idle speed EC-77, EC-522
Ignition coil EC-435, EC-792
Ignition control system EC-435, EC-792
Ignition timing EC-77, EC-522
IGNSYS - Wiring diagram EC-436, EC-793
ILL - Wiring diagram LT-247
Illumination LT-230
INJECT - Wiring diagram EC-445, EC-821
Injector EC-444, EC-820
Instrument panel IP-4
INT/L - Wiring diagram LT-217
Intake air system EC-346, EC-683
Intake air temperature sensor EC-153, EC-776

Intake door control linkage adjustment MTC-53
Intake valve timing control EC-133, EC-809
Intake valve timing control solenoid valve EC-293, EC-809
Interior lamp LT-200
IPDM (Intelligent power distribution module engine room) PG-18
ISO 15031-2 Terminology GI-49
ISO 15031-5 Mode 1 - 9 ..... EC-47
IVC - Wiring diagram EC-294
IVC/V - Wiring diagram EC-811

K

Keyless entry system - See Multi-remote control system BL-131
Knock sensor (KS) EC-257, EC-639
Knuckle spindle FAX-6
KS - Wiring diagram EC-258, EC-640

L

Length (Dimensions) GI-48
License lamp LT-152
Line pressure solenoid valve AT-160
Line pressure test (A/T) AT-65, AT-272
Liquid gasket application EM-106
Location of electrical units PG-95
Lubricant (R134a) A/C ATC-4, MTC-4, MTC-15, MTC-79
Lubricants MA-18
Lubrication circuit (engine)(QG) LU-3
Lubrication oil A/C MTC-79
Lubrication-locks, hinges and hood latches MA-41
Luggage compartment trim EI-26

M

Magnet clutch MTC-31
MAIN - Wiring diagram EC-125, EC-567
Malfunction indicator (MI) EC-60, EC-511
Manifold absolute pressure (MAP) sensor EC-148, EC-575
Manual air conditioner - Wiring diagram MTC-24, MTC-26
Master cylinder (brake) BR-14
Meter DI-5
MIL/DL - Wiring diagram EC-462, EC-838
Mirror, door GW-75
Mirror, out side GW-75
Misfire EC-251
Mode door control linkage adjustment MTC-54
Model variation GI-44
Molding - See Exterior EI-12, EI-13, EI-15
Multiport fuel injection (MFI) system EC-24, EC-484
Multiport fuel injection precautions GI-6
Multi-remote control system BL-131

N

NATS - Wiring diagram BL-226
NATS (Nissan anti-theft system) precautions GI-3
NAVI - Wiring diagram AV-18
Navigation system AV-17
NVH troubleshooting (BR) BR-5, PB-2
NVH troubleshooting (RSU) RSU-3
NVH troubleshooting (ST) PS-4

O

Oil cooler (engine) LU-16
Oil filter LU-14
Oil pan (engine) EM-133
Oil pressure (engine) LU-12
Oil pump (engine) LU-15
On board diagnostic system EC-47, EC-508
Out side mirror GW-75
Overdrive control switch AT-250, AT-361
Overheat EC-352, EC-689

P

Park/Neutral position switch EC-389, EC-815
Park/neutral position switch (A/T) AT-114
Parking brake control PB-3
Parking lamp LT-152
PCV (positive crankcase ventilation) EC-468, EC-844
PGC/V - Wiring diagram EC-280
PHASE - Wiring diagram EC-268, EC-652
Piston assembly EM-196
Piston pin inspection EM-196
Piston ring inspection EM-197
PNP/SW - Wiring diagram EC-391
PNPSW1 - Wiring diagram EC-816
POS - Wiring diagram EC-262, EC-645
POWER - Wiring diagram PG-5
Power door lock BL-15
Power socket WW-116
Power steering gear PS-9
Power supply routing PG-4
Power window GW-52, GW-69, GW-72
Precations for Leak detection dye ATC-9, MTC-9
Precautions (General) GI-4
PRGVLV - Wirng diagram EC-802

R

R/FOG - Wiring diagram LT-115
Radiator CO-34
Radiator fan - See Cooling fan CO-36
Radiator(QG) CO-17
Radio - See Audio AV-3
Rain sensor WW-48
Rear axle RAX-5
Rear bumper EI-6
Rear drum brake BR-27
Rear fog lamp LT-100, LT-186

Rear seat SE-11
Rear seat belt SB-4
Rear side window GW-8
Rear suspension RSU-4
Rear washer WW-82
Rear window defogger GW-14
Rear wiper WW-82
Refrigerant connection precaution ATC-4, MTC-4
Refrigerant general precaution ATC-3, MTC-3
Refrigerant lines MTC-61
Refrigerant pressure sensor EC-455, EC-831, MTC-14, MTC-71
Refrigeration cycle MTC-14
Removal and installation (A/T) AT-430
Road wheel size GI-48
Rocker cover EM-138
Roof trim EI-24
RP/SEN - Wiring diagram EC-456, EC-832
RRO2 - Wiring diagram EC-772, EC-787

S

S/LOCK - Wiring diagram BL-33, BL-39, BL-87, BL-94
Seat belt inspection SB-4, MA-41
Seat belt pre-tensioner SB-3
Seat belt pre-tensioner disposal SRS-49
Seat belt, front SB-3
Seat belt, rear SB-4
Seat, front SE-7
Seat, rear SE-11
SEN/PW - Wiring diagram EC-386, EC-723
Sheft warning system BL-222
SHIFT - Wiring diagram AT-419
Shift lock system AT-418
Shift schedule AT-534
Shift solenoid valve A (A/T) .. AT-135, AT-140, AT-152
Shift solenoid valve B (A/T) AT-135, AT-140
Shock absorber (front) FSU-8
Shock absorber (rear) RSU-6
Side air bag SRS-41, SRS-43
Side air bag (satellite) sensor SRS-46
Side curtain air bag SRS-43
Side trim EI-19
Side window - See Rear side window GW-8
SMJ (super multiple junction) PG-103
Spare tire size GI-48
Specification value EC-119, EC-561
Speedometer DI-5
Spiral cable SRS-38
SROOF - Wiring diagram RF-4
SRS - See Supplemental Restraint System SRS-6
SRS - Wiring diagram SRS-11, SRS-12
SRS Trouble diagnoses SRS-8
Stabilizer bar (front) FSU-11
Stall test (A/T) AT-62, AT-269
Standardized relay PG-104
START - Wiring diagram SC-40, SC-42
Starter SC-39
Starting system SC-39
Steering gear and linkage inspection MA-40
Steering linkage PS-9
Steering wheel and column PS-5, PS-7
Steering wheel play PS-5
Steering wheel turning force PS-5
Stop lamp LT-181, LT-186
Stop lamp switch EC-395, EC-726
STOP/L - Wiring diagram LT-181
Sunroof RF-2
Super lock BL-70
Supplemental Restraint System SRS-6
Supplemental restraint system - Wiring diagram SRS-11, SRS-12
Suspension MA-40
Symbols and abbreviations GI-10, GI-22
Symptom matrix chart EC-82, EC-527
SYSTEM BRC-6
System readiness test (SRT) code EC-51

T

Tachometer DI-5
Tail lamp LT-152, LT-186
TAIL/L - Wiring diagram LT-169
TCM circuit diagram AT-14
TCM inspection table AT-104, AT-311
THEFT - Wiring diagram BL-222
Thermo control amp MTC-56
Three way catalyst function EC-273
Three way catalyst precautions GI-5
Throttle control motor relay EC-305, EC-673
Throttle position sensor (TPS) EC-163, EC-221, EC-227, EC-366, EC-372, EC-374, EC-420, EC-585, EC-609, EC-615, EC-703, EC-709, EC-711, EC-751
Throttle valve closed position learning EC-42, EC-503
Tie-rod PS-9
Tie-rod ball joints PS-9
Tightening torque of standard bolts GI-43
Timing belt EM-140
Tire size GI-48
Torque converter installation AT-431, AT-527
Tow truck towing GI-41
TPS1 - Wiring diagram EC-229, EC-617
TPS2 - Wiring diagram EC-165, EC-368, EC-587, EC-705
TPS3 - Wiring diagram EC-223, EC-422, EC-611, EC-753
Tread-FR&RR (Dimensions) GI-48
Trouble diagnoses GI-10
Turbocharger EM-129
Turbocharger precautions GI-6
TURN - Wiring diagram LT-138
Turn signal lamp LT-121, LT-186
Two trip detection logic EC-47, EC-508
Two-pole lift GI-39

V

Vacuum hose (brake system) BR-19

Vacuum hose drawing (Engine control) EC-23, EC-483
Vacuum pump EM-137
Valve clearance EM-161, EM-194
Valve guide EM-192
Valve seat EM-192
Valve spring EM-194
VDC -Wiring diagram BRC-66
Vehicle identification number GI-46
Vehicle recovery (freeing a stuck vehicle) GI-42
Vehicle speed sensor (VSS) EC-284, EC-808
Viscosity number (SAE) MA-19

W

WARN - Wiring diagram DI-66, DI-71
Warning chime DI-81
Warning lamps DI-65
Water pump CO-39
Water temperature (High) warning lamp DI-5
Water temperature (Low) indicator lamp DI-5
Wheel alignment (front) FSU-6
Wheel alignment (rear) RSU-5
Wheel bearing (front) FAX-6
Wheel bearing (rear) RAX-5
Wheel hub (front) FAX-6
Wheel hub (rear) RAX-5
Wheel sensor (VDC) BRC-101
Wheel sensors (ABS) BRC-44
Wheel size GI-48
Wheelbase (Dimensions) GI-48
Width (Dimensions) GI-48
WINDOW - Wiring diagram GW-55
Window antenna AV-15
Window, back GW-10
Window, back door GW-10
Window, door GW-69, GW-72
Window, rear side GW-8
Window, side - See Rear side window GW-8
Windshield GW-4
WIP/R - Wiring diagram WW-100
WIPER - Wiring diagram WW-25
Wiring Diagram (Cell code) list PG-92
Wiring diagrams GI-14

SECTION IP
INSTRUMENT PANEL

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Precautions 2
CLIP AND FASTENER 3
List of Table 3
INSTRUMENT PANEL ASSEMBLY 4
Component Parts Location 4
Removal and Installation 5
WORK ITEM TABLE 5
REMOVAL 5
REMOVAL AND INSTALLATION OF INSTRUMENT PAD 9
REMOVAL AND INSTALLATION OF CONSOLE BOX. 9
CONSOLE BOX 10
Disassembly and Assembly 11
INSTRUMENT PANEL PAD 11
GLOVE BOX COVER ASSEMBLY 11

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004OW

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions

EIS004OX

- Disconnect both battery cables in advance.
- Disconnect air bag system line in advance.
- Never tamper with or force air bag lid open, as this may adversely affect air bag performance.
- Be careful not to scratch pad and other parts.
- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

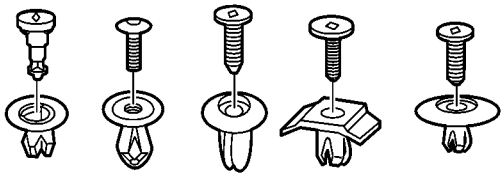
- Do not use any organic solvent, such as thinner or benzine.

CLIP AND FASTENER

PFP:76906

List of Table

EIS004OH

Symbol No.	Shape	Removal and installation
CS101		**Removal:** 1. Screw out with a Phillips screwdriver. 2. Remove female portion with flat-bladed screwdriver. MIIB0017E

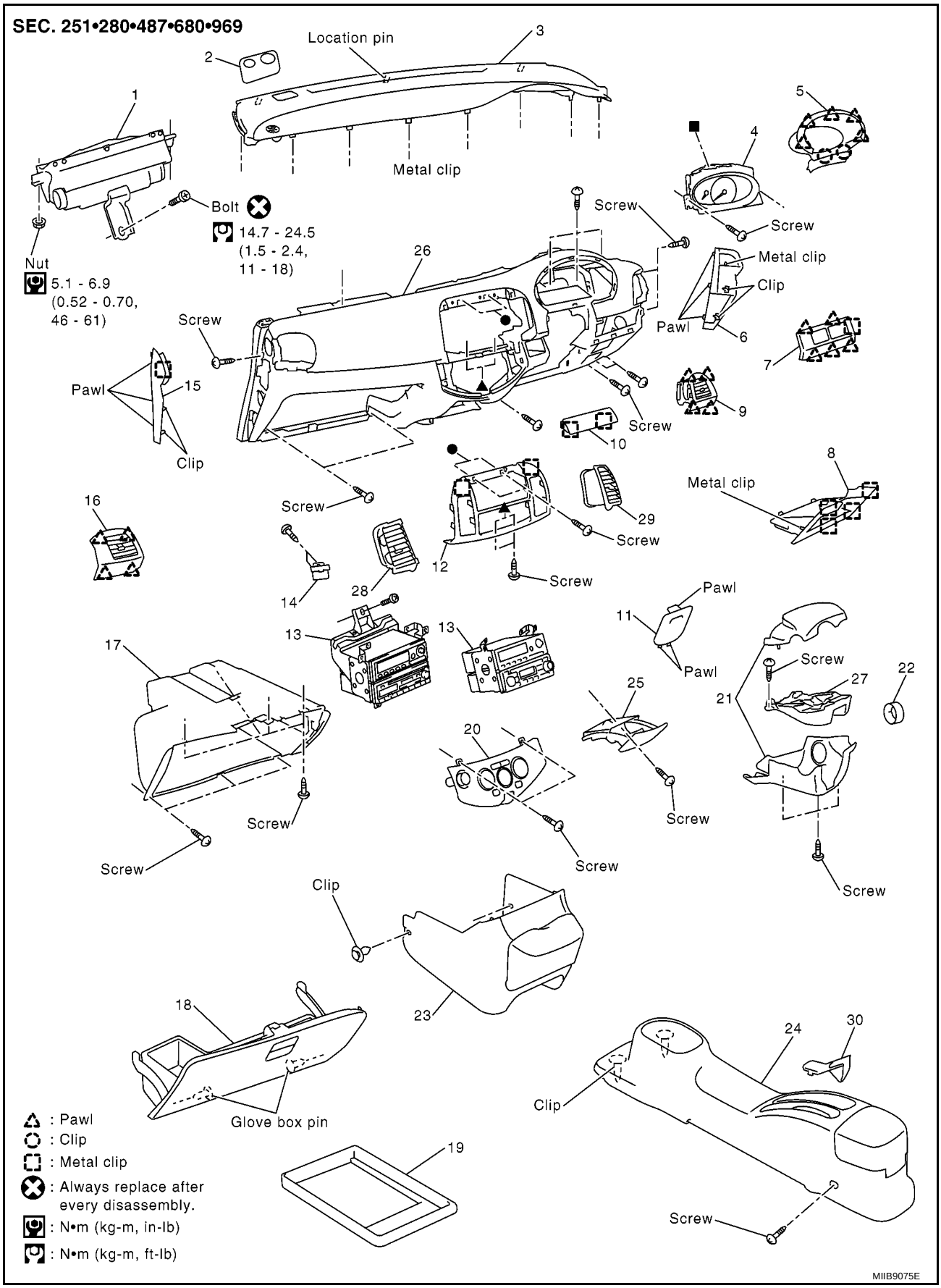
INSTRUMENT PANEL ASSEMBLY

PFP:68200

Component Parts Location

SMA for VIN >SJNxxAK12U1000000

EIS004OI



1. Passenger air bag module
2. Instrument mask
3. Upper instrument panel
4. Combination meter
5. Cluster lid “A”
6. Instrument side mask (RH)
7. Switch panel finisher
8. Instrument panel under tray
9. Side ventilator grille (RH)
10. Instrument finisher
11. Fuse block lid
12. Cluster lid C
13. Audio
14. Glove box striker
15. Instrument side mask (LH)
16. Side ventilator grille (LH)
17. Glove box cover assembly
18. Glove box lid
19. Tray
20. Air conditioner finisher
21. Steering column cover
22. Steering lock escutcheon
23. Instrument panel stay cover
24. Console box
25. Coin holder
26. Instrument panel & pad
27. Steering column protector
28. Central ventilator grille (LH)
29. Central ventilator grille (RH)
30. Console mask

Removal and Installation

EIS004OJ

SMA for VIN >SJNxxAK12U1000000

WORK ITEM TABLE

Component Parts Location		Instrument panel &Brake pad	Instrument pad	Upper instrument panel	Combination meter	Audio, Car-Wings unit
A. Front pillar garnish	IP-5	[1]	[1]	[1]	[1]	[1]Note
B. Upper instrument panel	IP-6	[2]	[2]	[2]	[2]	[2]Note
C. Steering lock escutcheon	IP-6	[3]	[3]			
D. Instrument panel under tray	IP-6	[4]				
E. Switch panel finisher	IP-6	[5]	[4]			
F. Steering column cover	IP-6	[6]	[5]		[3]	
G. Combination switch	IP-6	[7]	[6]			
H. Cluster lid “A”	IP-7	[8]	[7]		[4]	
I. Combination meter	IP-7	[9]	[8]		[5]	
J. Instrument finisher	IP-7	[10]	[9]			[3]
K. Cluster lid C	IP-7	[11]	[10]			[4]
L. Air conditioner finisher	IP-7	[12]				
M. Instrument panel stay cover	IP-8	[13]				
N. Glove box lid	IP-8	[14]	[11]			
O. Glove box cover assembly	IP-8	[15]	[12]			
P. Side ventilator grille	IP-8	[16]	[13]			
Q. Instrument side mask	IP-8	[17]	[14]			
R. Passenger seat air bag module	IP-8	[18]	[15]			
S. Steering wheel	IP-8	[19]				
T. Instrument panel & pad	IP-9	[20]				
U. Instrument pad	IP-9		[16]			

[ ]: The number shows the removal order.

CAUTION:

- **Only applies to combinations of Car-Wings unit and MD/CD integrated AM/FM electronic tuner radio, and of pocket deck and MD/CD integrated AM/FM electronic tuner radio. Other companies can only be removed using procedures [3] and [4].**

REMOVAL

A. Front Pillar Garnish

Refer to EI-19, "BODY SIDE TRIM" in EI section.

B. Upper Instrument Panel

1. Insert a screwdriver wrapped with cloth into the instrument mask back notch to remove the instrument mask. When vehicle has sunload sensor, disconnect the sensor harness. Refer to ATC-67, "SUNLOAD SENSOR" in ATC section.
2. Insert a screwdriver, etc., wrapped with cloth into the upper instrument panel passenger side back edge and disengage metal clips and lift up panel.
3. Hold the lifted up part by hand, remove metal clips engaged in instrument pad, and remove upper instrument panel.

C. Steering Lock Escutcheon

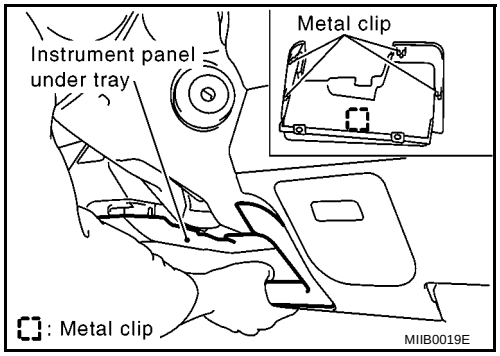
Pull toward vehicle and remove.

CAUTION:

To install, align key cylinder end bottom protrusion with escutcheon inside notch and install.

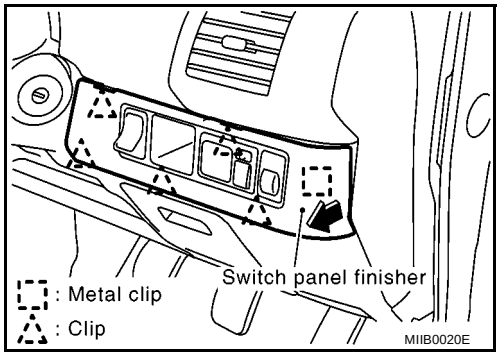
D. Instrument Panel Under Tray

1. Disengage upper metal clips, hold bottom lid by hand, pull panel forward, and disengage metal clips.
2. Remove being careful of interference from surrounding metal objects.



E. Switch Panel Finisher

Hold lid side (arrow area) by hand, disengage metal clips, and then pull forward and disengage plastic clips to remove.



F. Steering Column Cover

Upper

1. To make it easier to remove lower side, face steering pad top downward. (Tilt right side at about 160°)
2. Tilt down steering column and remove screw (1) facing front of vehicle.
3. Disengage hooks and remove.

Lower

- Remove screws (3).

CAUTION:

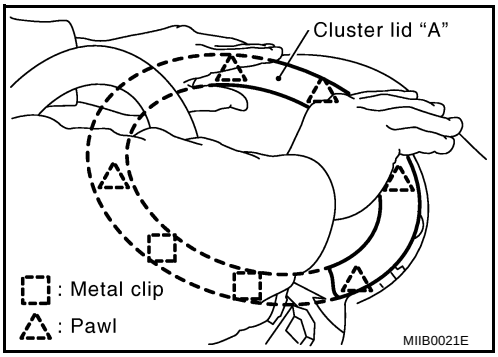
Pull out being careful of interference with surrounding objects.

G. Combination Switch

Refer to LT-187, "LIGHTING AND TURN SIGNAL SWITCH" in LT section and WW-46, "Removal and Installation of Front Wiper and Washer Switch" (models without rain sensor) or WW-80, "Removal and Installation of Front Wiper and Washer Switch" (models with rain sensor) and WW-109, "Removal and Installation of Rear Wiper and Washer Switch" in WW section.

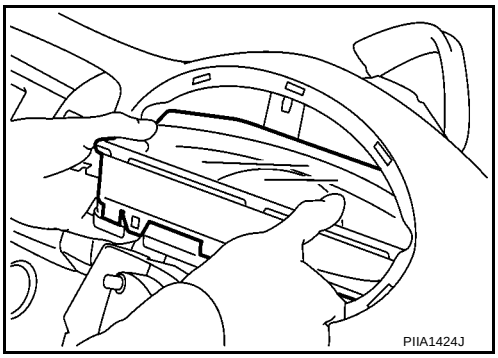
H. Cluster lid “A”

1. Tilt down steering column.
2. Pull cluster lid A forward and remove hooks and mounting clips.
3. While being careful of surrounding interference, remove from steering right side.



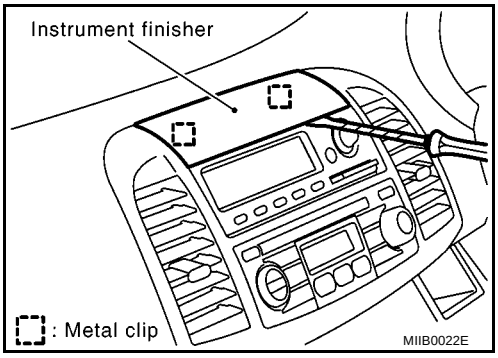
I. Combination Meter

After removing screws, remove harness connector, and then place combination meter top to the rear and remove.



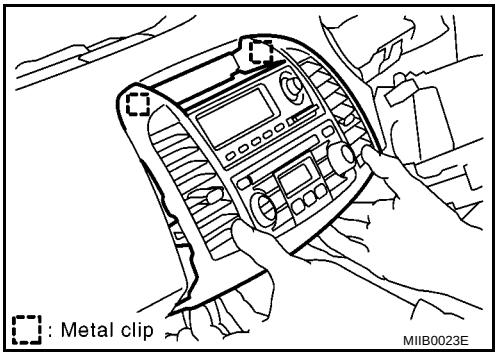
J. Instrument Finisher

- Insert a screwdriver wrapped with tape into the bottom of instrument finisher, and pull up and remove finisher.
- (Vehicles with pocket decks) Open pocket, insert a screwdriver wrapped with tape into the bottom of the instrument finisher at the top, and remove the finisher.



K. Cluster Lid C

1. Remove screws and metal clips, hold lid bottom by hand, and pull straight out.
2. Separate and remove audio harness connector.
3. After removal, separate the center ventilator grille and audio equipment. Refer to ATC-80, "DUCTS AND GRILLES" in ATC section, MTC-57, "DUCTS AND GRILLES" in MTC section, DI-64, "Removal and Installation of Drive Computer" in DI section and AV-12, "Removal and Installation of Audio Unit" in AV section.

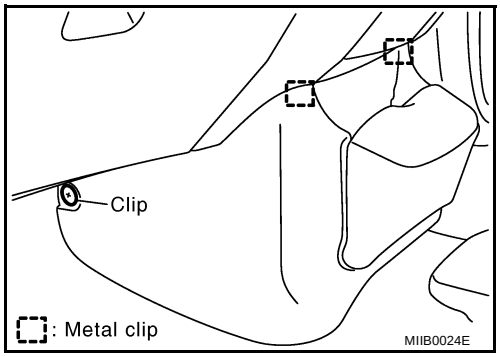


L. Air Conditioner Finisher

Refer to ATC-63, "Removal and Installation" in ATC section and MTC-43, "Removal and Installation" in MTC section.

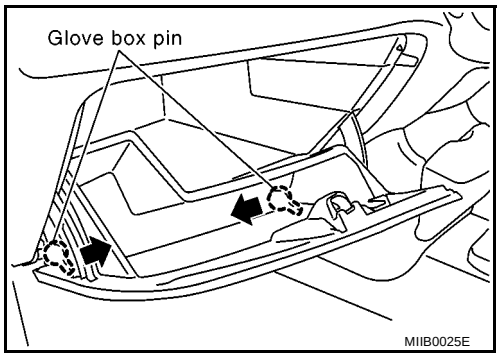
M. Instrument Panel Stay Cover

1. Remove at LH/RH mounting clips.
2. Pull instrument stay cover toward rear of vehicle, disengage metal clips, orient straight above cup holder, and remove.



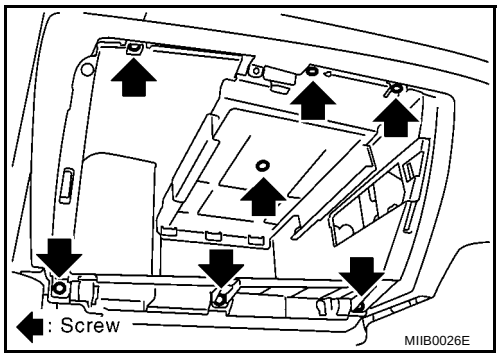
N. Glove Box Lid

1. Remove glove box pin and then remove glove box lid.



O. Glove Box Cover Assembly

1. Pull out tray (only vehicles equipped with tray).
2. Remove screws shown in figure, and then remove glove box cover assembly.
3. After removal, separate parts. Refer to IP-11, "GLOVE BOX COVER ASSEMBLY" in “Disassembly and Assembly”.

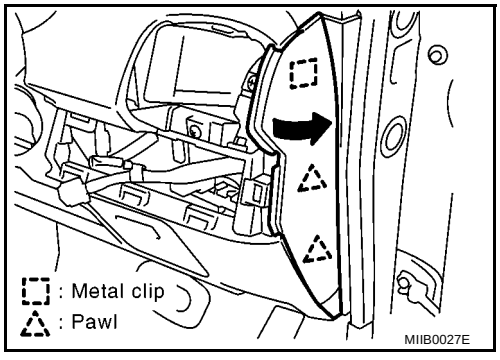


P. Side Ventilator Grille

Refer to ATC-80, "DUCTS AND GRILLES" in ATC section and MTC-57, "DUCTS AND GRILLES" in MTC section.

Q. Instrument Side Mask

1. Rotate instrument side mask to center of vehicle forward insertion area, disengage metal clips and plastic hooks, and remove.
2. Pull out inserted area and remove from vehicle.



R. Passenger Seat Air Bag Module

Refer to SRS-40, "FRONT PASSENGER AIR BAG MODULE" in SRS section.

S. Steering Wheel

Refer to SRS-36, "DRIVER AIR BAG MODULE" and SRS-38, "SPIRAL CABLE" in SRS section.

T. Instrument Panel & Pad

1. Tilt down steering column.
2. Remove screws, and remove instrument panel and pad from passenger door opening.
3. After removal, separate parts. Refer to IP-11, "INSTRUMENT PANEL PAD" in “Disassembly and Assembly”.

U. Instrument Pad

1. Remove instrument pad screws (6).
2. Remove metal clips (4) engaged in instrument panel, and remove instrument pad.

REMOVAL AND INSTALLATION OF INSTRUMENT PAD

Removal

1. Remove front pillar garnish. Refer to IP-5, "A. Front Pillar Garnish" .
2. Remove upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .
3. Remove steering lock escutcheon. Refer to IP-6, "C. Steering Lock Escutcheon" .
4. Remove switch panel finisher. Refer to IP-6, "E. Switch Panel Finisher" .
5. Remove steering column cover. Refer to IP-6, "F. Steering Column Cover" .
6. Remove combination switch. Refer to IP-6, "G. Combination Switch" .
7. Remove cluster lid “A”. Refer to IP-7, "H. Cluster lid “A”" .
8. Remove combination meter. Refer to IP-7, "I. Combination Meter" .
9. Remove instrument panel finisher. Refer to IP-7, "J. Instrument Finisher" .
10. Remove cluster lid “C”. Refer to IP-7, "K. Cluster Lid C" .
11. Remove mask. Refer to IP-7, "L. Air Conditioner Finisher" .
12. Remove glove box lid. Refer to IP-8, "N. Glove Box Lid" .
13. Remove glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
14. Remove side ventilator grille (LH/RH). Refer to IP-8, "P. Side Ventilator Grille" .
15. Remove passenger air bag module. Refer to IP-8, "R. Passenger Seat Air Bag Module" .

Installation

Install in the reverse order of removal.

REMOVAL AND INSTALLATION OF CONSOLE BOX.

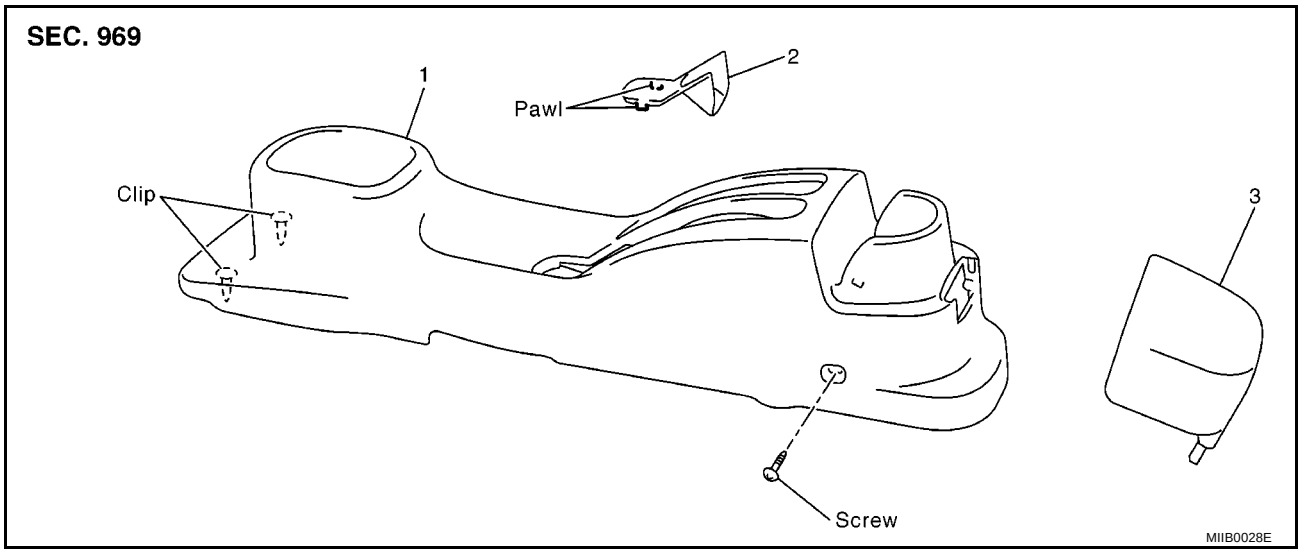
Removal

1. For manual transmission vehicles, remove shift knob from shift lever.
2. Pull up parking brake
3. Remove inside key antenna (center console) (vehicles with key system only) connector from console box.
4. Remove console mask.
5. Move the seat and remove the screws.
6. Lift up the console box and remove the front side clips.

Installation

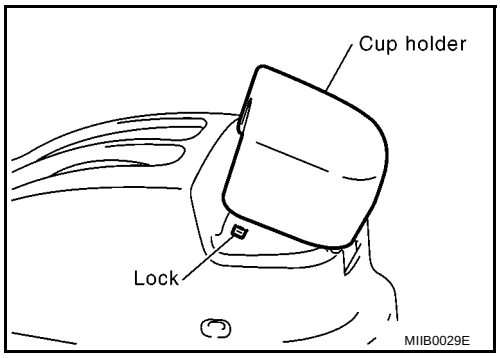
Install in the reverse order of removal.

CONSOLE BOX



1. Console box
2. Console mask
3. Cup holder

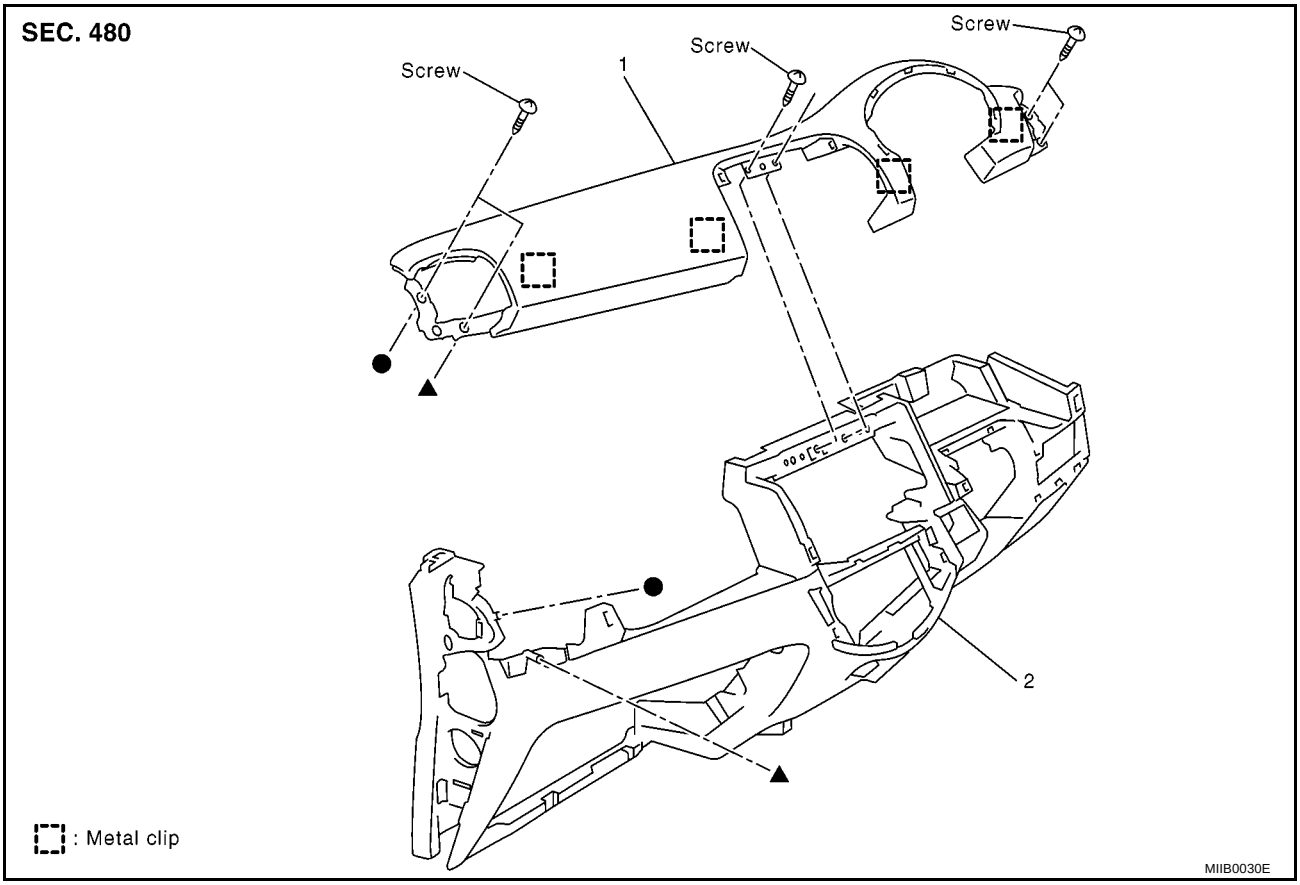
1. Remove console mask. (hooks: 2 locations)
2. Open and secure the cup holder at the position where the lock opens, and then in this state pull it straight up to remove it.



Disassembly and Assembly

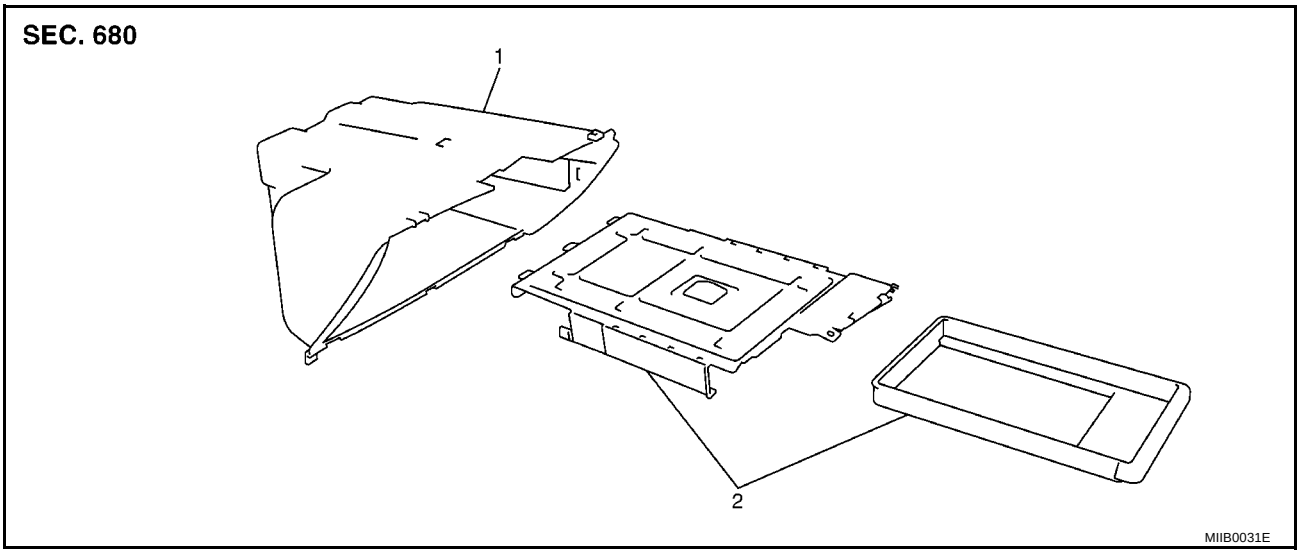
EIS004OK

INSTRUMENT PANEL PAD



1. Instrument pad
2. Instrument panel .

GLOVE BOX COVER ASSEMBLY



1. Glove box cover
2. Tray bracket assembly

SECTION LAN

LAN SYSTEM

CONTENTS

CAN

PRECAUTIONS 4
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 4
Precautions When Using CONSULT-II 4
CHECK POINTS FOR USING CONSULT-II 4
Precautions For Trouble Diagnosis 4
CAN SYSTEM 4
Precautions For Harness Repair 5
CAN SYSTEM 5
Maintenance Information 5
RHD MODELS 5
LHD MODELS 5
CAN COMMUNICATION 6
System Description 6
CAN Communication Unit 6
TYPE 1/TYPE 2 7
TYPE 3/TYPE 4 10
TYPE 5/TYPE 6 12
TYPE 7/TYPE 8 15
TYPE 9/TYPE 10 17
CAN SYSTEM (TYPE 1) 20
System Description 20
Component Parts and Harness Connector Location 20
Wiring Diagram — CAN — 21
Work Flow 23
CHECK SHEET 25
CHECK SHEET RESULTS (EXAMPLE) 27
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 38
ECM Circuit Check 39
Data Link Connector Circuit Check 40
Combination Meter Circuit Check 41
Intelligent Key Unit Circuit Check 42
EPS Control Unit Circuit Check 43
BCM Circuit Check 44
ABS Actuator and Electric Unit (Control Unit) Circuit Check 45
TCM Circuit Check 46
IPDM E/R Circuit Check 47
CAN Communication Circuit Check 48
IPDM E/R Ignition Relay Circuit Check 51
Component Inspection 51
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 51
CAN SYSTEM (TYPE 2) 52
System Description 52
Component Parts and Harness Connector Location 52
Wiring Diagram — CAN — 53
Work Flow 55
CHECK SHEET 57
CHECK SHEET RESULTS (EXAMPLE) 59
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 69
ECM Circuit Check 70
Data Link Connector Circuit Check 71
Combination Meter Circuit Check 72
EPS Control Unit Circuit Check 73
BCM Circuit Check 74
ABS Actuator and Electric Unit (Control Unit) Circuit Check 75
TCM Circuit Check 76
IPDM E/R Circuit Check 77
CAN Communication Circuit Check 78
IPDM E/R Ignition Relay Circuit Check 81
Component Inspection 81
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 81
CAN SYSTEM (TYPE 3) 82
System Description 82
Component Parts and Harness Connector Location 82
Wiring Diagram — CAN — 83
Work Flow 85
CHECK SHEET 87
CHECK SHEET RESULTS (EXAMPLE) 89
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 99
ECM Circuit Check 100
Data Link Connector Circuit Check 101

Combination Meter Circuit Check 102
Intelligent Key Unit Circuit Check 103
EPS Control Unit Circuit Check 104
BCM Circuit Check 105
ABS Actuator and Electric Unit (Control Unit) Circuit Check 106
IPDM E/R Circuit Check 107
CAN Communication Circuit Check 108
IPDM E/R Ignition Relay Circuit Check 111
Component Inspection 111
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 111
CAN SYSTEM (TYPE 4) 112
System Description 112
Component Parts and Harness Connector Location 112
Wiring Diagram — CAN — 113
Work Flow 115
CHECK SHEET 117
CHECK SHEET RESULTS (EXAMPLE) 119
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 128
ECM Circuit Check 129
Data Link Connector Circuit Check 130
Combination Meter Circuit Check 131
EPS Control Unit Circuit Check 132
BCM Circuit Check 133
ABS Actuator and Electric Unit (Control Unit) Circuit Check 134
IPDM E/R Circuit Check 135
CAN Communication Circuit Check 136
IPDM E/R Ignition Relay Circuit Check 139
Component Inspection 139
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 139
CAN SYSTEM (TYPE 5) 140
System Description 140
Component Parts and Harness Connector Location 140
Wiring Diagram — CAN — 141
Work Flow 143
CHECK SHEET 145
CHECK SHEET RESULTS (EXAMPLE) 147
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 158
ECM Circuit Check 159
Data Link Connector Circuit Check 160
Combination Meter Circuit Check 161
Intelligent Key Unit Circuit Check 162
EPS Control Unit Circuit Check 163
BCM Circuit Check 164
ABS Actuator and Electric Unit (Control Unit) Circuit Check 165
TCM Circuit Check 166
IPDM E/R Circuit Check 167
CAN Communication Circuit Check 168
IPDM E/R Ignition Relay Circuit Check 171
Component Inspection 171
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 171
CAN SYSTEM (TYPE 6) 172
System Description 172
Component Parts and Harness Connector Location 172
Wiring Diagram — CAN — 173
Work Flow 175
CHECK SHEET 177
CHECK SHEET RESULTS (EXAMPLE) 179
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 189
ECM Circuit Check 190
Data Link Connector Circuit Check 191
Combination Meter Circuit Check 192
EPS Control Unit Circuit Check 193
BCM Circuit Check 194
ABS Actuator and Electric Unit (Control Unit) Circuit Check 195
TCM Circuit Check 196
IPDM E/R Circuit Check 197
CAN Communication Circuit Check 198
IPDM E/R Ignition Relay Circuit Check 201
Component Inspection 201
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 201
CAN SYSTEM (TYPE 7) 202
System Description 202
Component Parts and Harness Connector Location 202
Wiring Diagram — CAN — 203
Work Flow 205
CHECK SHEET 207
CHECK SHEET RESULTS (EXAMPLE) 209
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 219
ECM Circuit Check 220
Data Link Connector Circuit Check 221
Combination Meter Circuit Check 222
Intelligent Key Unit Circuit Check 223
EPS Control Unit Circuit Check 224
BCM Circuit Check 225
ABS Actuator and Electric Unit (Control Unit) Circuit Check 226
IPDM E/R Circuit Check 227
CAN Communication Circuit Check 228
IPDM E/R Ignition Relay Circuit Check 231
Component Inspection 231
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 231
CAN SYSTEM (TYPE 8) 232
System Description 232
Component Parts and Harness Connector Location 232
Wiring Diagram — CAN — 233
Work Flow 235
CHECK SHEET 237
CHECK SHEET RESULTS (EXAMPLE) 239
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 248
ECM Circuit Check 249
Data Link Connector Circuit Check 250
Combination Meter Circuit Check 251
EPS Control Unit Circuit Check 252

BCM Circuit Check 253
ABS Actuator and Electric Unit (Control Unit) Circuit Check 254
IPDM E/R Circuit Check 255
CAN Communication Circuit Check 256
IPDM E/R Ignition Relay Circuit Check 259
Component Inspection 259
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 259
CAN SYSTEM (TYPE 9) 260
System Description 260
Component Parts and Harness Connector Location 260
Wiring Diagram — CAN — 261
Work Flow 263
CHECK SHEET 265
CHECK SHEET RESULTS (EXAMPLE) 267
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 277
ECM Circuit Check 278
Data Link Connector Circuit Check 279
Combination Meter Circuit Check 280
Intelligent Key Unit Circuit Check 281
EPS Control Unit Circuit Check 282
BCM Circuit Check 283
ABS Actuator and Electric Unit (Control Unit) Circuit Check 284
IPDM E/R Circuit Check 285
CAN Communication Circuit Check 286
IPDM E/R Ignition Relay Circuit Check 289
Component Inspection 289
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 289
CAN SYSTEM (TYPE 10) 290
System Description 290
Component Parts and Harness Connector Location 290
Wiring Diagram — CAN — 291
Work Flow 293
CHECK SHEET 295
CHECK SHEET RESULTS (EXAMPLE) 297
Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit) 306
ECM Circuit Check 307
Data Link Connector Circuit Check 308
Combination Meter Circuit Check 309
EPS Control Unit Circuit Check 310
BCM Circuit Check 311
ABS Actuator and Electric Unit (Control Unit) Circuit Check 312
IPDM E/R Circuit Check 313
CAN Communication Circuit Check 314
IPDM E/R Ignition Relay Circuit Check 317
Component Inspection 317
ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION 317

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS0089Q

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

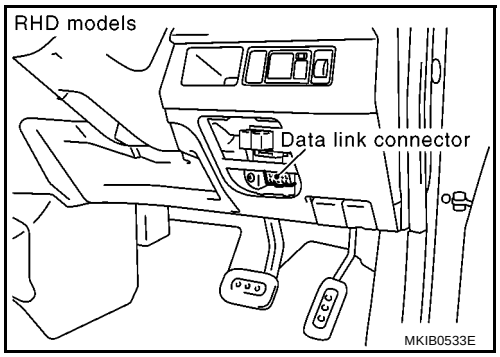
Precautions When Using CONSULT-II

EKS0073H

When connecting CONSULT-II to data link connector, connect them through CONSULT-II CONVERTER.

CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.



CHECK POINTS FOR USING CONSULT-II

1. Has CONSULT-II been used without connecting CONSULT-II CONVERTER on this vehicle?
   - If YES, GO TO 2.
   - If NO, GO TO 5.
2. Is there any indication other than indications relating to CAN communication system in the self-diagnosis results?
   - If YES, GO TO 3.
   - If NO, GO TO 4.
3. Based on self-diagnosis results unrelated to CAN communication, carry out the inspection.
4. Malfunctions may be detected in self-diagnosis depending on control units carrying out CAN communication. Therefore, erase the self-diagnosis results.
5. Diagnose CAN communication system. Refer to LAN-6, "CAN Communication Unit" .

Precautions For Trouble Diagnosis

EKS0073I

CAN SYSTEM

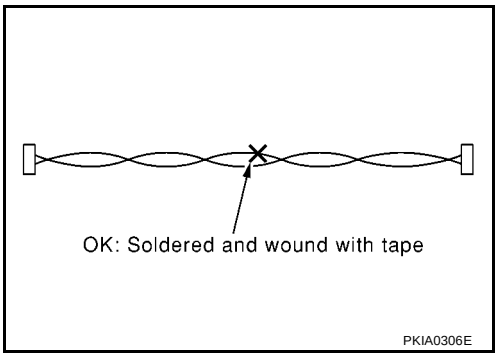
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Be sure to turn ignition switch off and disconnect negative battery terminal before checking the circuit.

Precautions For Harness Repair

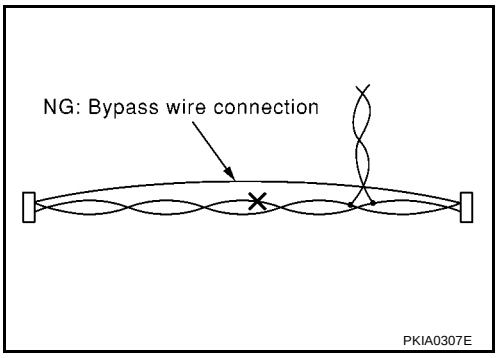
EKS0073J

CAN SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)



Maintenance Information

EKS008WQ

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

CAN COMMUNICATION

PFP:23710

System Description

EKS007UG

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

CAN Communication Unit

EKS007UH

Go to CAN system, when selecting your car model from the following table.

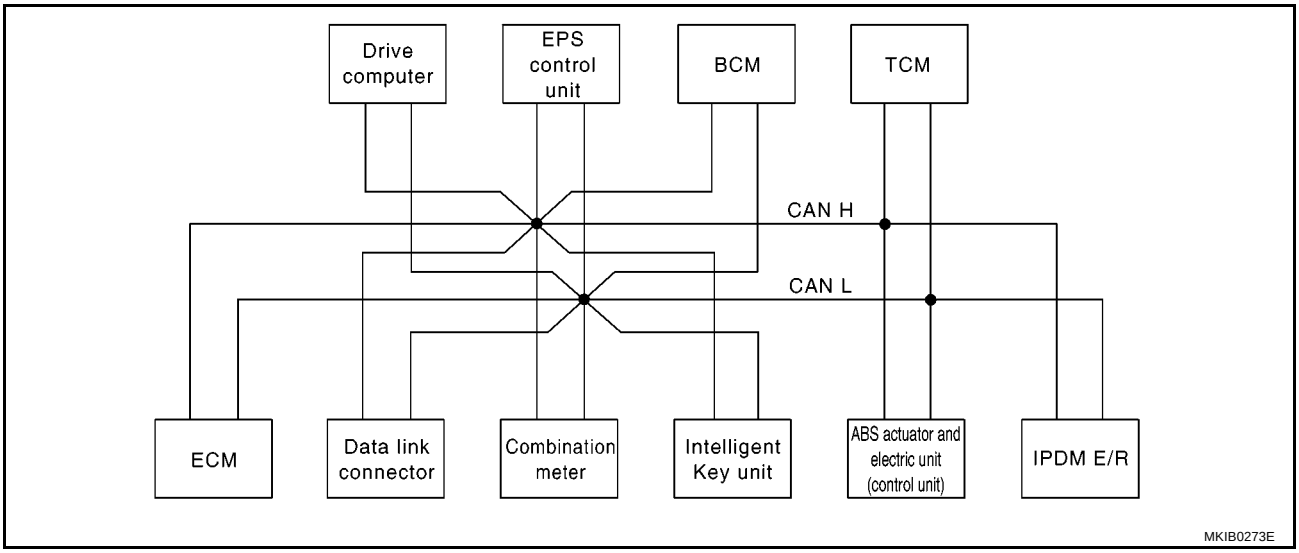
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LAN-7, "TYPE 1/TYPE 2"				LAN-10, "TYPE 3/TYPE 4"				LAN-12, "TYPE 5/TYPE 6"				LAN-15, "TYPE 7/TYPE 8"				LAN-17, "TYPE 9/TYPE 10"			
CAN system trouble diagnosis	LAN-20, "CAN SYSTEM (TYPE 1)"		LAN-52, "CAN SYSTEM (TYPE 2)"		LAN-82, "CAN SYSTEM (TYPE 3)"		LAN-112, "CAN SYSTEM (TYPE 4)"		LAN-140, "CAN SYSTEM (TYPE 5)"		LAN-172, "CAN SYSTEM (TYPE 6)"		LAN-202, "CAN SYSTEM (TYPE 7)"		LAN-232, "CAN SYSTEM (TYPE 8)"		LAN-260, "CAN SYSTEM (TYPE 9)"		LAN-290, "CAN SYSTEM (TYPE 10)"	

×: Applicable

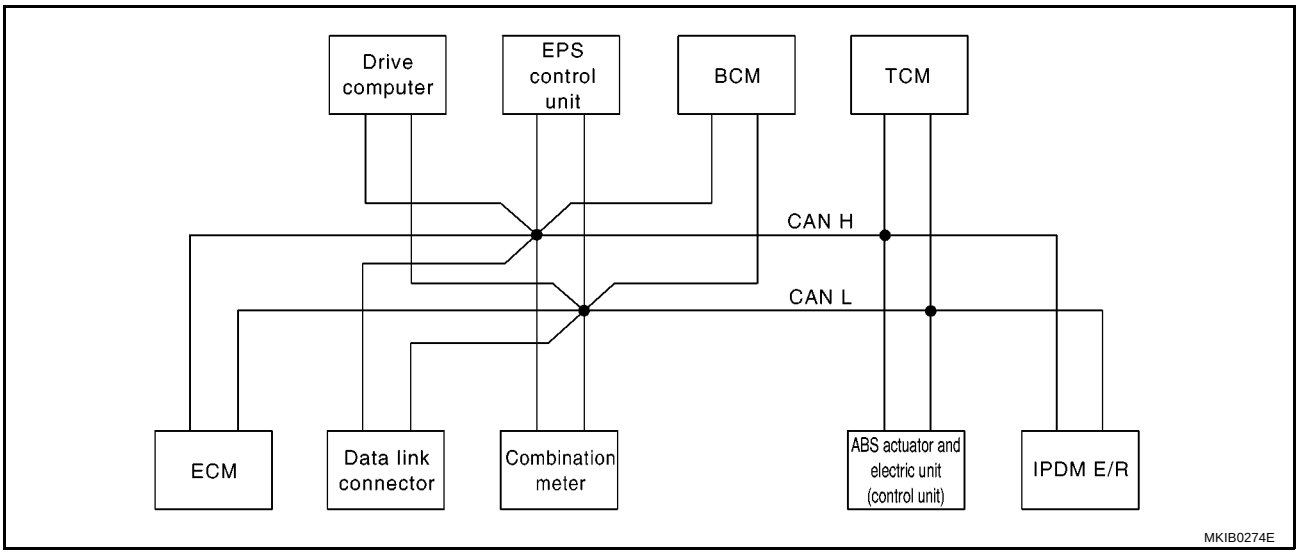
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

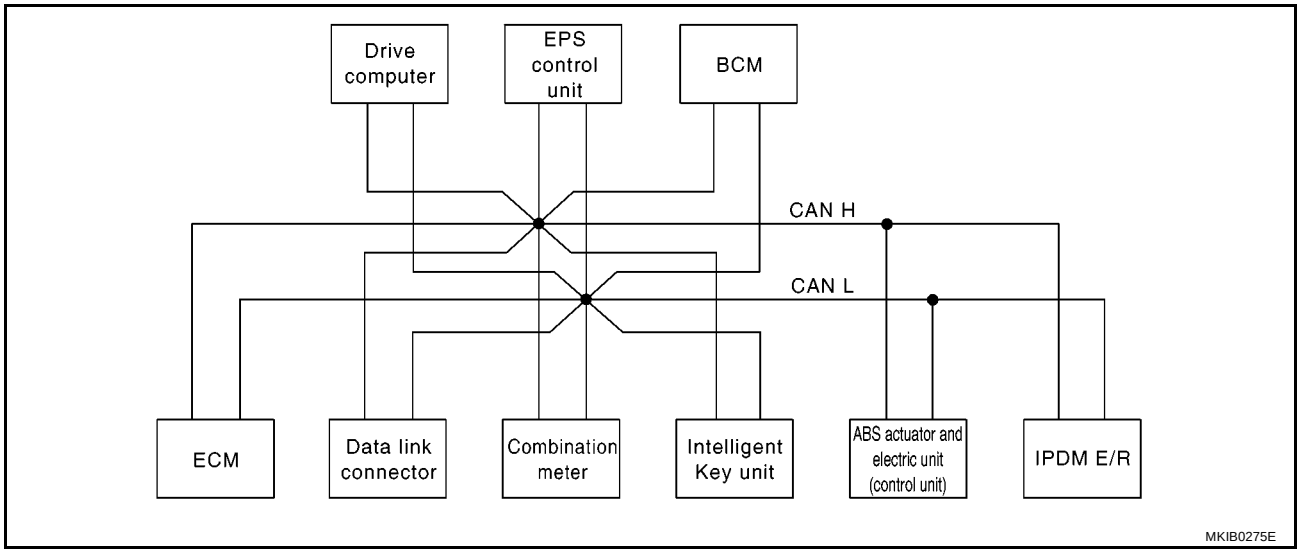
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

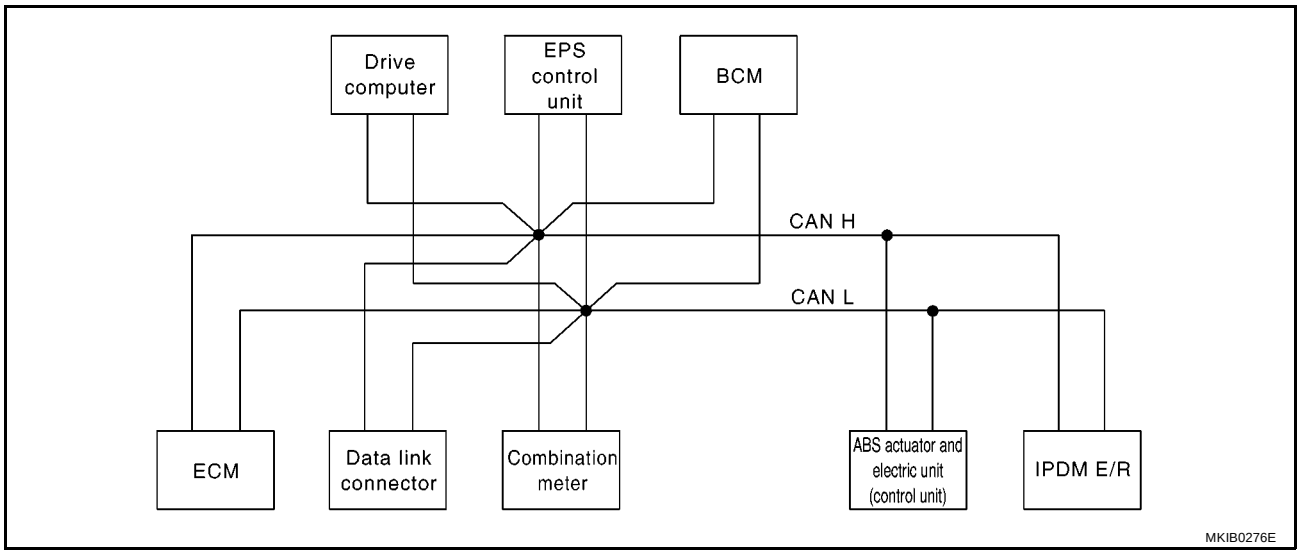
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

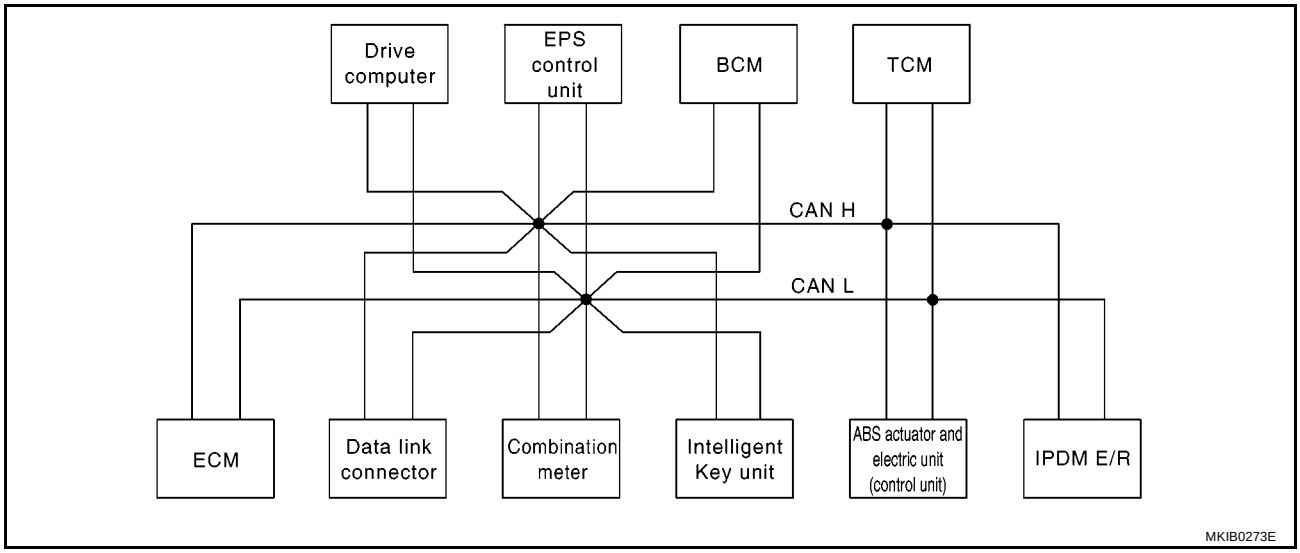
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

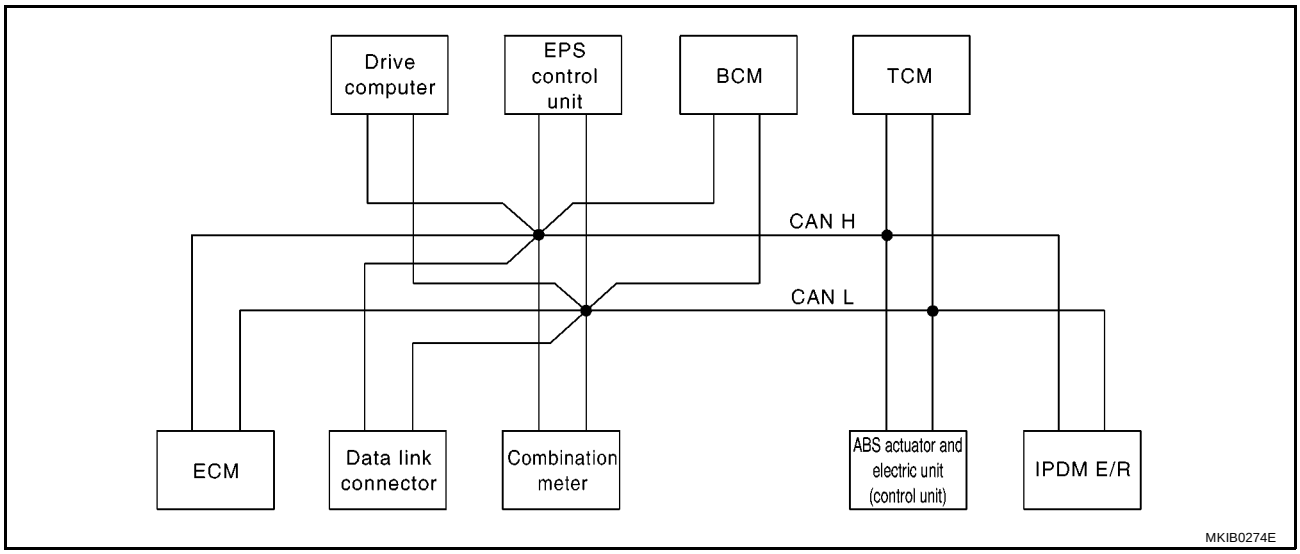
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

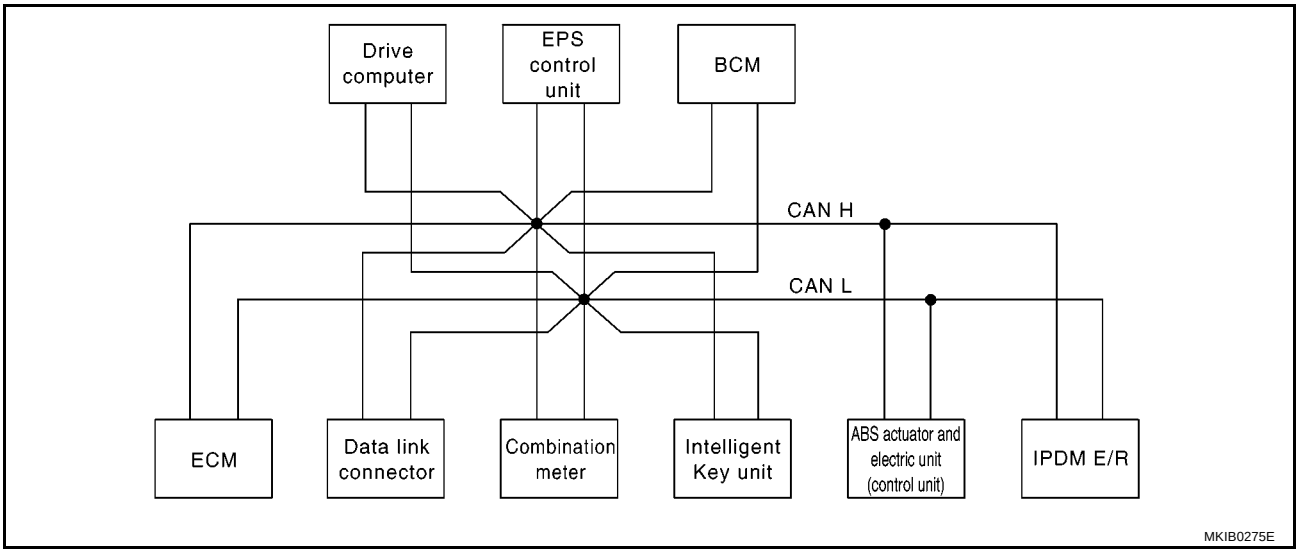
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

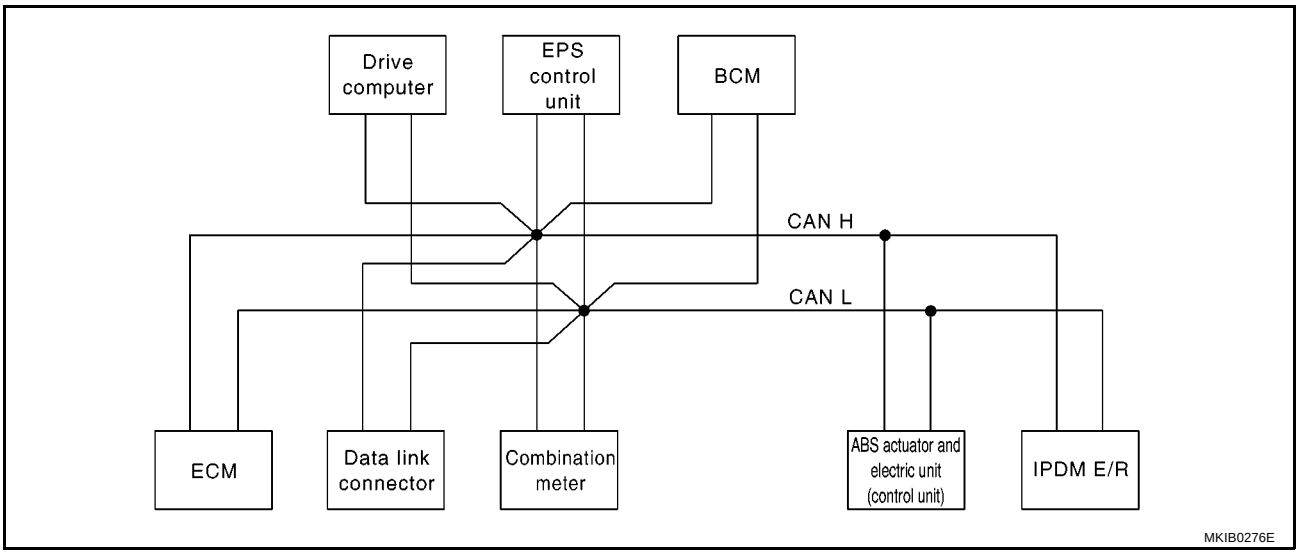
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

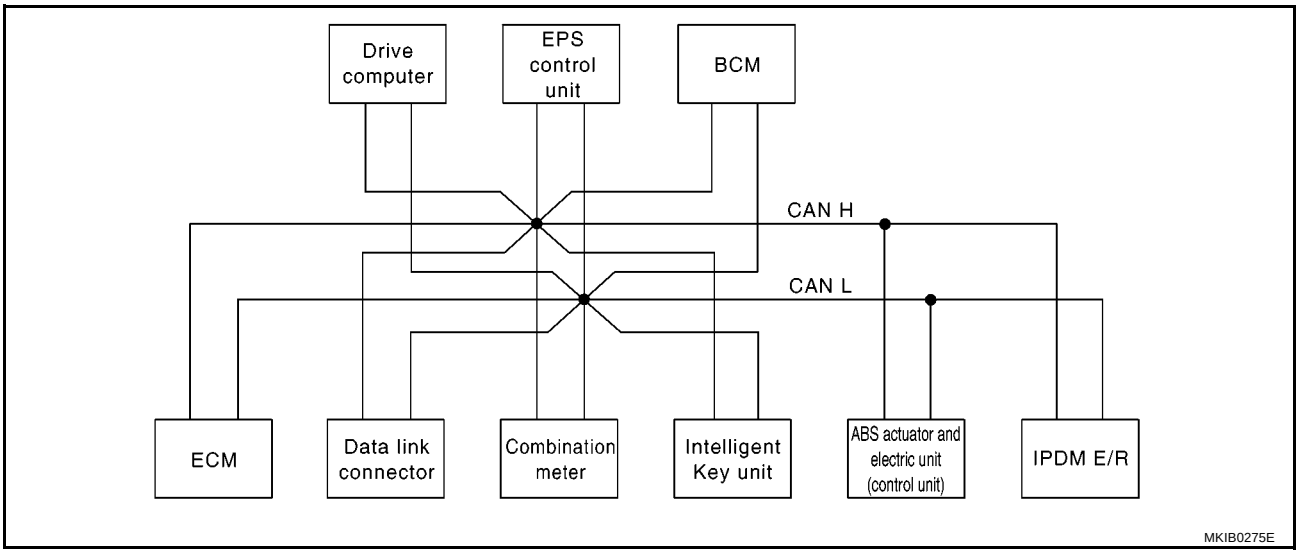
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

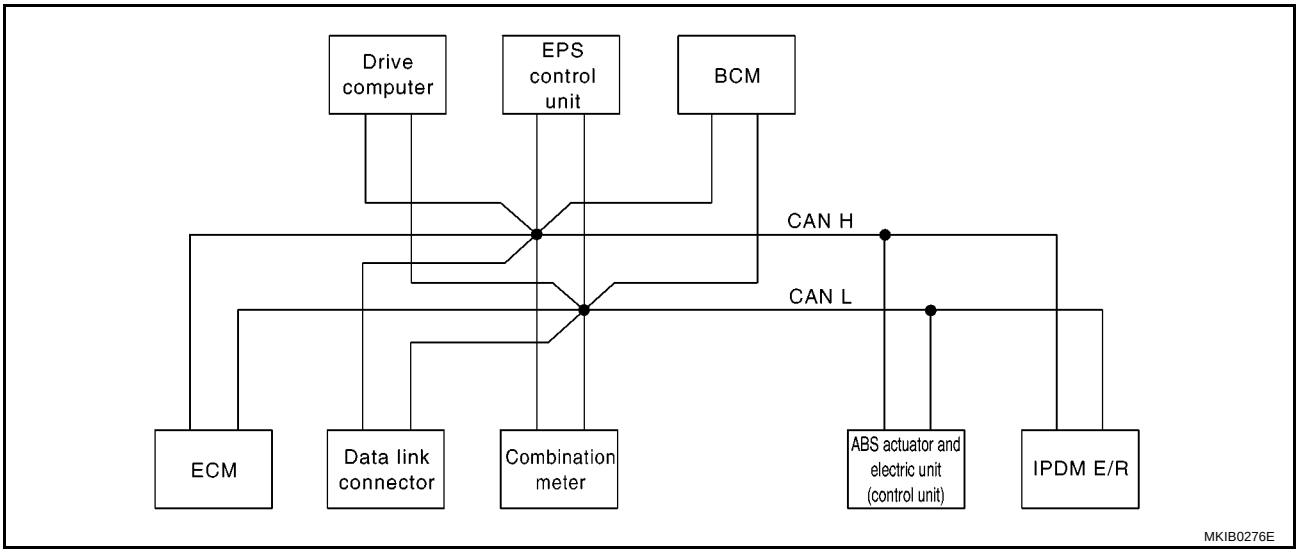
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

CAN SYSTEM (TYPE 1)

PFP:23710

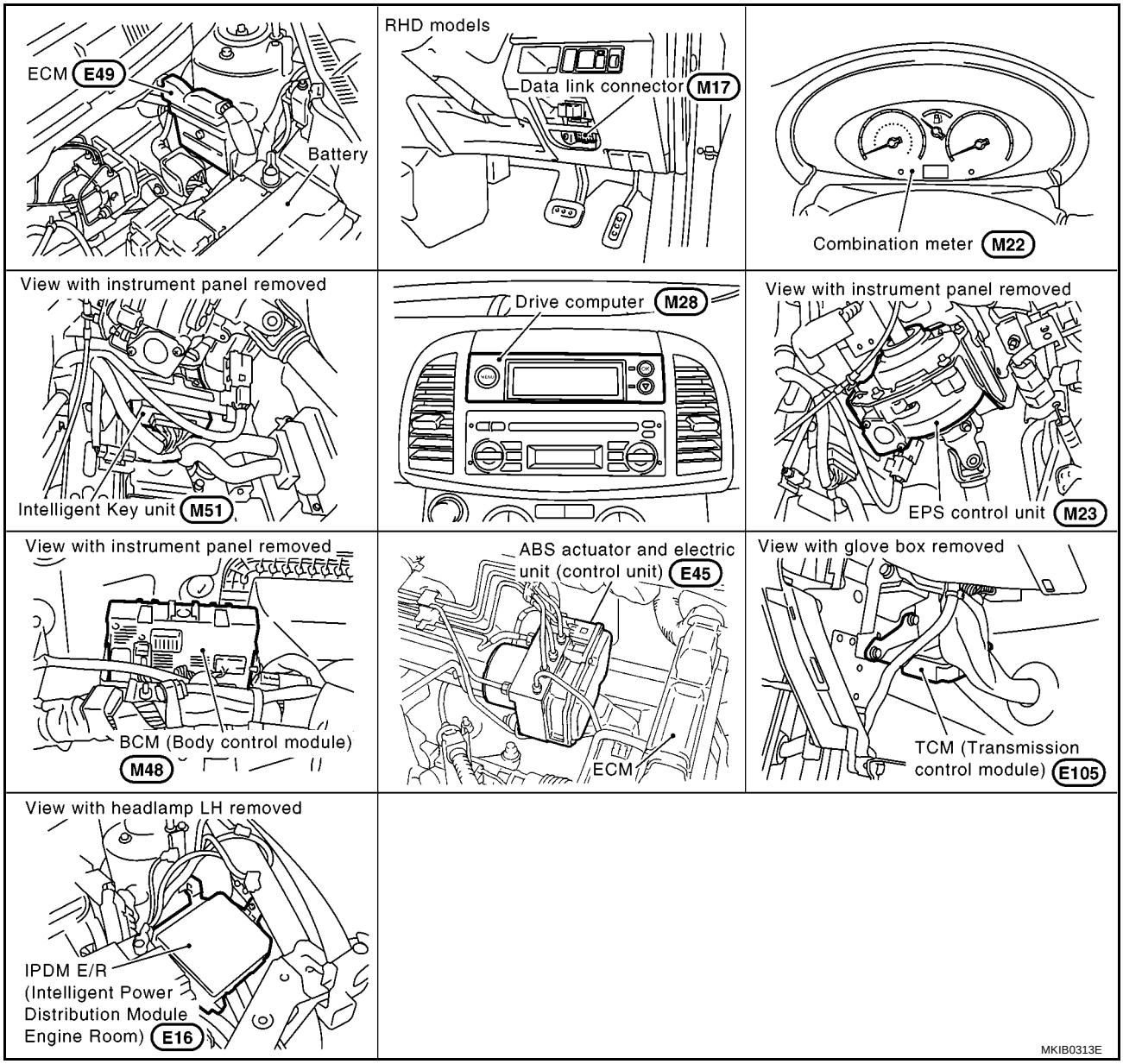
System Description

EKS0073M

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

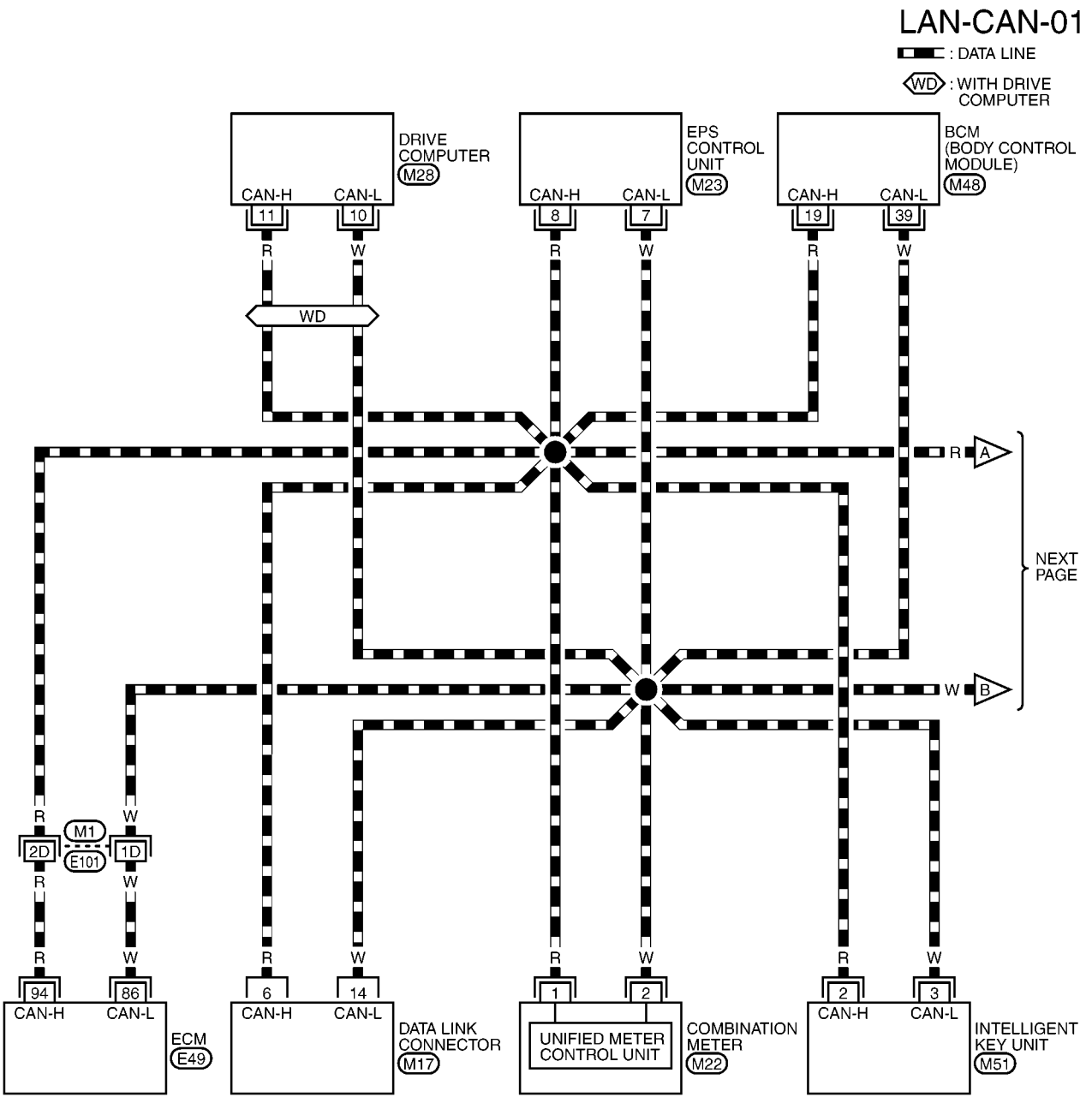
Component Parts and Harness Connector Location

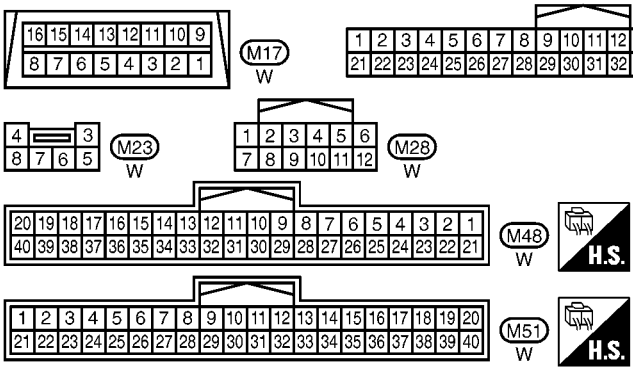
EKS0073N



Wiring Diagram — CAN —

EKS0073O



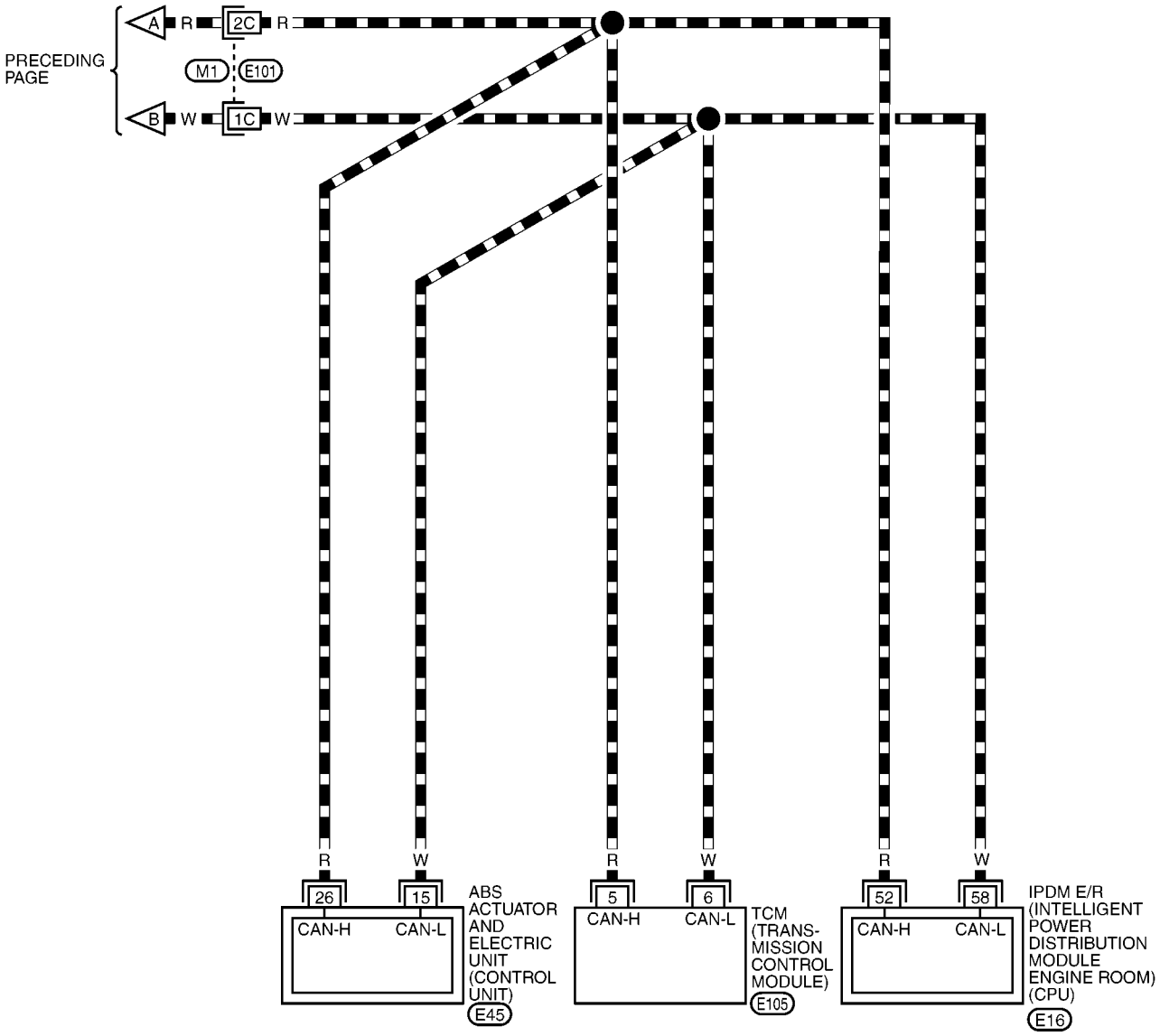


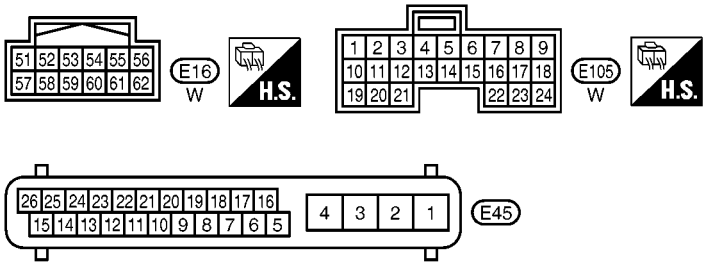
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

MKWA0790E

LAN-CAN-02

: DATA LINE





REFER TO THE FOLLOWING.

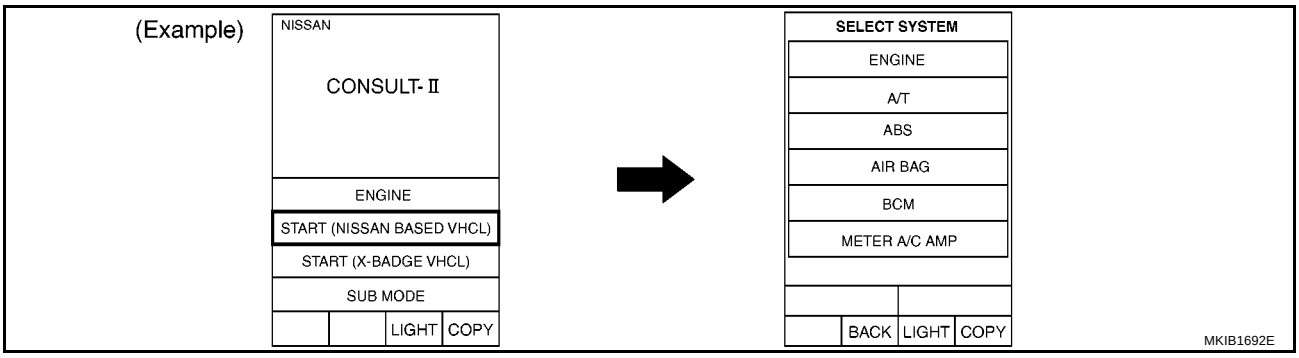
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA0791E

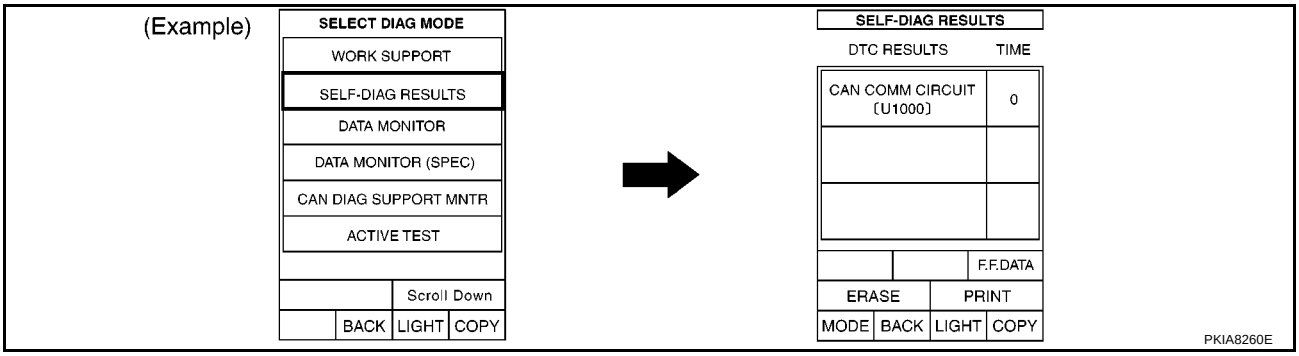
Work Flow

EKS0073P

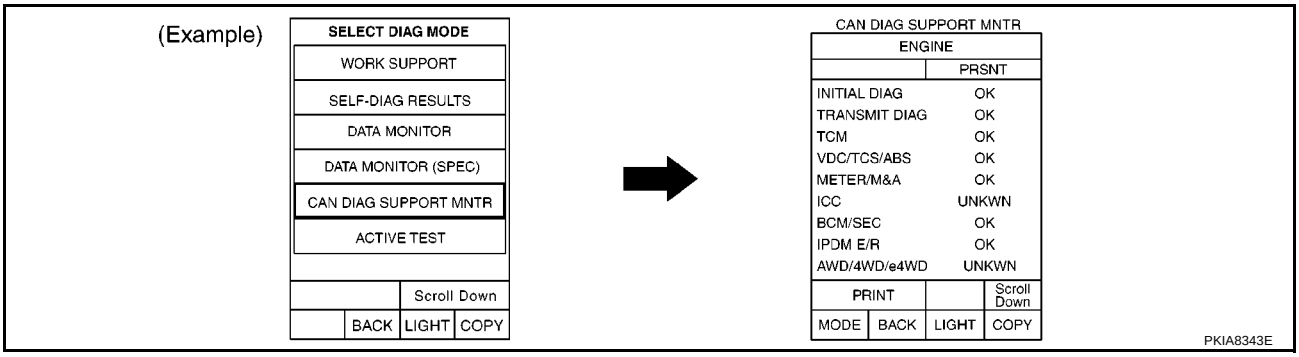
1. When there are no indications of “INTELLIGENT KEY”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.

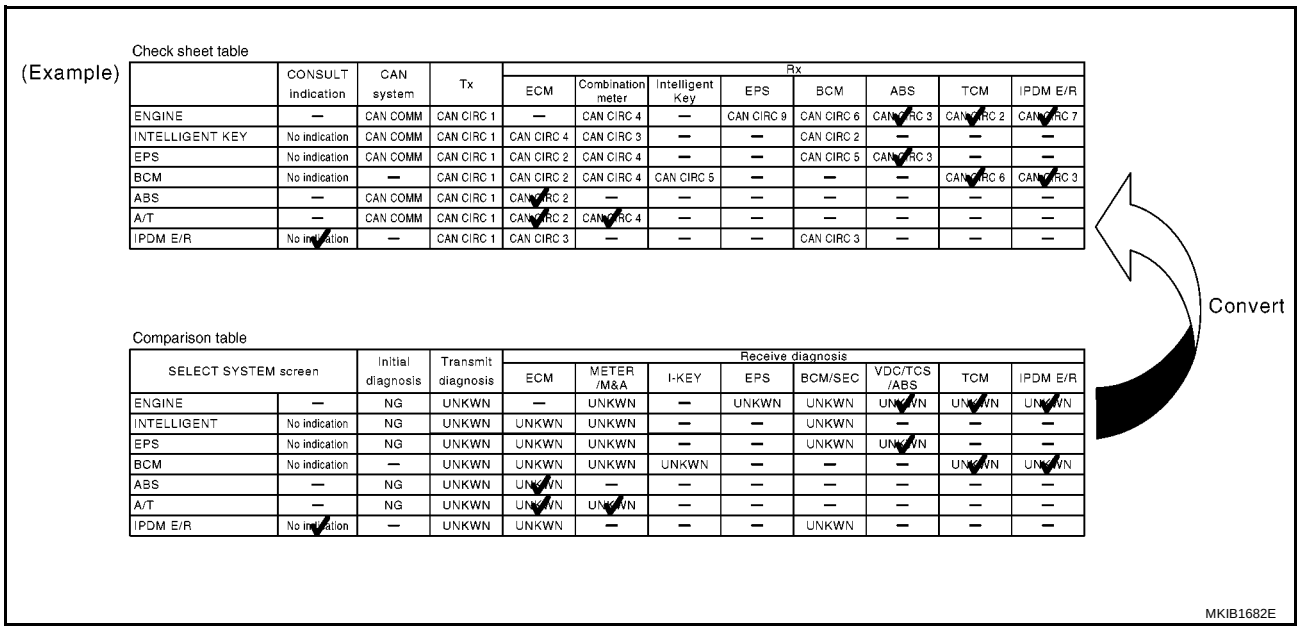


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-25, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-25, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



7. According to the check sheet results (example), start inspection. Refer to LAN-27, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis							
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	—	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	—	—	—
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—	—	—
A/T	—	NG	UNKWN	UNKWN	UNKWN	—	—	—	—	—	—
IPDM E/R	No indication	—	UNKWN	UNKWN	—	—	—	UNKWN	—	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1601E

Attach copy of
ENGINE
SELF-DIAG RESULTS

Attach copy of
INTELLIGENT KEY
SELF-DIAG RESULTS

Attach copy of
EPS
SELF-DIAG RESULTS

Attach copy of
BCM
SELF-DIAG RESULTS

Attach copy of
ABS
SELF-DIAG RESULTS

Attach copy of
A/T
SELF-DIAG RESULTS

Attach copy of
IPDM E/R
SELF-DIAG RESULTS

Attach copy of
ENGINE
DATA MONITOR

Attach copy of
INTELLIGENT KEY
DATA MONITOR

Attach copy of
EPS
DATA MONITOR

Attach copy of
BCM
DATA MONITOR

Attach copy of
ABS
DATA MONITOR

Attach copy of
A/T
DATA MONITOR

Attach copy of
IPDM
DATA MONITOR

MKIB0278E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

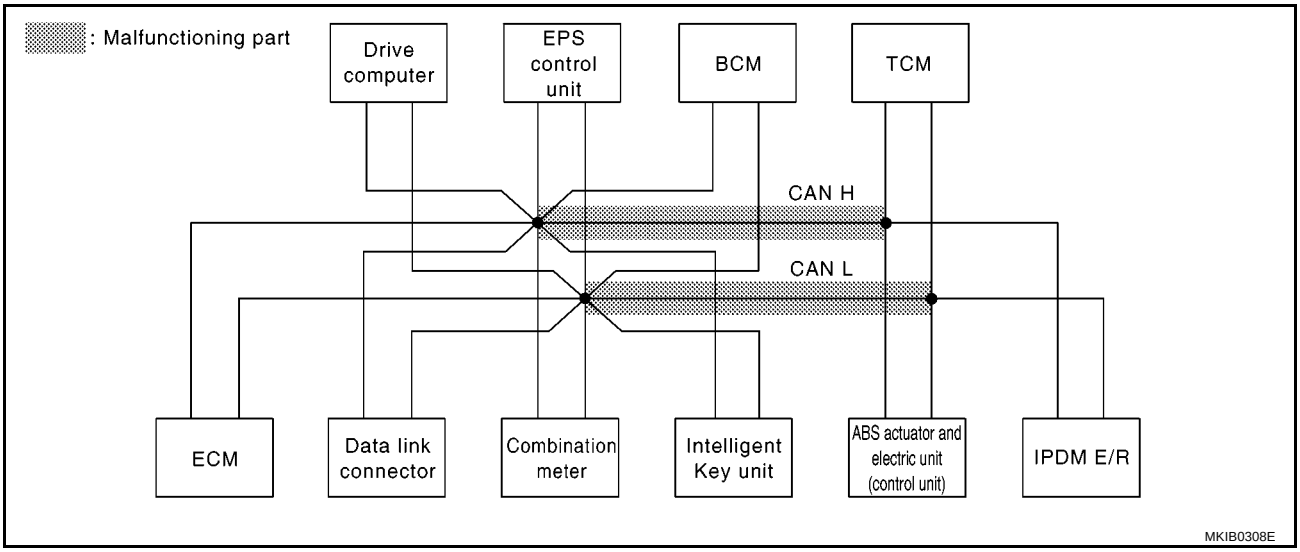
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-38, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6 ✓	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4 ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1611E



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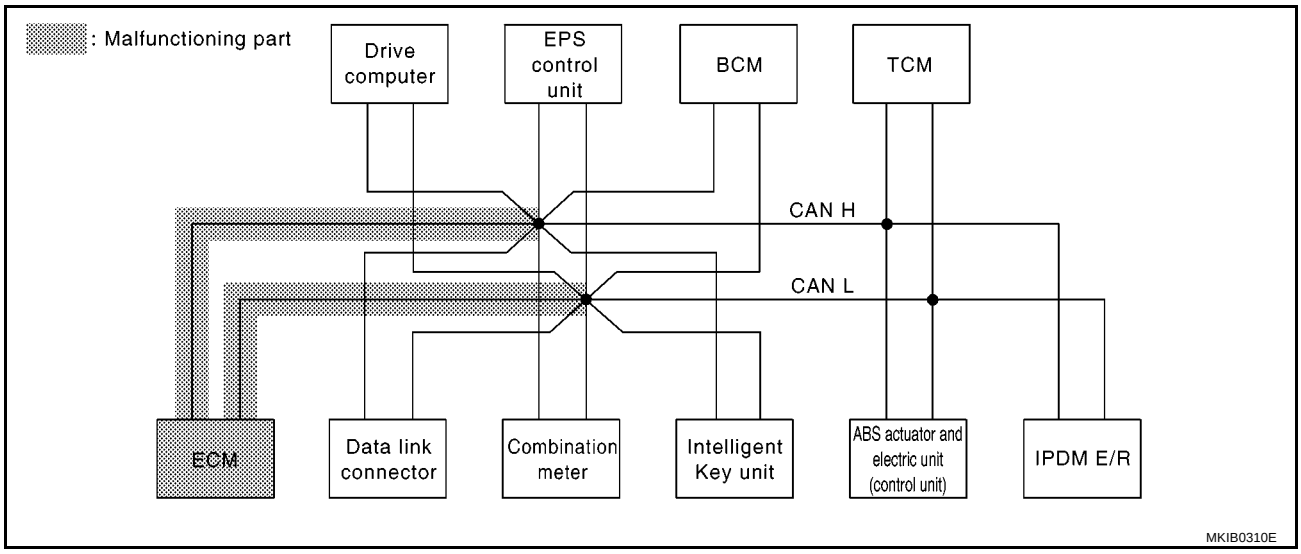
Case 2

Check ECM circuit. Refer to LAN-39, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1612E



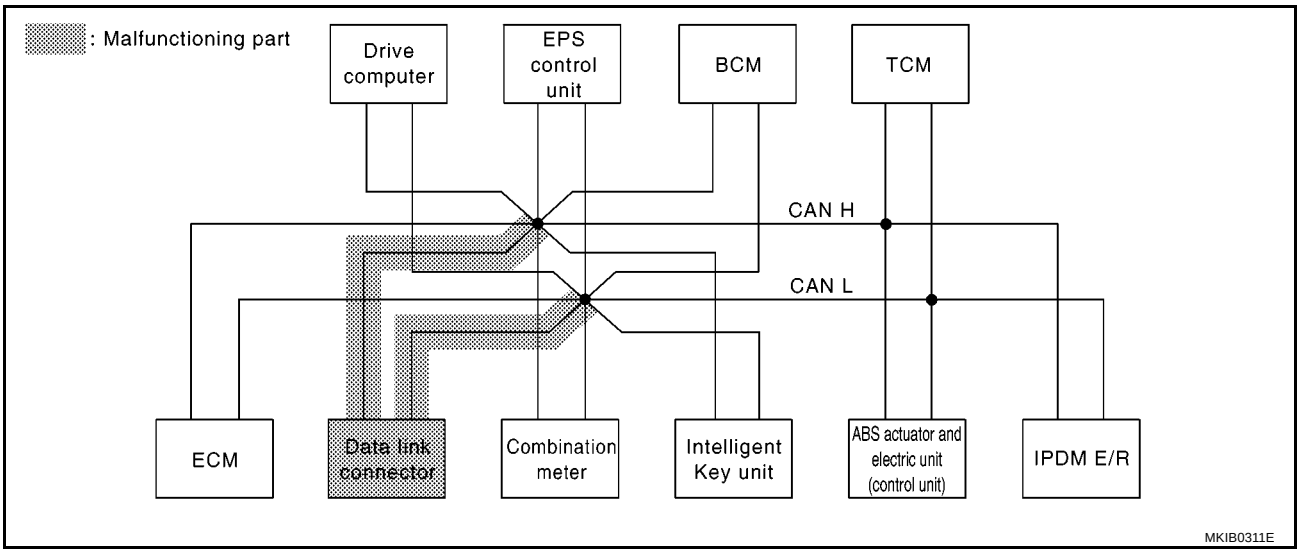
MKIB0310E

Case 3

Check data link connector circuit. Refer to LAN-40, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1613E



MKIB0311E

Case 4

Check combination meter circuit. Refer to LAN-41, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

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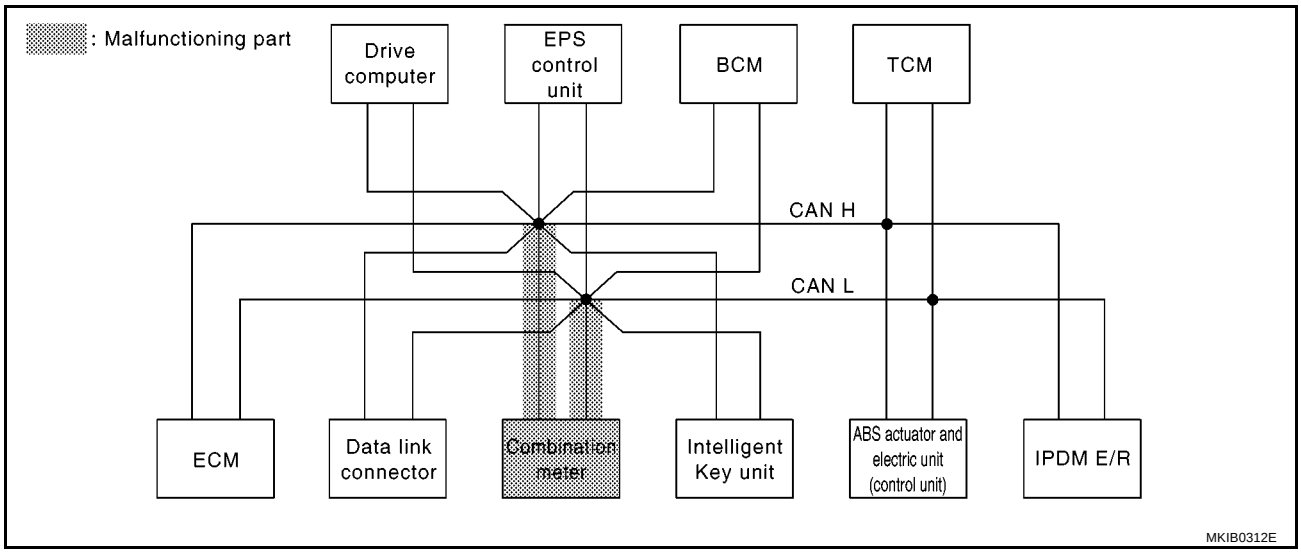


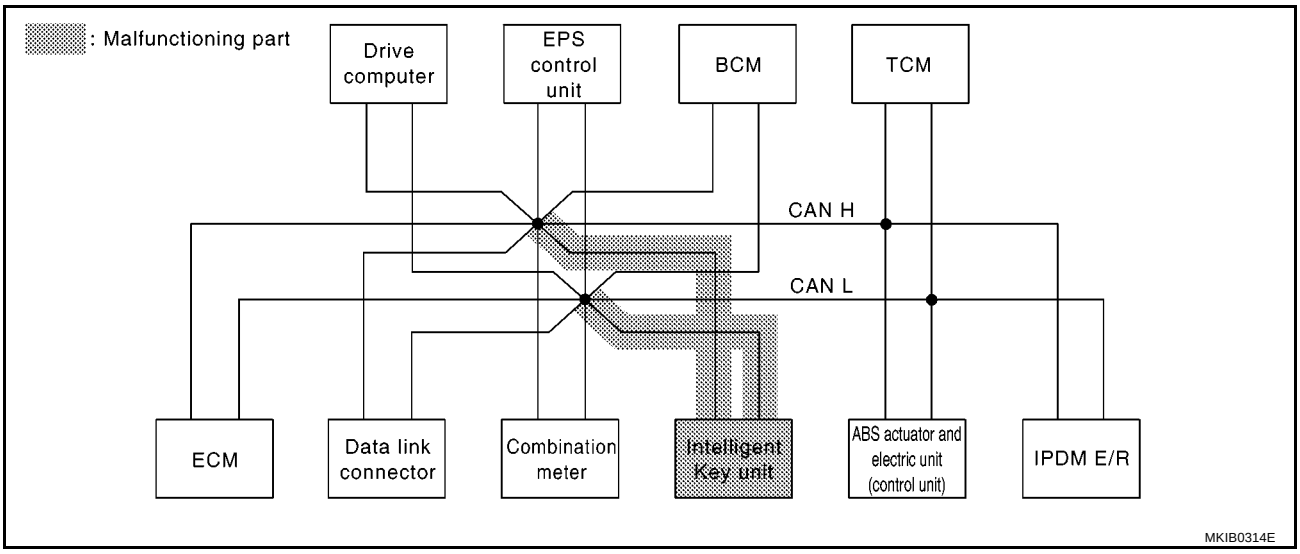
MKIB0312E

Case 5

Check Intelligent Key unit circuit. Refer to LAN-42, "Intelligent Key Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1615E



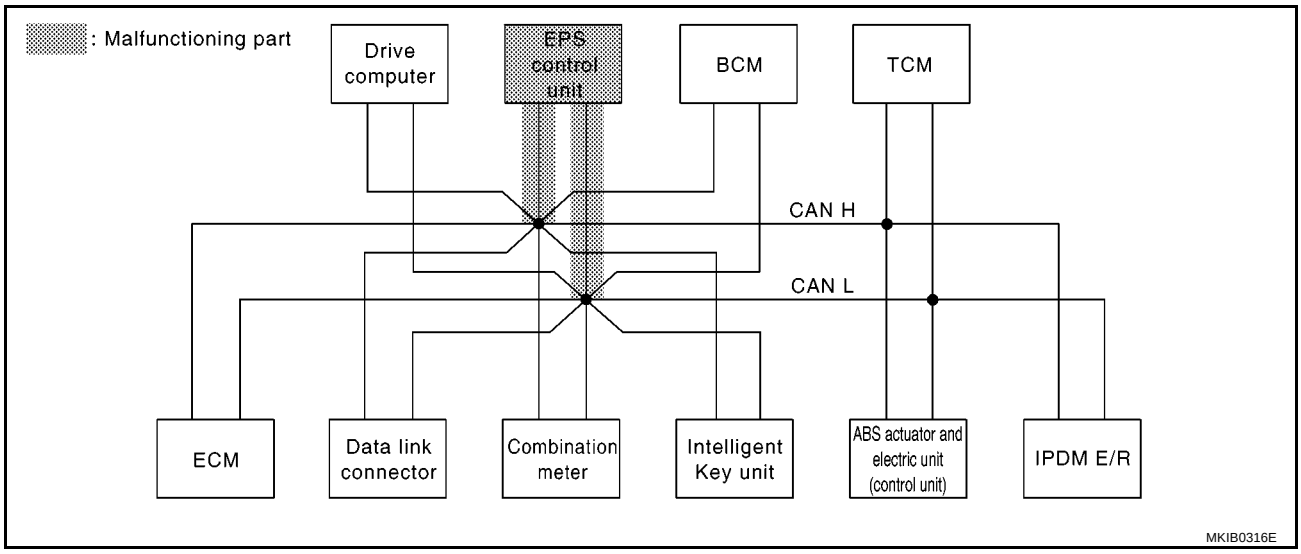
MKIB0314E

Case 6

Check EPS control unit circuit. Refer to LAN-43, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1616E



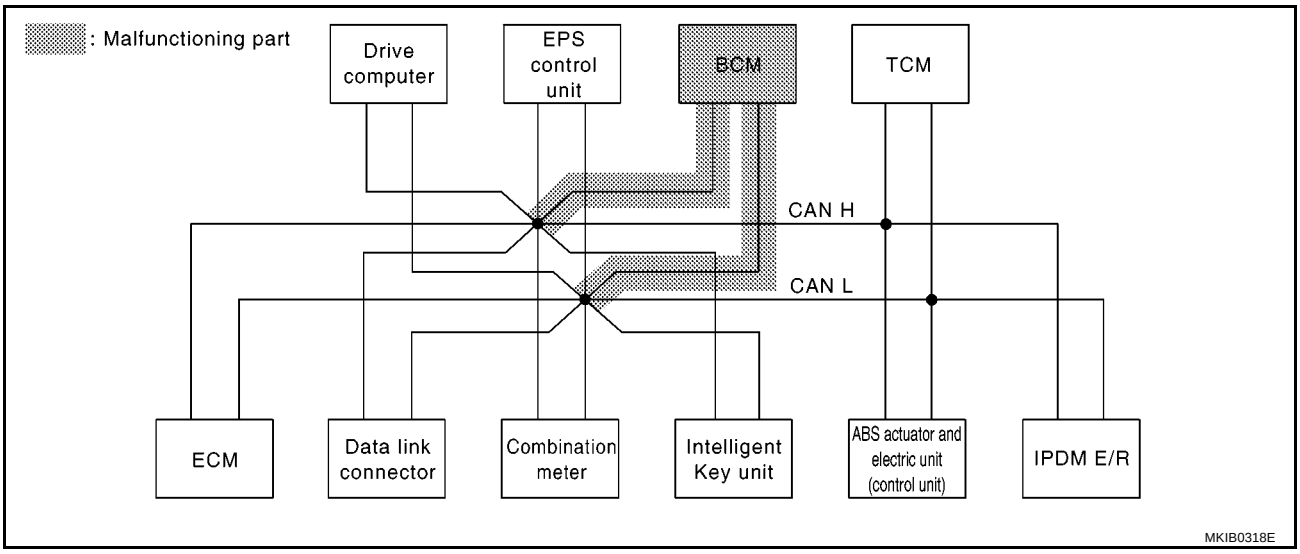
MKIB0316E

Case 7

Check BCM circuit. Refer to LAN-44, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6 ✔	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2 ✔	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5 ✔	CAN CIRC 3	—	—
BCM	No indication ✔	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3 ✔	—	—	—

MKIB1617E

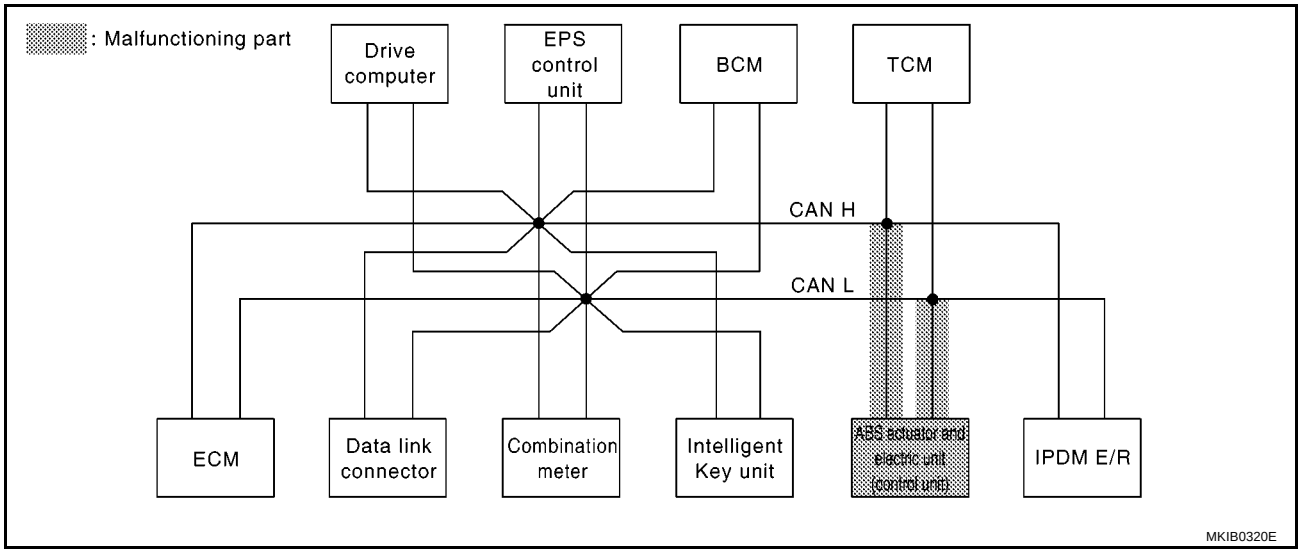


Case 8

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-45, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1618E



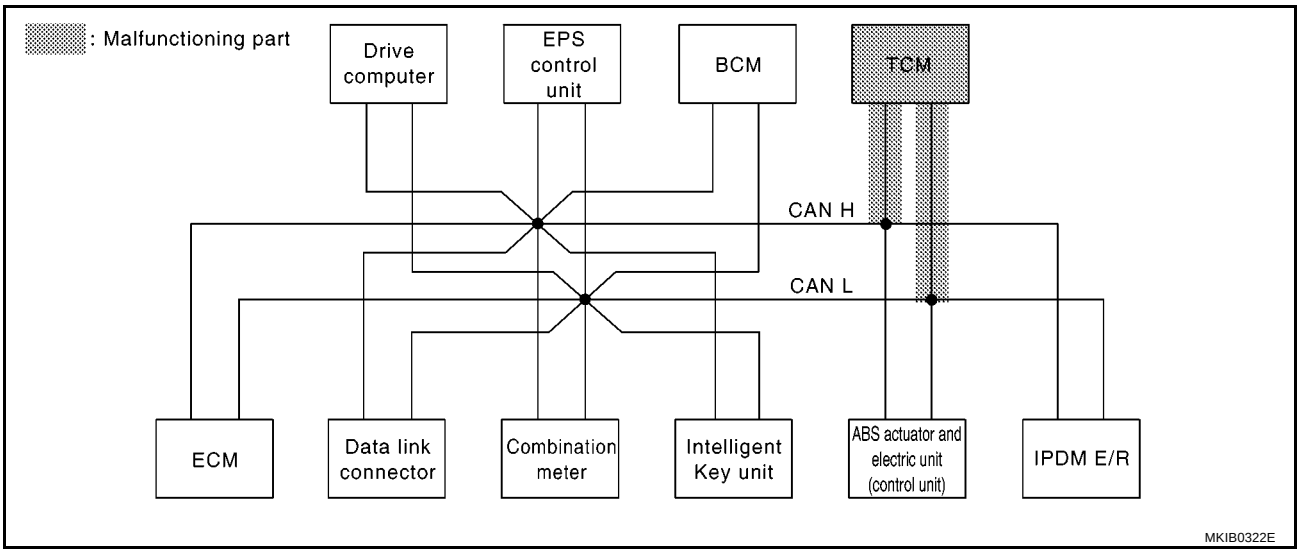
MKIB0320E

Case 9

Check TCM circuit. Refer to LAN-46, "TCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1619E



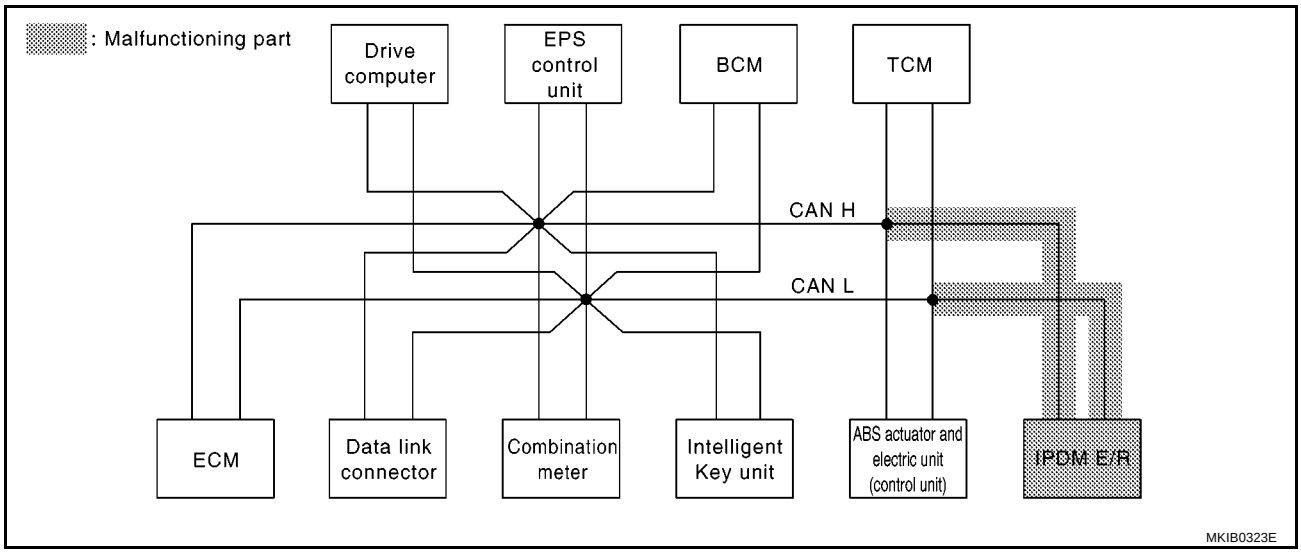
MKIB0322E

Case 10

Check IPDM E/R circuit. Refer to LAN-47, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1620E



MKIB0323E

Case 11

Check CAN communication circuit. Refer to LAN-48, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1621E

Case 12

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-51, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1623E

Case 13

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-51, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—	—

MKIB1622E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS0073Q

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

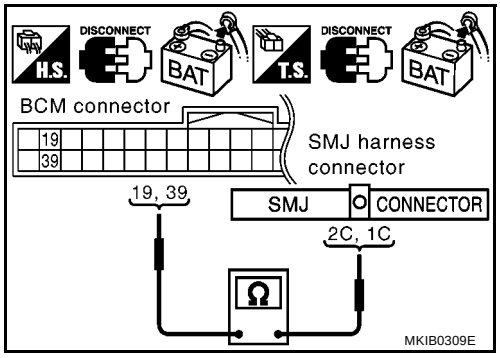
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



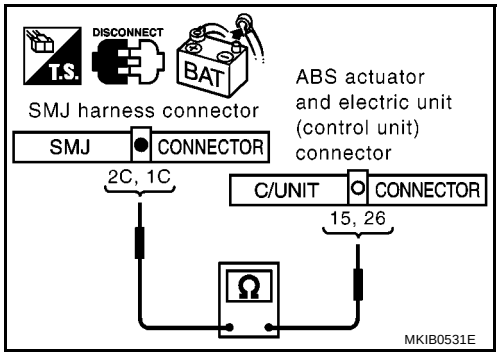
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-23, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS0073U

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

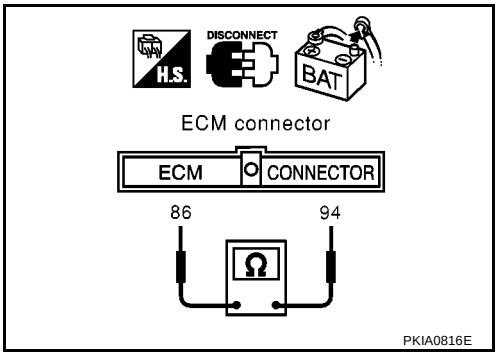
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS0073W

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check date link connector and terminals for damage, bend and loose connection (connector side and harness side).

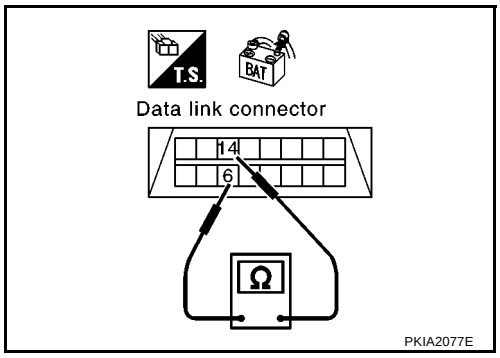
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-23, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS0073X

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

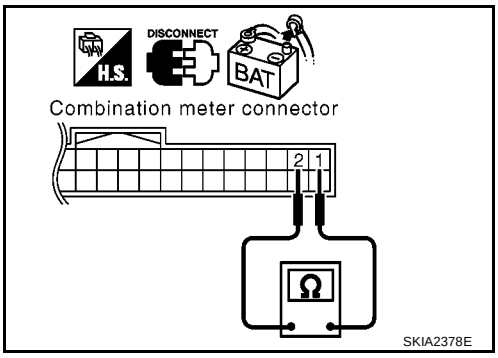
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

Intelligent Key Unit Circuit Check

EKS007XM

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of Intelligent Key unit for damage, bend and loose connection (control unit side and harness side).

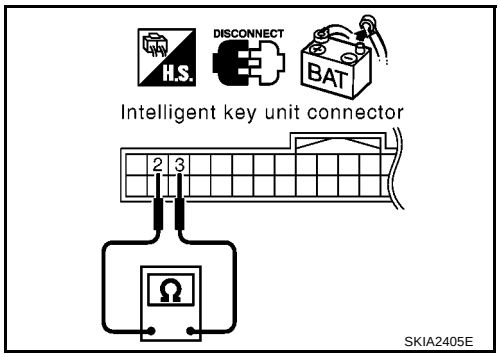
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check resistance between Intelligent Key unit harness connector M51 terminals 2 (R) and 3 (W).

2 (R) – 3 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair harness between Intelligent Key unit and data link connector.

EPS Control Unit Circuit Check

EKS007XN

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

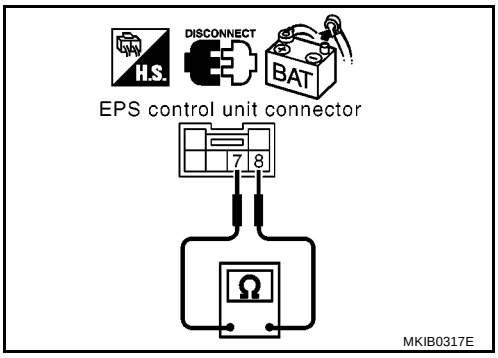
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS0073Y

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

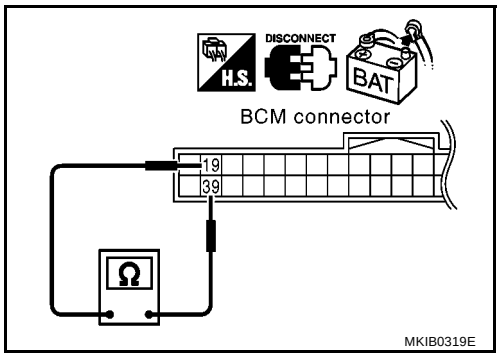
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS0073Z

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

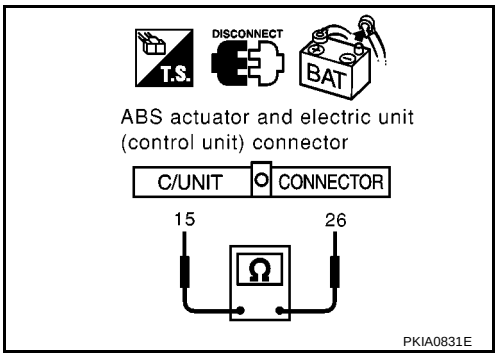
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and TCM.

TCM Circuit Check

EKS0073V

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

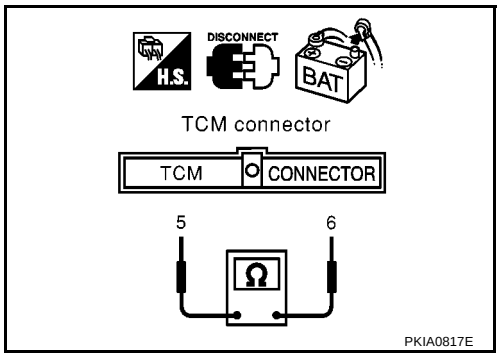
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector E105 terminals 5 (R) and 6 (W).

5 (R) – 6 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and IPDM E/R.

IPDM E/R Circuit Check

EKS00740

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

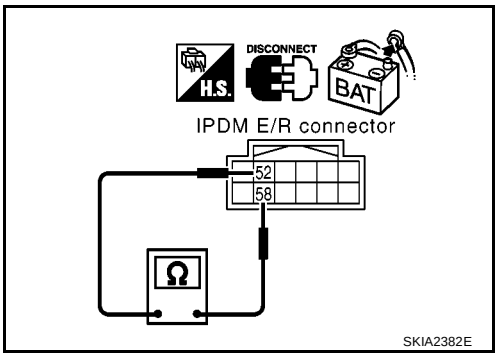
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and TCM.

CAN Communication Circuit Check

EKS00741

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Intelligent Key unit
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- TCM
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

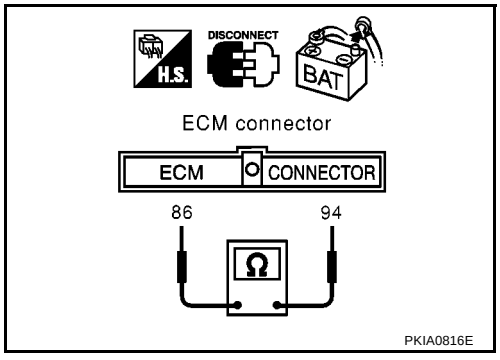
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



3. CHECK HARNESS FOR SHORT CIRCUIT

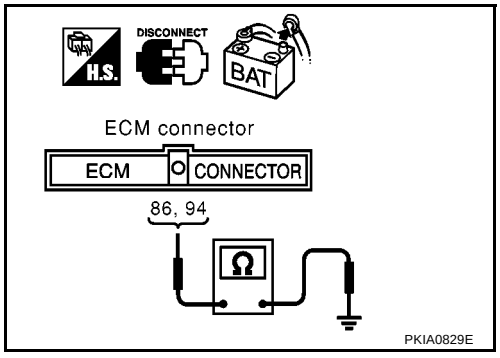
Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.

86 (W) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.

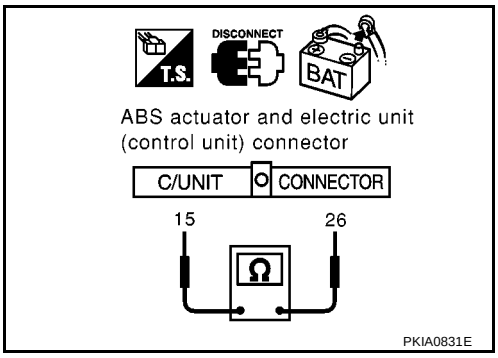


4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- TCM connector
- IPDM E/R connector

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

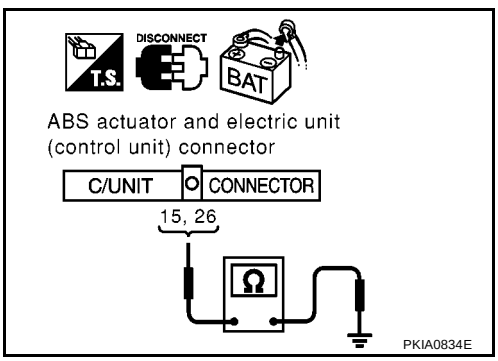
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.

15 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 6.

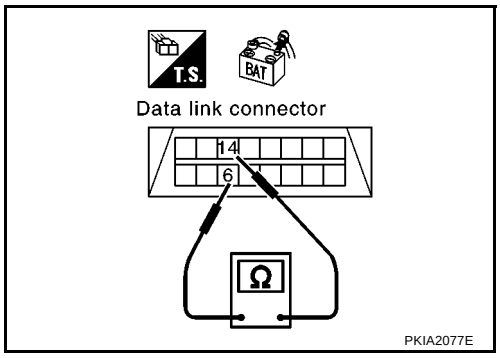
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



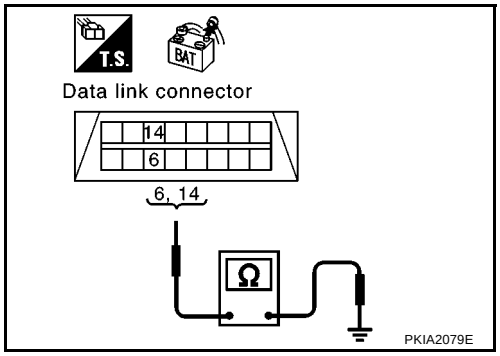
OK or NG

OK >> GO TO 7.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-51, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-23, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00742

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

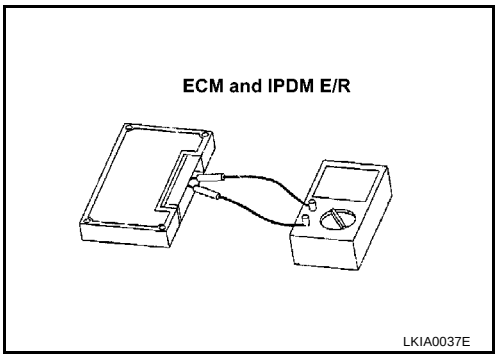
Component Inspection

EKS00743

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 2)

PFP:23710

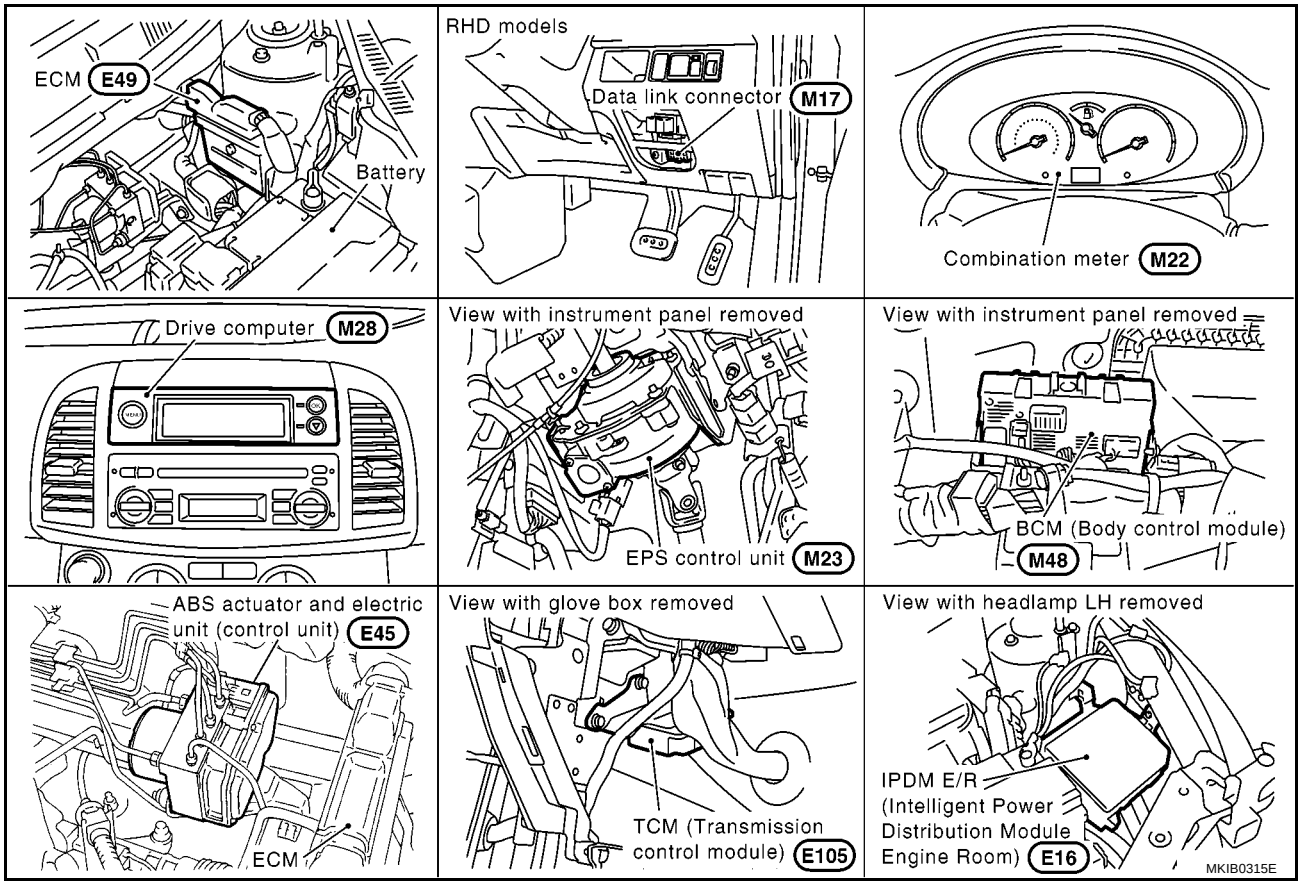
System Description

EKS00744

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

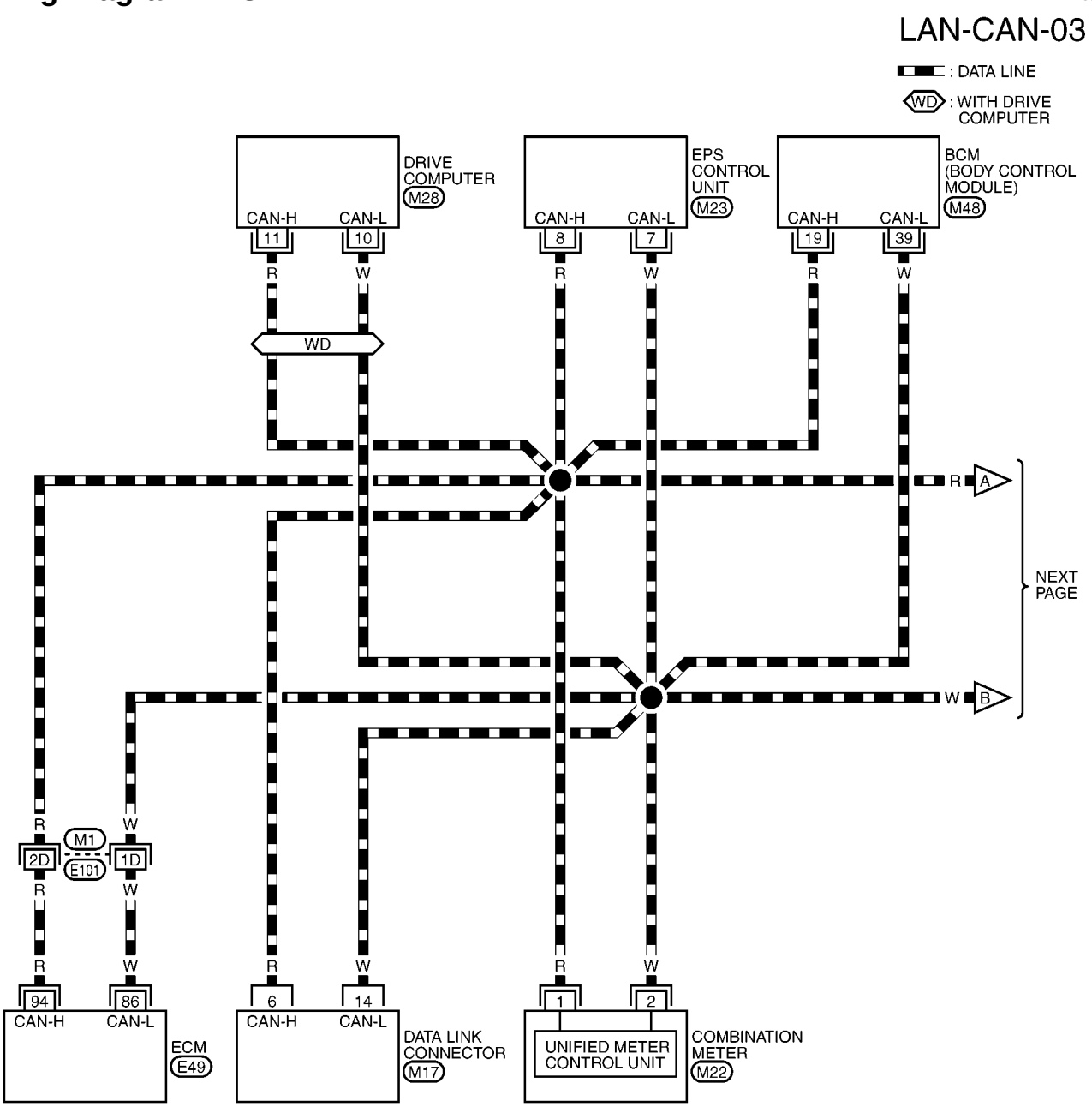
Component Parts and Harness Connector Location

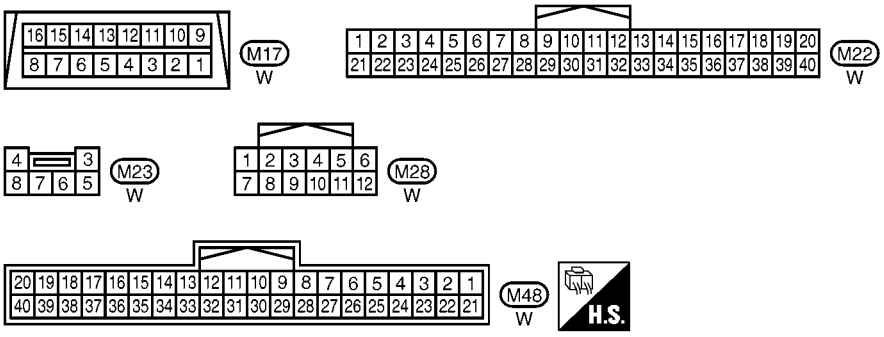
EKS00745



Wiring Diagram — CAN —

EKS007Y0





REFER TO THE FOLLOWING.

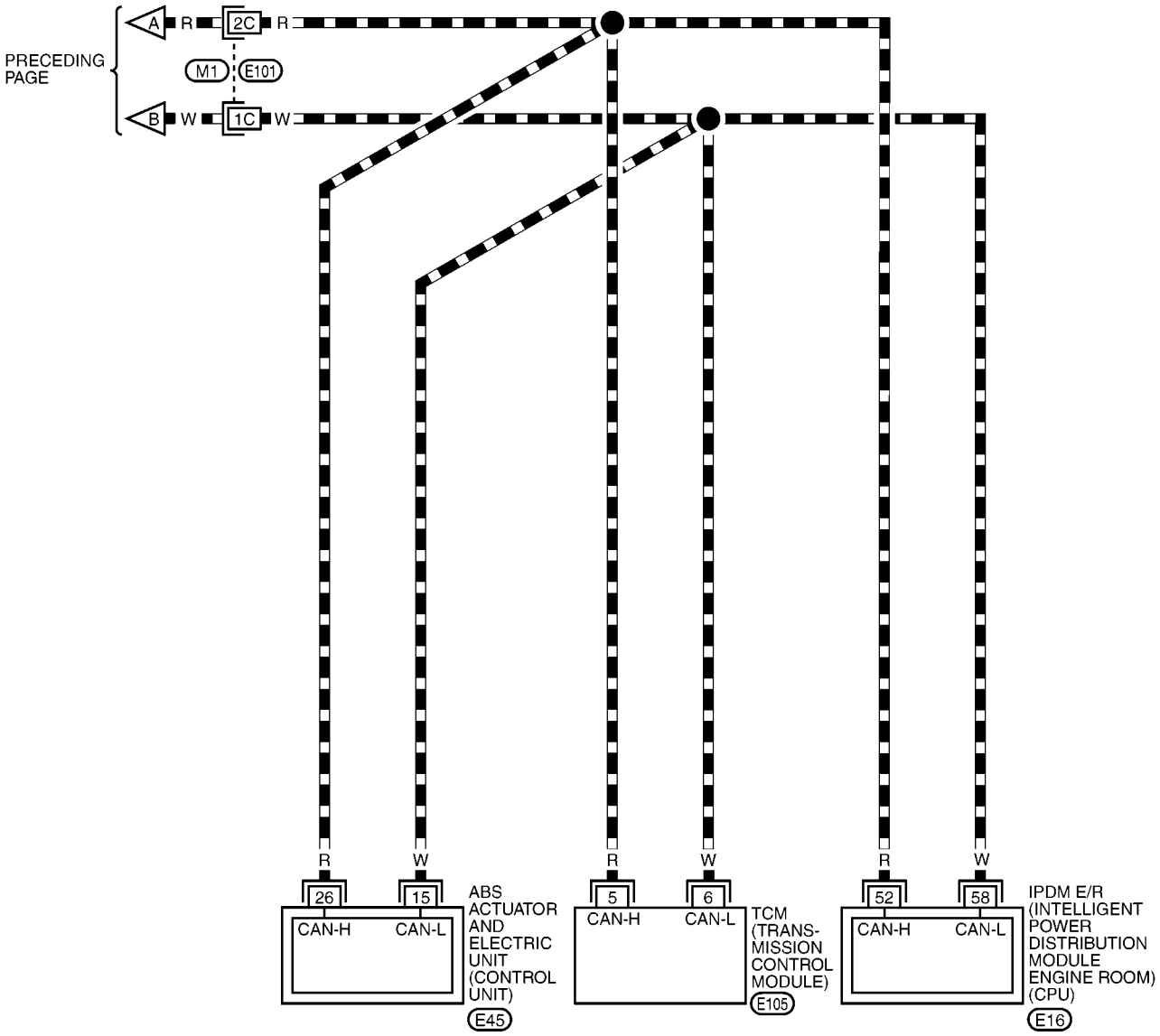
M1 -SUPER MULTIPLE JUNCTION (SMJ)

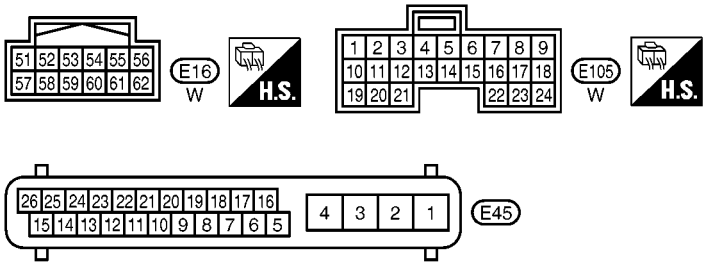
E49 -ELECTRICAL UNITS

MKWA0792E

LAN-CAN-04

: DATA LINE





REFER TO THE FOLLOWING.

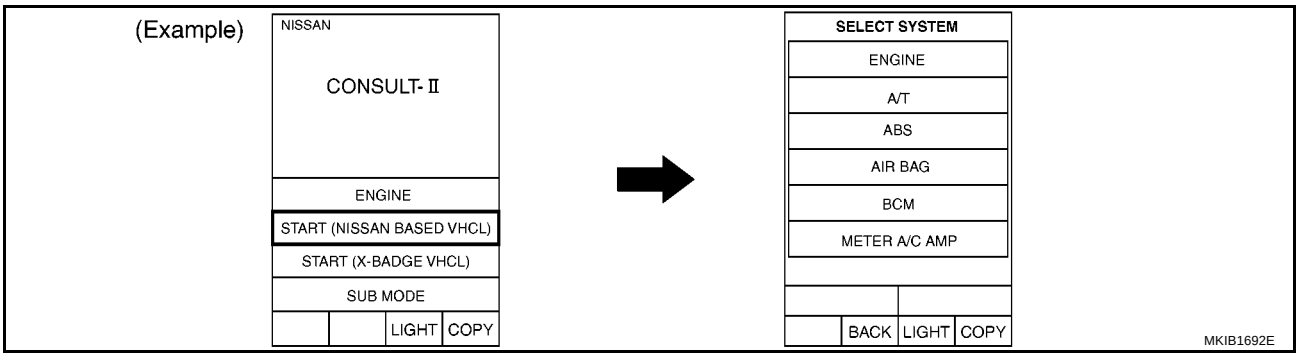
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1307E

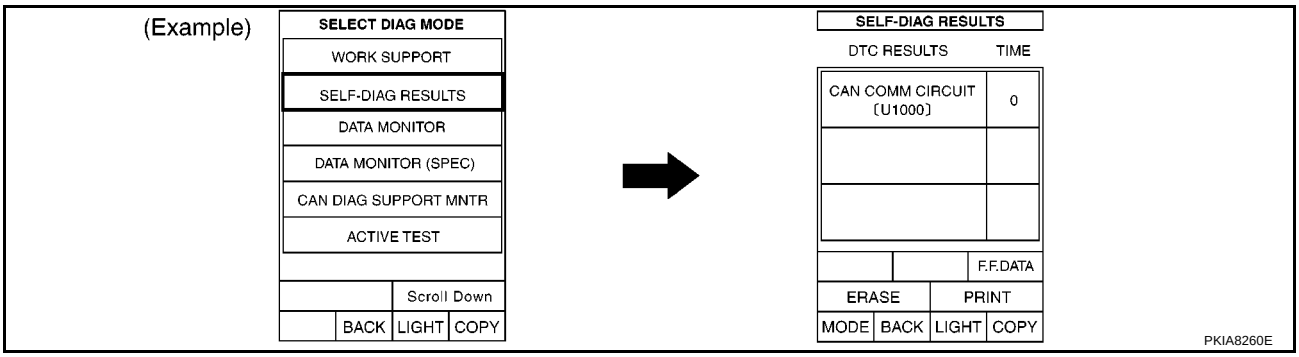
Work Flow

EKS00810

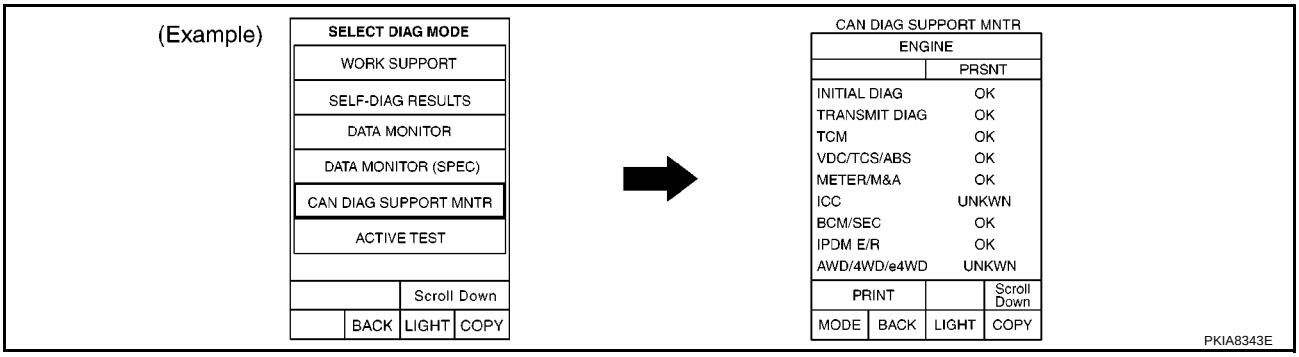
1. When there are no indications of “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-57, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-57, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.

(Example)

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6 ✓	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4 ✓	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

Convert

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	UNKWN	UNKWN	UNKWN ✓	UNKWN ✓	UNKWN ✓
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	UNKWN	UNKWN ✓	—	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN ✓	UNKWN ✓
ABS	—	NG	UNKWN	UNKWN ✓	—	—	—	—	—	—
A/T	—	NG	UNKWN	UNKWN ✓	UNKWN ✓	—	—	—	—	—
IPDM E/R	No indication ✓	—	UNKWN	UNKWN	—	—	UNKWN	—	—	—

MKIB1683E

7. According to the check sheet results (example), start inspection. Refer to LAN-59, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

Comparison table

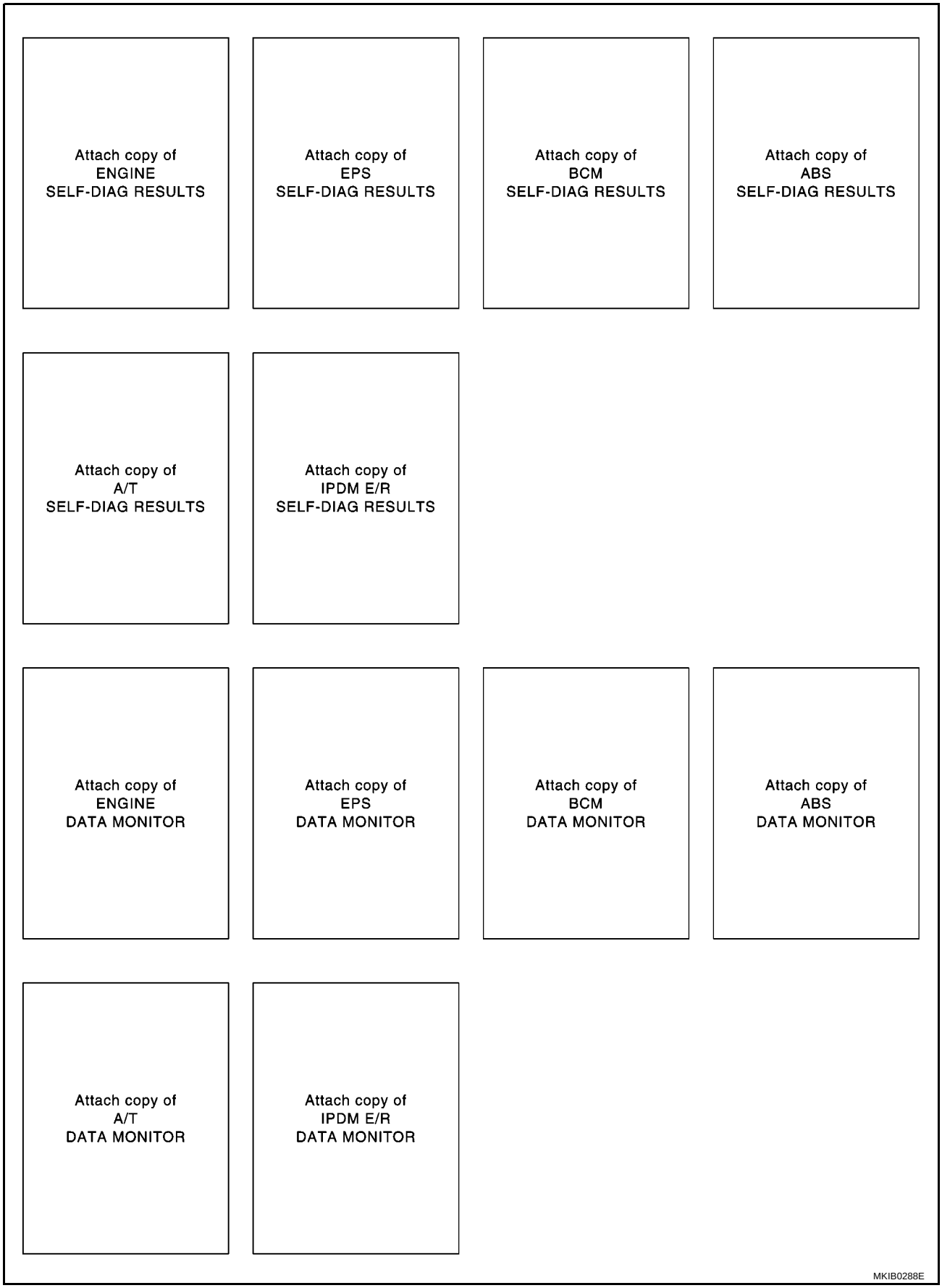
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	UNKWN	UNKWN	—	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—	—
A/T	—	NG	UNKWN	UNKWN	UNKWN	—	—	—	—	—
IPDM E/R	No indication	—	UNKWN	UNKWN	—	—	UNKWN	—	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1602E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
A/T
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
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ENGINE
DATA MONITOR
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EPS
DATA MONITOR
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BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
A/T
DATA MONITOR
Attach copy of
IPDM E/R
DATA MONITOR
MKIB0288E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

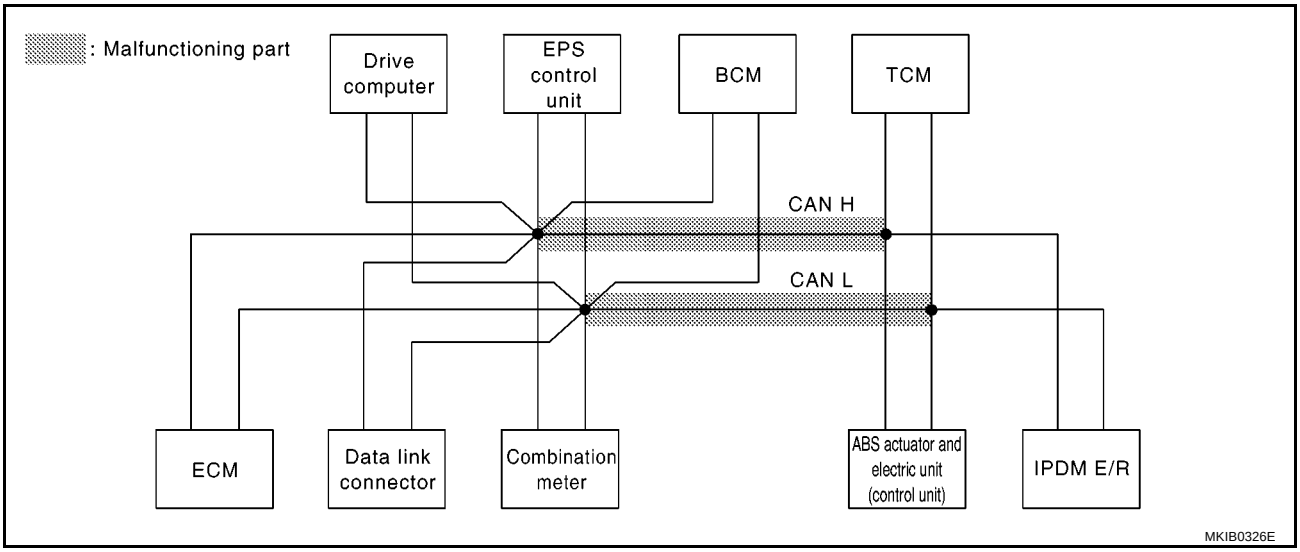
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-69, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6 ✓	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4 ✓	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1624E



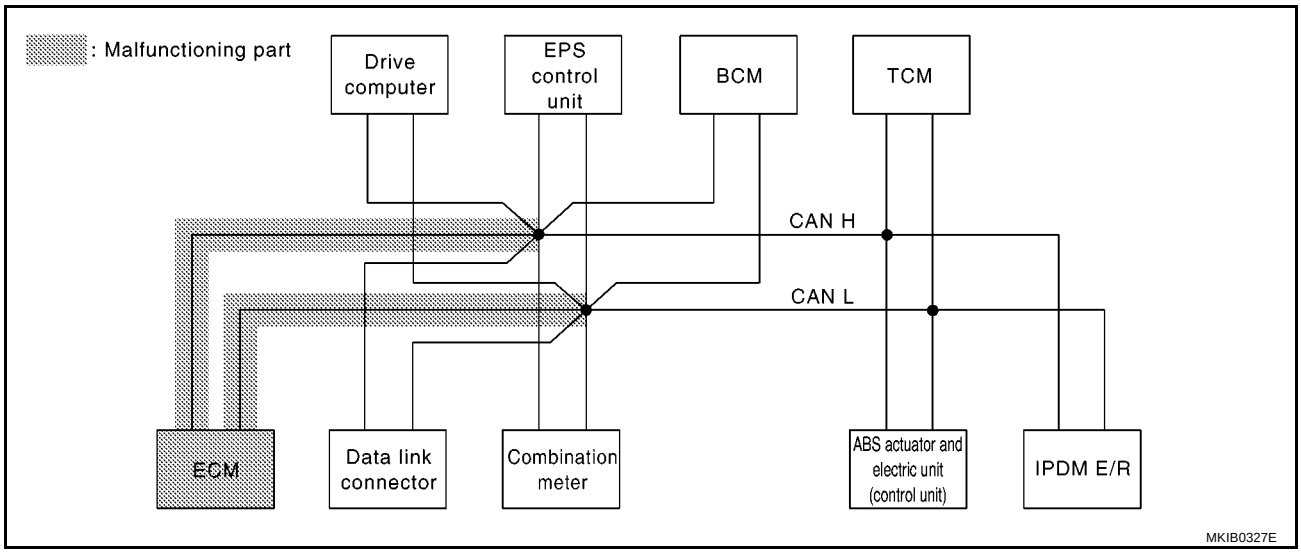
MKIB0326E

Case 2

Check ECM circuit. Refer to LAN-70, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1625E



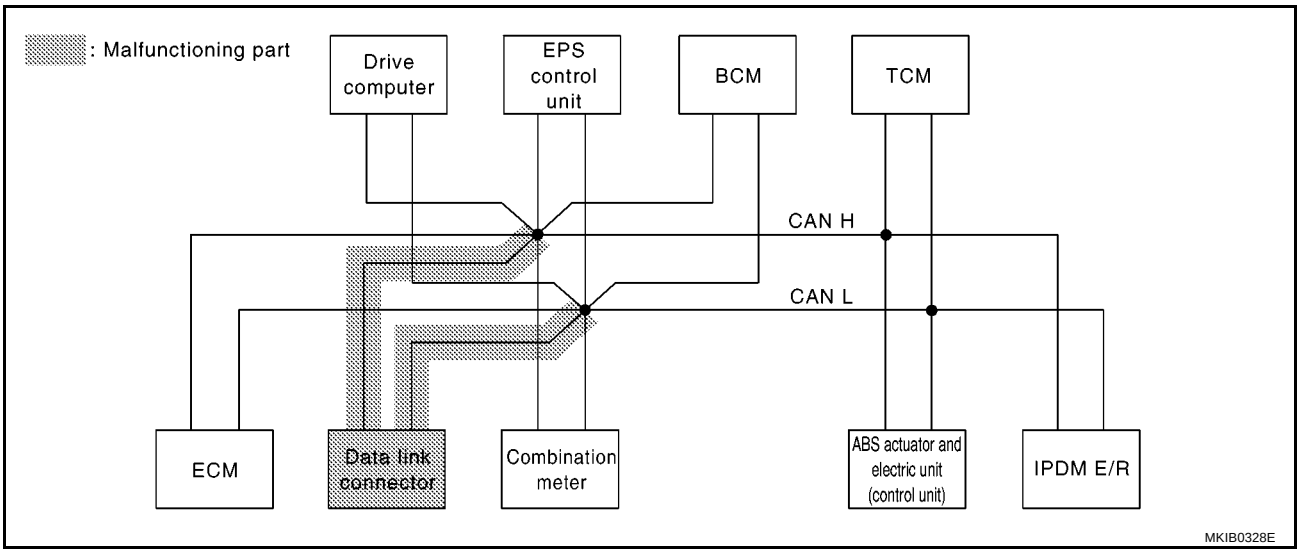
MKIB0327E

Case 3

Check data link connector circuit. Refer to LAN-71, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1626E



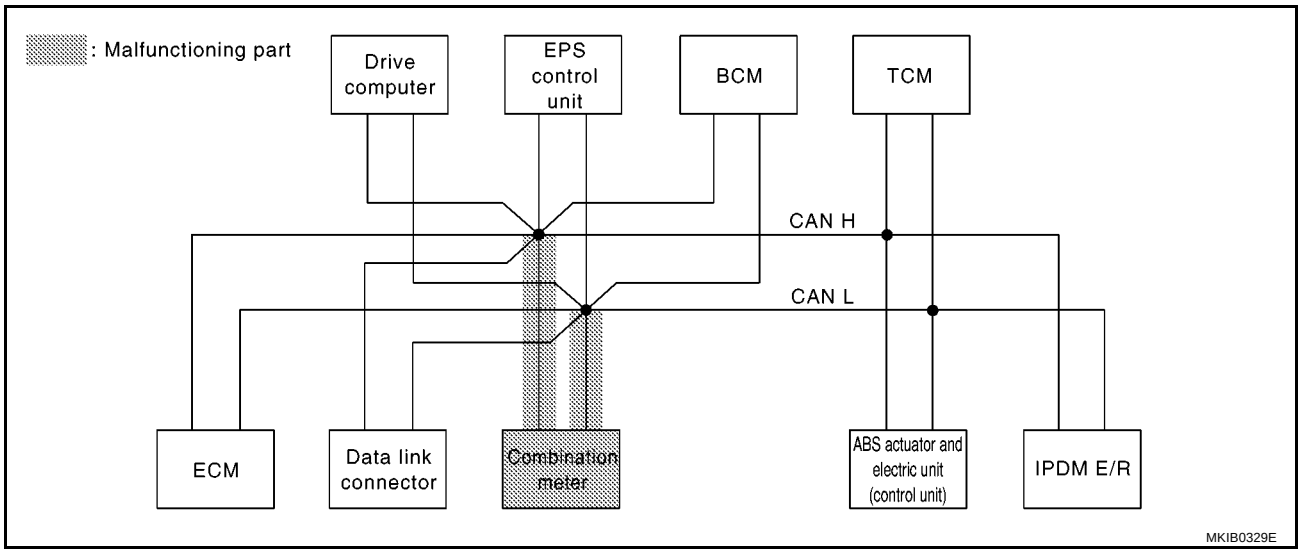
MKIB0328E

Case 4

Check combination meter circuit. Refer to LAN-72, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1627E



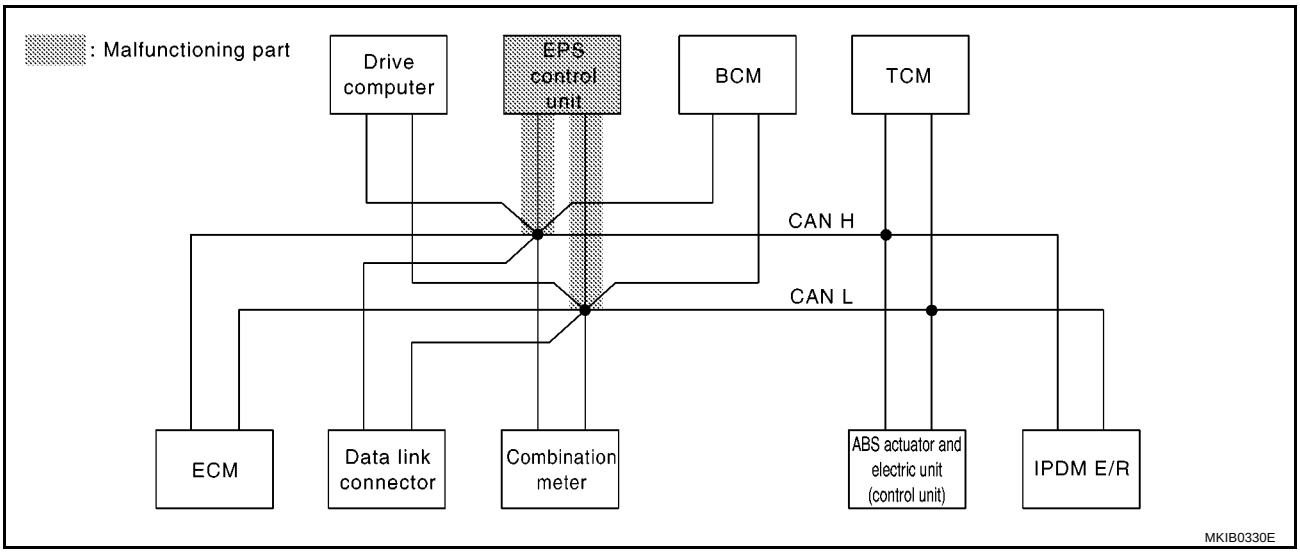
MKIB0329E

Case 5

Check EPS control unit circuit. Refer to LAN-73, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1628E



MKIB0330E

Case 6

Check BCM circuit. Refer to LAN-74, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

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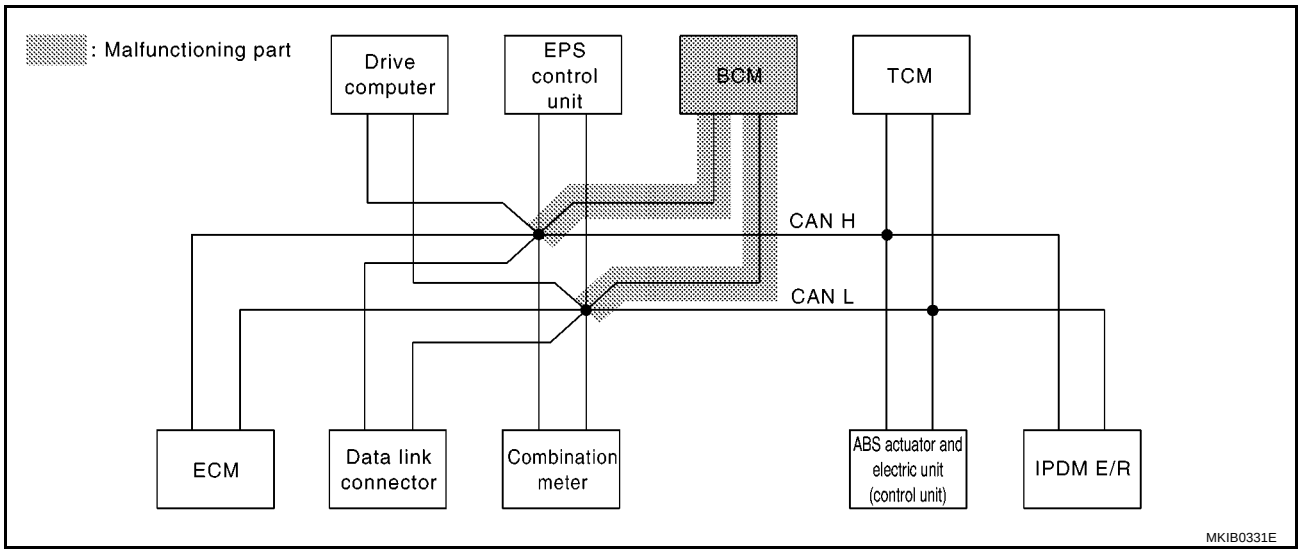


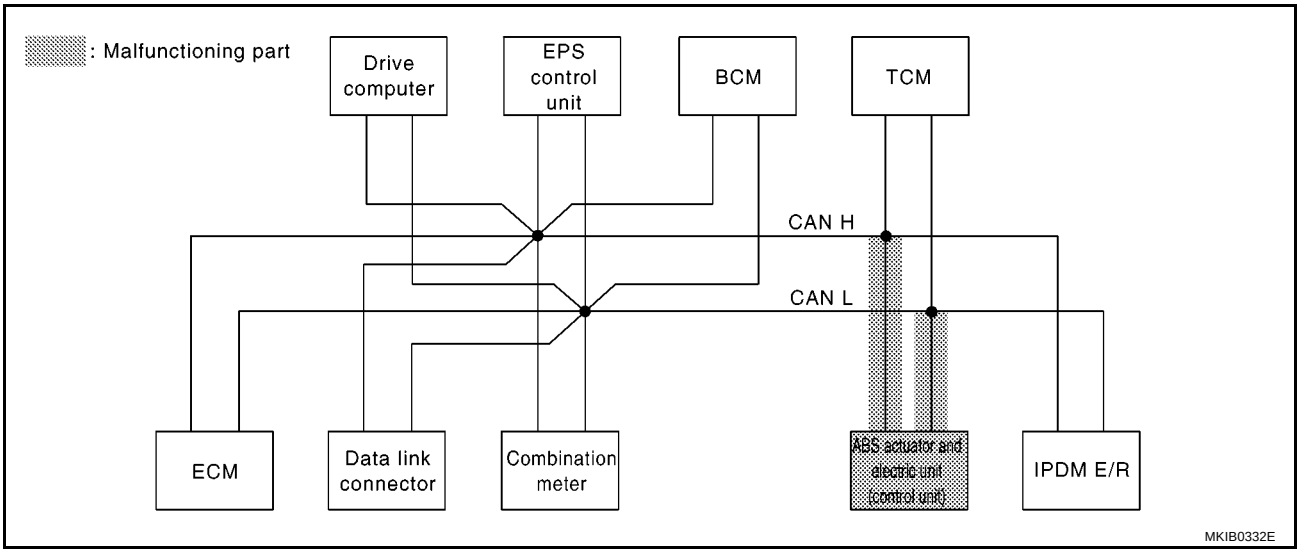
MKIB0331E

Case 7

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-75, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1630E



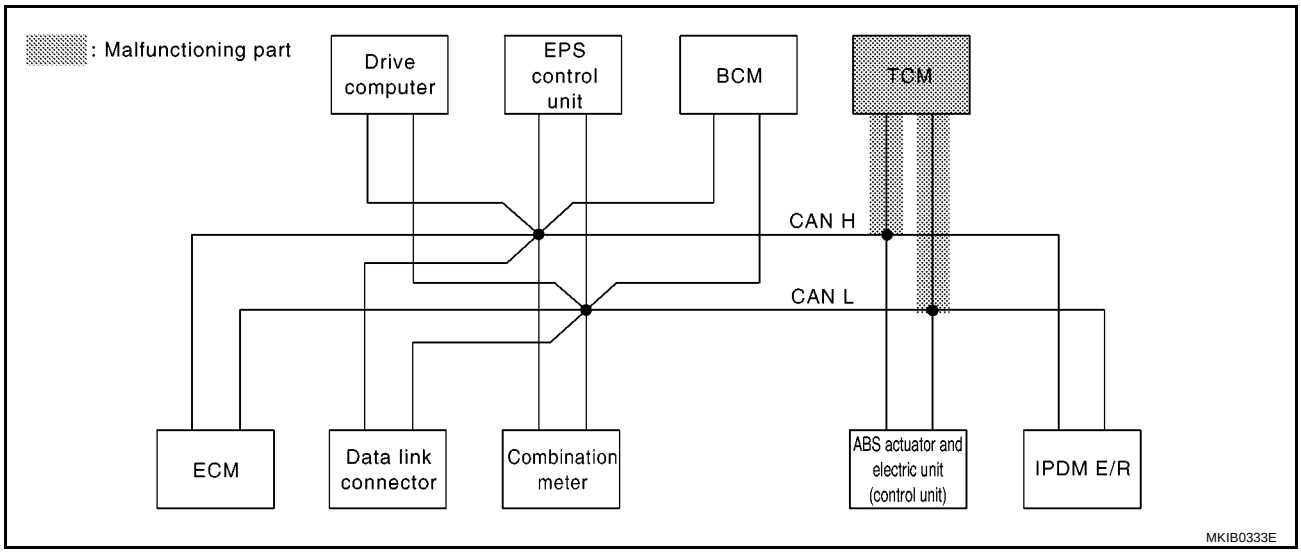
MKIB0332E

Case 8

Check TCM circuit. Refer to LAN-76, "TCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2 ✓	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6 ✓	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	CAN CIRC 4 ✓	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1631E



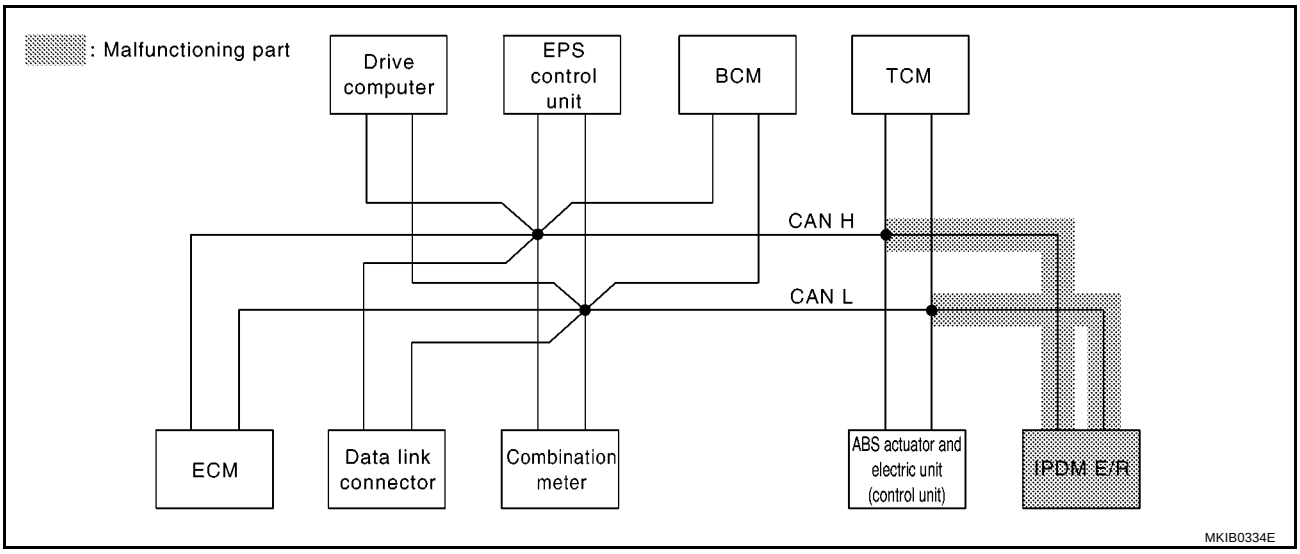
MKIB0333E

Case 9

Check IPDM E/R circuit. Refer to LAN-77, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7 ✔
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3 ✔
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication ✔	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1632E



MKIB0334E

Case 10

Check CAN communication circuit. Refer to LAN-78, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1633E

Case 11

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-81, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1635E

Case 12

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-81, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 6	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
A/T	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—	—

MKIB1634E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00811

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

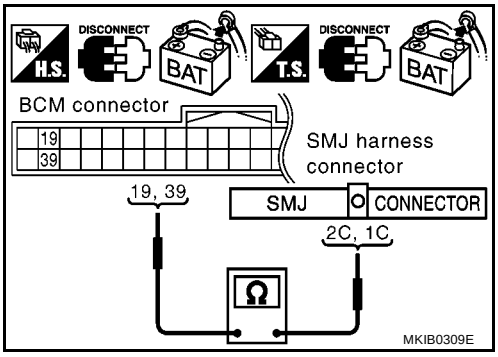
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



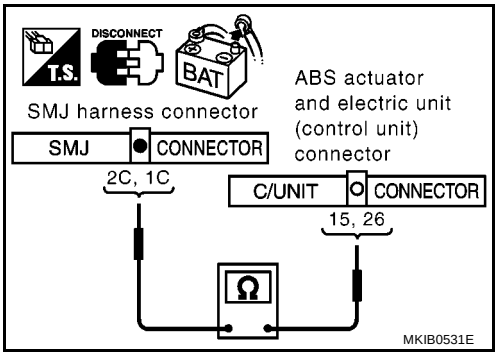
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-55, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00812

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

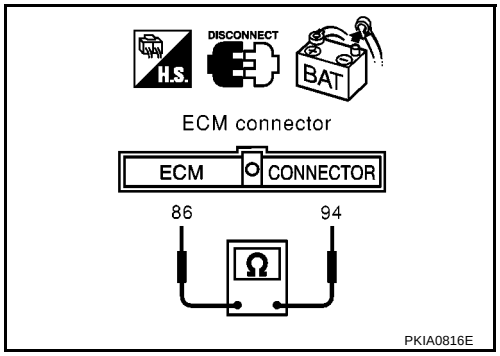
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00813

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check data link connector and terminals for damage, bend and loose connection (connector side and harness side).

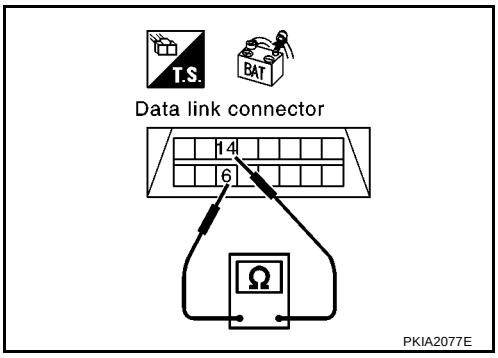
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-55, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00814

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

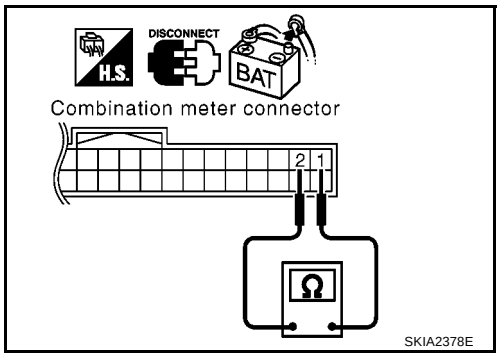
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

EPS Control Unit Circuit Check

EKS00815

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

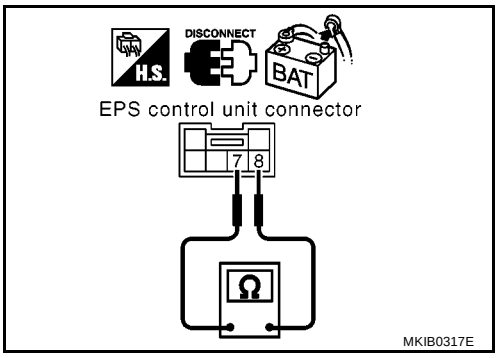
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00816

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

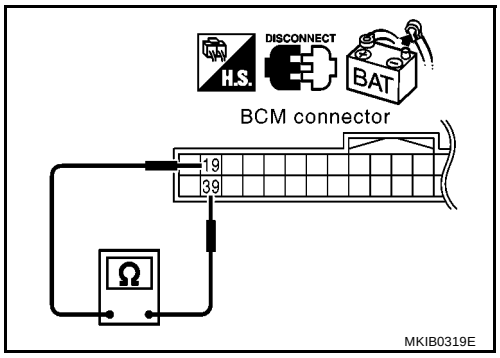
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00817

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

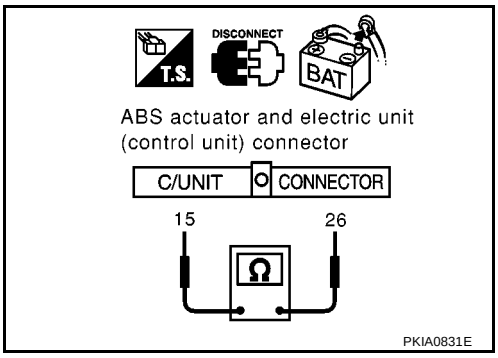
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and TCM.



TCM Circuit Check

EKS00818

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

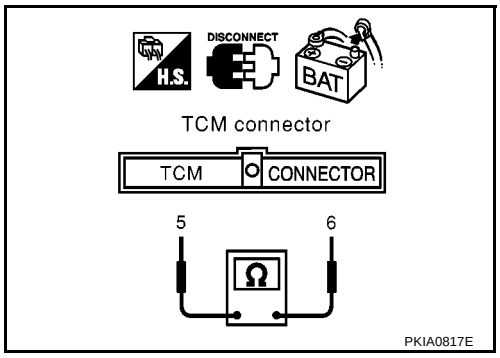
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector E105 terminals 5 (R) and 6 (W).

5 (R) – 6 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and IPDM E/R.

IPDM E/R Circuit Check

EKS00819

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

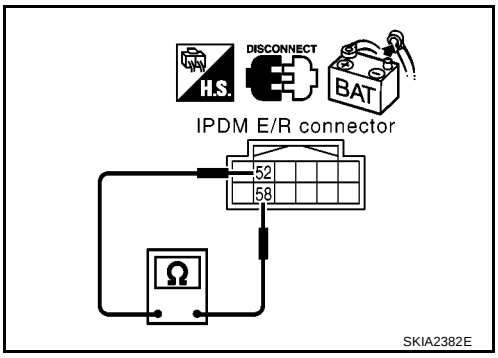
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and TCM.

CAN Communication Circuit Check

EKS0081A

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- TCM
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

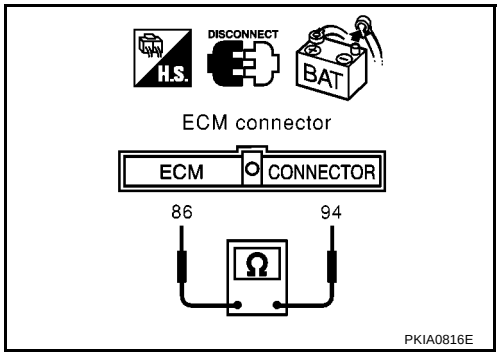
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



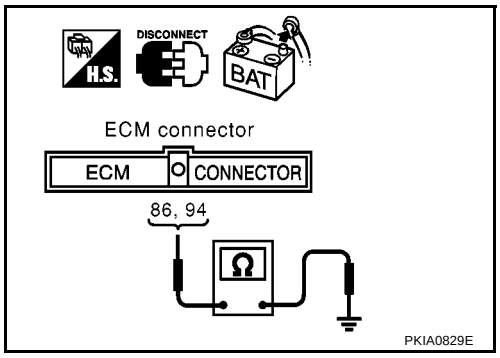
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.

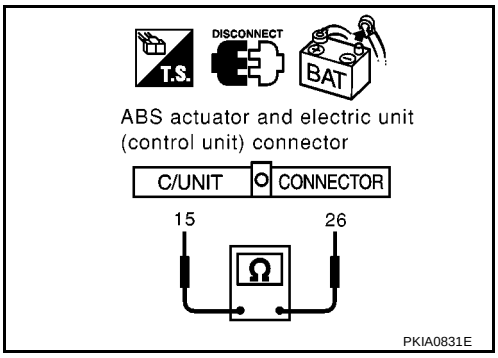


4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- TCM connector
- IPDM E/R connector

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

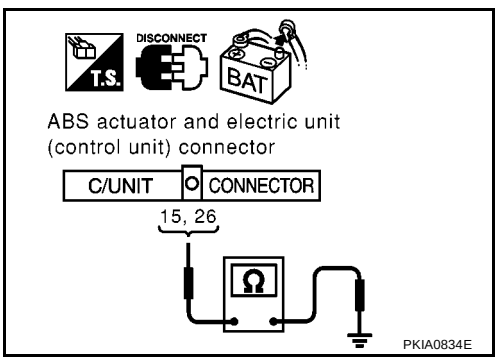
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.

15 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 6.

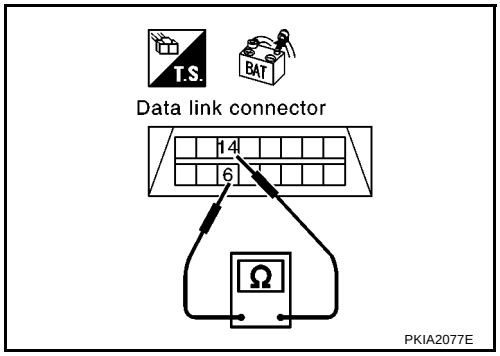
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 7.

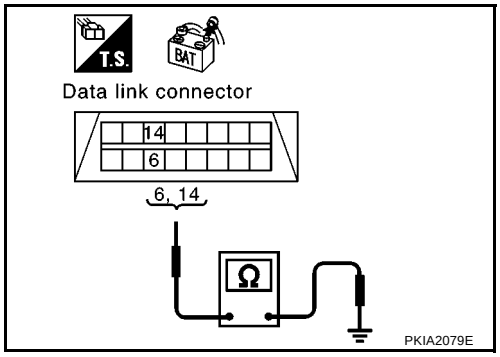
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM.

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – ground : Continuity should not exist.

14 (W) – ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.

NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM.

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-81, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-55, "Work Flow" .

NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS0081B

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

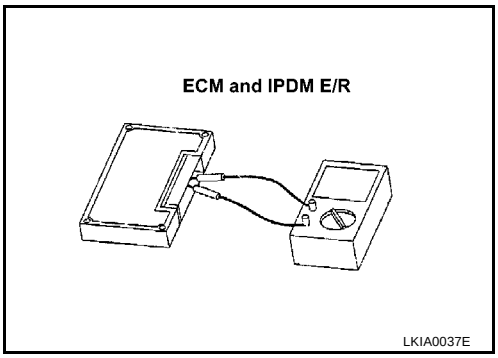
Component Inspection

EKS0081C

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 3)

PFP:23710

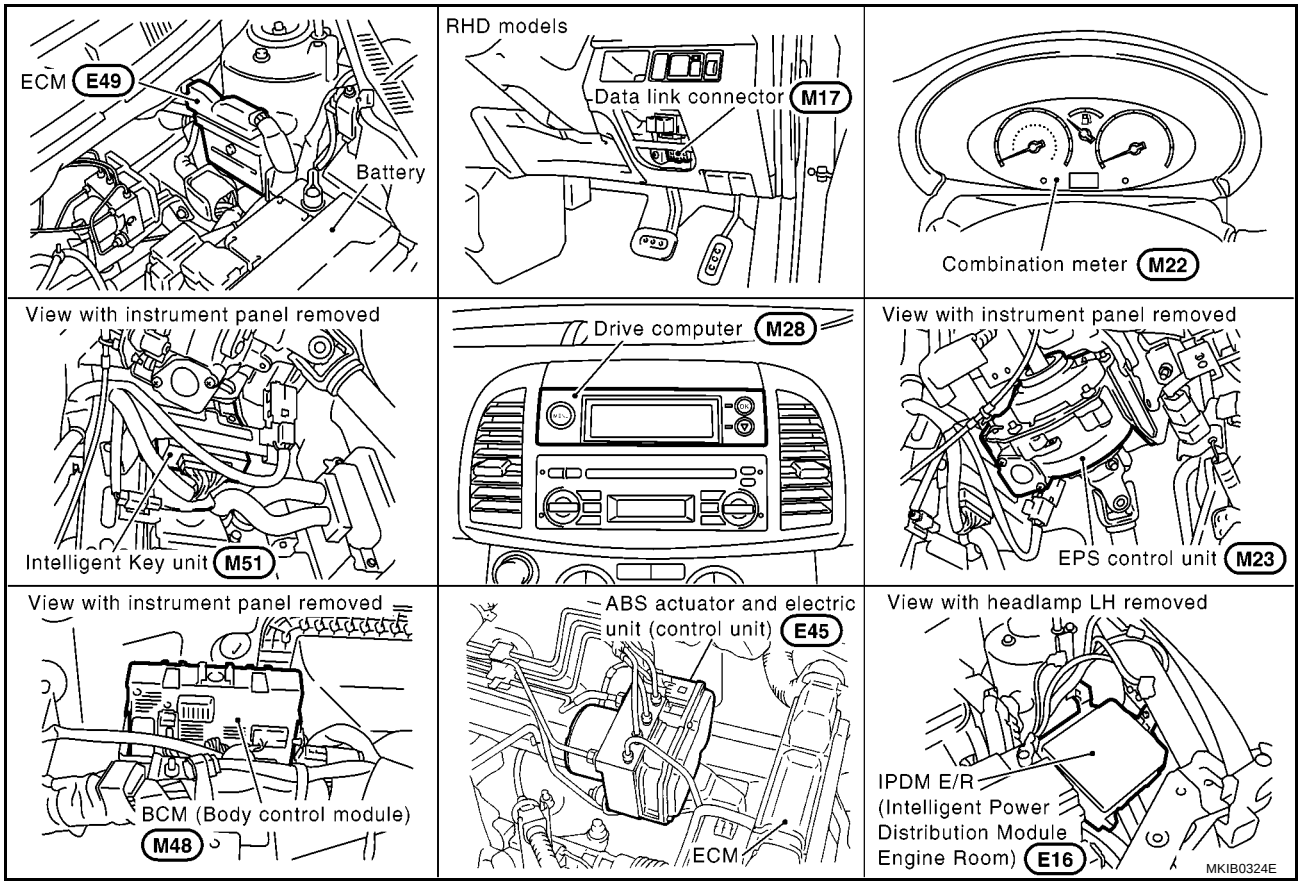
System Description

EKS0074L

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

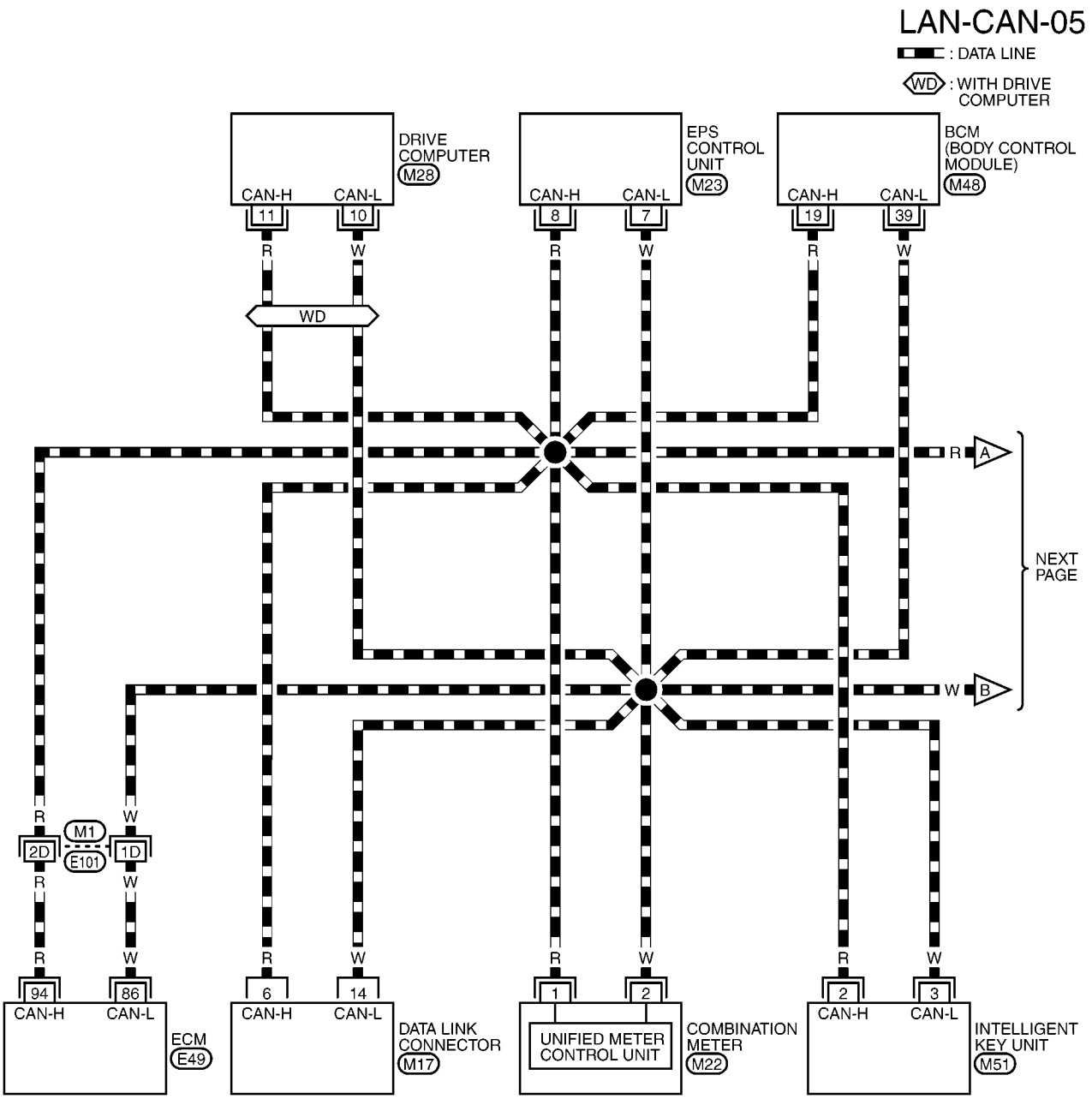
Component Parts and Harness Connector Location

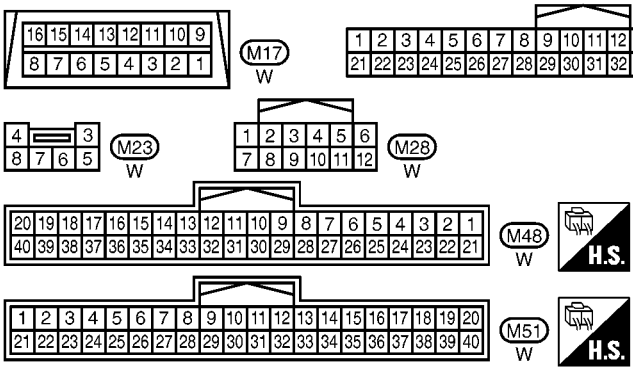
EKS0074M



Wiring Diagram — CAN —

EKS007YF



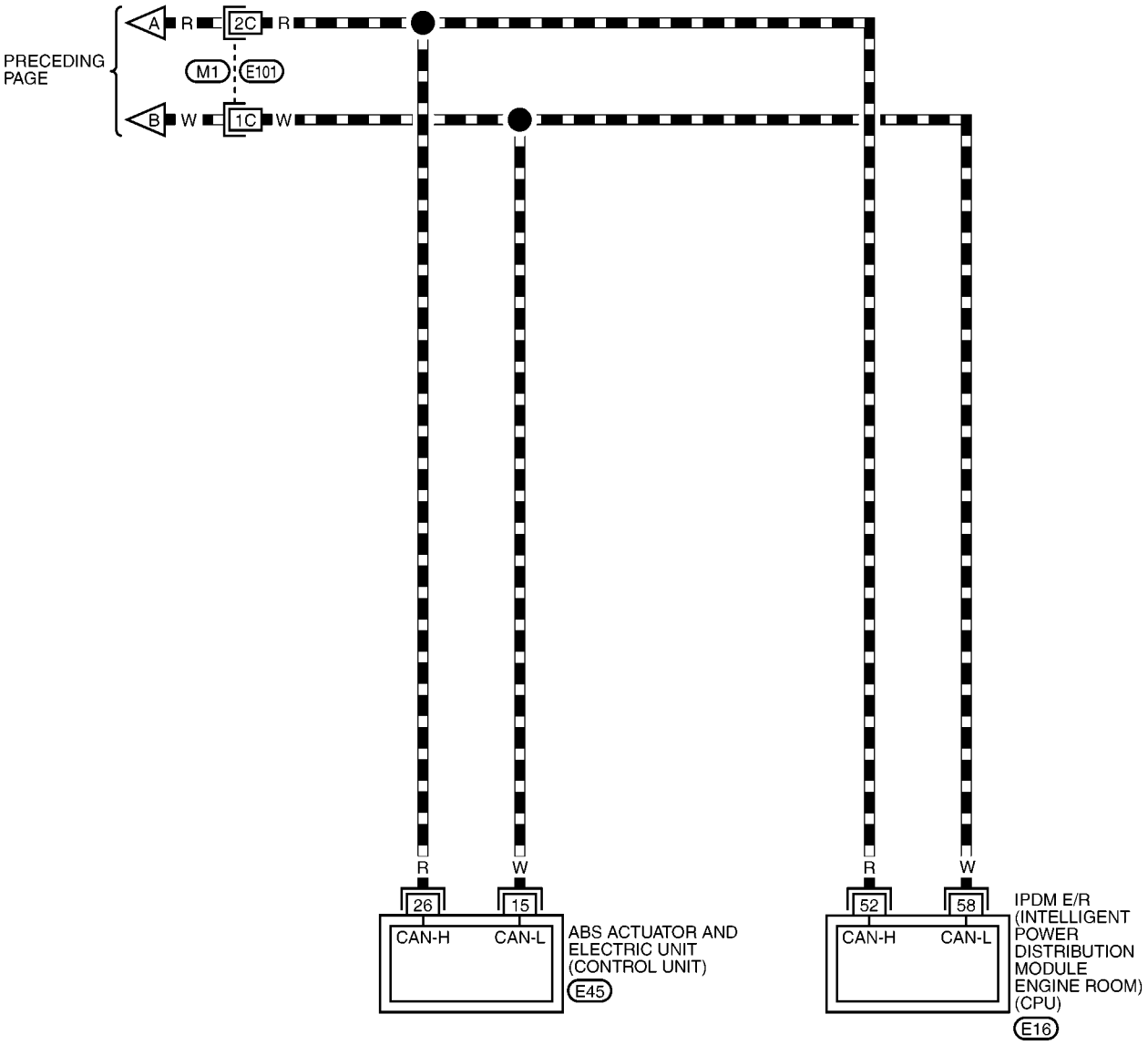


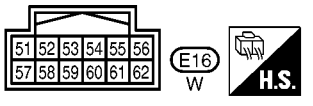
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

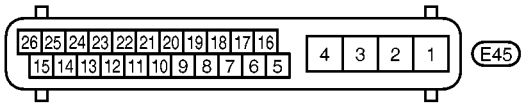
MKWA1308E

LAN-CAN-06

: DATA LINE







REFER TO THE FOLLOWING.

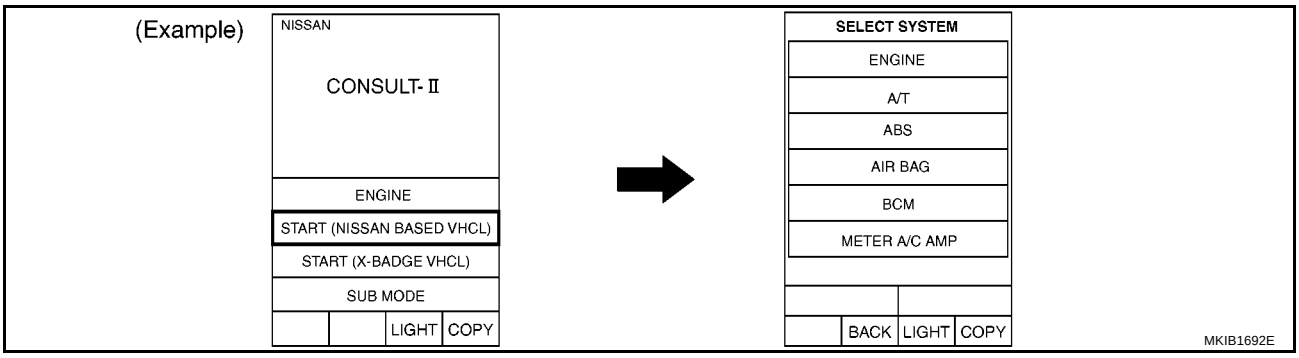
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1309E

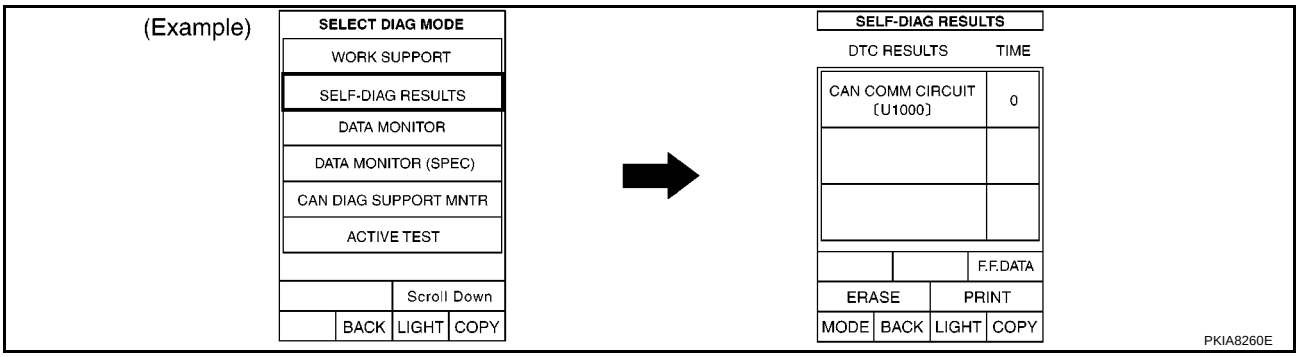
Work Flow

EKS0081D

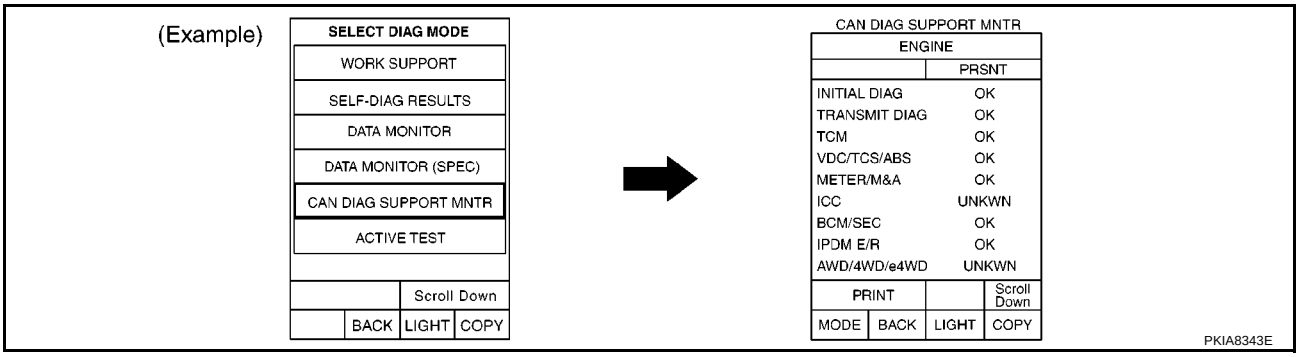
1. When there are no indications of “INTELLIGENT KEY”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.

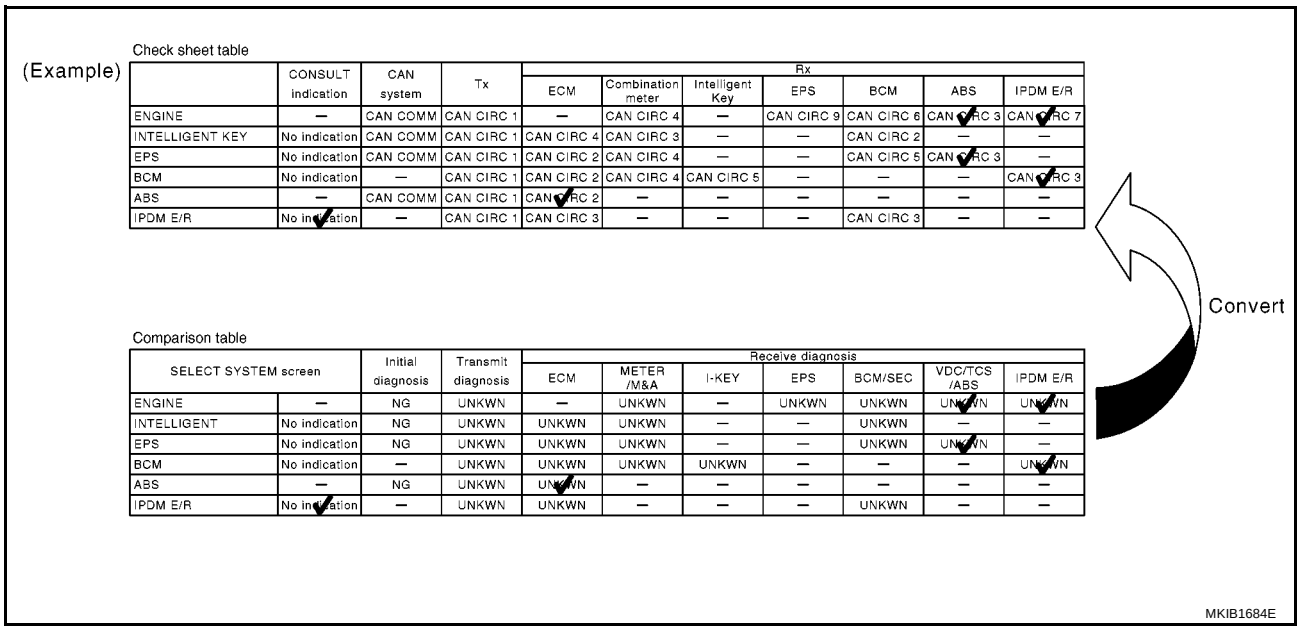


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-87, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-87, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	—	UNKWN	UNKWN	UNKWN ✓	UNKWN ✓
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	—	—
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	UNKWN ✓	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN ✓
ABS	—	NG	UNKWN	UNKWN ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	UNKWN	UNKWN	—	—	—	UNKWN	—	—

7. According to the check sheet results (example), start inspection. Refer to LAN-89, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

Comparison table

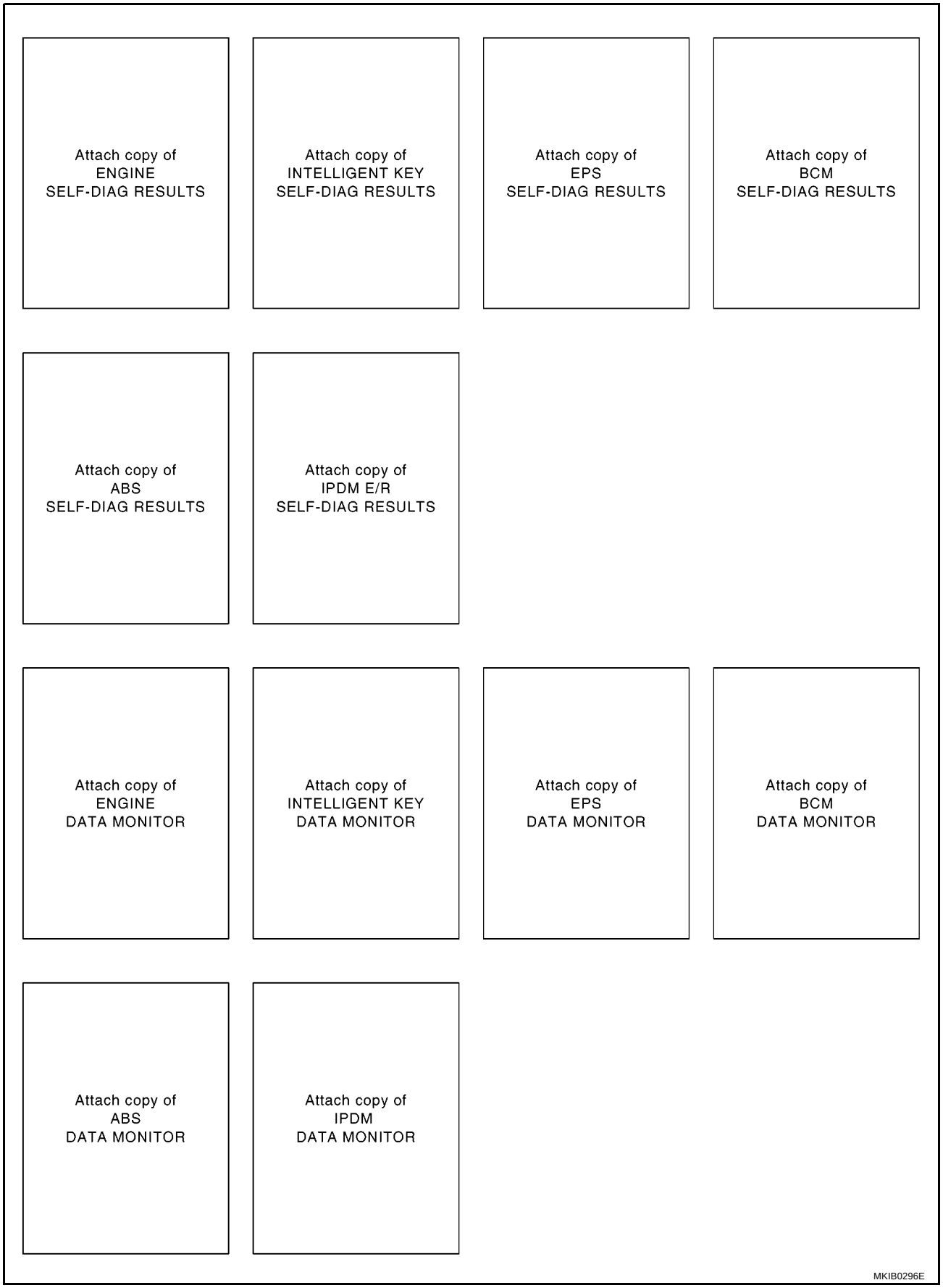
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	—	UNKWN	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	—	—
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—	—
IPDM E/R	No indication	—	UNKWN	UNKWN	—	—	—	UNKWN	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1603E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
INTELLIGENT KEY
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
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IPDM E/R
SELF-DIAG RESULTS
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ENGINE
DATA MONITOR
Attach copy of
INTELLIGENT KEY
DATA MONITOR
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EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
IPDM
DATA MONITOR
MKIB0296E

CHECK SHEET RESULTS (EXAMPLE)

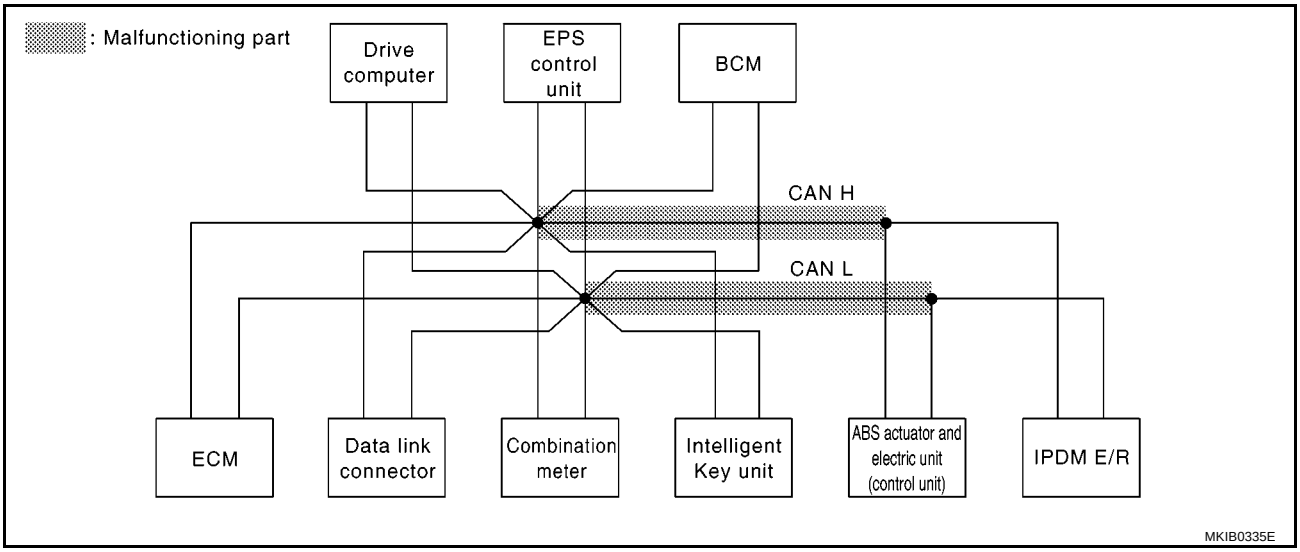
NOTE:
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-99, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1636E



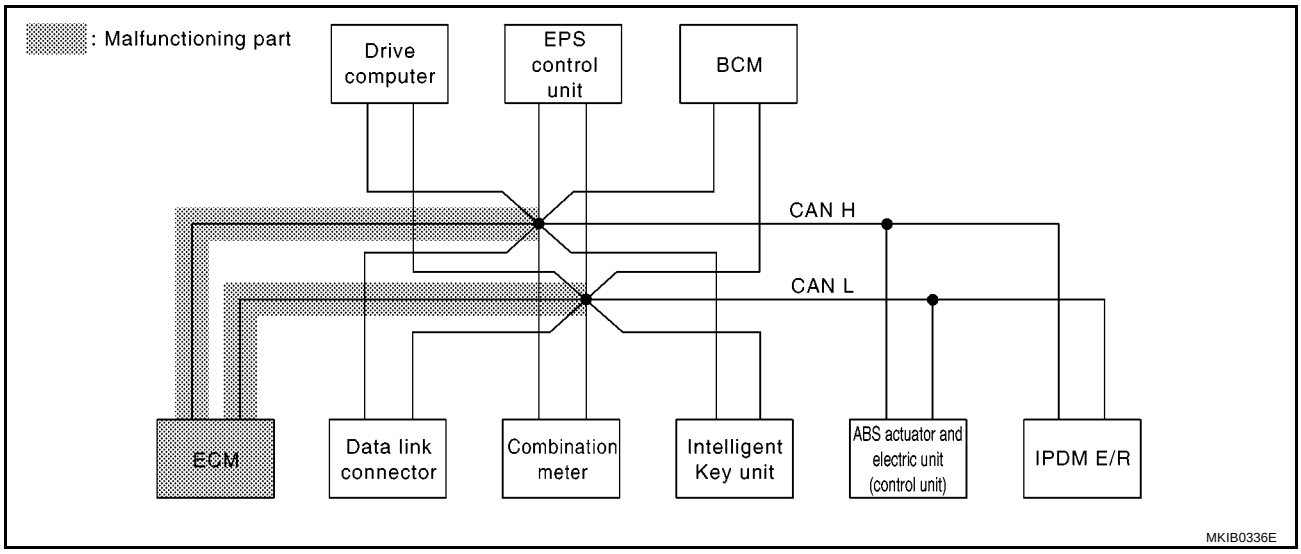
MKIB0335E

Case 2

Check ECM circuit. Refer to LAN-100, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9 ✓	CAN CIRC 6 ✓	CAN CIRC 3 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4 ✓	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3 ✓	—	—	—	CAN CIRC 3	—	—

MKIB1637E



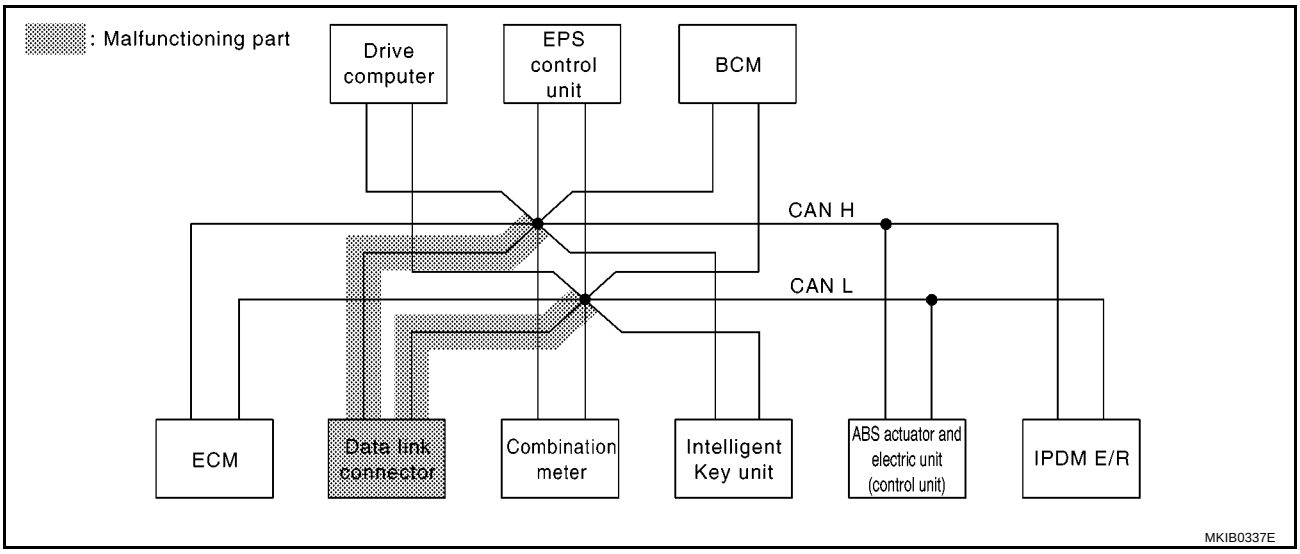
MKIB0336E

Case 3

Check data link connector circuit. Refer to LAN-101, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1638E



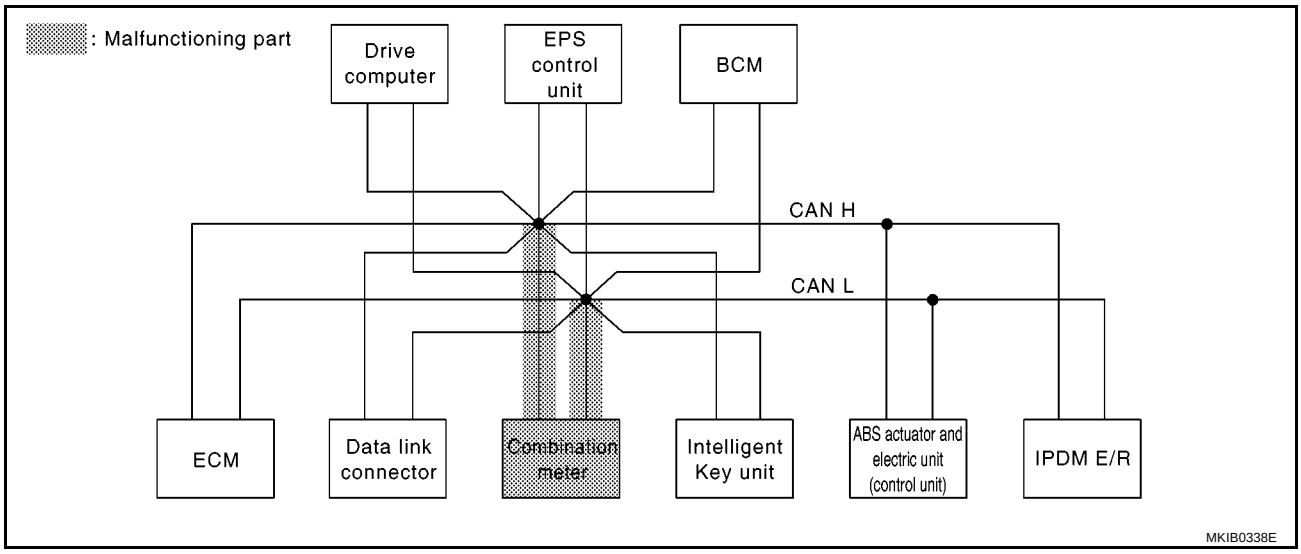
MKIB0337E

Case 4

Check combination meter circuit. Refer to LAN-102, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1639E



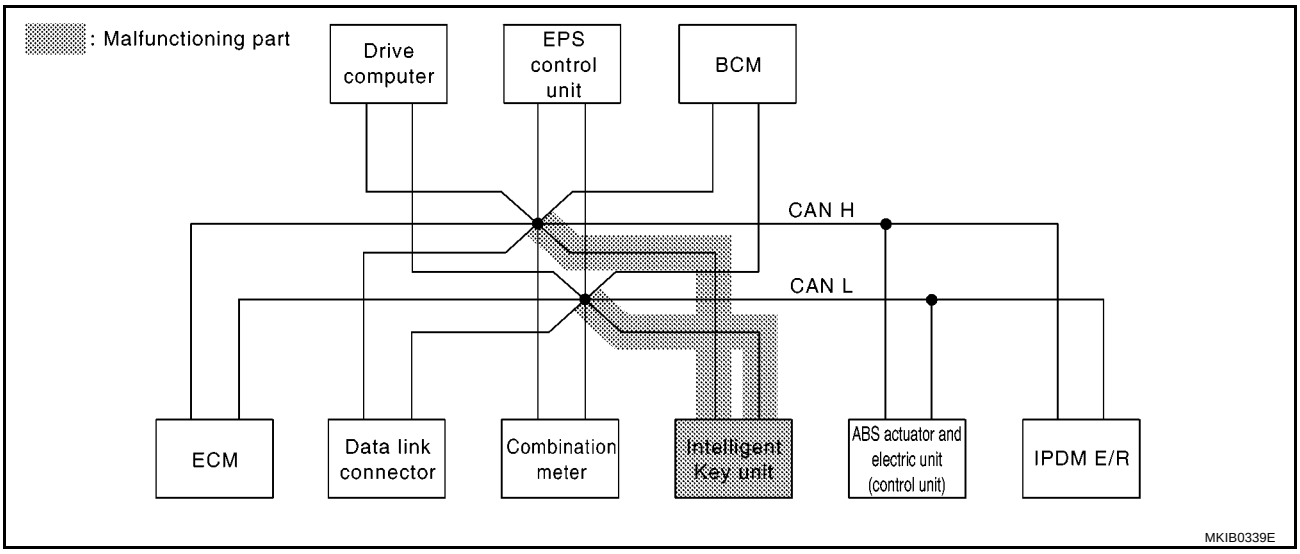
MKIB0338E

Case 5

Check Intelligent Key unit circuit. Refer to LAN-103, "Intelligent Key Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5 ✔	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1640E



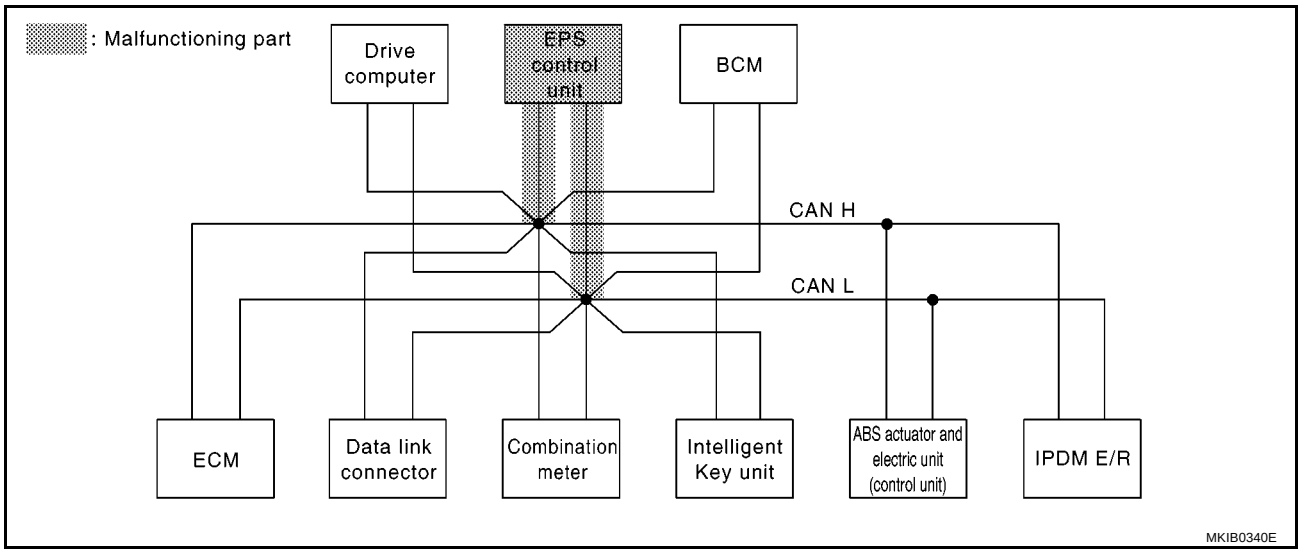
MKIB0339E

Case 6

Check EPS control unit circuit. Refer to LAN-104, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1641E



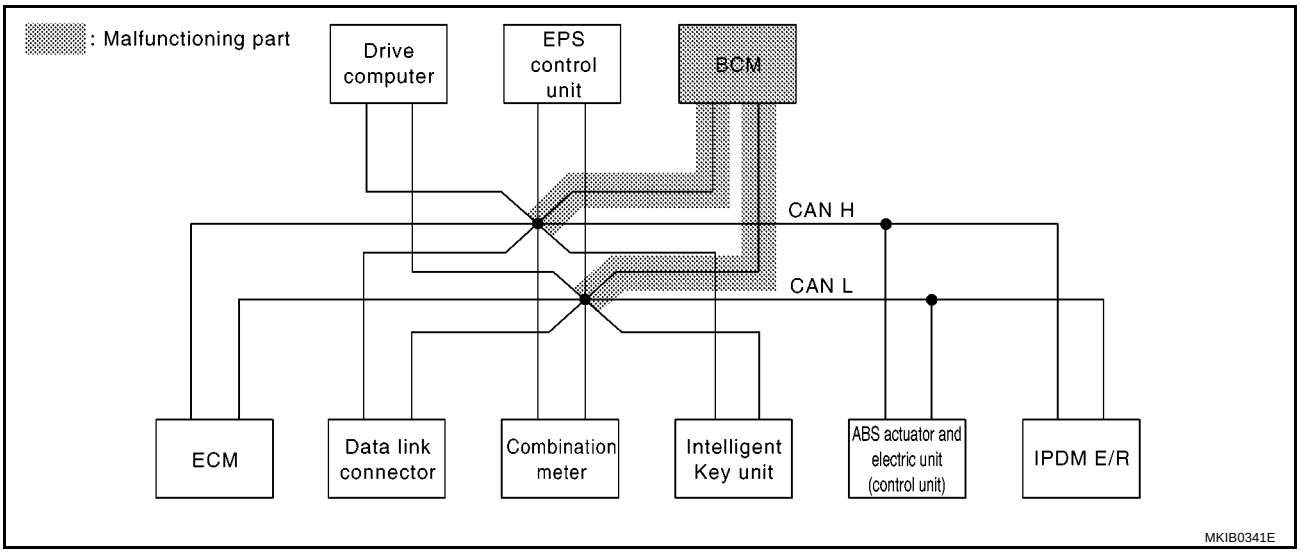
MKIB0340E

Case 7

Check BCM circuit. Refer to LAN-105, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6 ✔	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2 ✔	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5 ✔	CAN CIRC 3	—
BCM	No indication ✔	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3 ✔	—	—

MKIB1642E



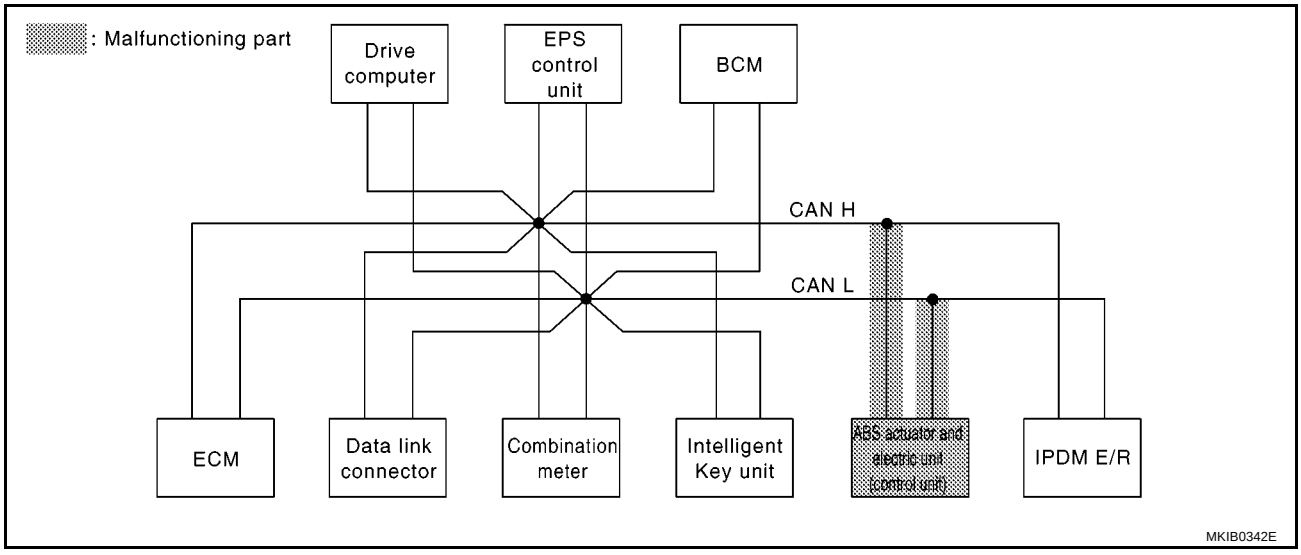
MKIB0341E

Case 8

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-106, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1643E



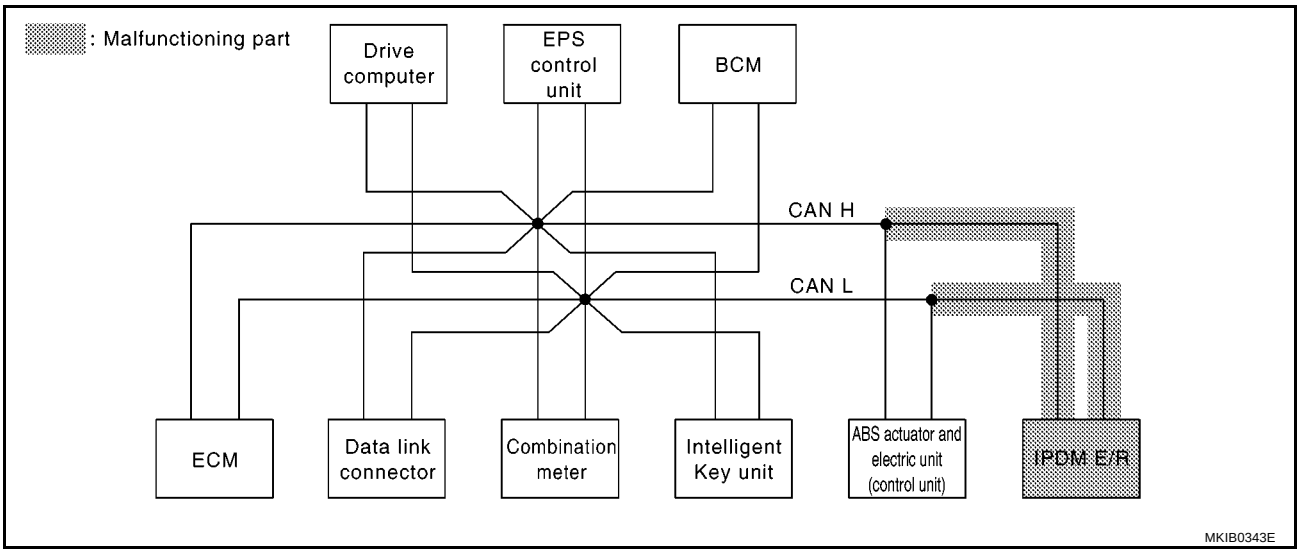
MKIB0342E

Case 9

Check IPDM E/R circuit. Refer to LAN-107, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1644E



MKIB0343E

Case 10

Check CAN communication circuit. Refer to LAN-108, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4 ✓	—	CAN CIRC 9 ✓	CAN CIRC 6 ✓	CAN CIRC 3 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication ✓	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1645E

Case 11

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-111, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	—	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4 ✓	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3 ✓	—	—	—	CAN CIRC 3	—	—

MKIB1647E

Case 12

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-111, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4 ✓	—	CAN CIRC 9 ✓	CAN CIRC 6 ✓	CAN CIRC 3	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 3	—	—

MKIB1646E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS0081E

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

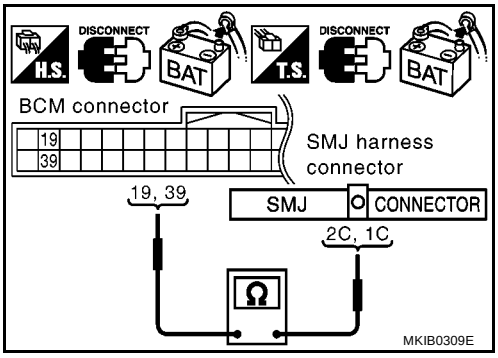
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



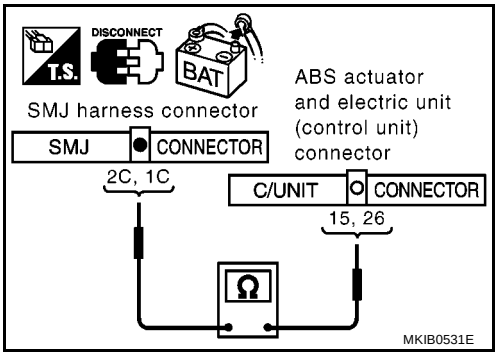
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-85, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS0081F

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

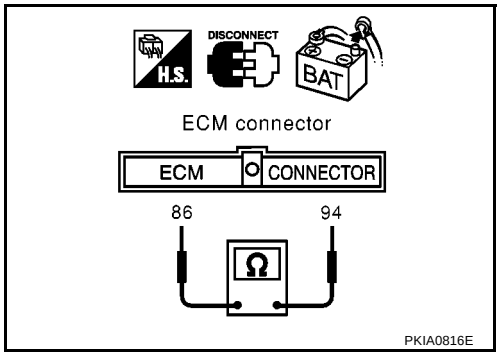
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS0081G

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check the data link connector and terminals for damage, bend and loose connection (connector side and harness side).

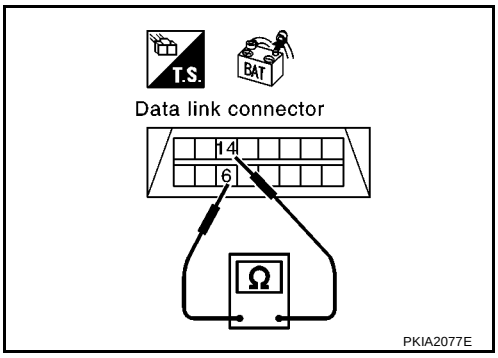
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-85, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS0081H

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

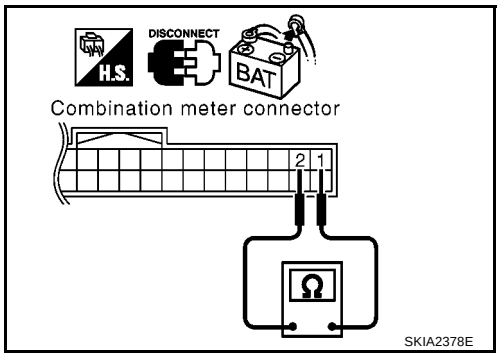
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and data link connector.

Intelligent Key Unit Circuit Check

EKS0081I

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of Intelligent Key unit for damage, bend and loose connection (control unit side and harness side).

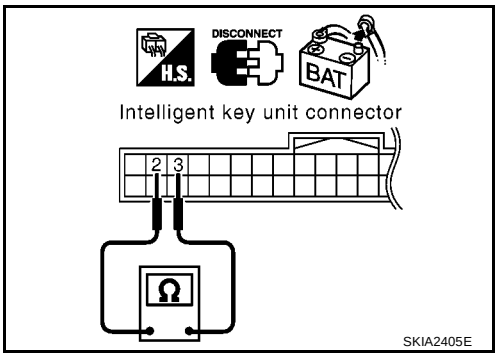
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check resistance between Intelligent Key unit harness connector M51 terminals 2 (R) and 3 (W).

2 (R) – 3 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair harness between Intelligent Key unit and data link connector.

EPS Control Unit Circuit Check

EKS0081J

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

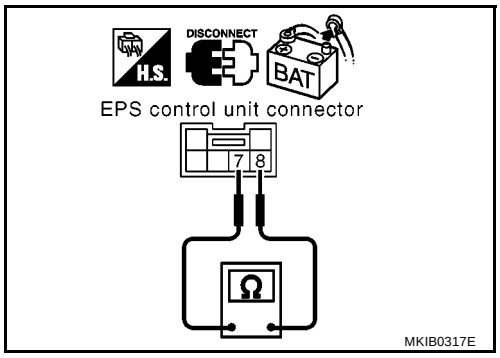
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS0081K

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

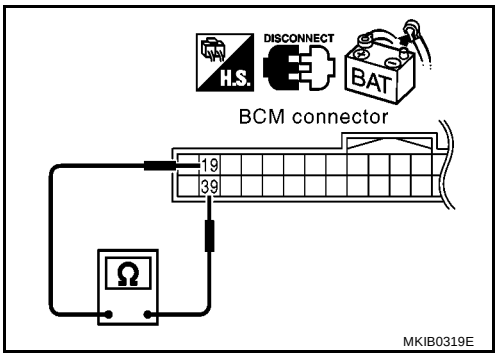
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS0081L

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

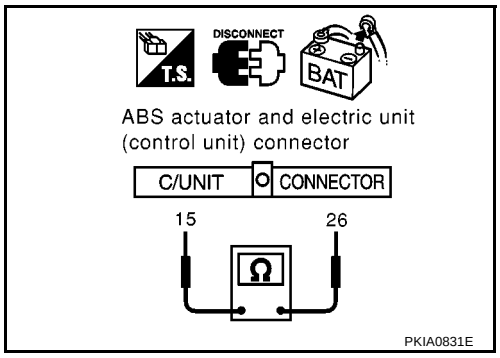
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.

IPDM E/R Circuit Check

EKS0081M

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

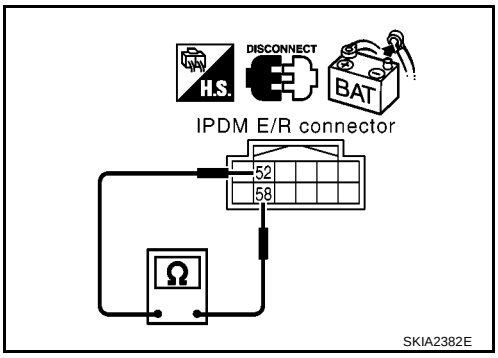
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS0081N

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Intelligent Key unit
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

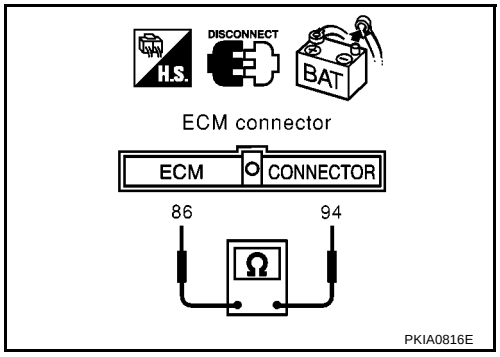
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



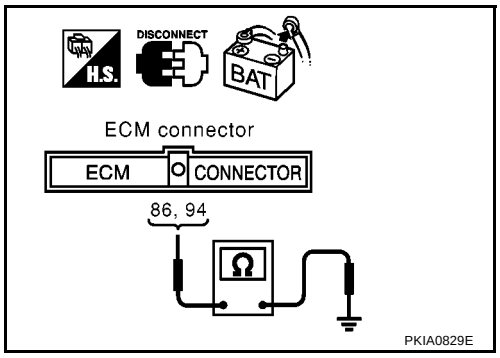
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

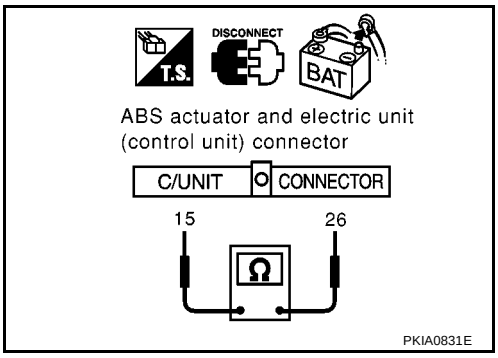
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



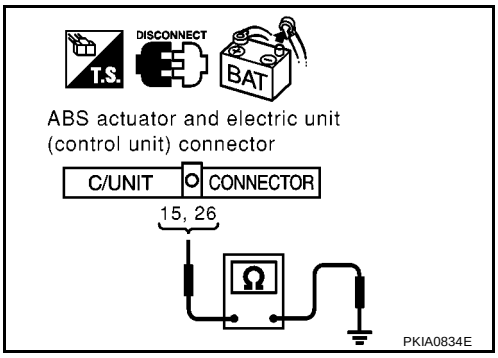
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.
15 (W) – Ground : Continuity should not exist.



OK or NG

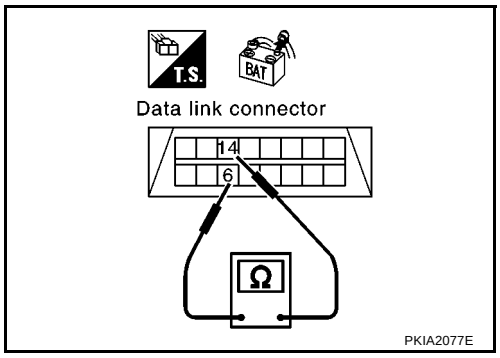
OK >> GO TO 6.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



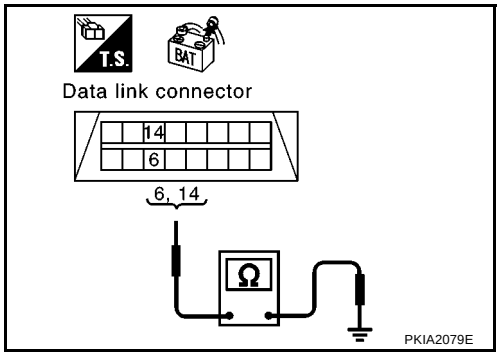
OK or NG

OK >> GO TO 7.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-111, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-85, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS0081O

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

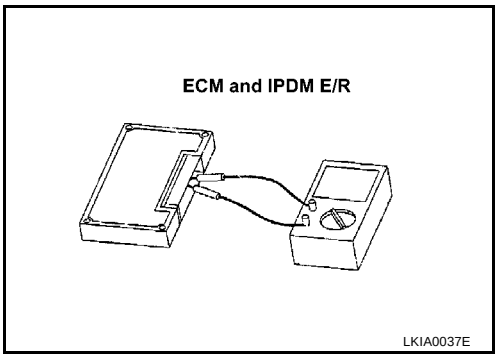
Component Inspection

EKS0081P

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 4)

PFP:23710

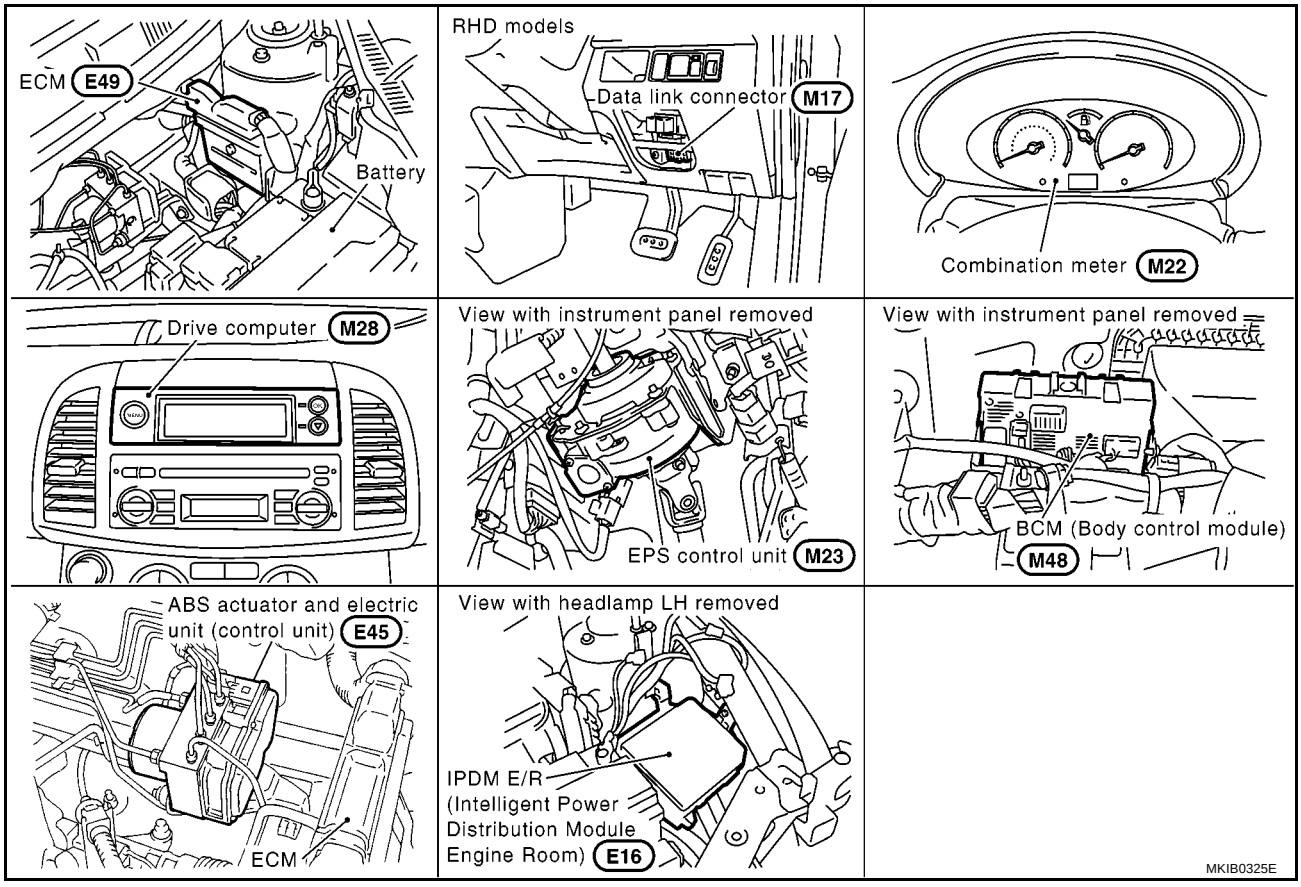
System Description

EKS00754

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

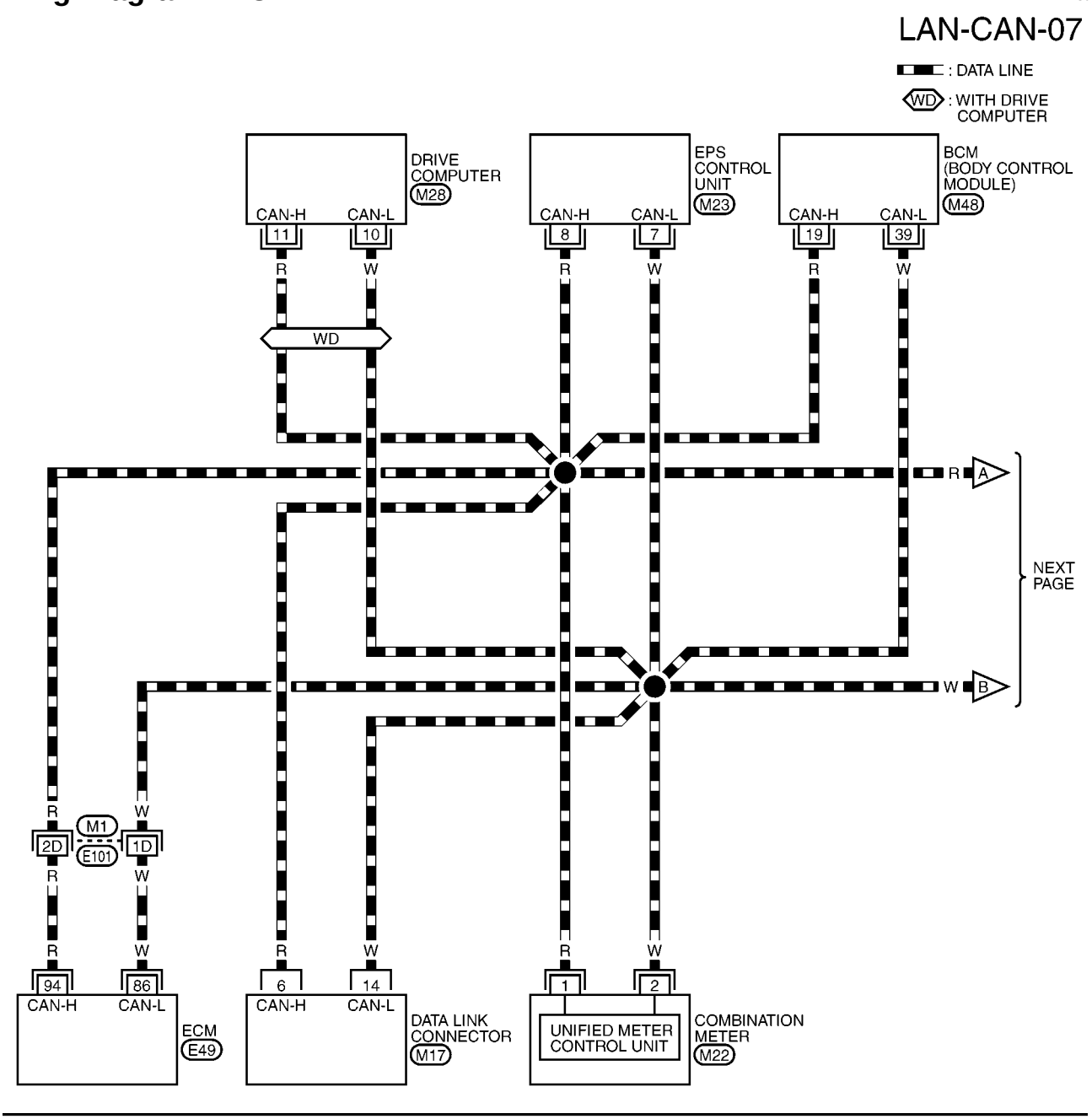
Component Parts and Harness Connector Location

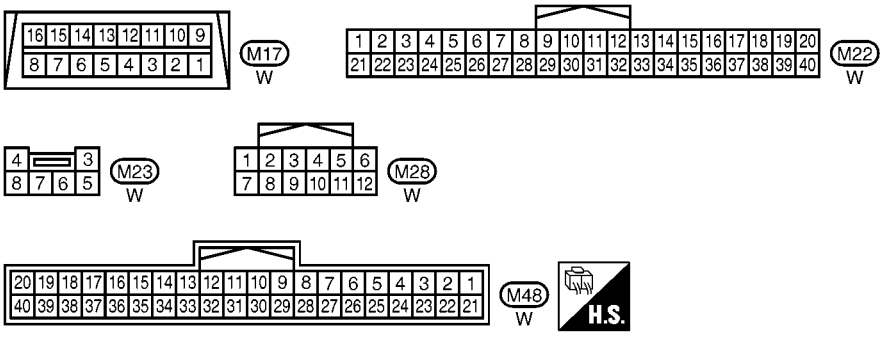
EKS00755



Wiring Diagram — CAN —

EKS007YU





REFER TO THE FOLLOWING.

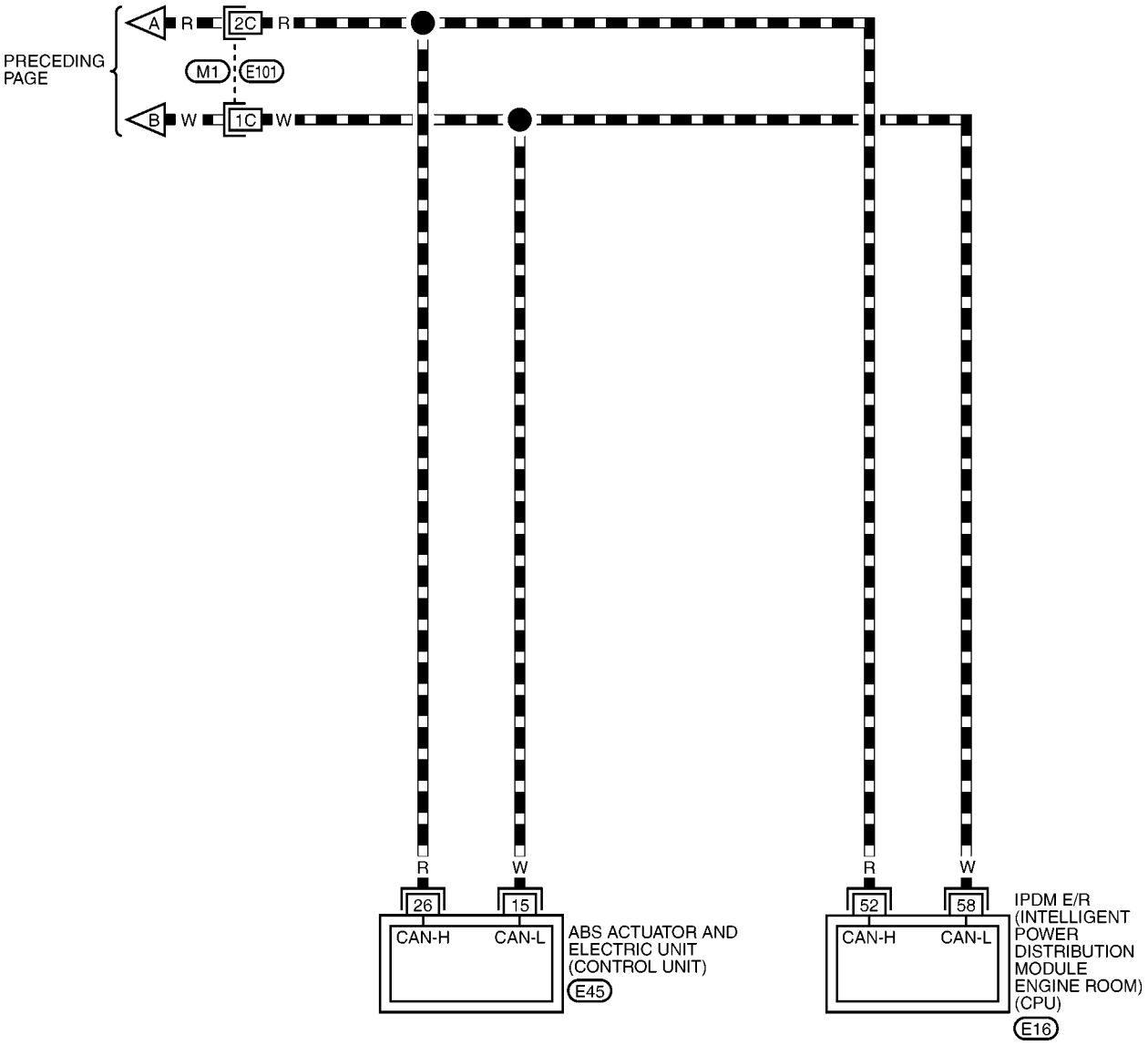
M1 -SUPER MULTIPLE JUNCTION (SMJ)

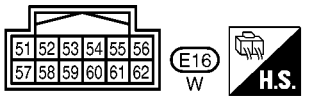
E49 -ELECTRICAL UNITS

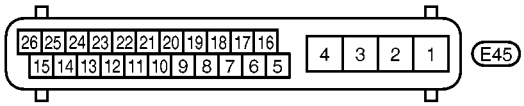
MKWA1310E

LAN-CAN-08

: DATA LINE







REFER TO THE FOLLOWING.

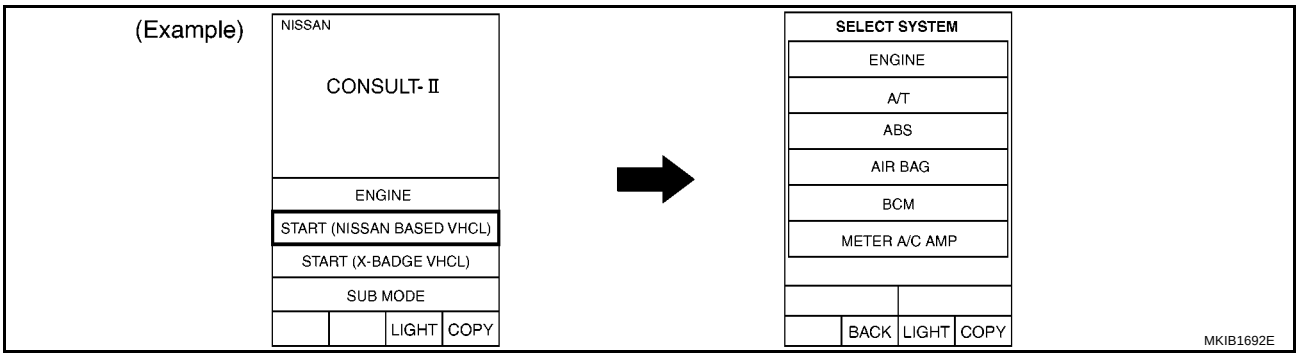
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1311E

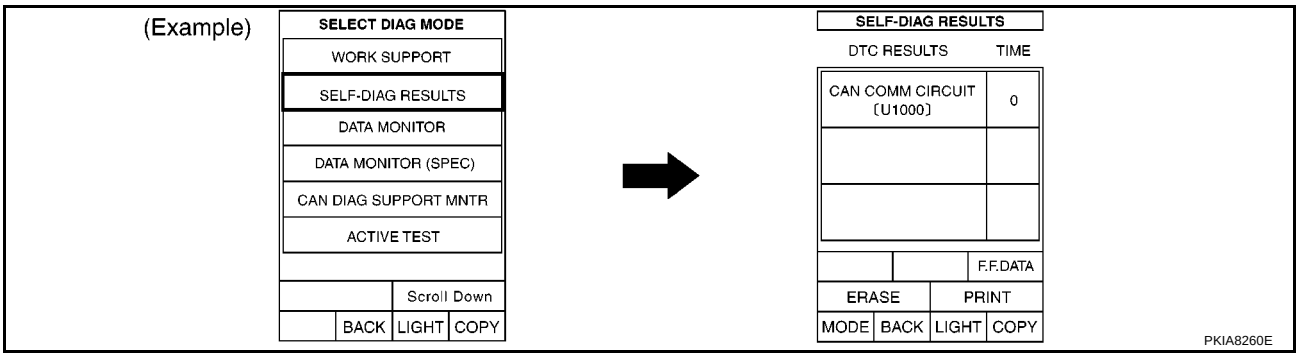
Work Flow

EKS0081Q

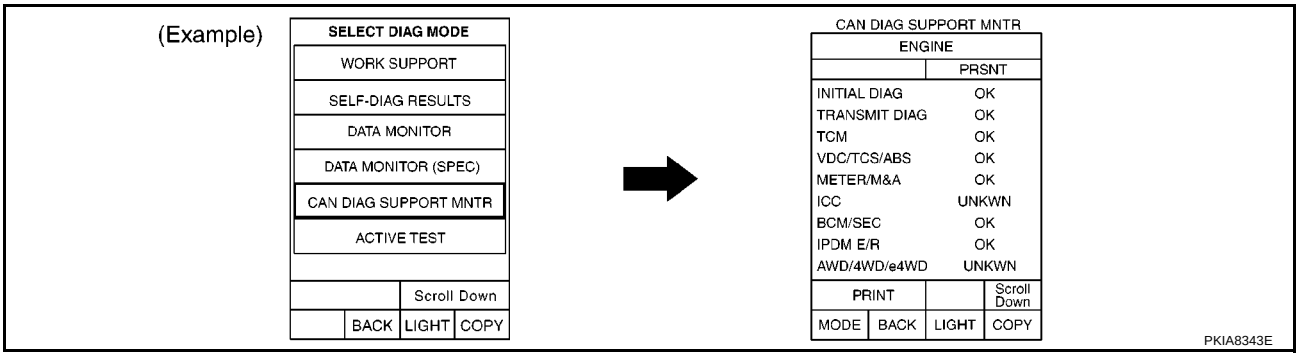
1. When there are no indications of “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.

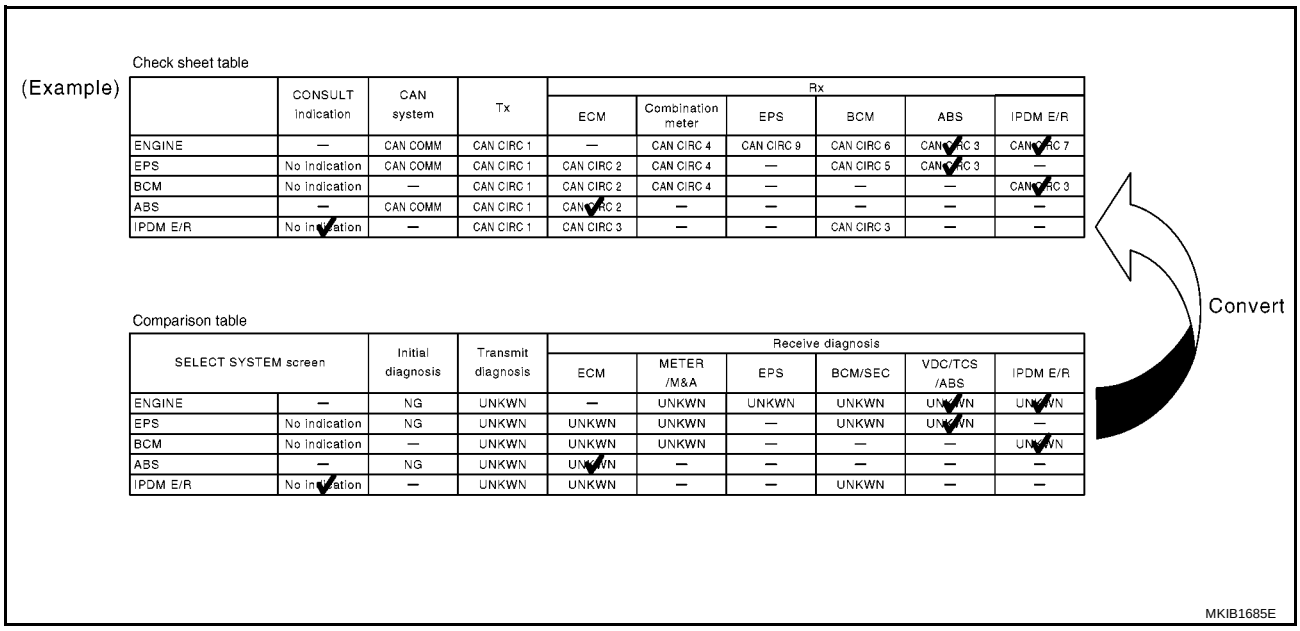


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-117, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-117, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



7. According to the check sheet results (example), start inspection. Refer to LAN-119, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis					
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	—	NG	UNKWN	—	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	UNKWN	UNKWN	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—
IPDM E/R	No indication	—	UNKWN	UNKWN	—	—	UNKWN	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1604E

Attach copy of
ENGINE
SELF-DIAG RESULTS

Attach copy of
EPS
SELF-DIAG RESULTS

Attach copy of
BCM
SELF-DIAG RESULTS

Attach copy of
ABS
SELF-DIAG RESULTS

Attach copy of
IPDM E/R
SELF-DIAG RESULTS

Attach copy of
ENGINE
DATA MONITOR

Attach copy of
EPS
DATA MONITOR

Attach copy of
BCM
DATA MONITOR

Attach copy of
ABS
DATA MONITOR

Attach copy of
IPDM E/R
DATA MONITOR

MKIB0304E

CHECK SHEET RESULTS (EXAMPLE)

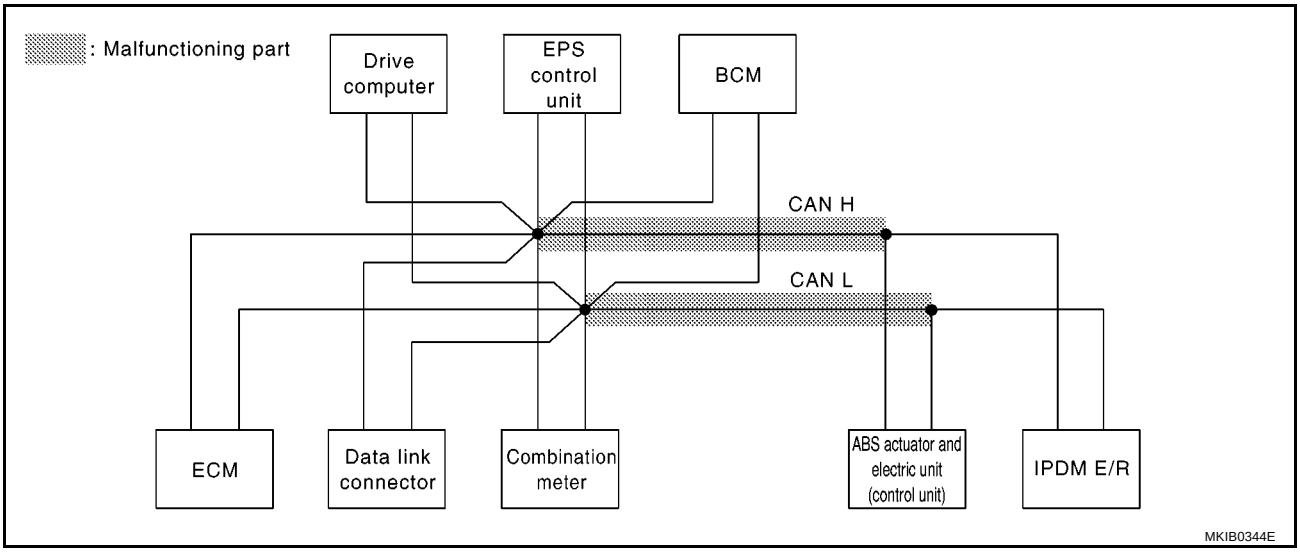
NOTE:
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-128, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1648E



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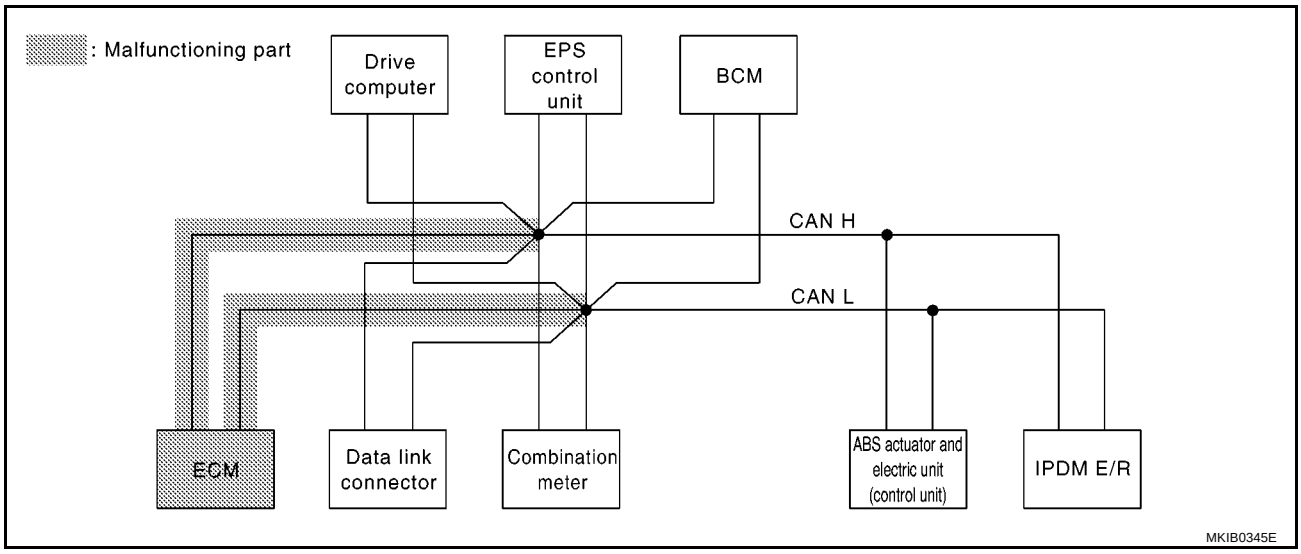
Case 2

Check ECM circuit. Refer to LAN-129, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1649E



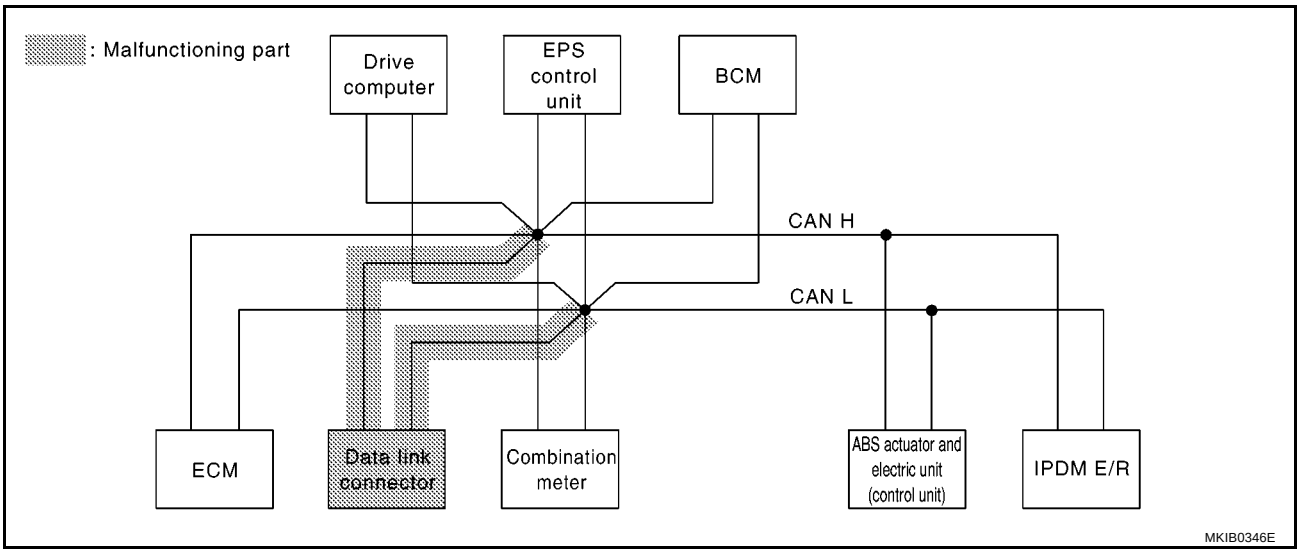
MKIB0345E

Case 3

Check data link connector circuit. Refer to LAN-130, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1650E



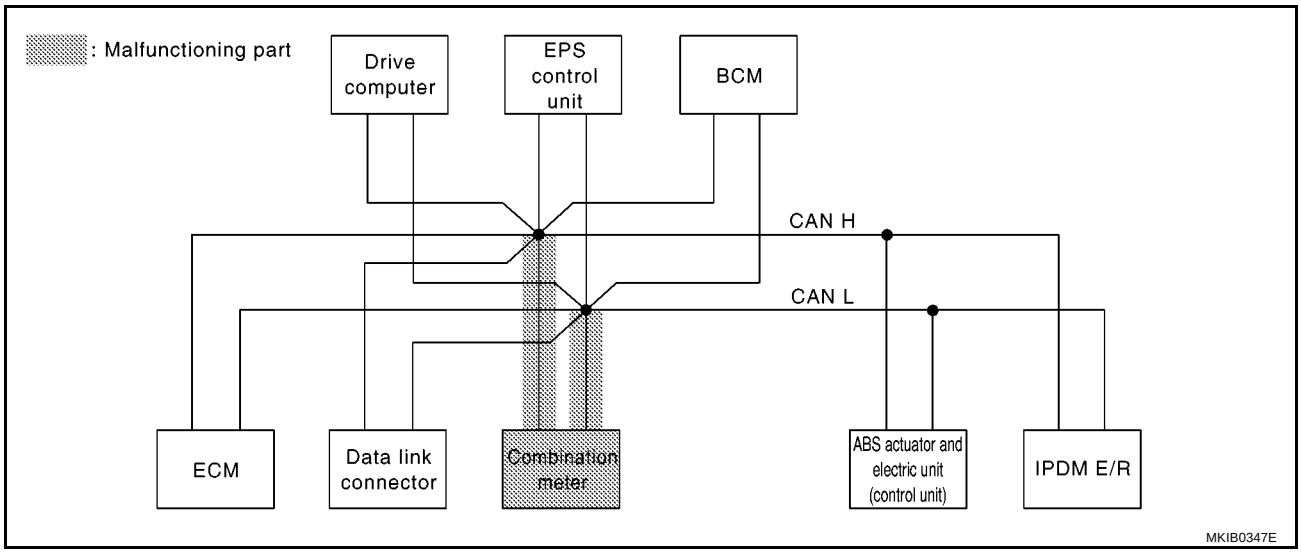
MKIB0346E

Case 4

Check combination meter circuit. Refer to LAN-131, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1651E



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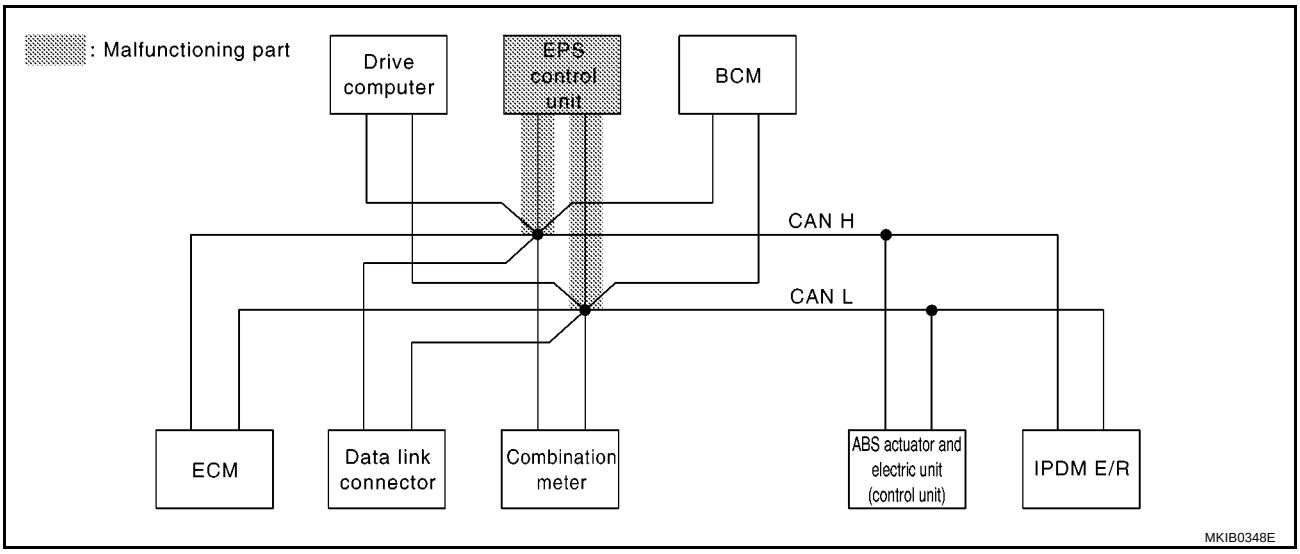
Case 5

Check EPS control unit circuit. Refer to LAN-132, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1652E



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Case 6

Check BCM circuit. Refer to LAN-133, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

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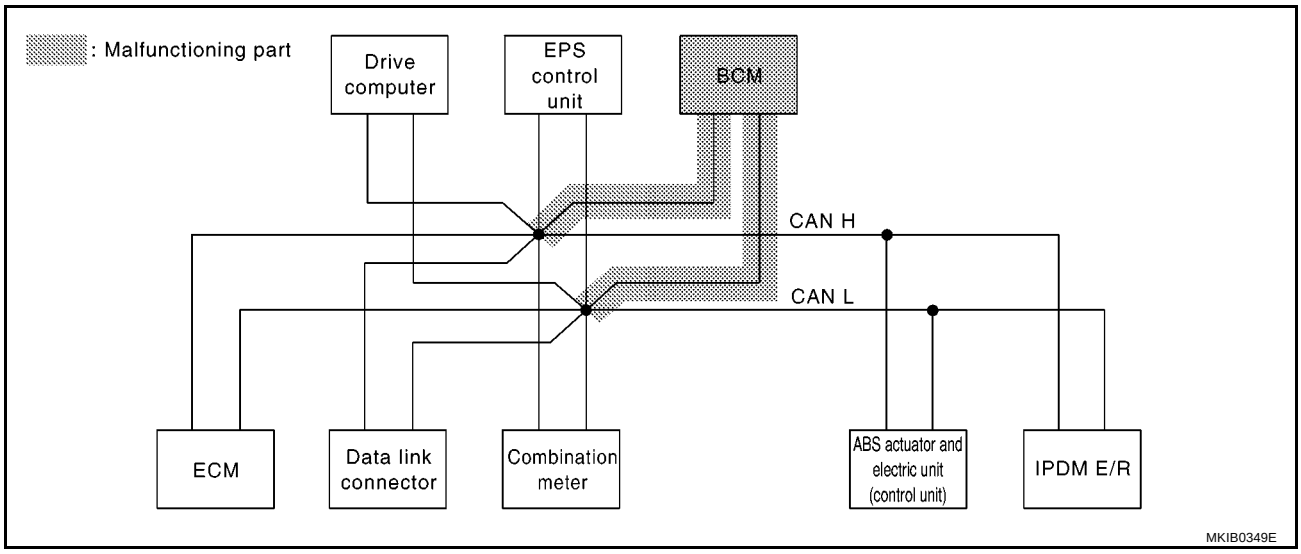


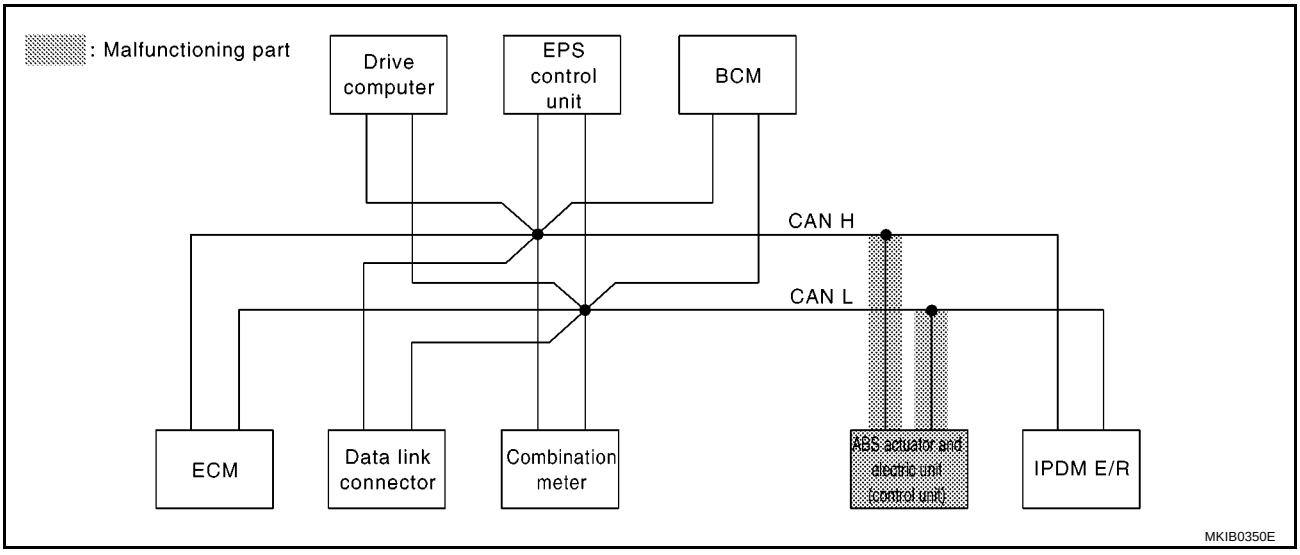
MKIB0349E

Case 7

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-134, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1654E



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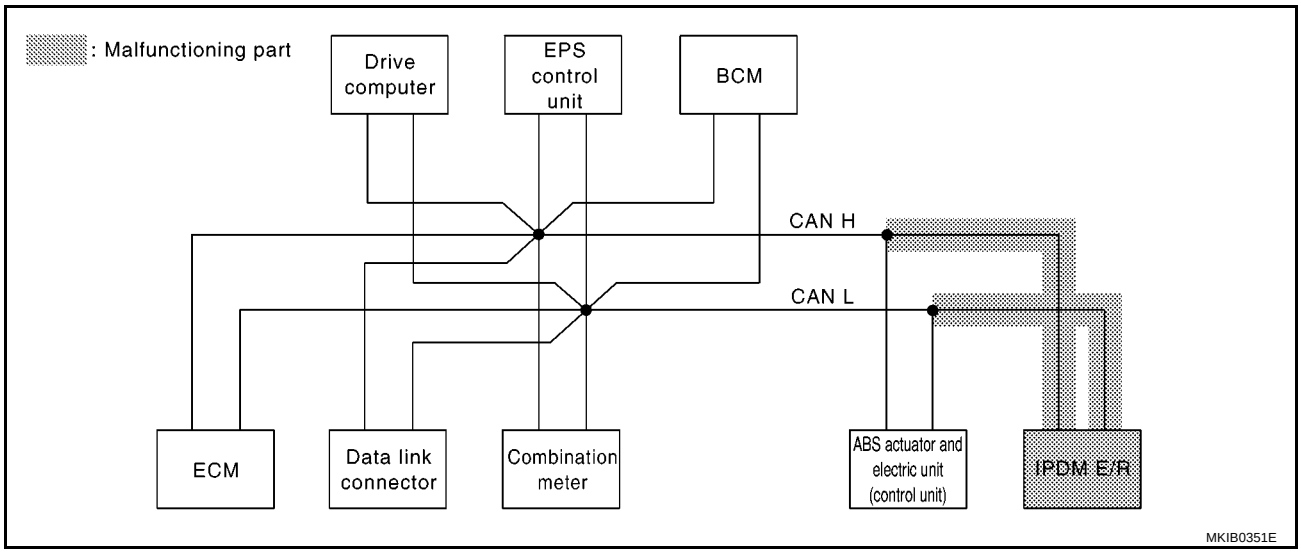
Case 8

Check IPDM E/R circuit. Refer to LAN-135, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1655E



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Case 9

Check CAN communication circuit. Refer to LAN-136, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1 ✓	—	CAN CIRC 4 ✓	CAN CIRC 9 ✓	CAN CIRC 6 ✓	CAN CIRC 3 ✓	CAN CIRC 7 ✓
EPS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication ✓	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—
IPDM E/R	No indication ✓	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1656E

Case 10

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-139, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3 ✓	—	—	CAN CIRC 3	—	—

MKIB1658E

Case 11

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-139, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	—	CAN COMM	CAN CIRC 1	—	CAN CIRC 4 ✓	CAN CIRC 9 ✓	CAN CIRC 6 ✓	CAN CIRC 3	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	—	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 3	—	—

MKIB1657E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS0081R

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

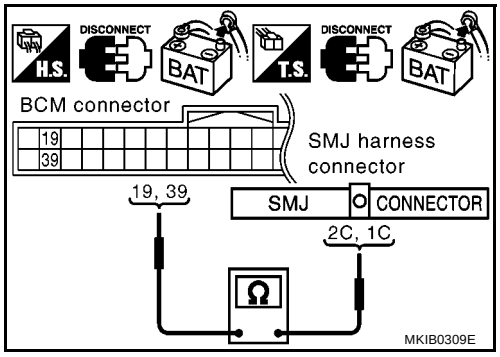
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



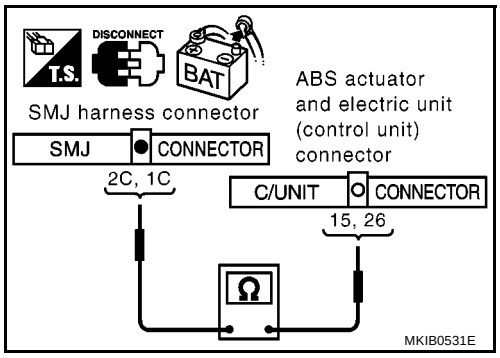
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-115, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS0081S

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

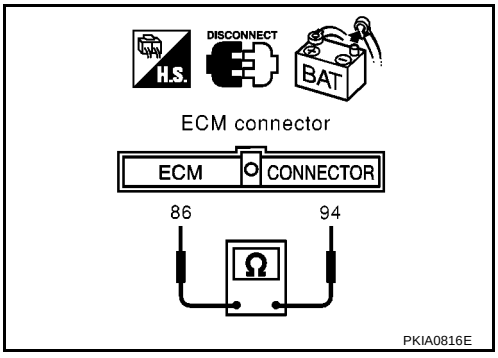
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS0081T

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check data link connector and terminals for damage, bend and loose connection (connector side and harness side).

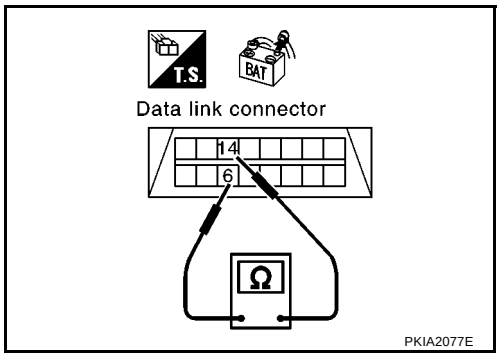
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-115, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS0081U

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

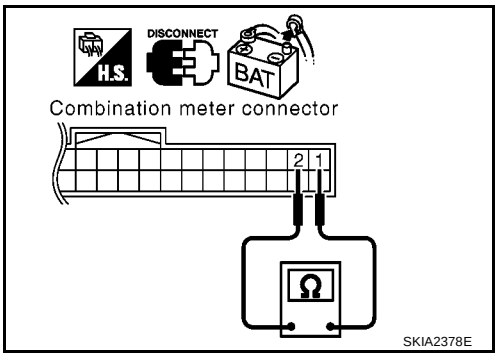
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

EPS Control Unit Circuit Check

EKS0081V

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

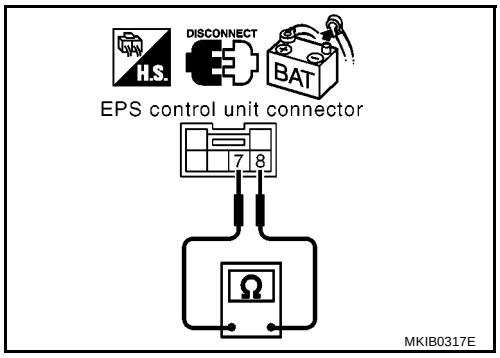
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS0081W

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

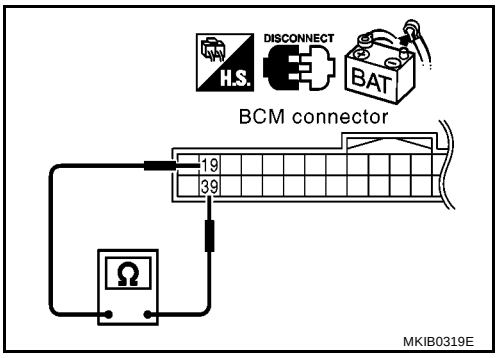
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS0081X

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

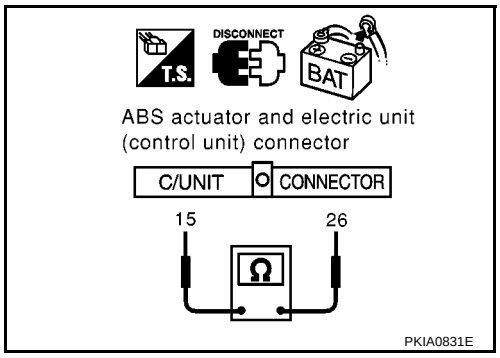
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.



IPDM E/R Circuit Check

EKS0081Y

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

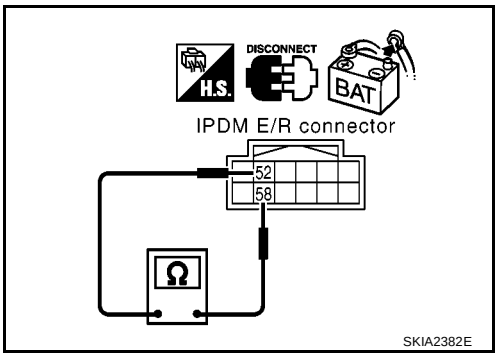
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS0081Z

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

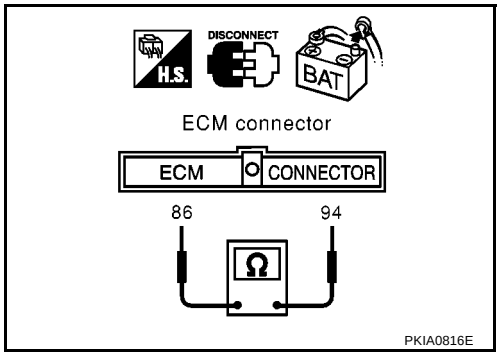
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



3. CHECK HARNESS FOR SHORT CIRCUIT

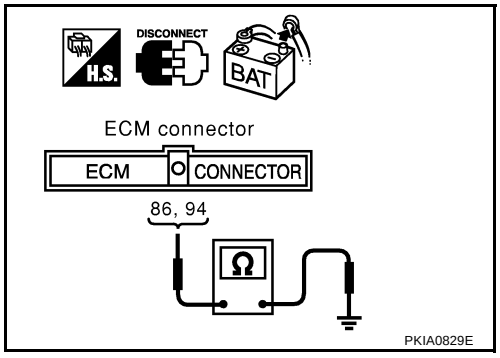
Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.

86 (W) – Ground : Continuity should not exist.

OK or NG

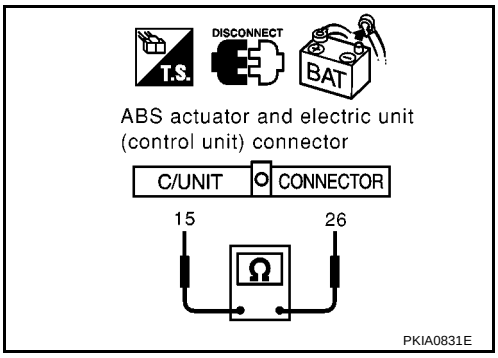
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



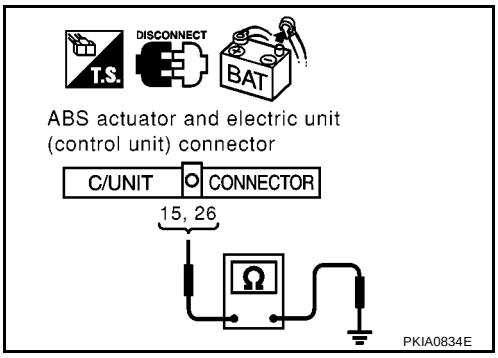
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.
15 (W) – Ground : Continuity should not exist.



OK or NG

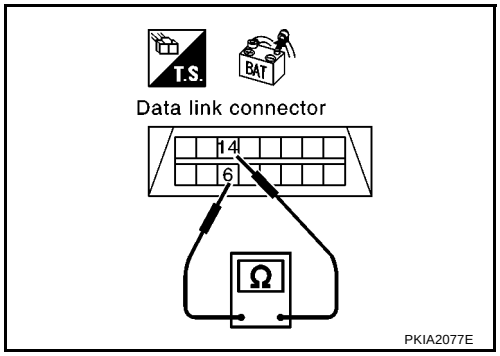
OK >> GO TO 4.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



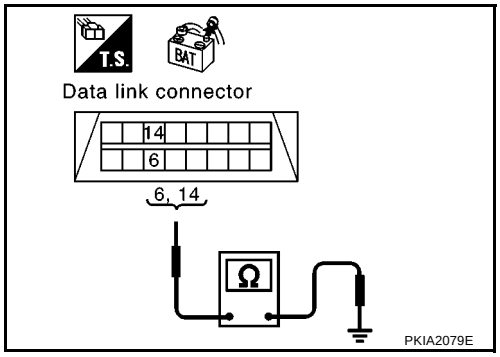
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 6.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-139, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-115, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00820

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

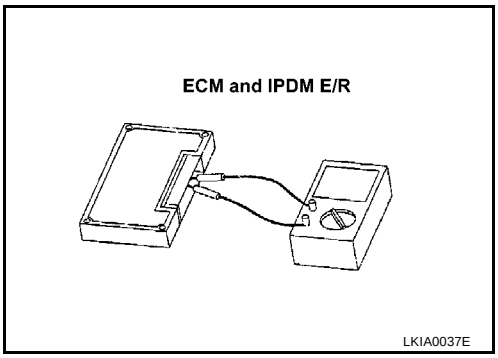
Component Inspection

EKS00821

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 5)

PFP:23710

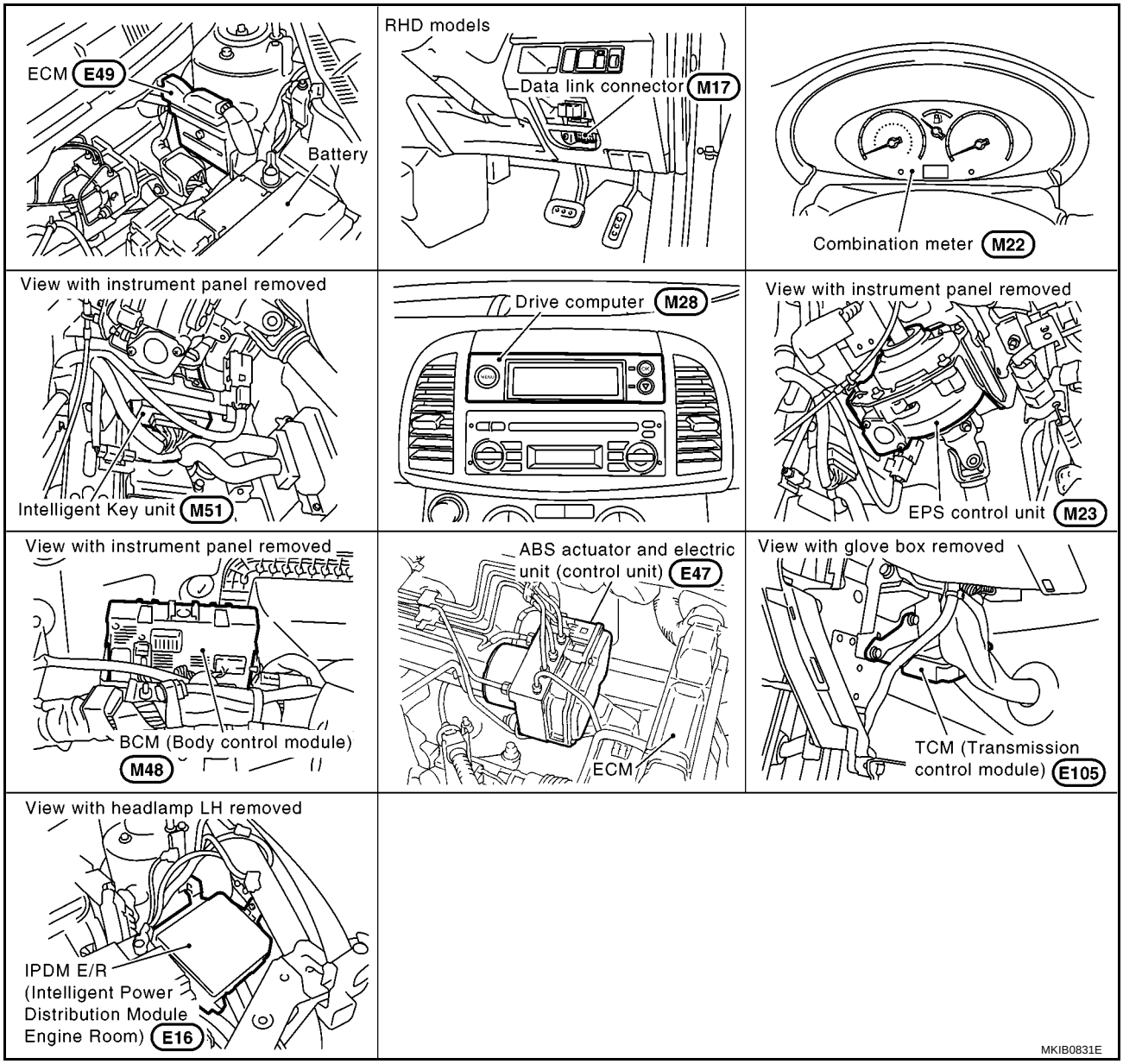
System Description

EKS00JO5

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

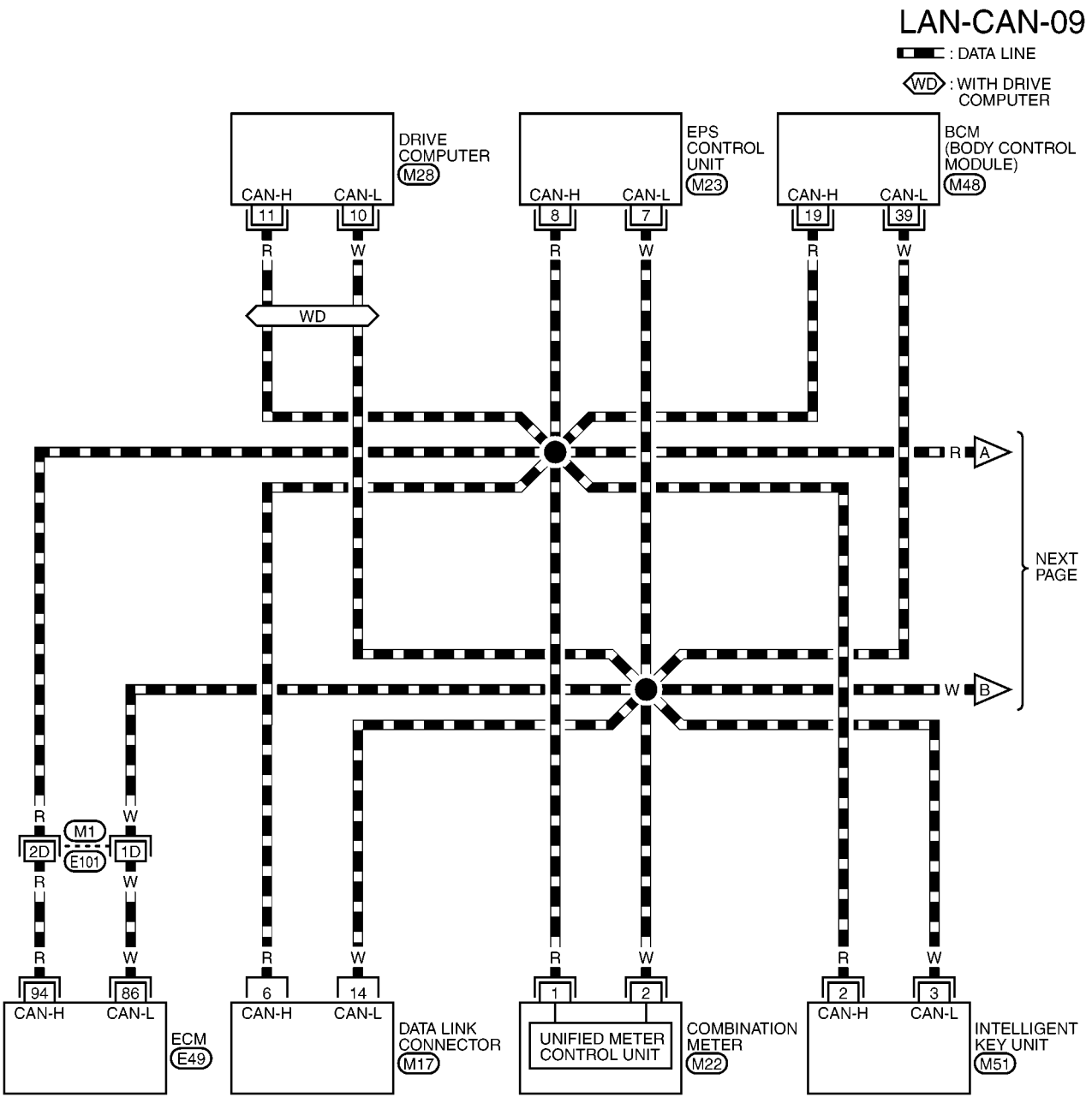
Component Parts and Harness Connector Location

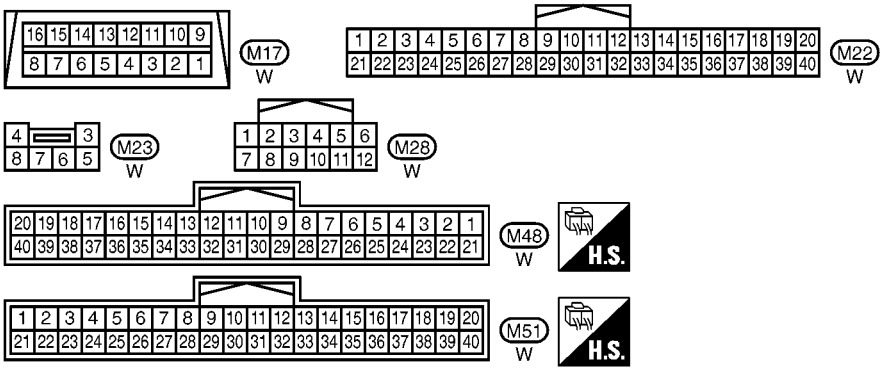
EKS00JO6



Wiring Diagram — CAN —

EKS00JO7



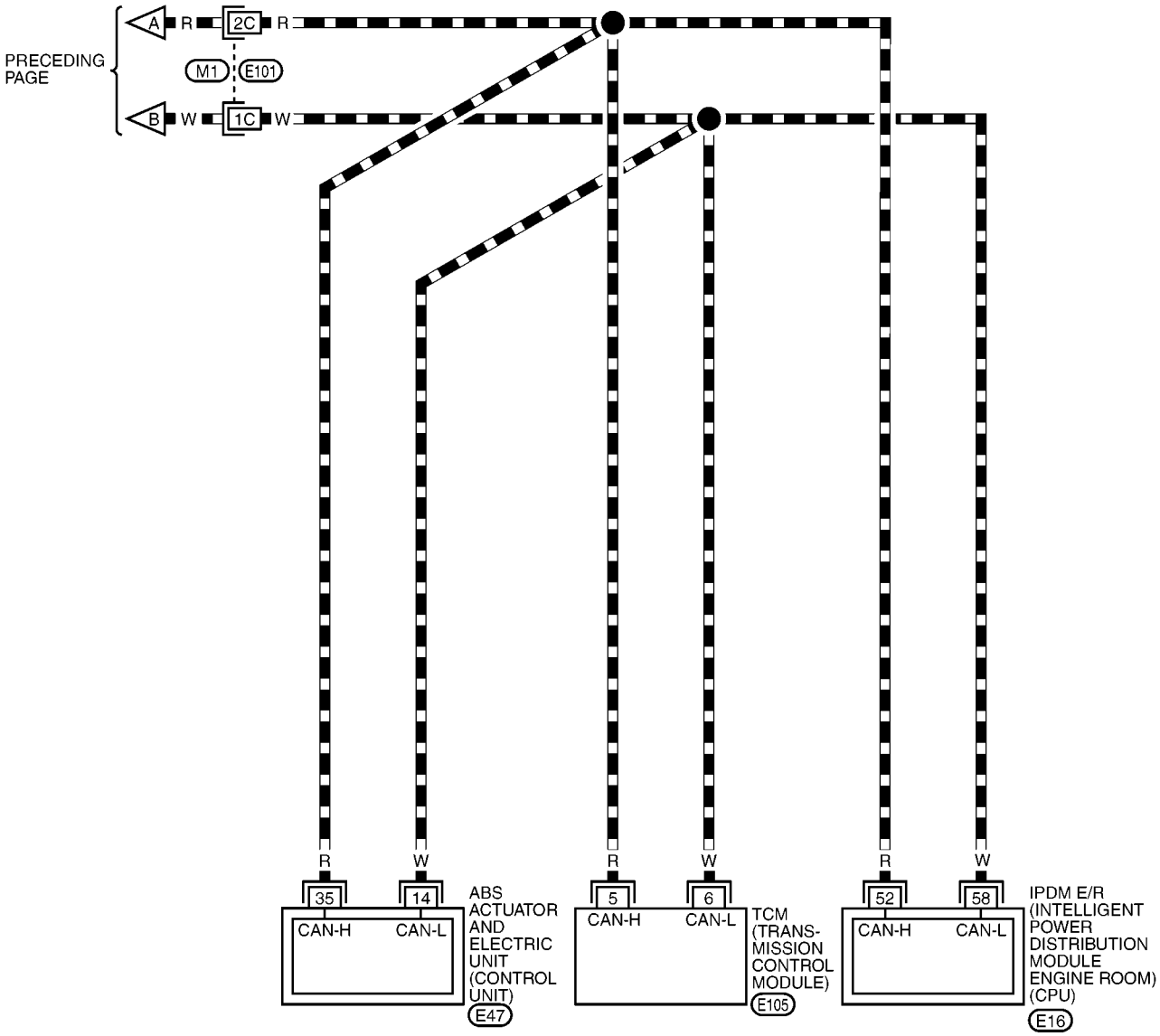


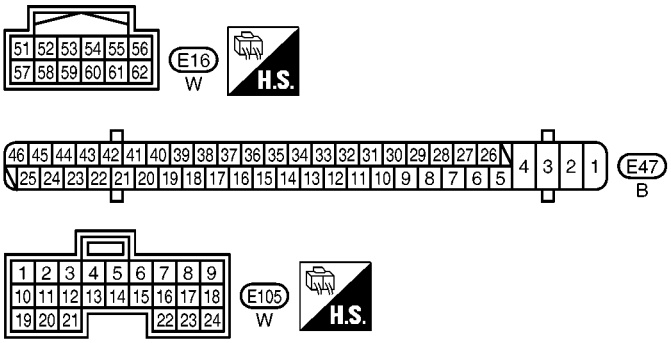
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

MKWA2709E

LAN-CAN-10

: DATA LINE





REFER TO THE FOLLOWING.

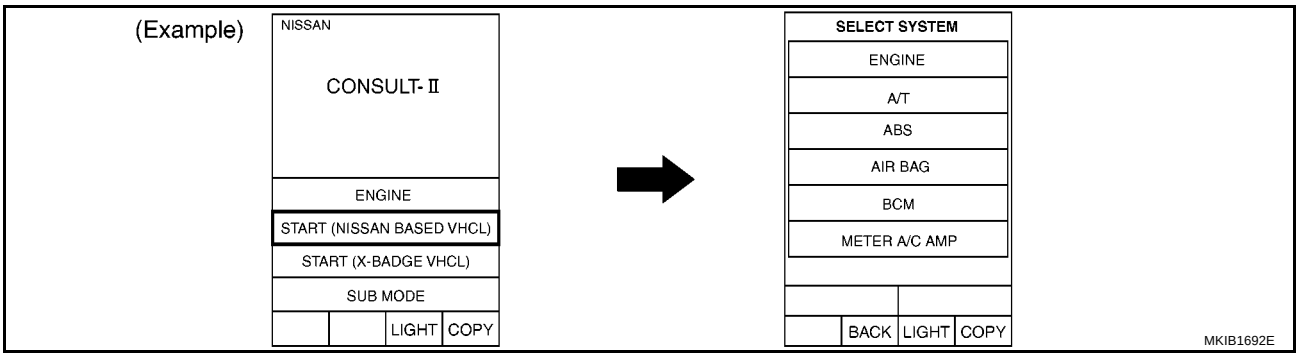
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2710E

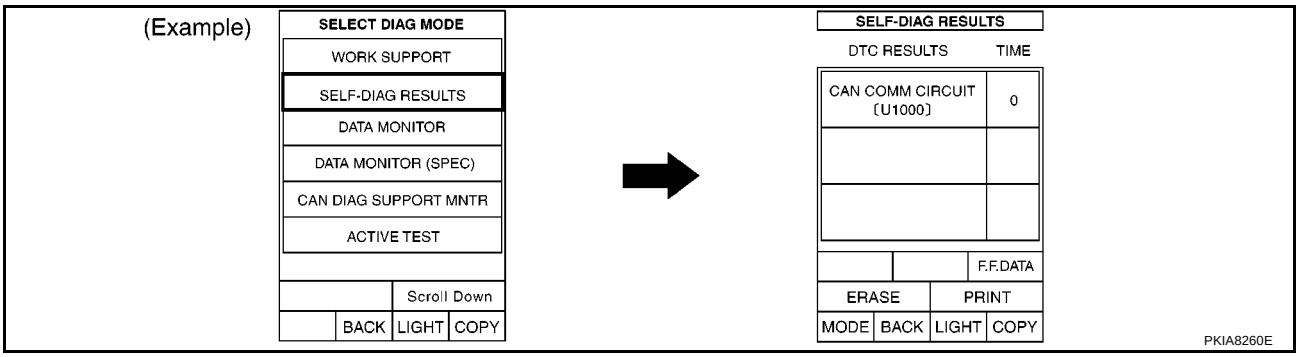
Work Flow

EKS00JO8

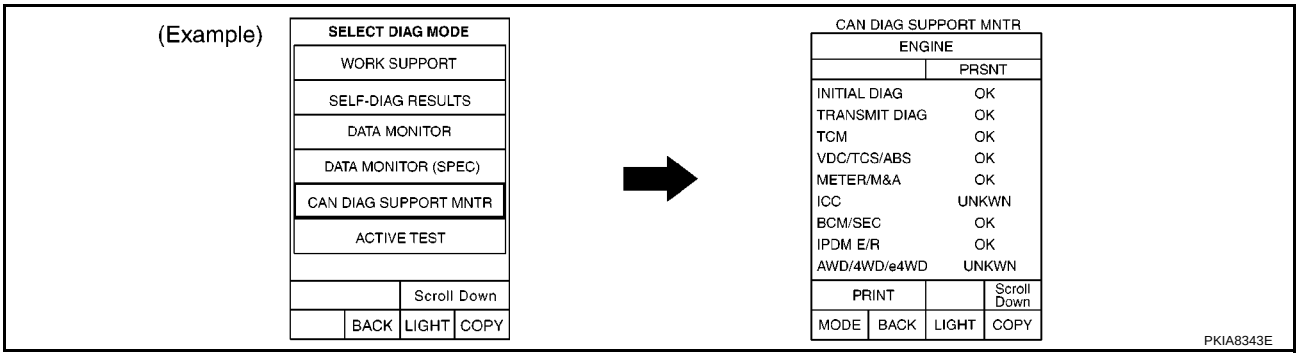
1. When there are no indications of “INTELLIGENT KEY”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-145, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-145, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.

(Example) Check sheet table

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

Convert

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis							
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–	–	–
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	–
A/T	–	NG	UNKWN	UNKWN	UNKWN	–	–	–	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	–	UNKWN	–	–	–

MKIB1686E

7. According to the check sheet results (example), start inspection. Refer to LAN-147, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

Comparison table

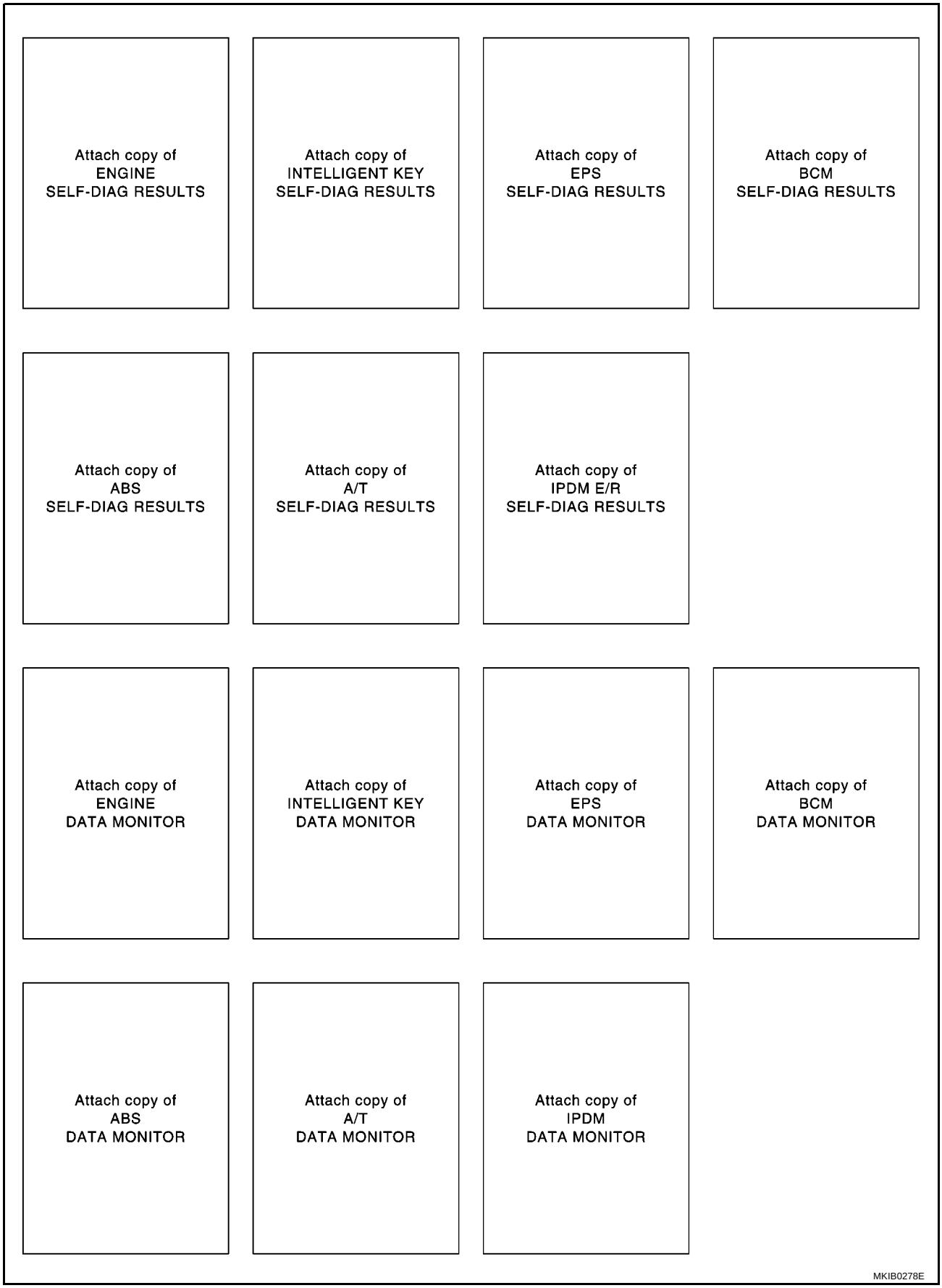
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis							
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–	–	–
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	–
A/T	–	NG	UNKWN	UNKWN	UNKWN	–	–	–	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	–	UNKWN	–	–	–

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1605E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
INTELLIGENT KEY
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
A/T
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
Attach copy of
ENGINE
DATA MONITOR
Attach copy of
INTELLIGENT KEY
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
A/T
DATA MONITOR
Attach copy of
IPDM
DATA MONITOR
MKIB0278E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

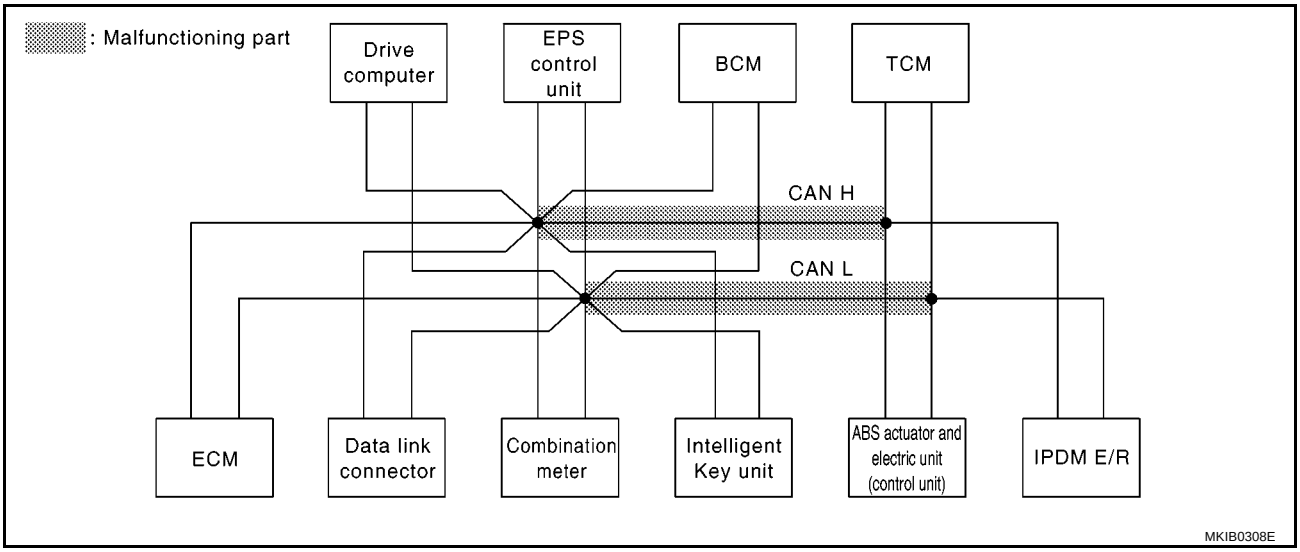
If “NG” is displayed on “CAN COMM” as “DATA MONITOR (CAN DIAG SUPPORT MNTR)” for the diagnosed control unit, replace the control unit.

Case1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-158, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3 ✓	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6 ✓	CAN CIRC 3 ✓
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4 ✓	–	–	–	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0777E



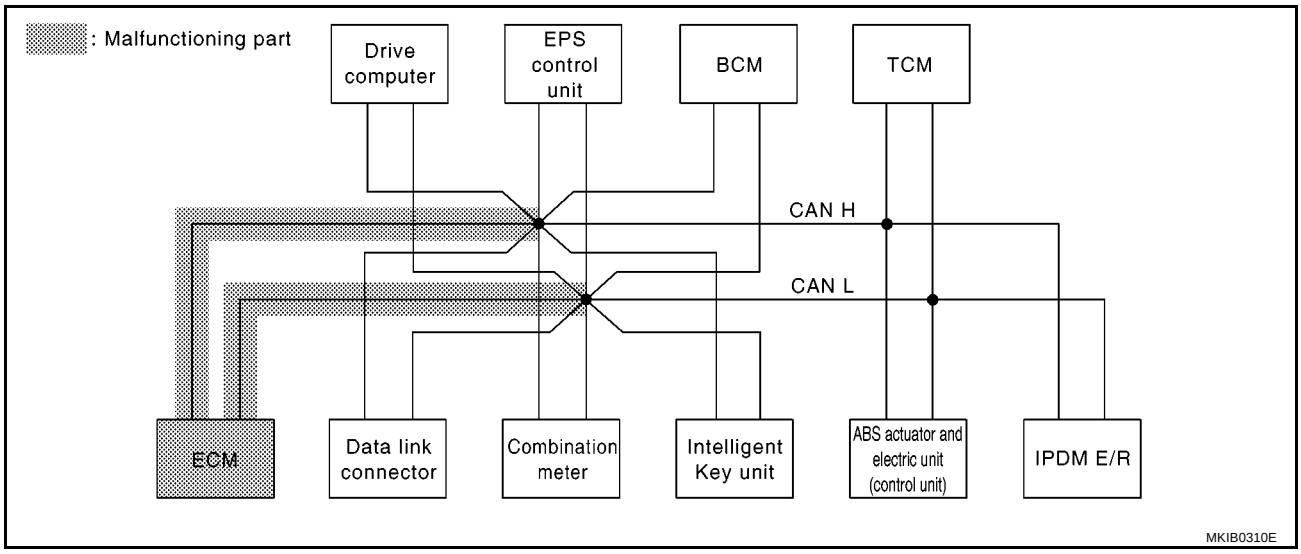
MKIB0308E

Case2

Check ECM circuit. Refer to LAN-159, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4 ✔	–	CAN CIRC 9 ✔	CAN CIRC 6 ✔	CAN CIRC 3 ✔	CAN CIRC 2 ✔	CAN CIRC 7 ✔
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4 ✔	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✔	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2 ✔	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✔	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✔	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3 ✔	–	–	–	CAN CIRC 2	–	–	–

MKIB0778E



MKIB0310E

Case3

Check data link connector circuit. Refer to LAN-160, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication ✔	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

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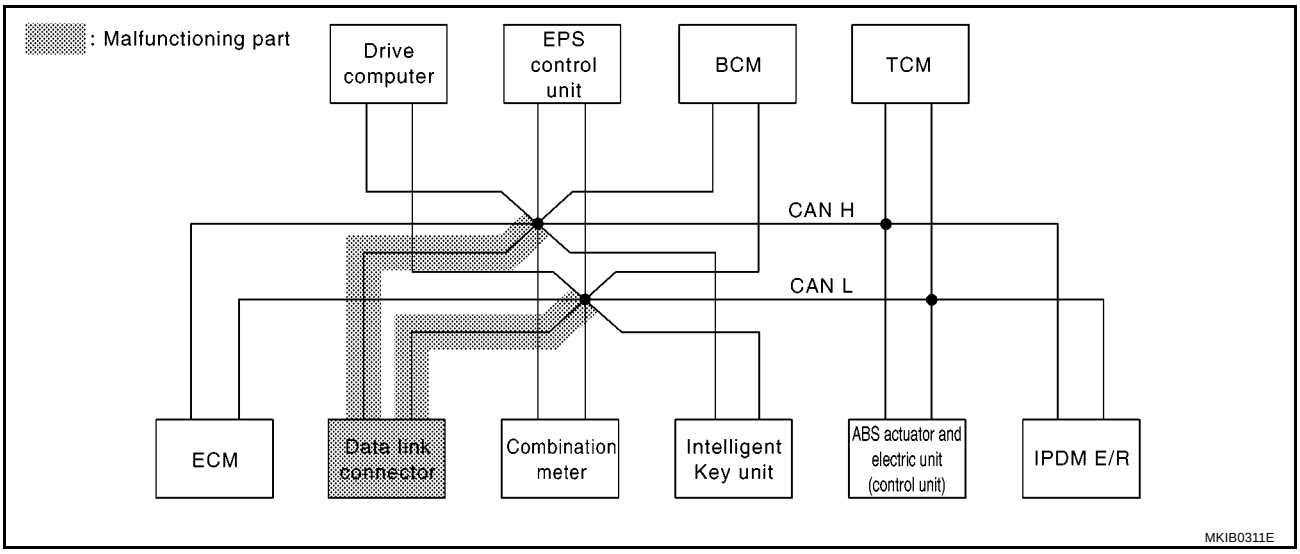


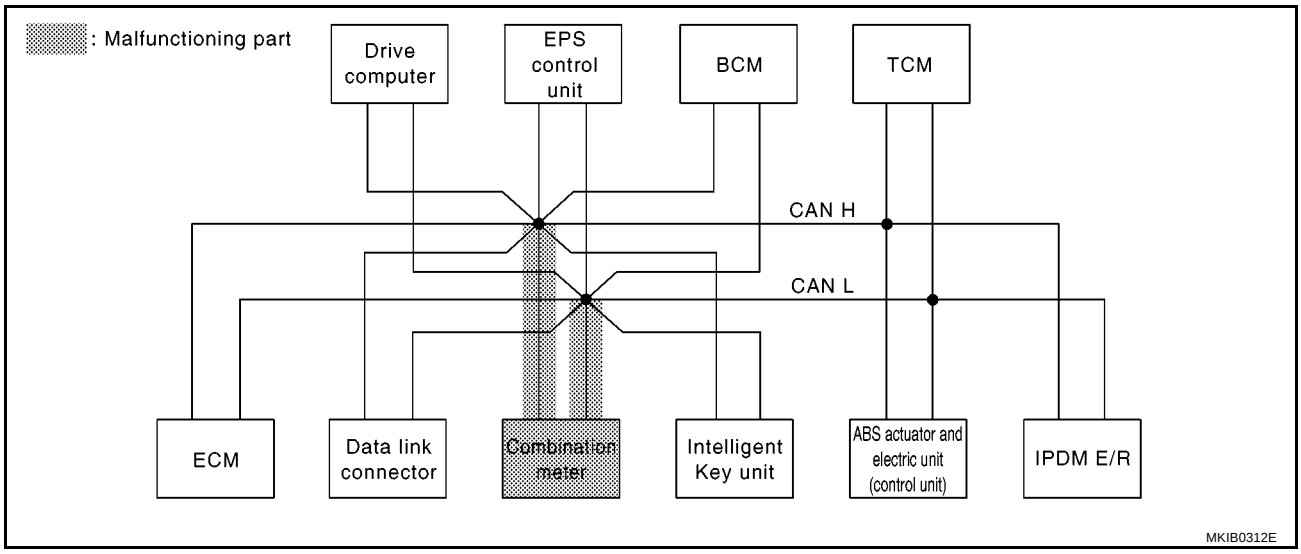
MKIB0311E

Case4

Check combination meter circuit. Refer to LAN-161, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0780E



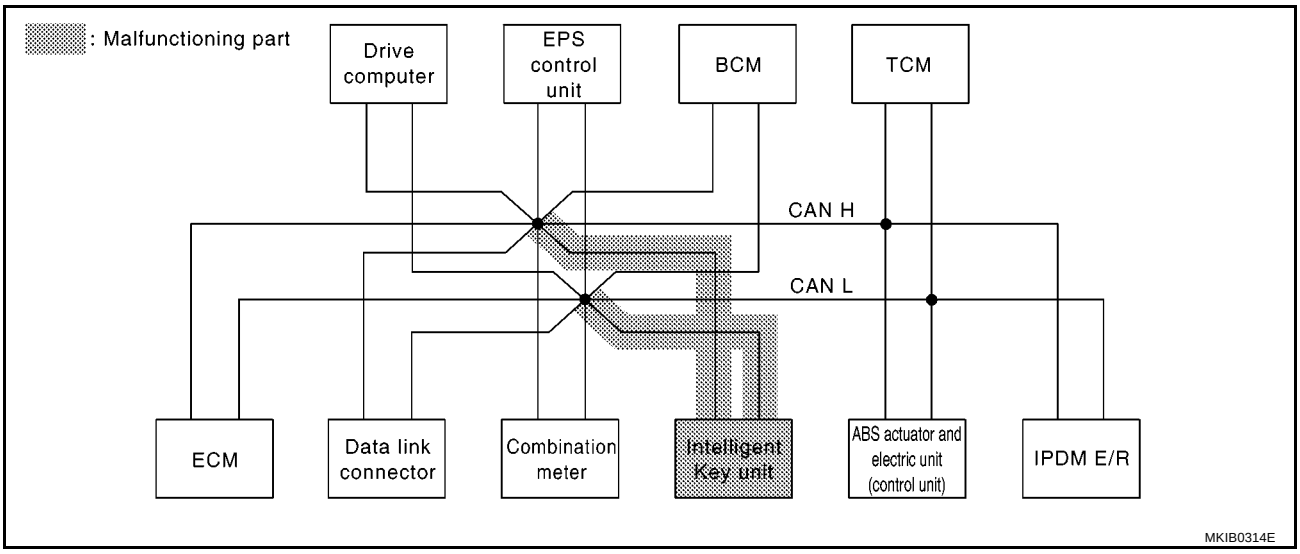
MKIB0312E

Case5

Check Intelligent Key unit circuit. Refer to LAN-162, "Intelligent Key Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0781E



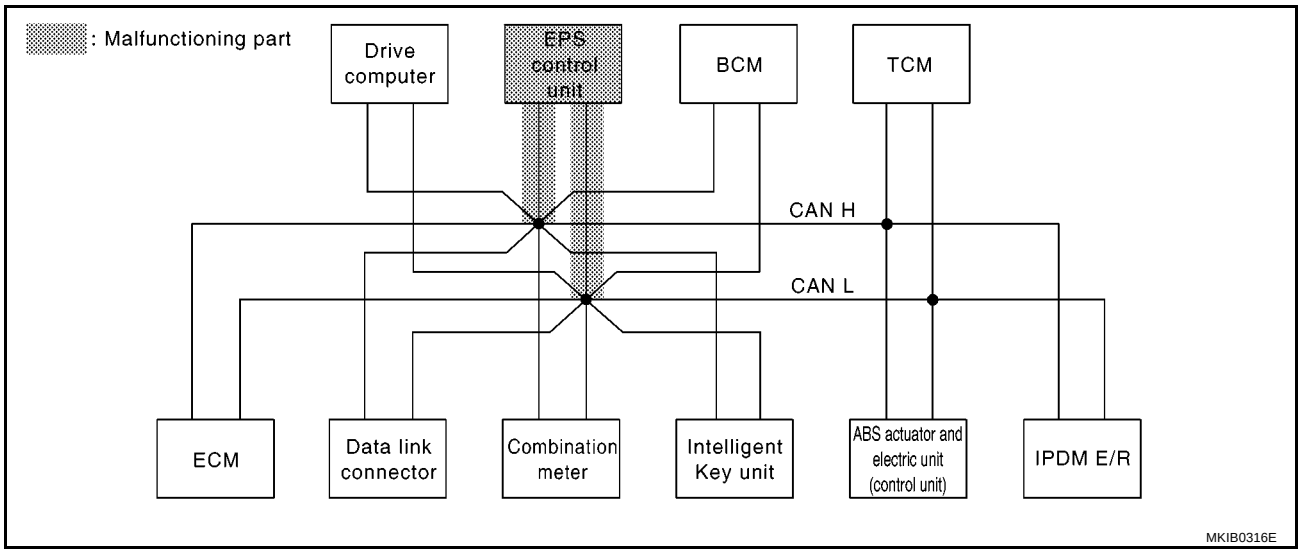
MKIB0314E

Case6

Check EPS control unit circuit. Refer to LAN-163, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0782E



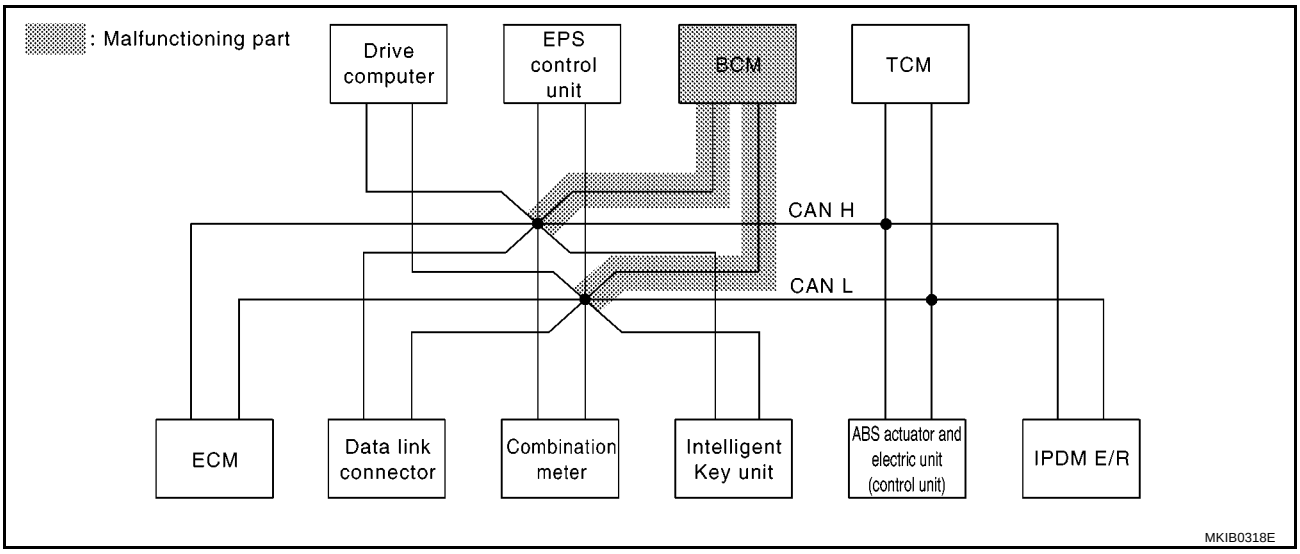
MKIB0316E

Case7

Check BCM circuit. Refer to LAN-164, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0783E



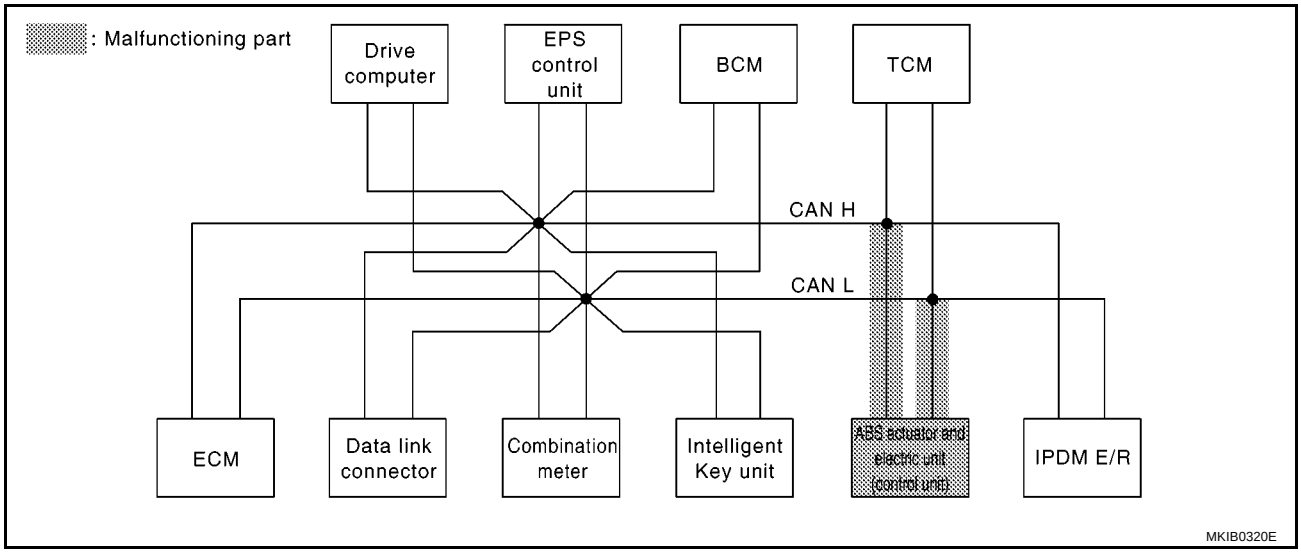
MKIB0318E

Case8

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-165, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0784E



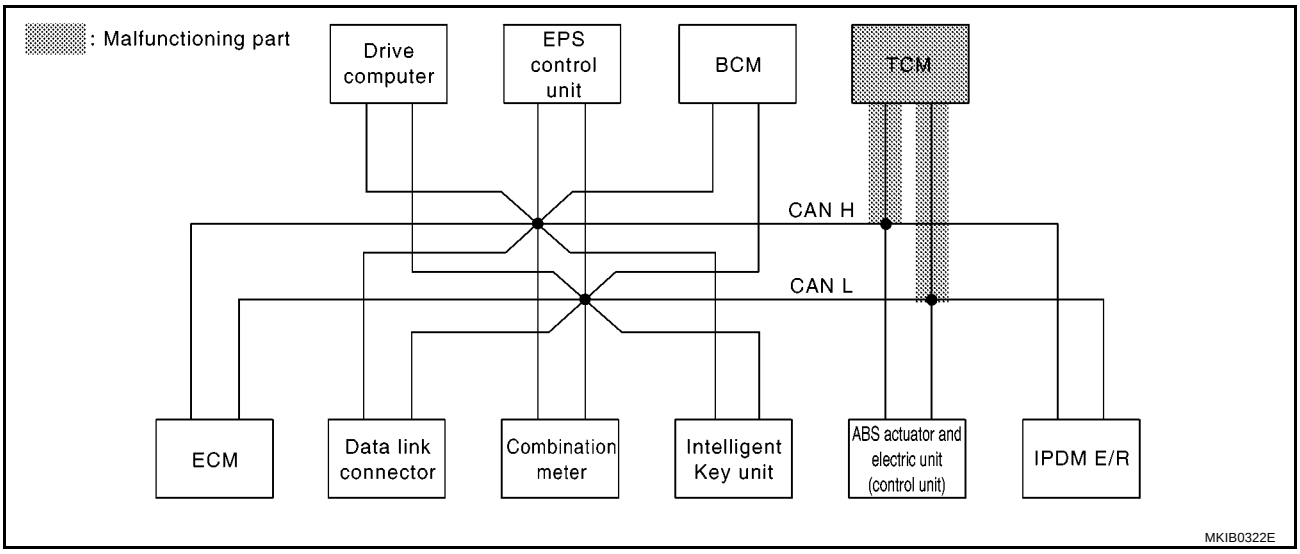
MKIB0320E

Case9

Check TCM circuit. Refer to LAN-166, "TCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0785E



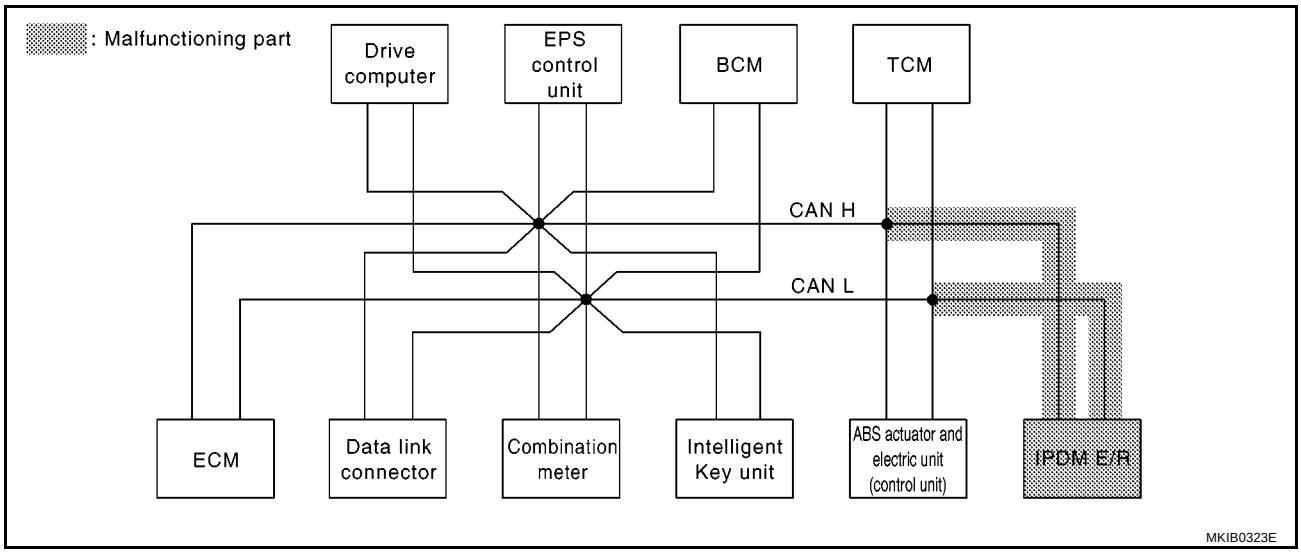
MKIB0322E

Case10

Check IPDM E/R circuit. Refer to LAN-167, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7 ✔
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3 ✔
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0786E



MKIB0323E

Case11

Check CAN communication circuit. Refer to LAN-168, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0787E

Case12

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-171, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0788E

Case13

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-171, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx							
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–	–

MKIB0789E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JO9

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

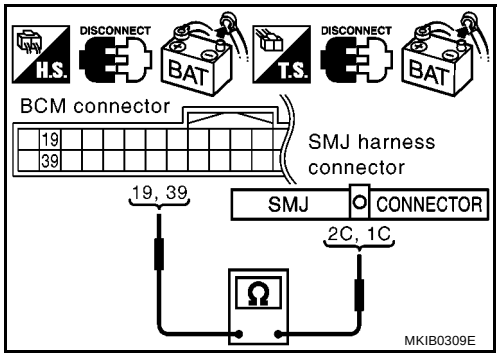
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



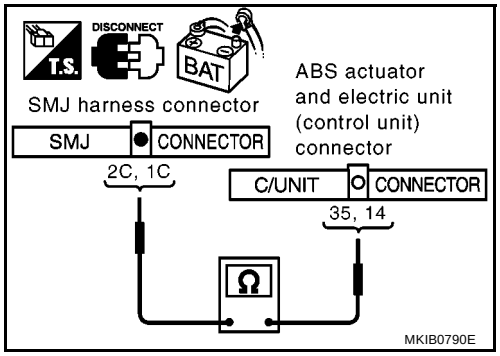
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W).

2C (R) – 35 (R) : Continuity should exist.
1C (W) – 14 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-143, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JOA

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

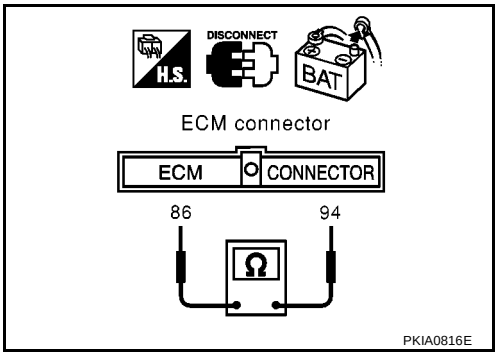
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JOB

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check date link connector and terminals for damage, bend and loose connection (connector side and harness side).

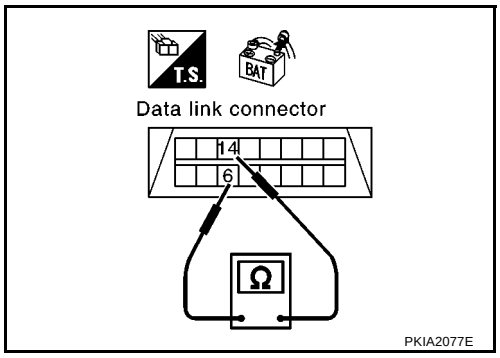
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-143, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JOC

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

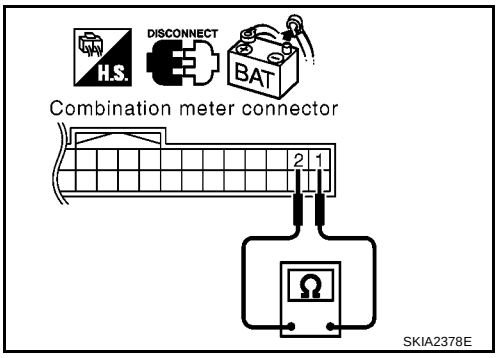
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

Intelligent Key Unit Circuit Check

EKS00JOD

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of Intelligent Key unit for damage, bend and loose connection (control unit side and harness side).

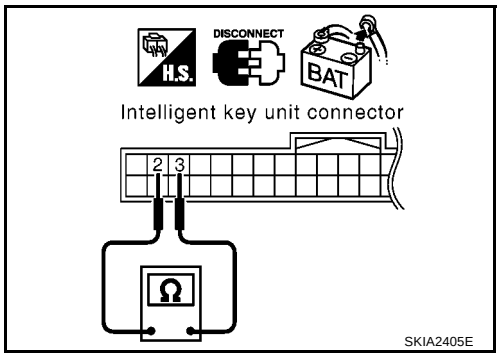
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check resistance between Intelligent Key unit harness connector M51 terminals 2 (R) and 3 (W).

2 (R) – 3 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair harness between Intelligent Key unit and data link connector.

EPS Control Unit Circuit Check

EKS00JOE

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

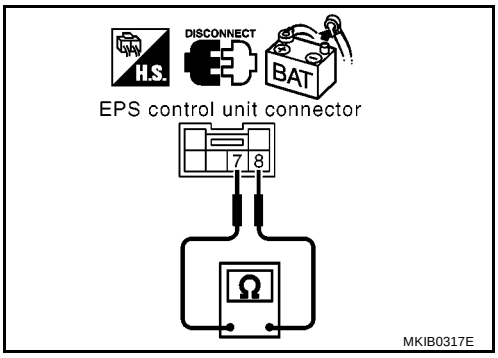
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JOF

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

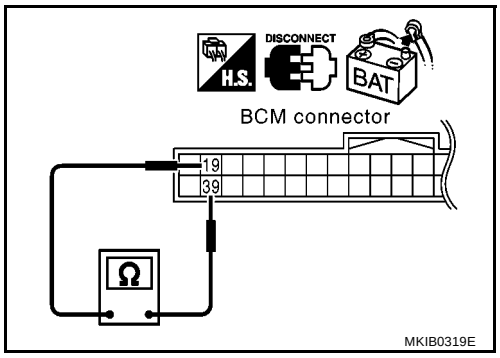
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JOG

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

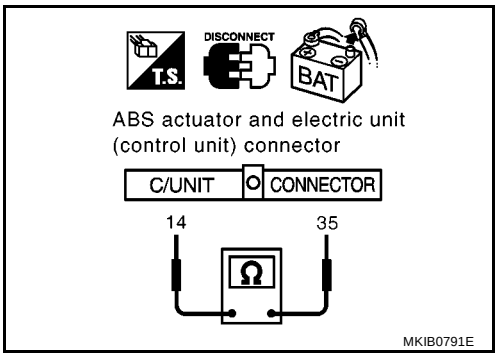
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and TCM.



TCM Circuit Check

EKS00JOH

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

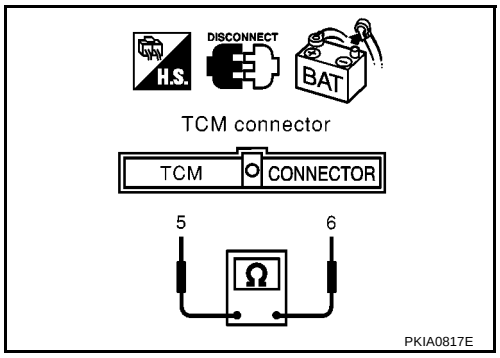
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector E105 terminals 5 (R) and 6 (W).

5 (R) – 6 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and IPDM E/R.

IPDM E/R Circuit Check

EKS00JOI

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

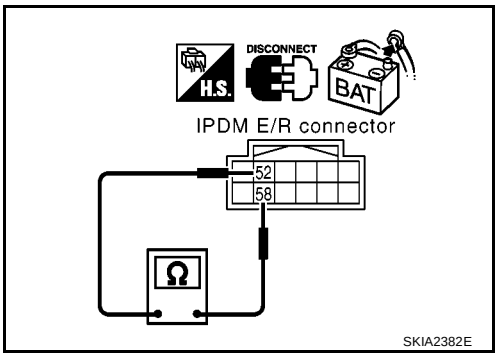
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and TCM.

CAN Communication Circuit Check

EKS00JOJ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Intelligent Key unit
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- TCM
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

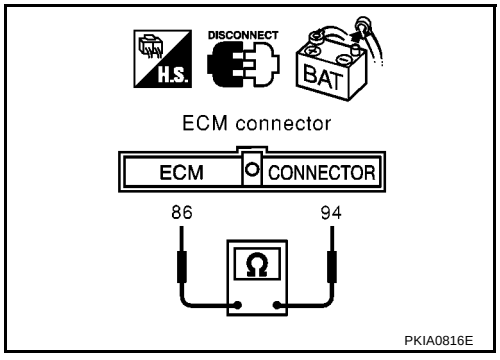
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



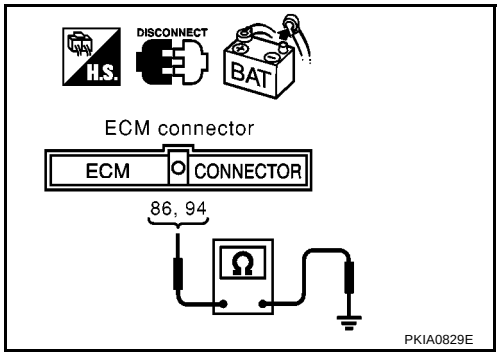
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.

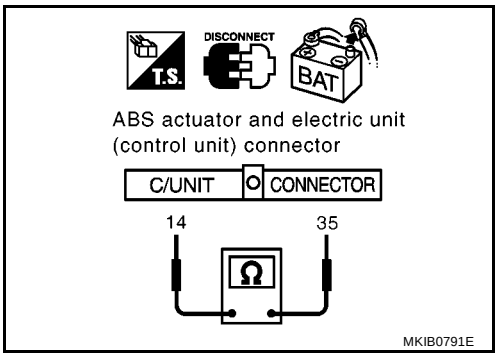


4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- TCM connector
- IPDM E/R connector

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

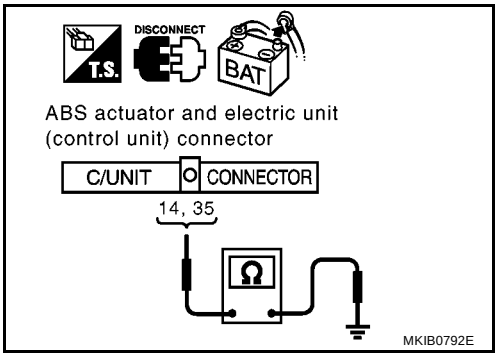
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W) and ground.

35 (R) – Ground : Continuity should not exist.

14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 6.

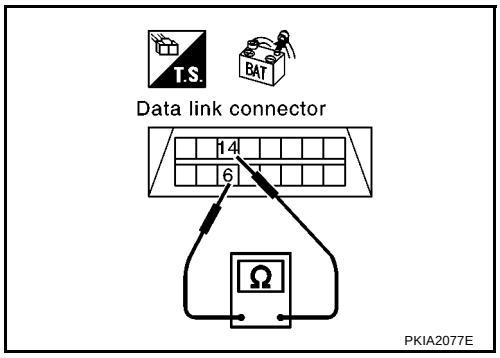
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



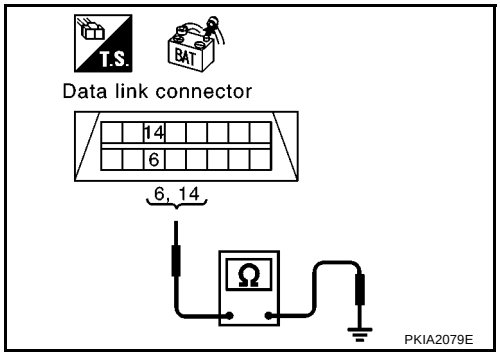
OK or NG

OK >> GO TO 7.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-171, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-143, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JOK

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

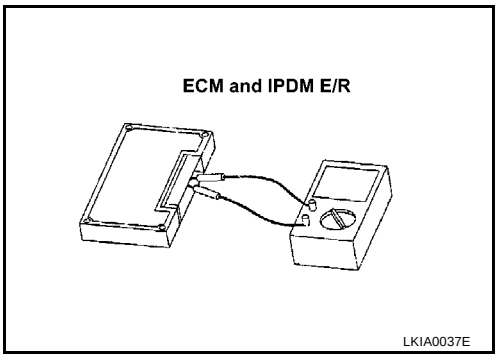
Component Inspection

EKS00JOL

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 6)

PFP:23710

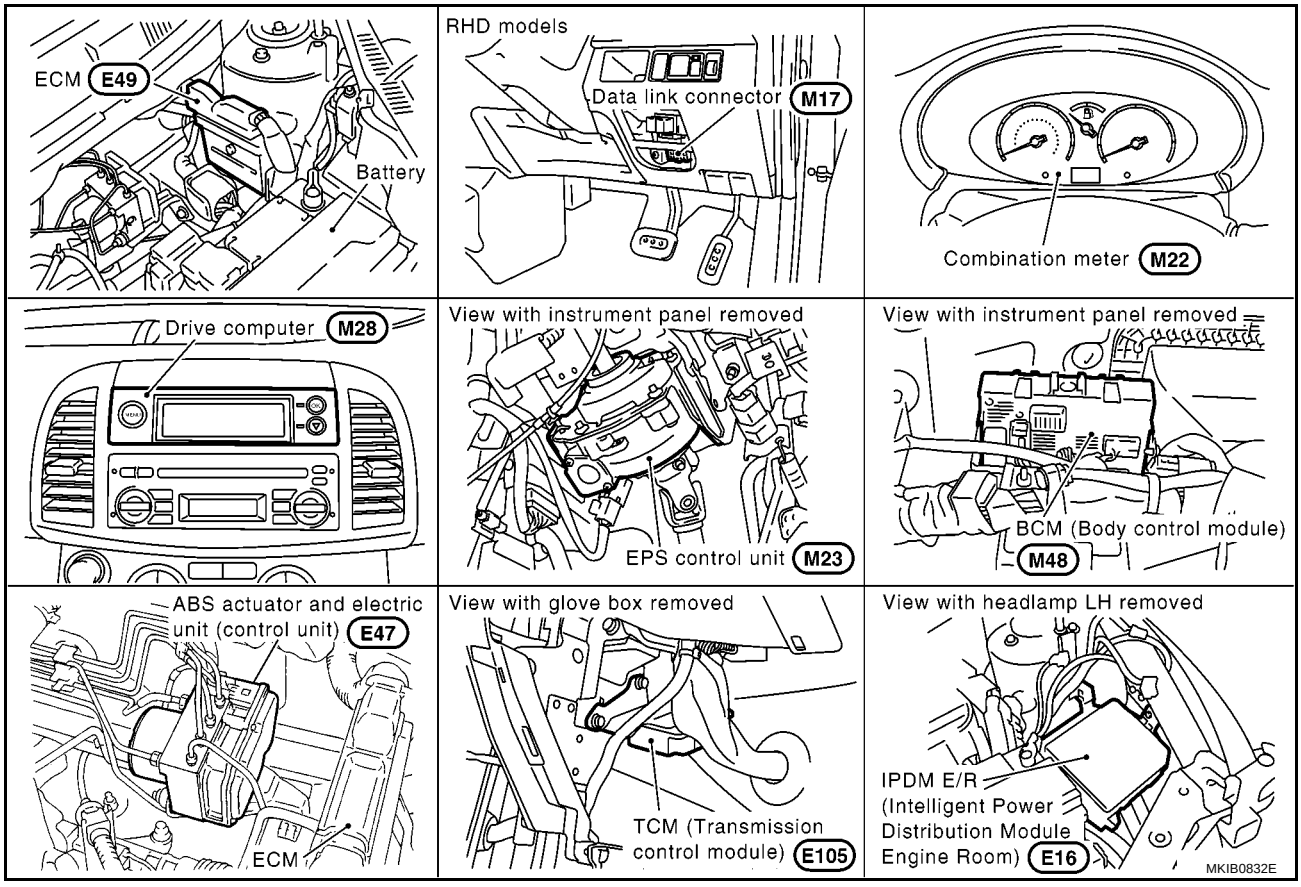
System Description

EKS00JOM

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

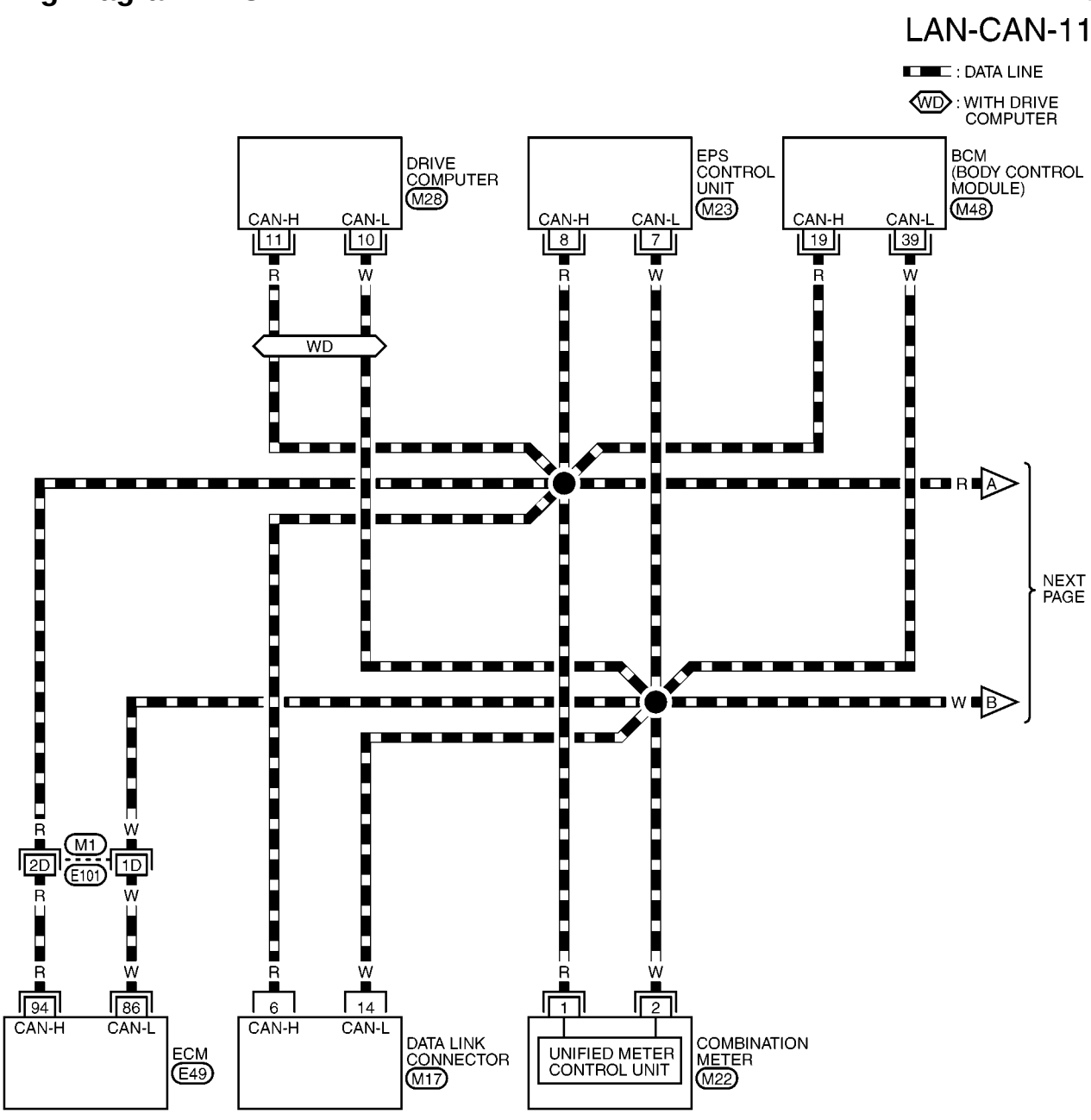
Component Parts and Harness Connector Location

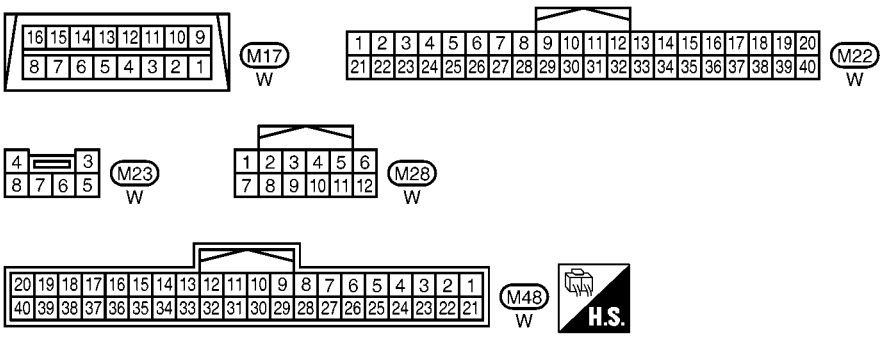
EKS00JON



Wiring Diagram — CAN —

EKS00JOO



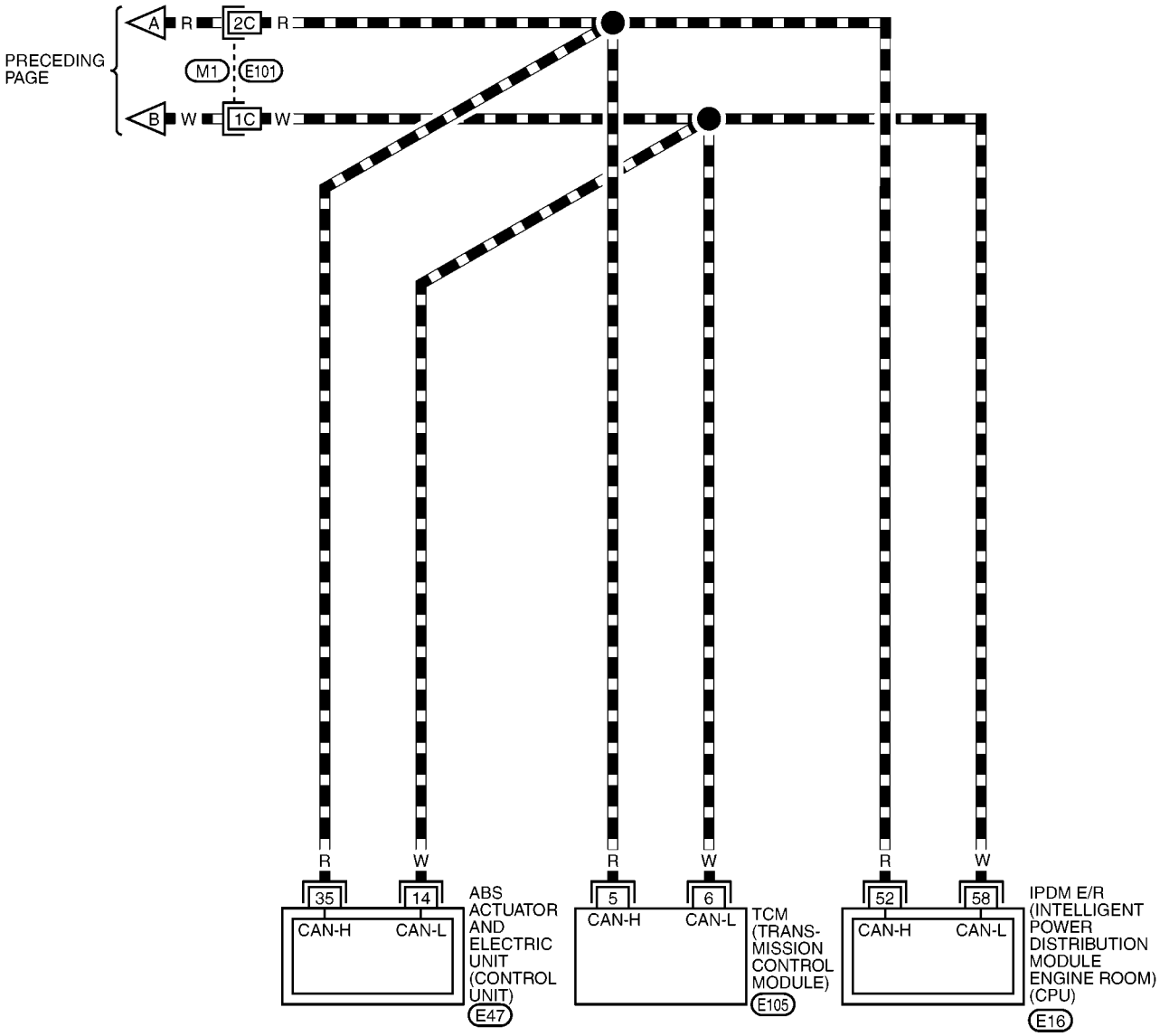


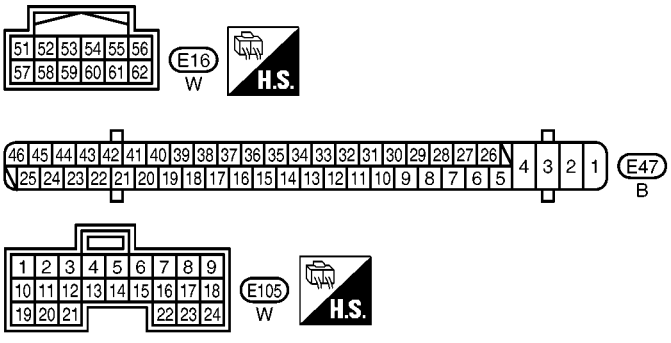
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

MKWA2711E

LAN-CAN-12

: DATA LINE





REFER TO THE FOLLOWING.

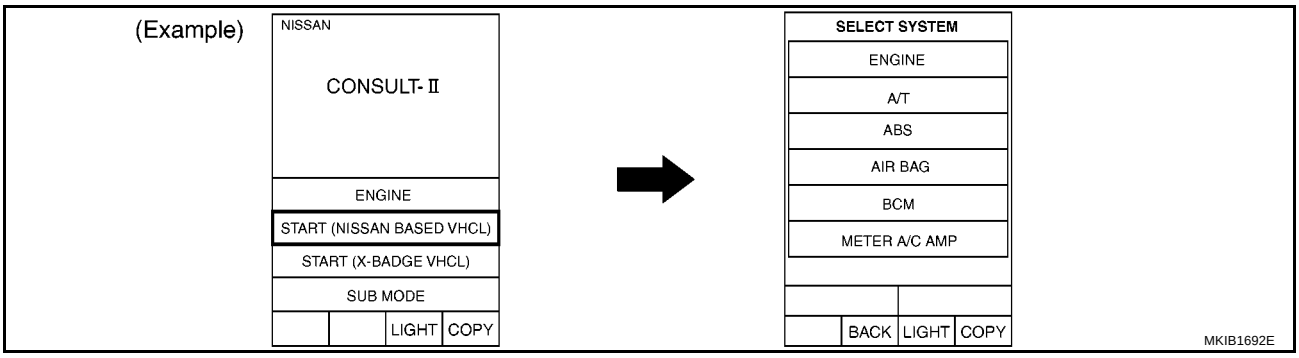
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2712E

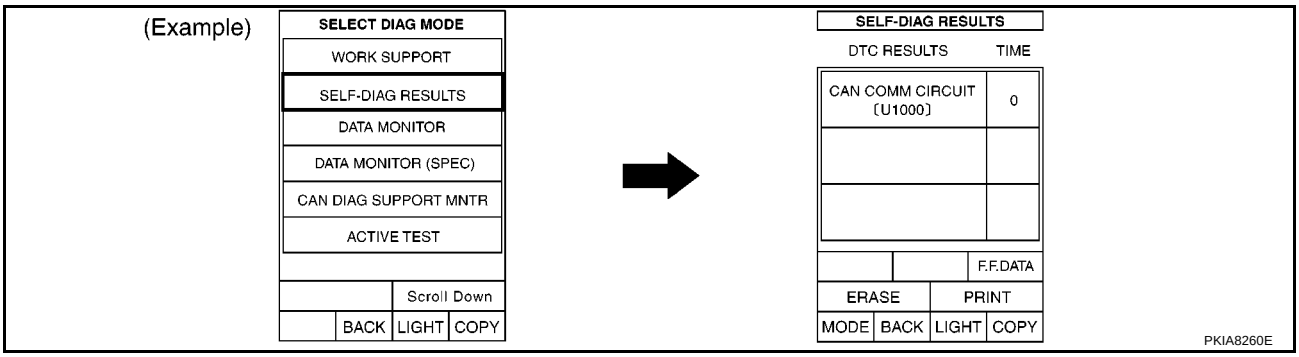
Work Flow

EKS00JOP

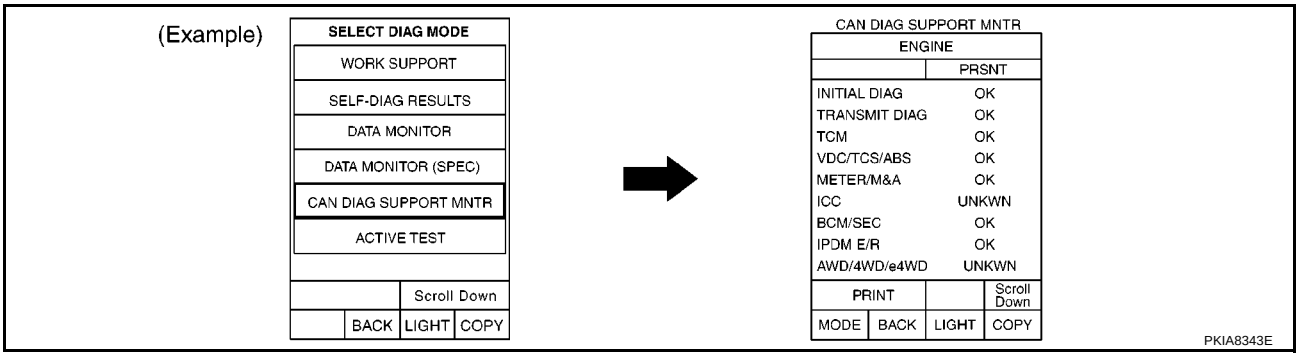
1. When there are no indications of “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “EPS”, “BCM”, “ABS”, “A/T” and “IPDM E/R” displayed on CONSULT-II.



4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-177, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-177, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.

(Example)

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

Convert

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	UNKWN	–	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–
A/T	–	NG	UNKWN	UNKWN	UNKWN	–	–	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	UNKWN	–	–	–

MKIB1687E

7. According to the check sheet results (example), start inspection. Refer to LAN-179, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

Comparison table

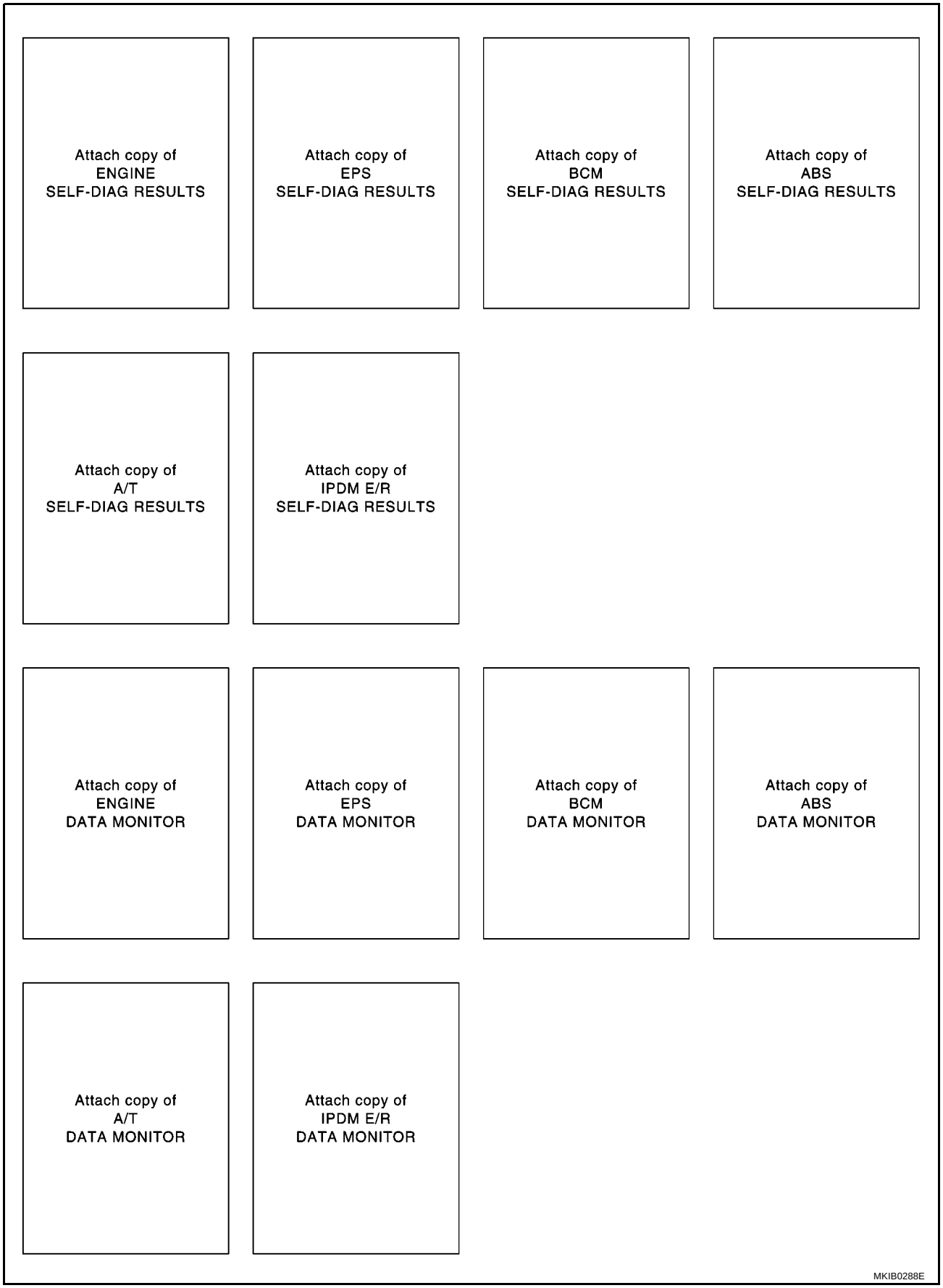
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	TCM	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	UNKWN	–	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–
A/T	–	NG	UNKWN	UNKWN	UNKWN	–	–	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	UNKWN	–	–	–

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1606E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
A/T
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
Attach copy of
ENGINE
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
A/T
DATA MONITOR
Attach copy of
IPDM E/R
DATA MONITOR
MKIB0288E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

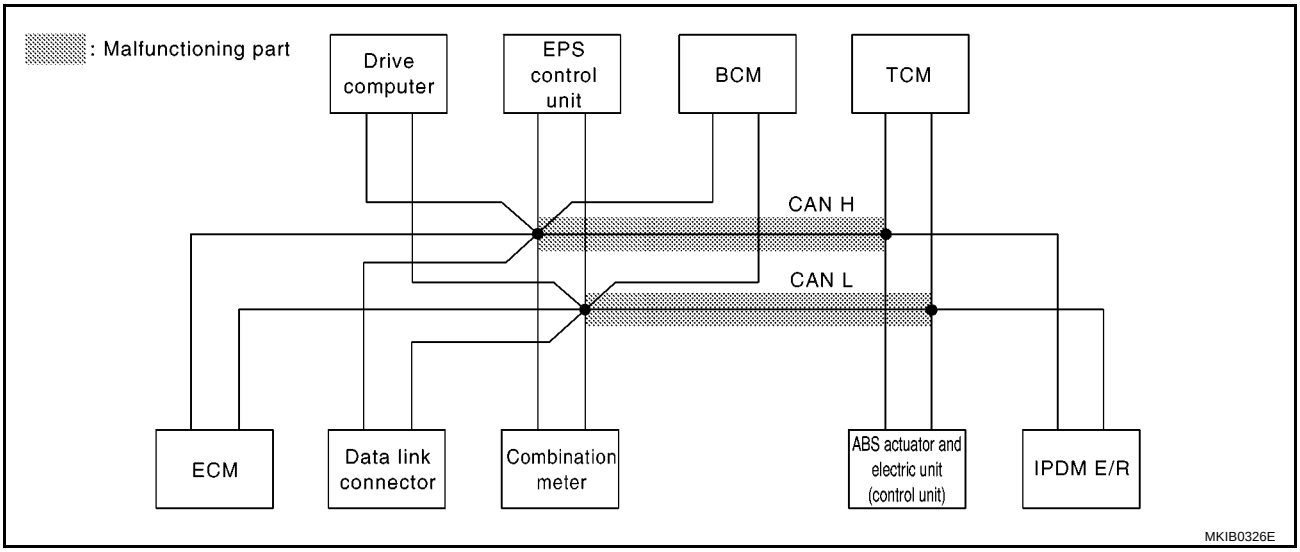
If “NG” is displayed on “CAN COMM” as “DATA MONITOR (CAN DIAG SUPPORT MNTR)” for the diagnosed control unit, replace the control unit.

Case1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-189, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3 ✓	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6 ✓	CAN CIRC 3 ✓
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	CAN CIRC 4 ✓	–	–	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0794E



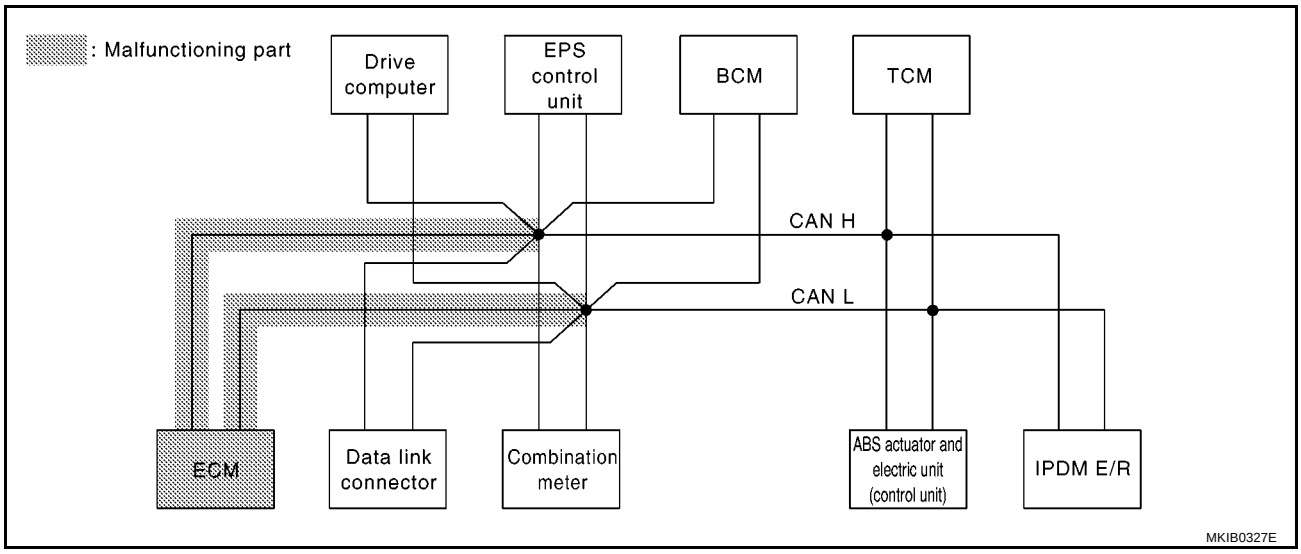
MKIB0326E

Case2

Check ECM circuit. Refer to LAN-190, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0795E



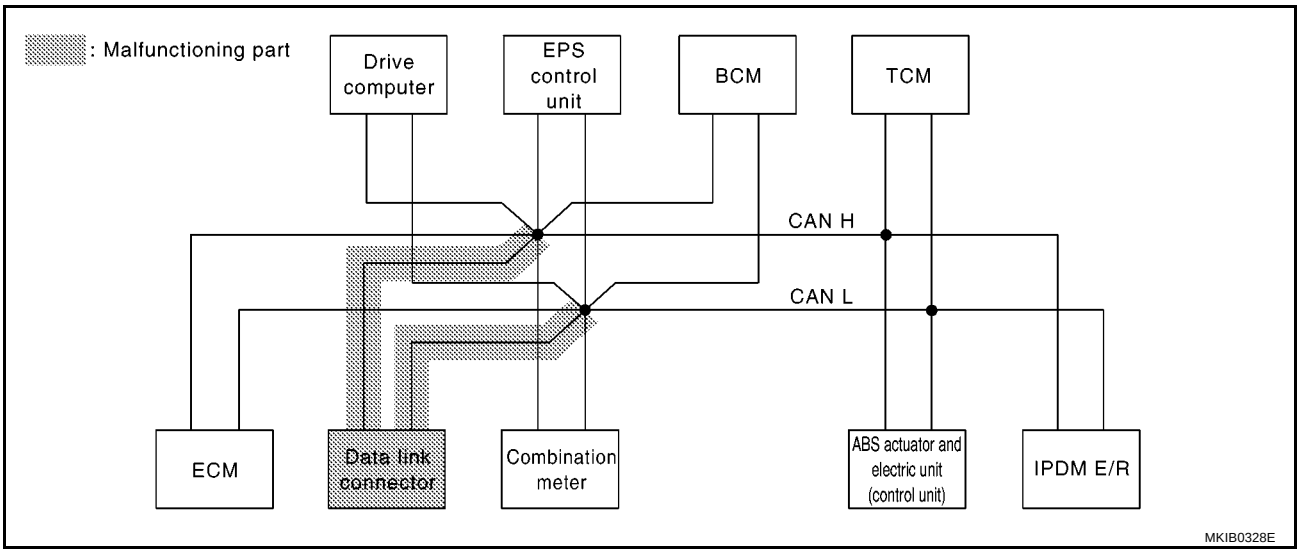
MKIB0327E

Case3

Check data link connector circuit. Refer to LAN-191, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0796E



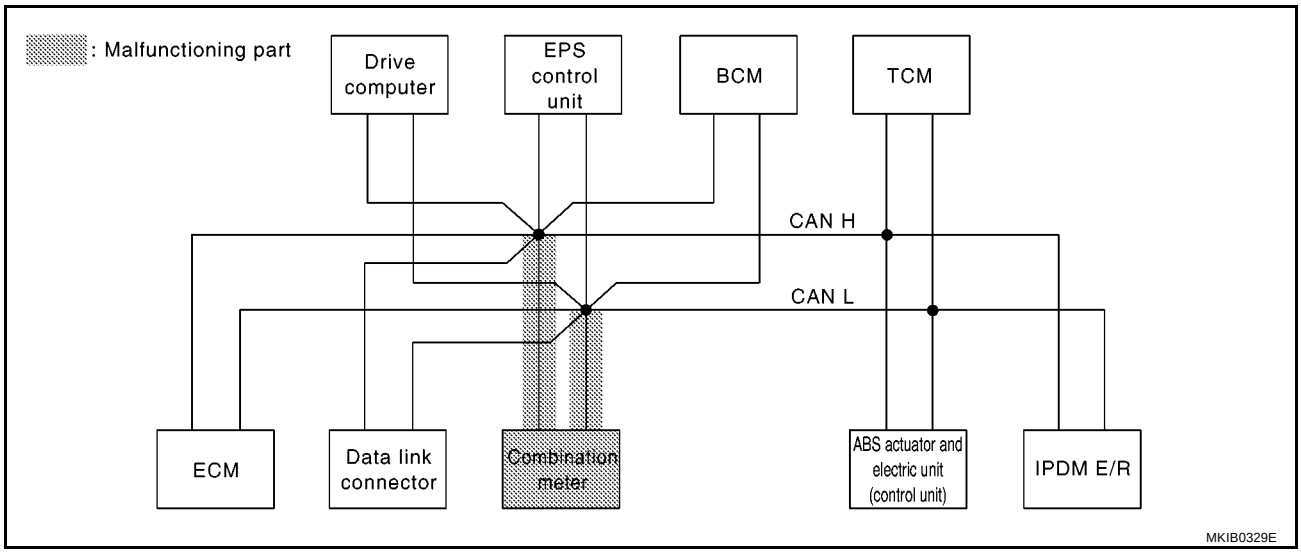
MKIB0328E

Case4

Check combination meter circuit. Refer to LAN-192, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0797E



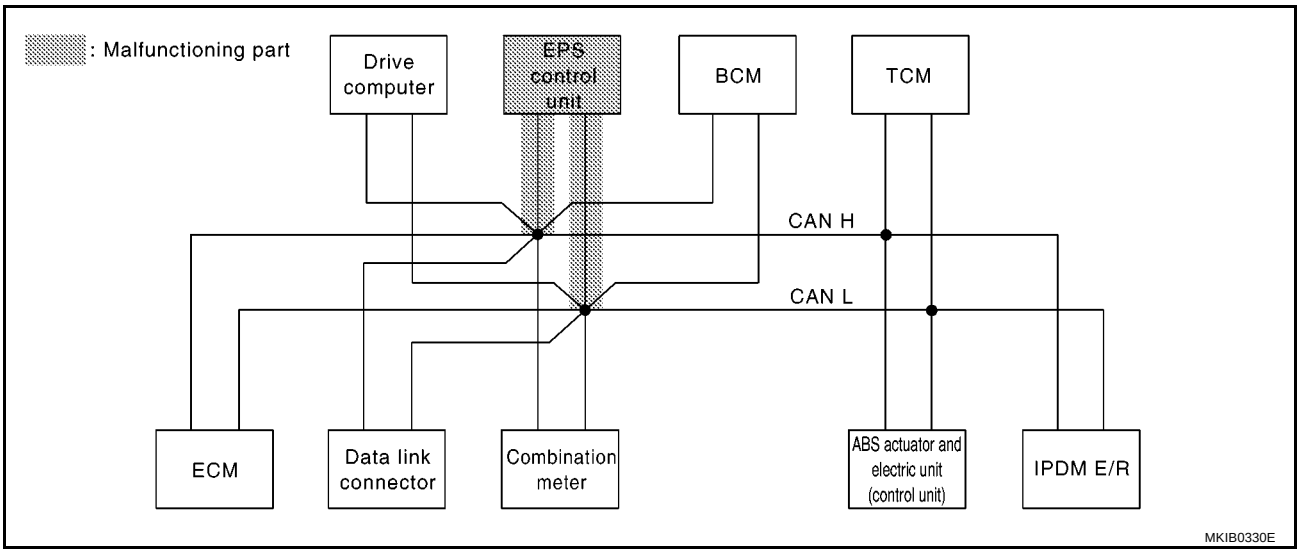
MKIB0329E

Case5

Check EPS control unit circuit. Refer to LAN-193, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0798E



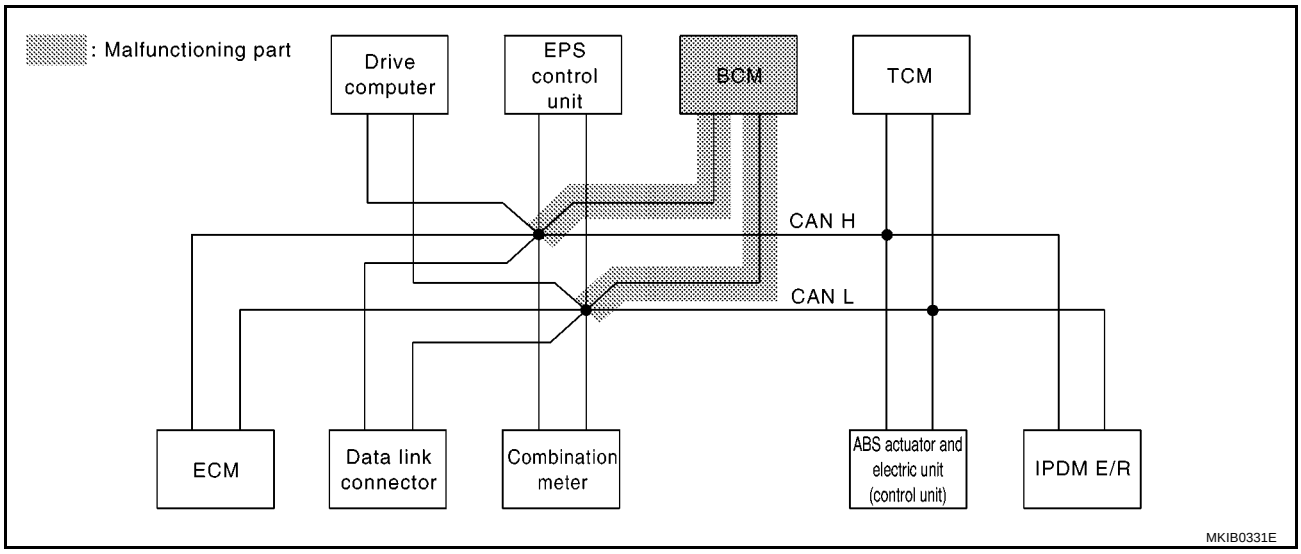
MKIB0330E

Case6

Check BCM circuit. Refer to LAN-194, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6 ✔	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5 ✔	CAN CIRC 3	–	–
BCM	No indication ✔	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2 ✔	–	–	–

MKIB0799E



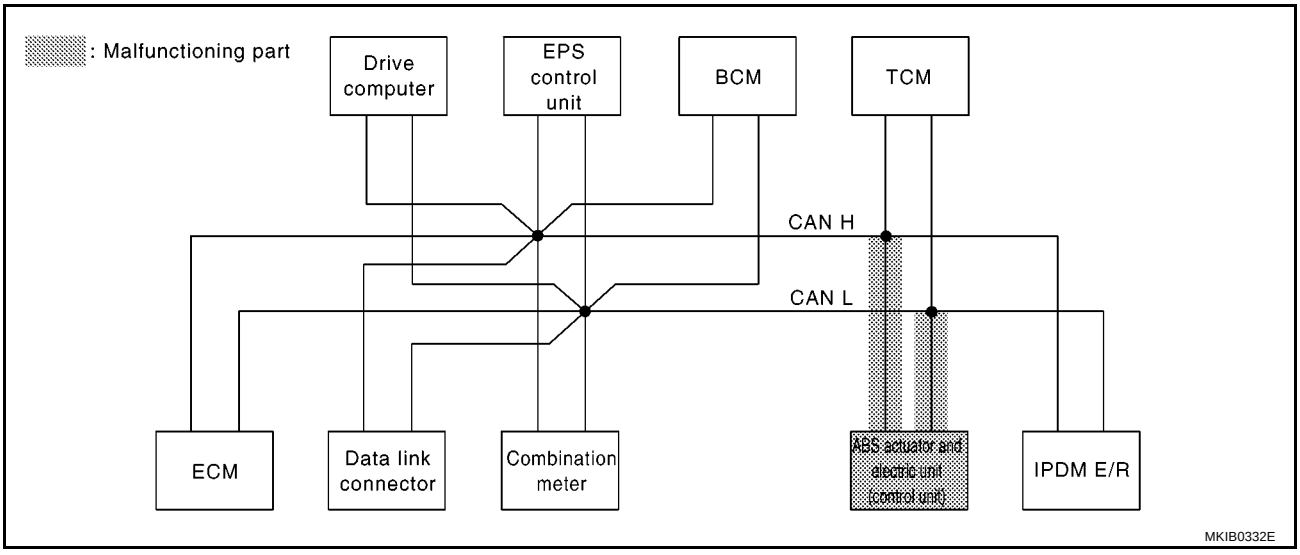
MKIB0331E

Case7

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-195, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3 ✓	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0800E



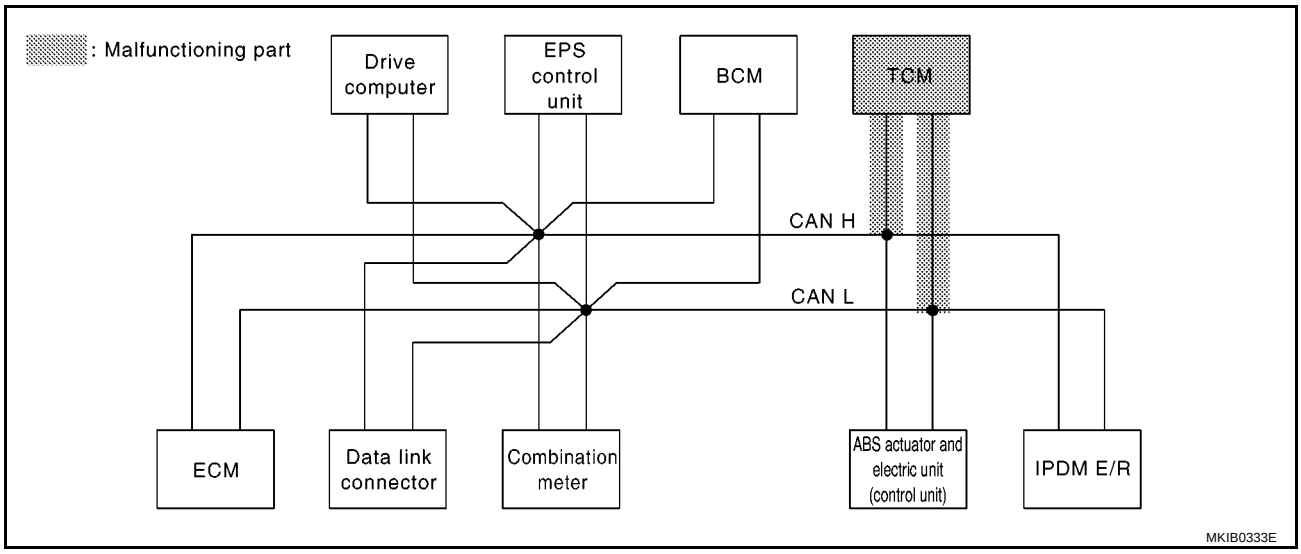
MKIB0332E

Case8

Check TCM circuit. Refer to LAN-196, "TCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0801E



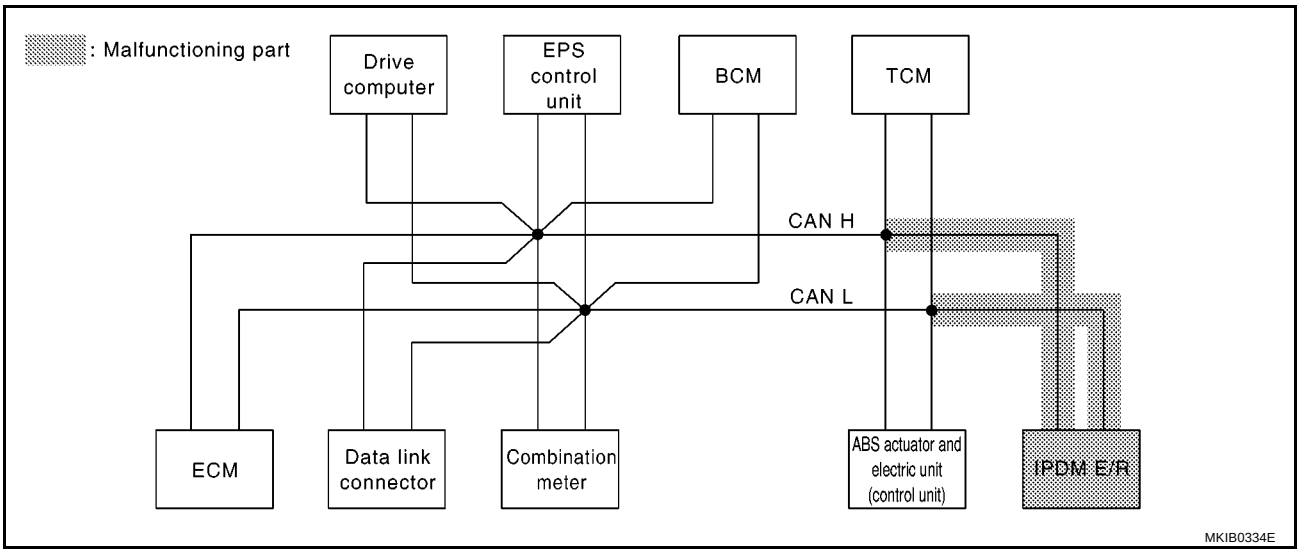
MKIB0333E

Case9

Check IPDM E/R circuit. Refer to LAN-197, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0802E



MKIB0334E

Case10

Check CAN communication circuit. Refer to LAN-198, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0803E

Case11

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-201, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0804E

Case12

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-201, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	EPS	BCM	ABS	TCM	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 6	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	CAN CIRC 3	–
A/T	–	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–	–

MKIB0805E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JOQ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

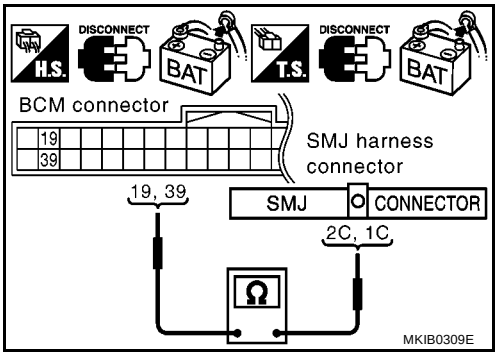
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.
- Harness connector M1
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector
2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



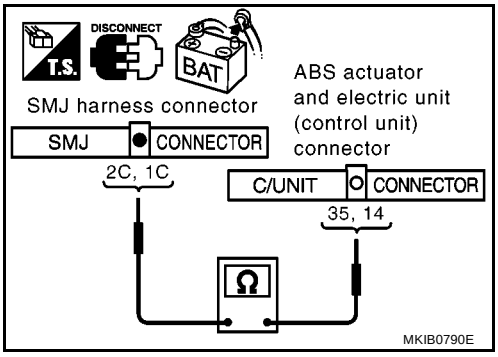
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W).

2C (R) – 35 (R) : Continuity should exist.
1C (W) – 14 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-175, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JOR

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

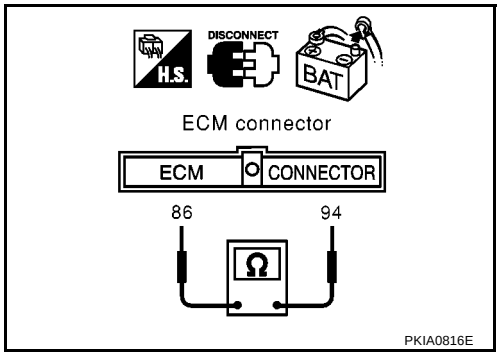
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JOS

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check data link connector and terminals for damage, bend and loose connection (connector side and harness side).

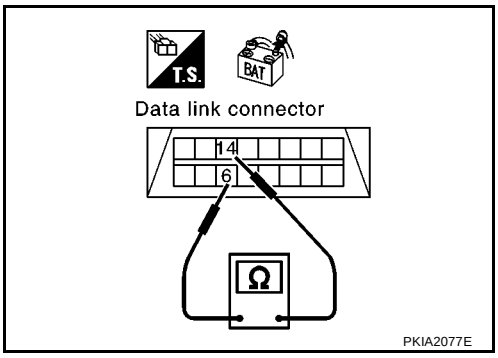
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-175, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JOT

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

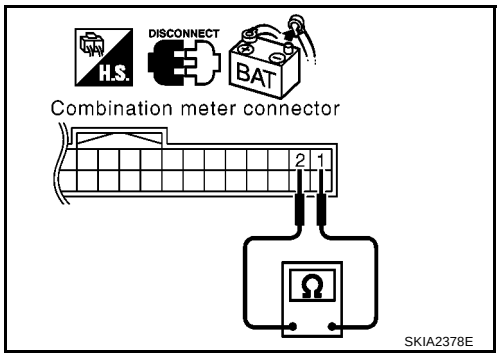
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

EPS Control Unit Circuit Check

EKS00JOU

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

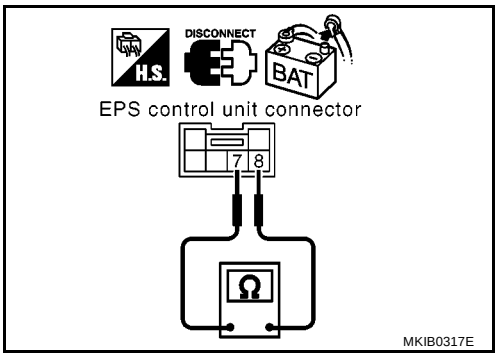
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JOV

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

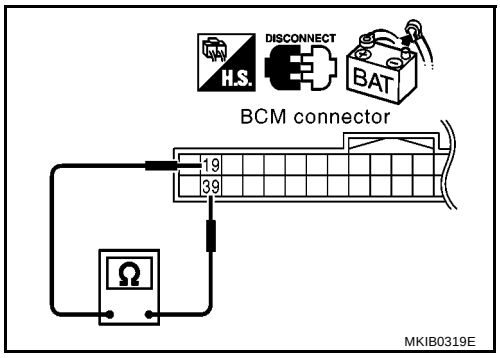
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JOW

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

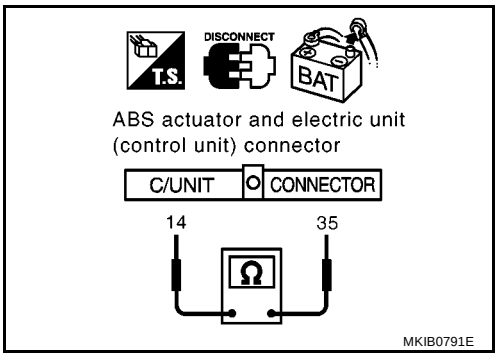
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and TCM.

TCM Circuit Check

EKS00JOX

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

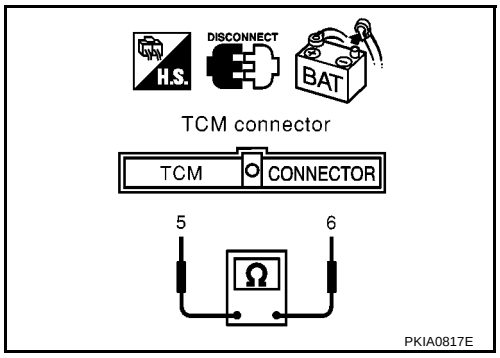
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector E105 terminals 5 (R) and 6 (W).

5 (R) – 6 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and IPDM E/R.

IPDM E/R Circuit Check

EKS00JOY

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

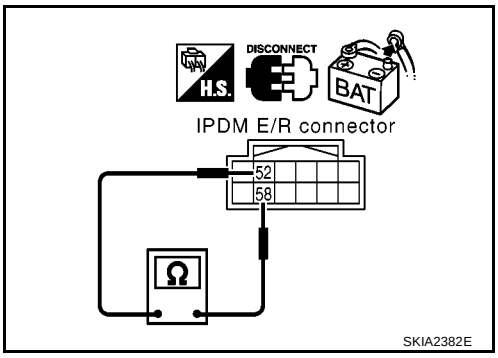
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and TCM.

CAN Communication Circuit Check

EKS00JOZ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- TCM
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

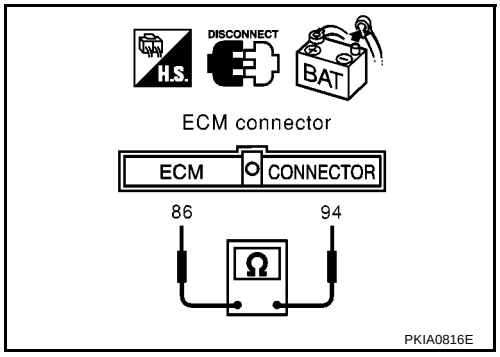
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



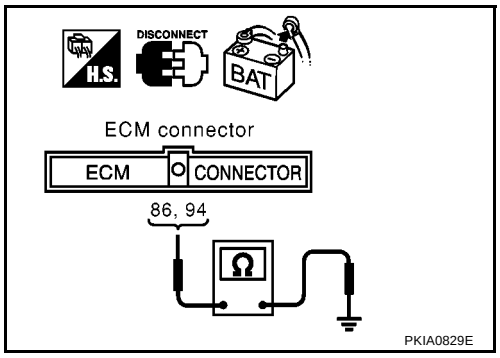
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.

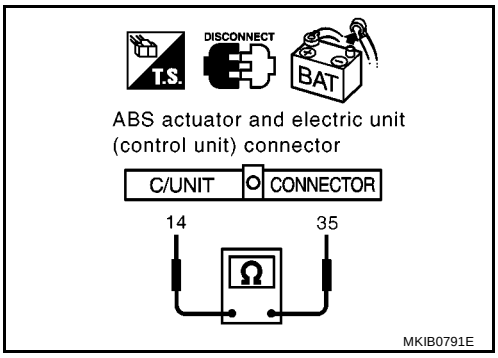


4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- TCM connector
- IPDM E/R connector

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

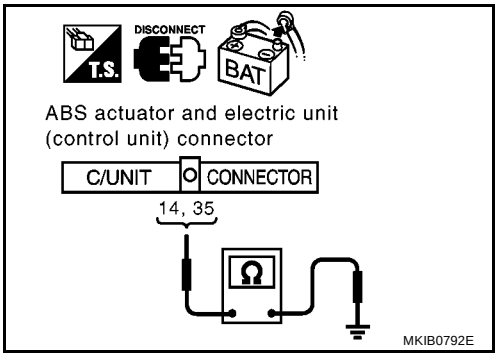
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W) and ground.

35 (R) – Ground : Continuity should not exist.

14 (W) – Ground : Continuity should not exist.



OK or NG

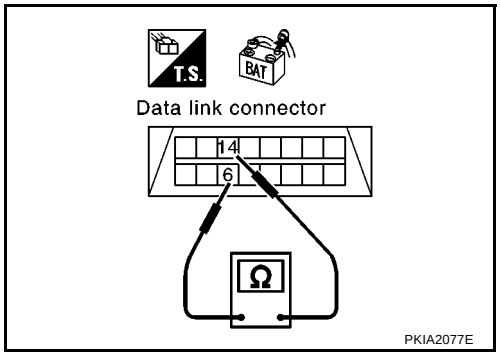
OK >> GO TO 6.

NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and TCM
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector
2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 7.

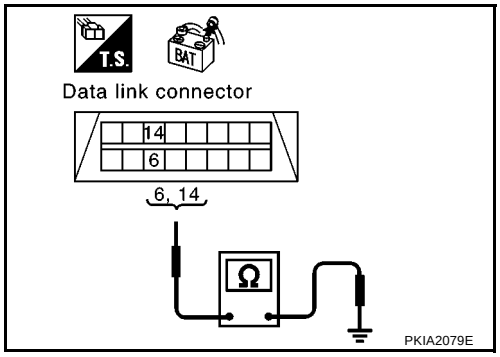
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM.

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – ground : Continuity should not exist.

14 (W) – ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.

NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM.

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-201, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-175, "Work Flow" .

NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JP0

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

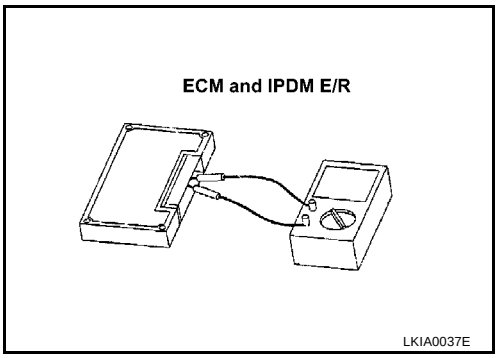
Component Inspection

EKS00JP1

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 7)

PFP:23710

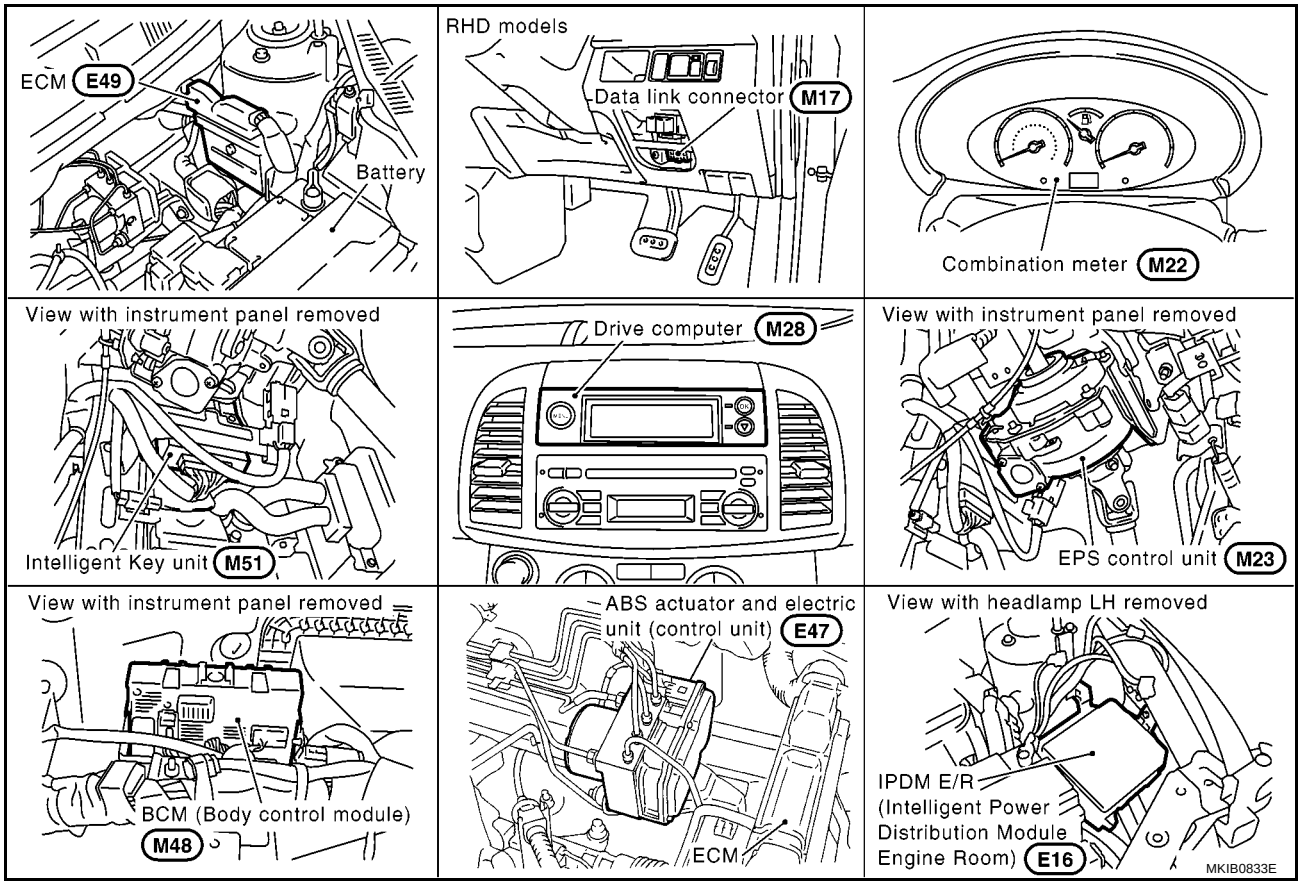
System Description

EKS00JP2

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

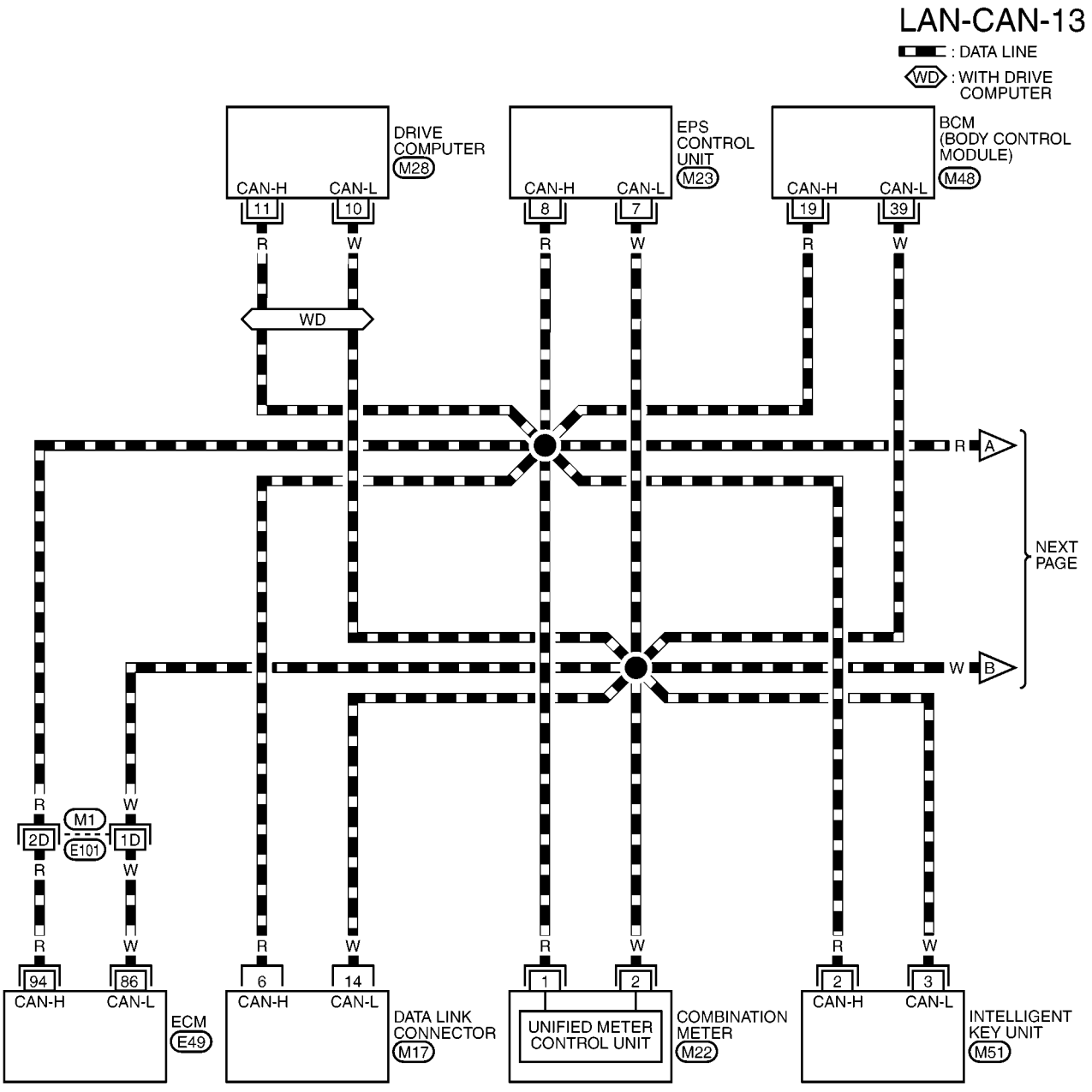
Component Parts and Harness Connector Location

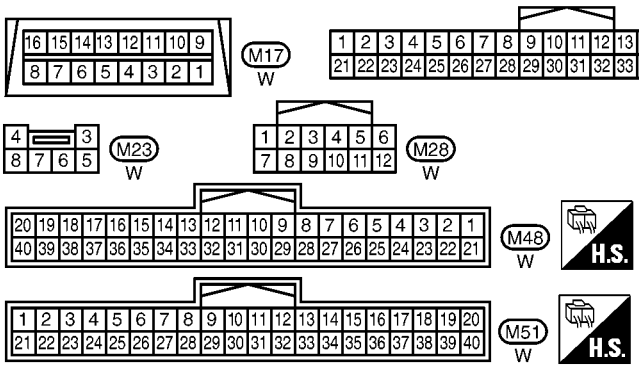
EKS00JP3



Wiring Diagram — CAN —

EKS00JP4



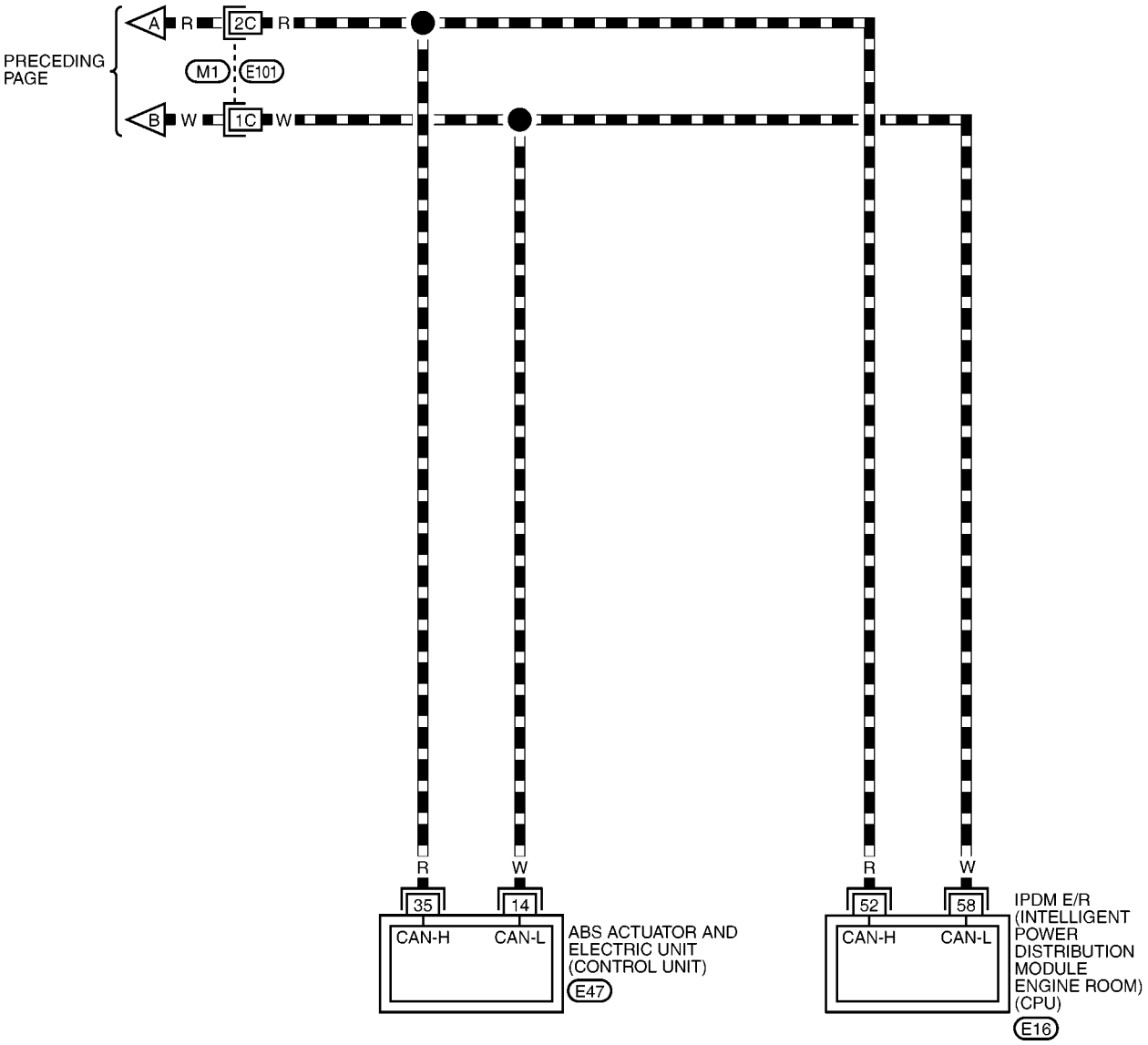


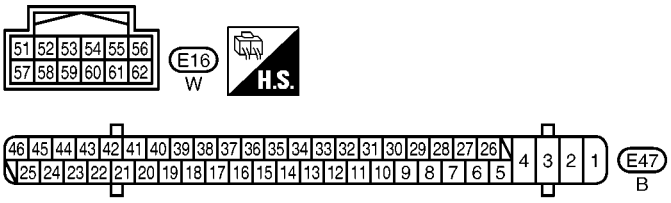
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

MKWA2713E

LAN-CAN-14

: DATA LINE





REFER TO THE FOLLOWING.

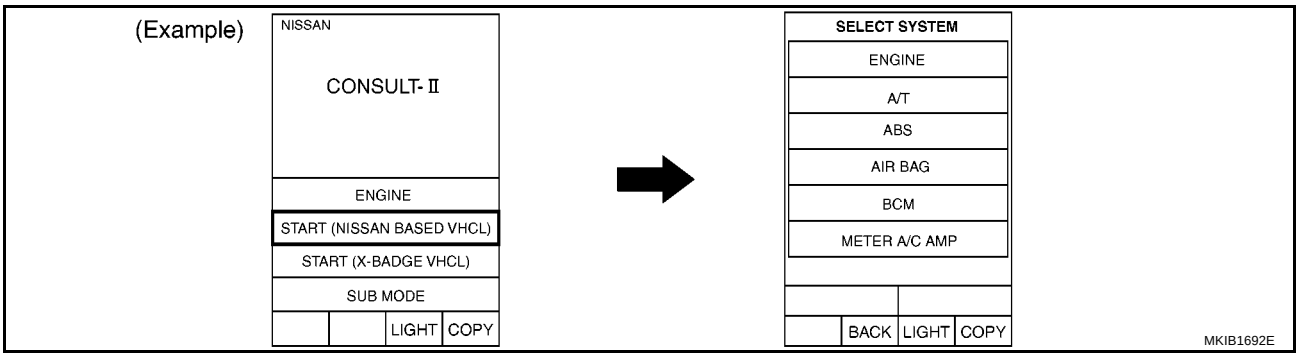
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2714E

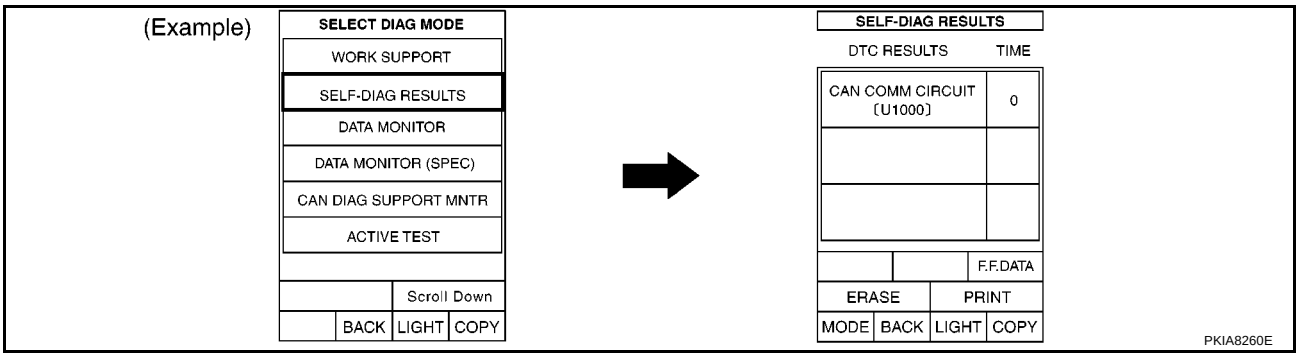
Work Flow

EKS00JP5

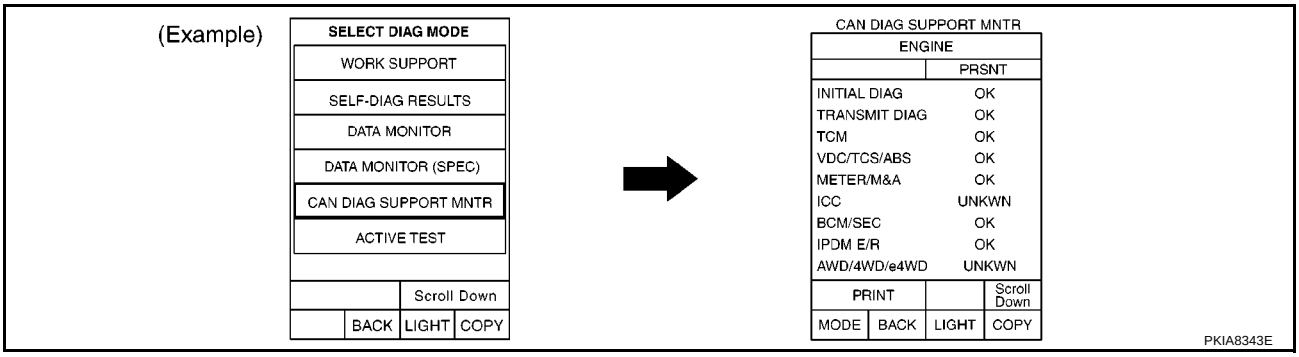
1. When there are no indications of “INTELLIGENT KEY”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-207, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-207, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.

(Example)

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✔	CAN CIRC 7 ✔
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3 ✔	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3 ✔
ABS	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

Convert

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	–	UNKWN	UNKWN	UNKWN ✔	UNKWN ✔
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–	–
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	UNKWN ✔	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN ✔
ABS	No indication ✔	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	–	–	–
IPDM E/R	No indication ✔	NG	UNKWN	UNKWN	–	–	–	UNKWN	–	–

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7. According to the check sheet results (example), start inspection. Refer to LAN-209, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

Comparison table

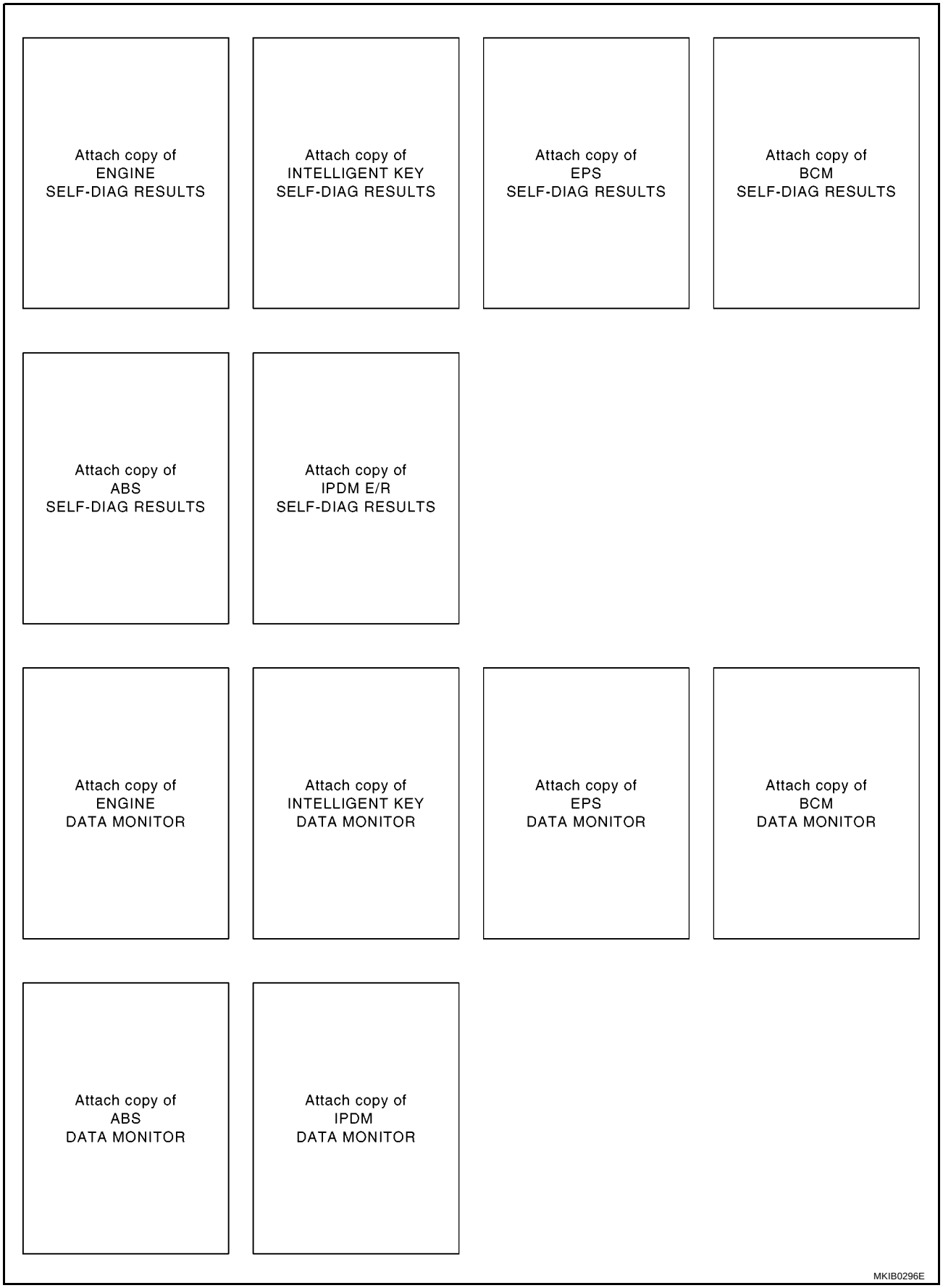
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	–	–
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	–	UNKWN	–	–

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1607E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
INTELLIGENT KEY
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
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IPDM E/R
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ENGINE
DATA MONITOR
Attach copy of
INTELLIGENT KEY
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
IPDM
DATA MONITOR
MKIB0296E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

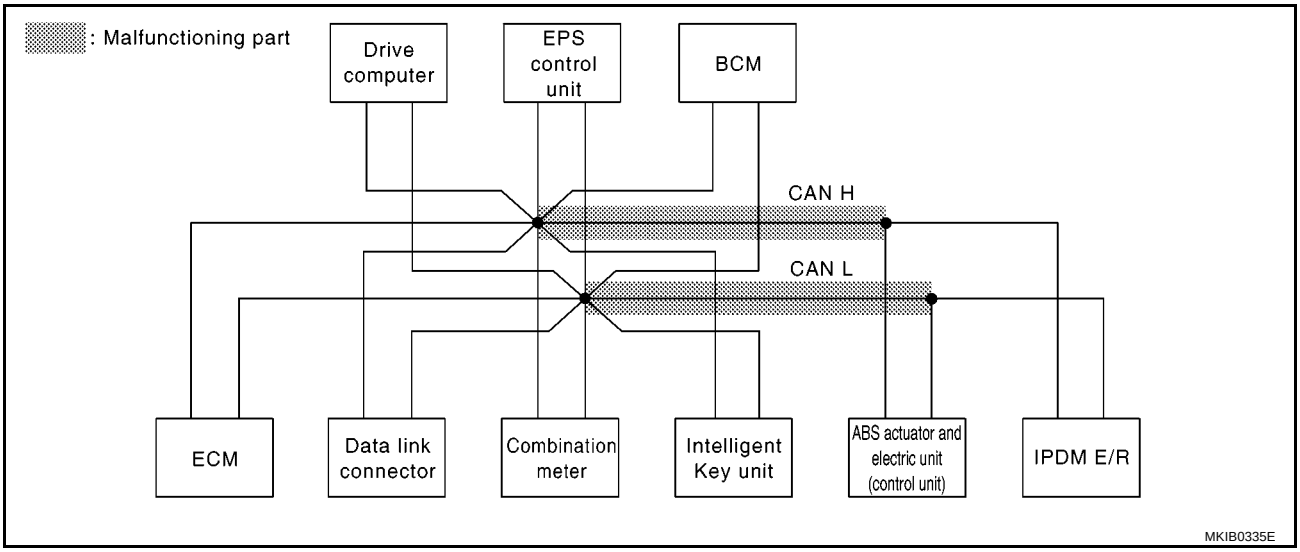
If “NG” is displayed on “CAN COMM” as “DATA MONITOR (CAN DIAG SUPPORT MNTR)” for the diagnosed control unit, replace the control unit.

Case1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-219, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3 ✓	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3 ✓
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0807E



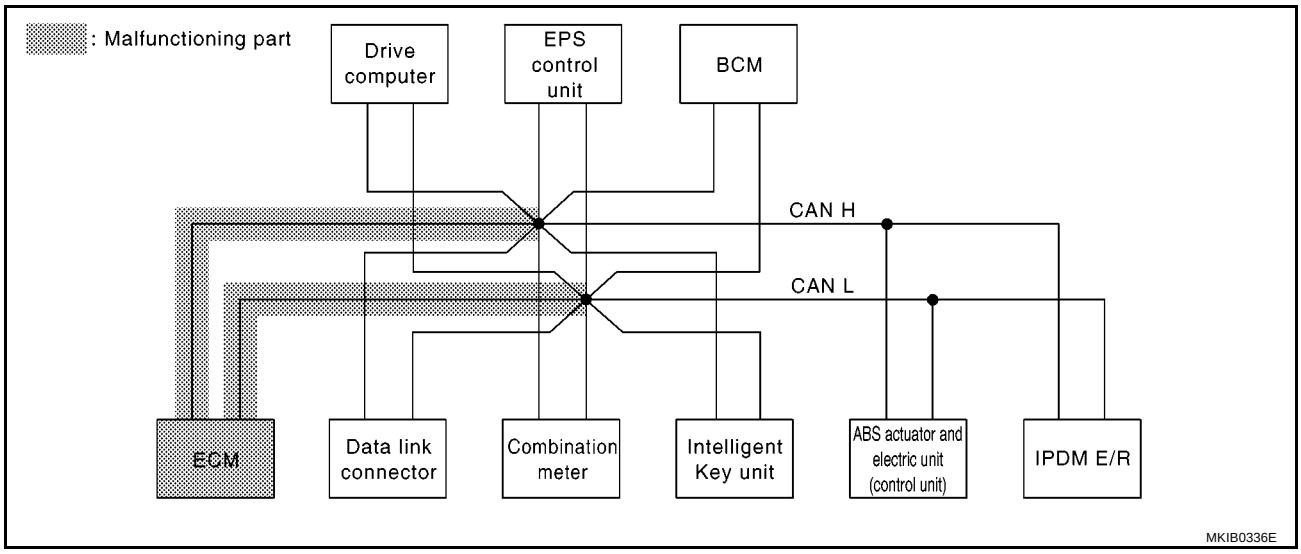
MKIB0335E

Case2

Check ECM circuit. Refer to LAN-220, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0808E



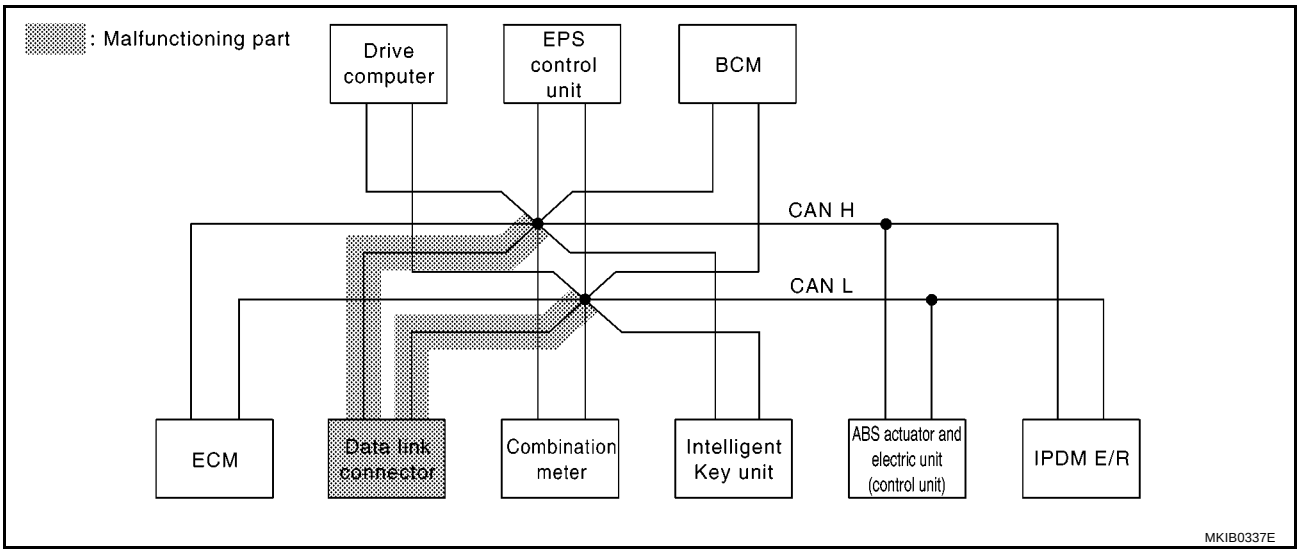
MKIB0336E

Case3

Check data link connector circuit. Refer to LAN-221, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0809E



MKIB0337E

Case4

Check combination meter circuit. Refer to LAN-222, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

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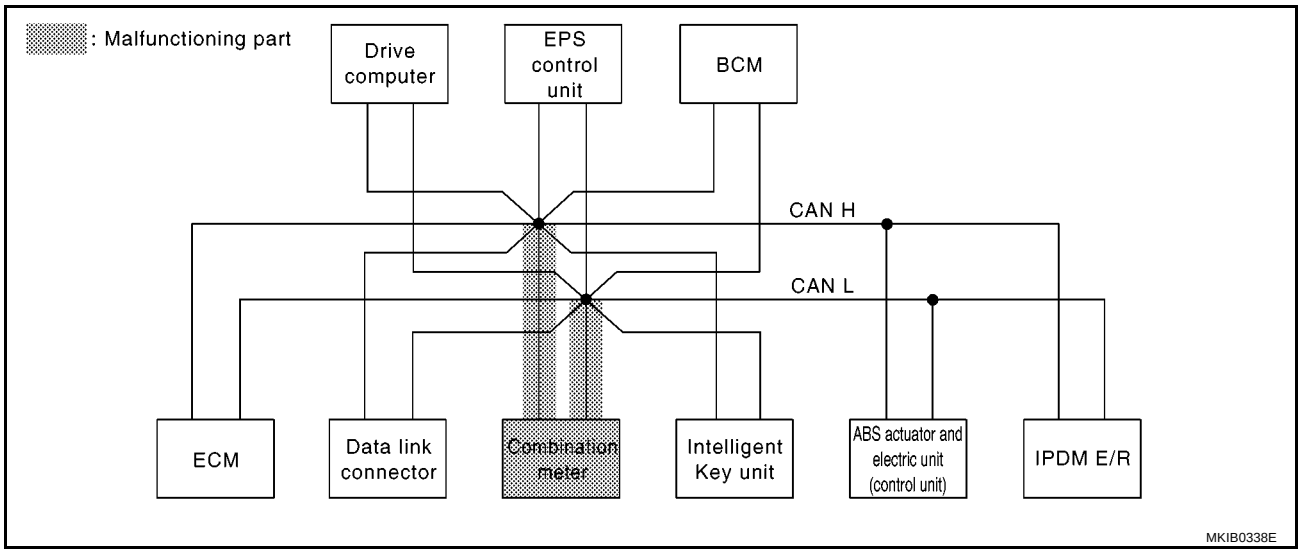


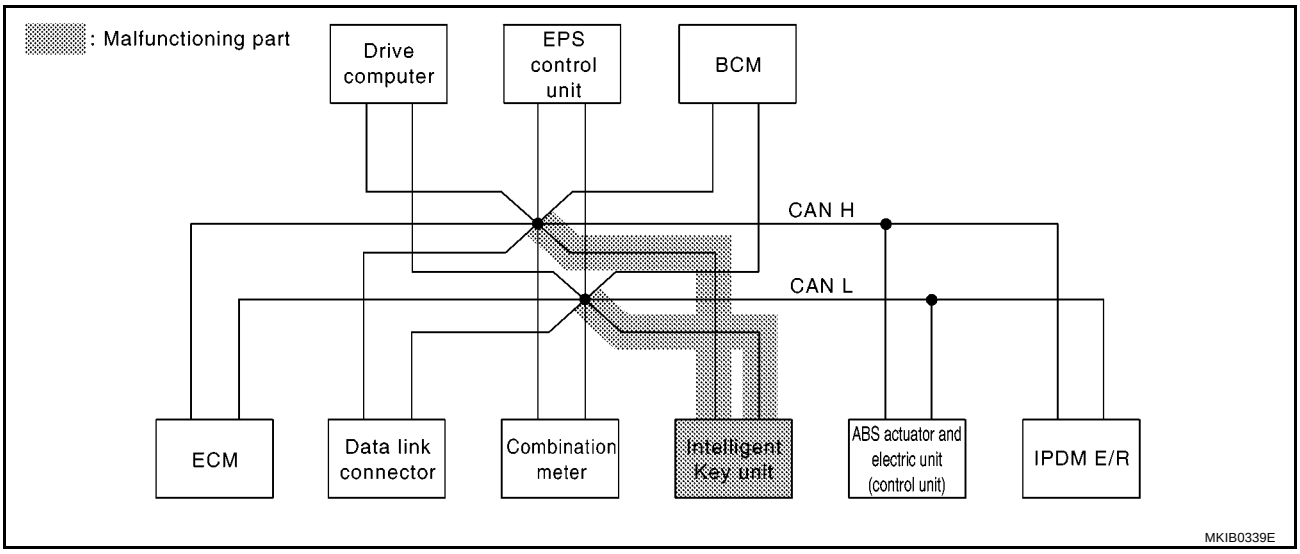
MKIB0338E

Case5

Check Intelligent Key unit circuit. Refer to LAN-223, "Intelligent Key Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5 ✔	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0811E



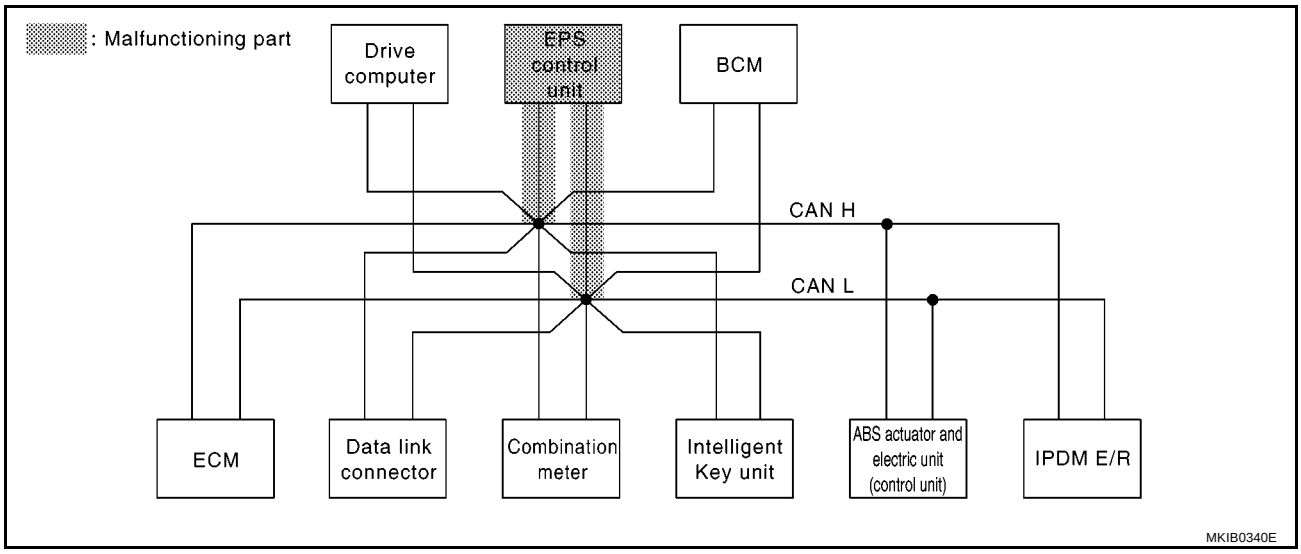
MKIB0339E

Case6

Check EPS control unit circuit. Refer to LAN-224, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9 ✔	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5 ✔	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0812E



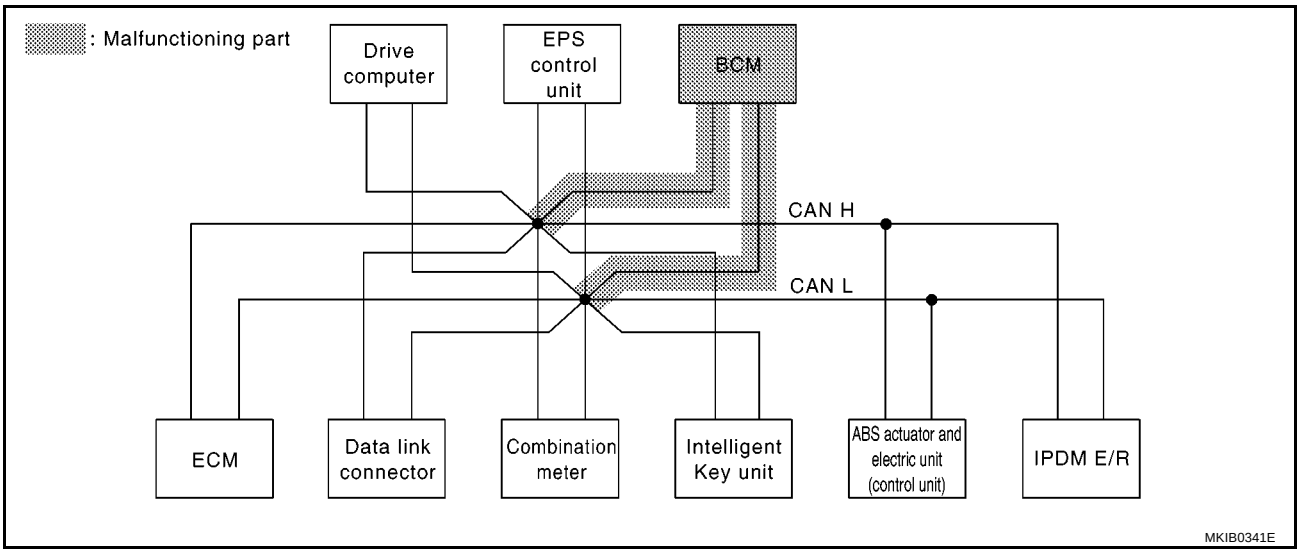
MKIB0340E

Case7

Check BCM circuit. Refer to LAN-225, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6 ✔	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2 ✔	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5 ✔	CAN CIRC 3	–
BCM	No indication ✔	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2 ✔	–	–

MKIB0813E



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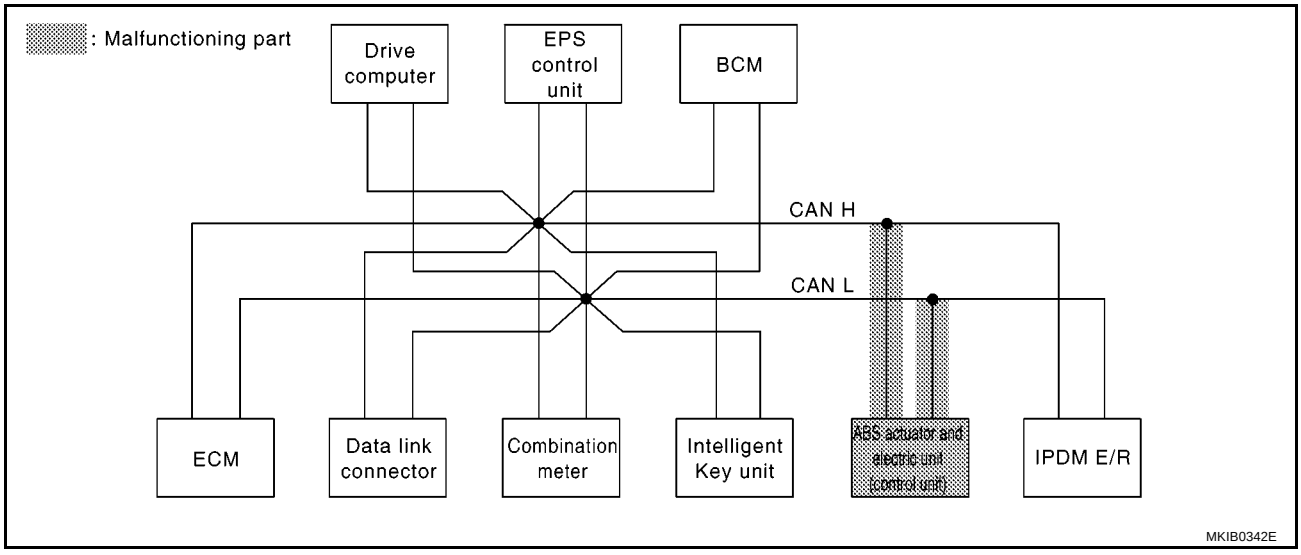
Case8

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-226, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0814E



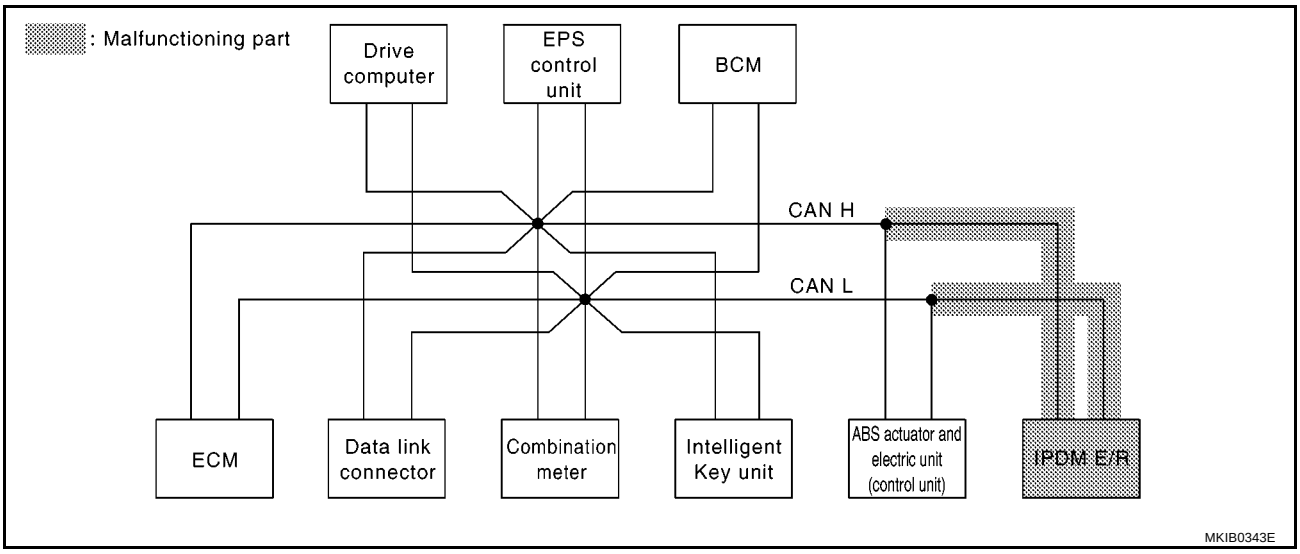
MKIB0342E

Case9

Check IPDM E/R circuit. Refer to LAN-227, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7 ✔
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3 ✔
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0815E



MKIB0343E

Case10

Check CAN communication circuit. Refer to LAN-228, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0816E

Case11

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-231, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0817E

Case12

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-231, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	–	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 4	CAN CIRC 3	–	–	CAN CIRC 2	–	–
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	–	CAN CIRC 2	–	–

MKIB0818E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JP6

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

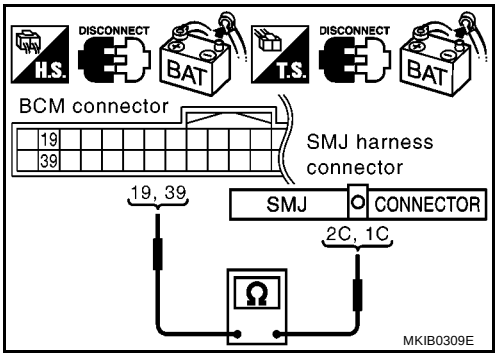
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



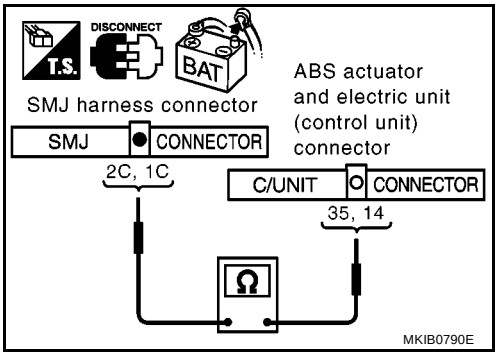
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W).

2C (R) – 35 (R) : Continuity should exist.
1C (W) – 14 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-205, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JP7

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

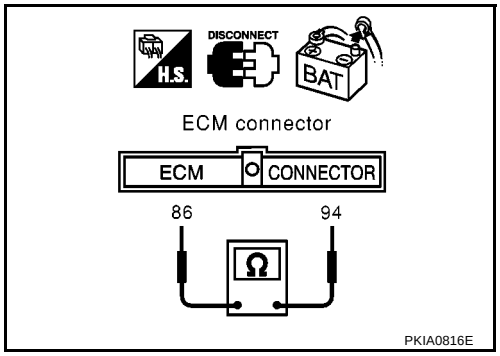
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JP8

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check the data link connector and terminals for damage, bend and loose connection (connector side and harness side).

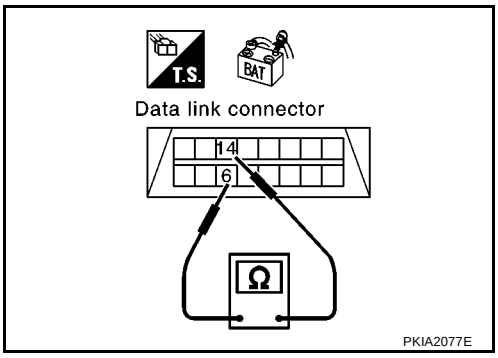
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-205, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JP9

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

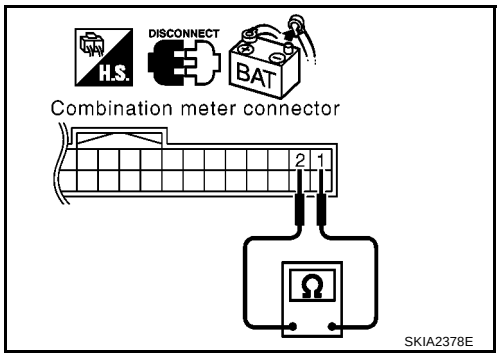
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and data link connector.

Intelligent Key Unit Circuit Check

EKS00JPA

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of Intelligent Key unit for damage, bend and loose connection (control unit side and harness side).

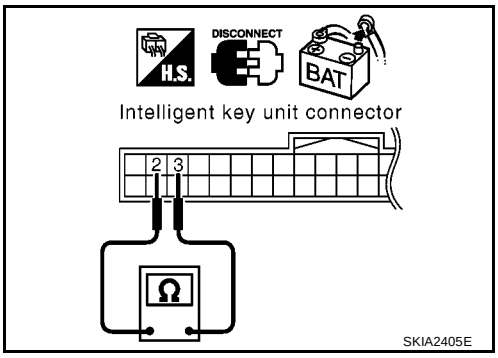
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check resistance between Intelligent Key unit harness connector M51 terminals 2 (R) and 3 (W).

2 (R) – 3 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair harness between Intelligent Key unit and data link connector.

EPS Control Unit Circuit Check

EKS00JPB

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

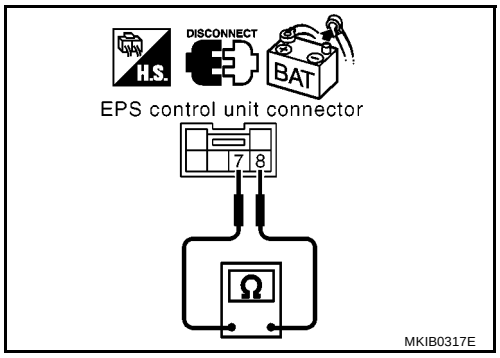
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JPC

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

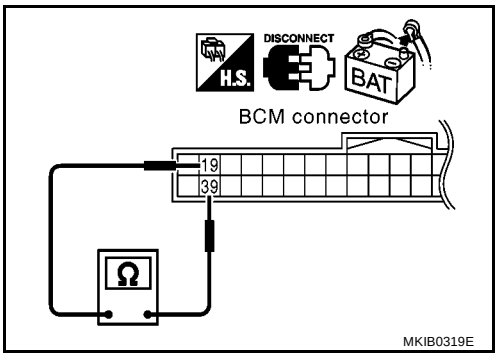
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JPD

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

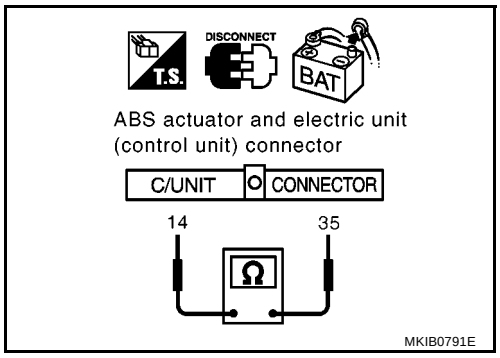
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.



IPDM E/R Circuit Check

EKS00JPE

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

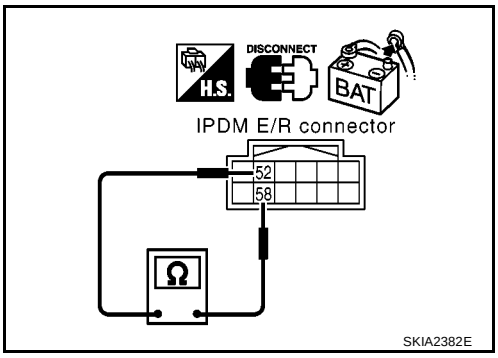
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS00JPF

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Intelligent Key unit
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

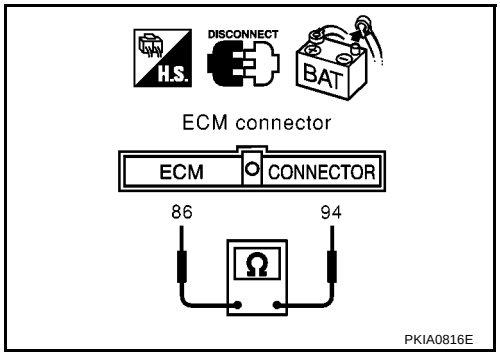
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



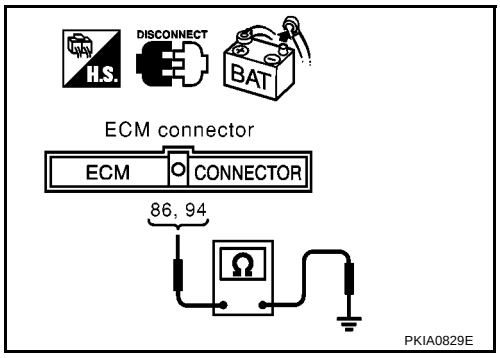
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

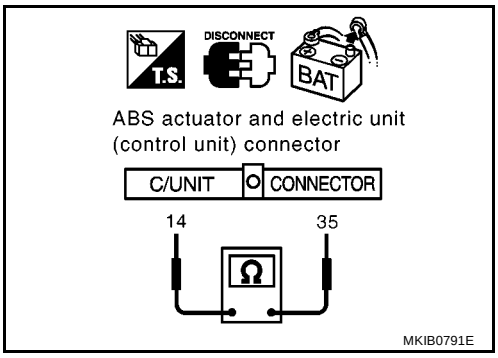
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Continuity should not exist.



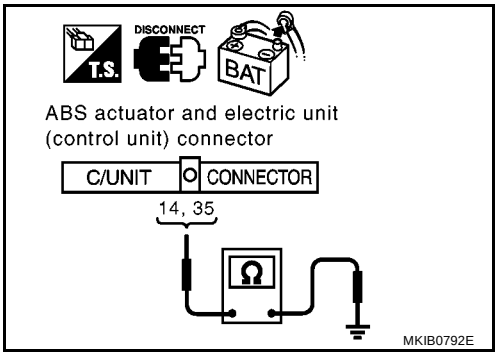
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E47 terminals 35 (R), 14 (W) and ground.

35 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

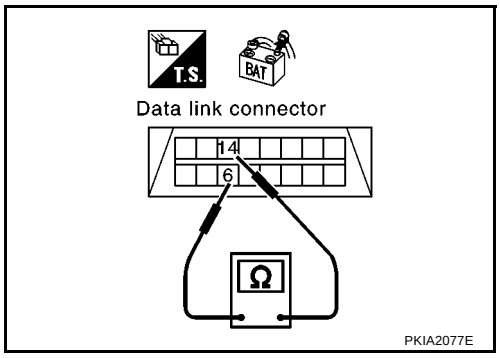
OK >> GO TO 6.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



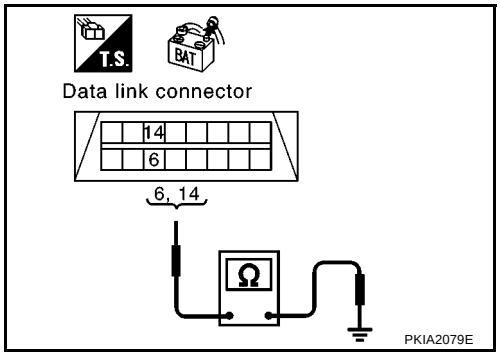
OK or NG

OK >> GO TO 7.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-231, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-205, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JPG

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

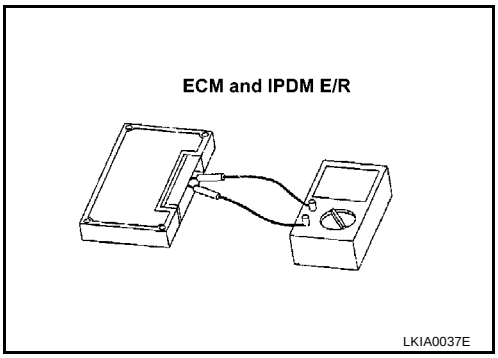
Component Inspection

EKS00JPH

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 8)

PFP:23710

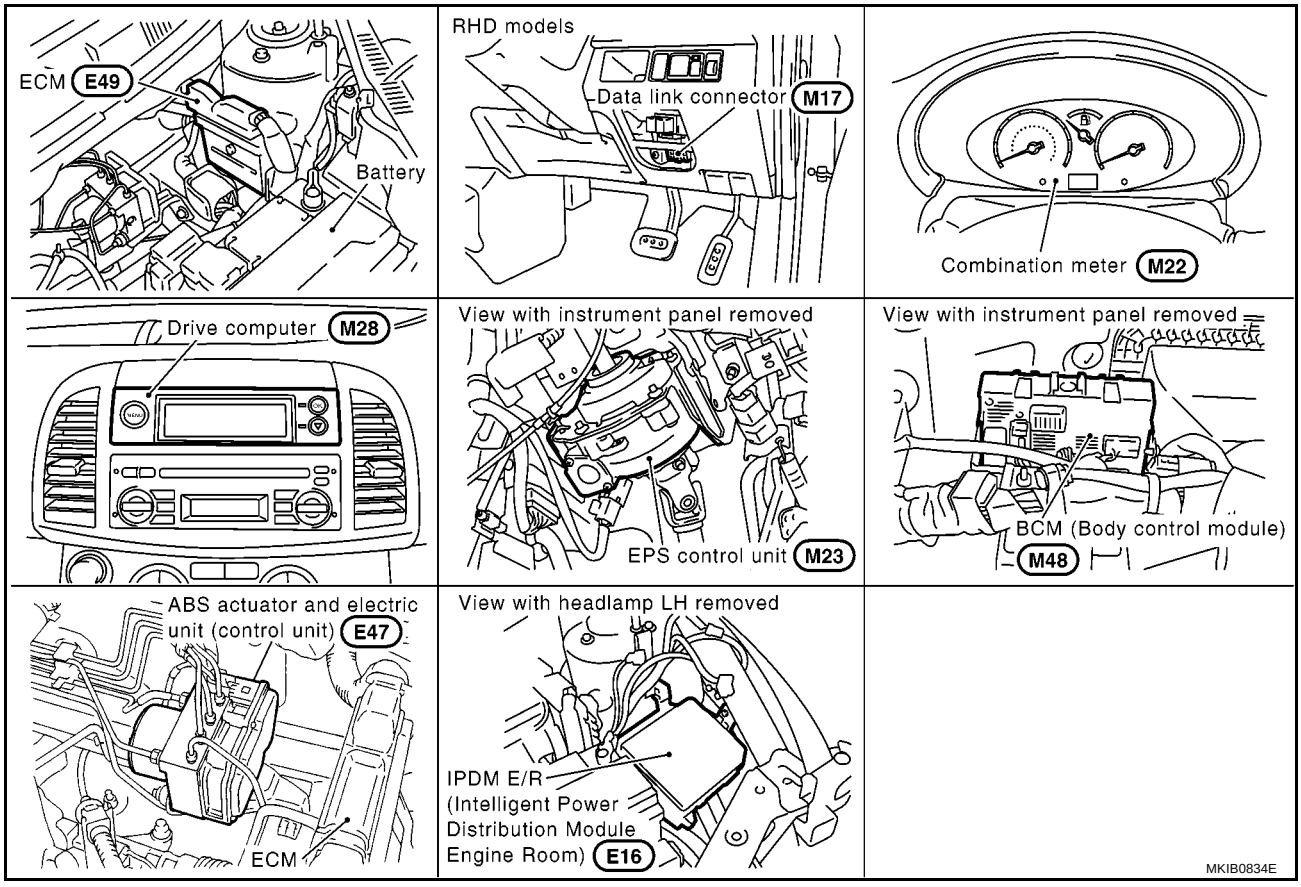
System Description

EKS00JPI

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

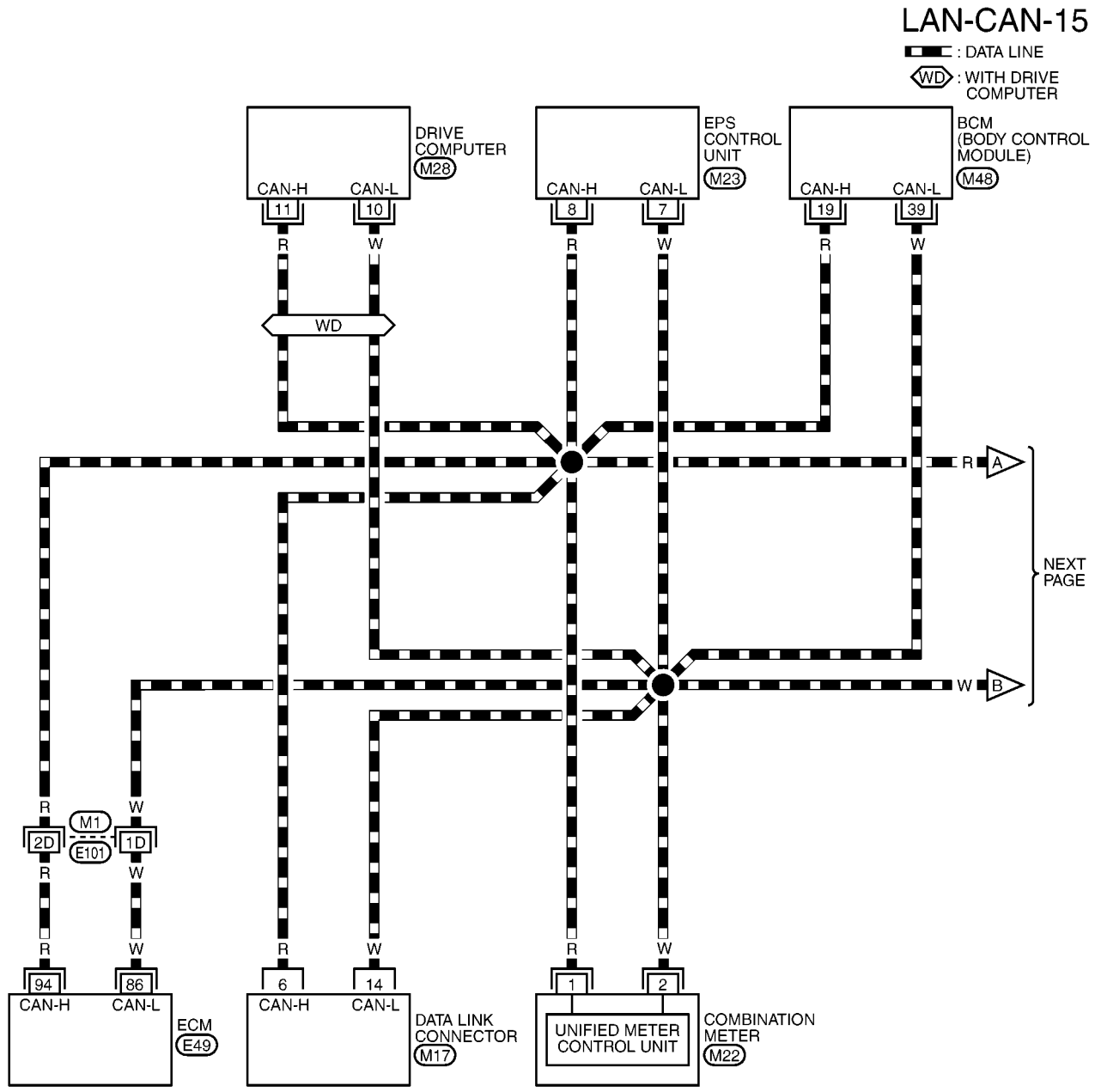
Component Parts and Harness Connector Location

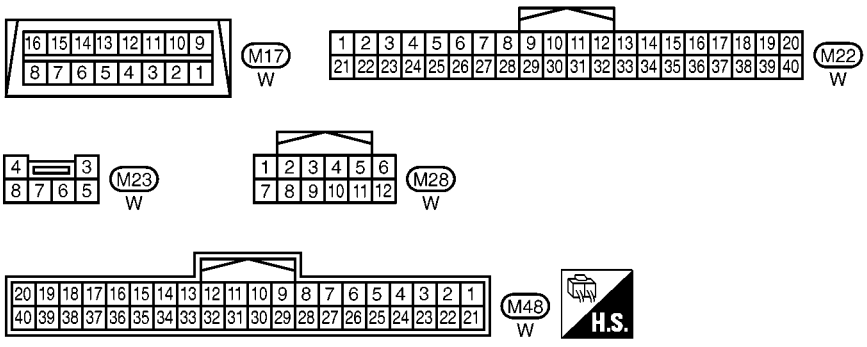
EKS00JPJ



Wiring Diagram — CAN —

EKS00JPK



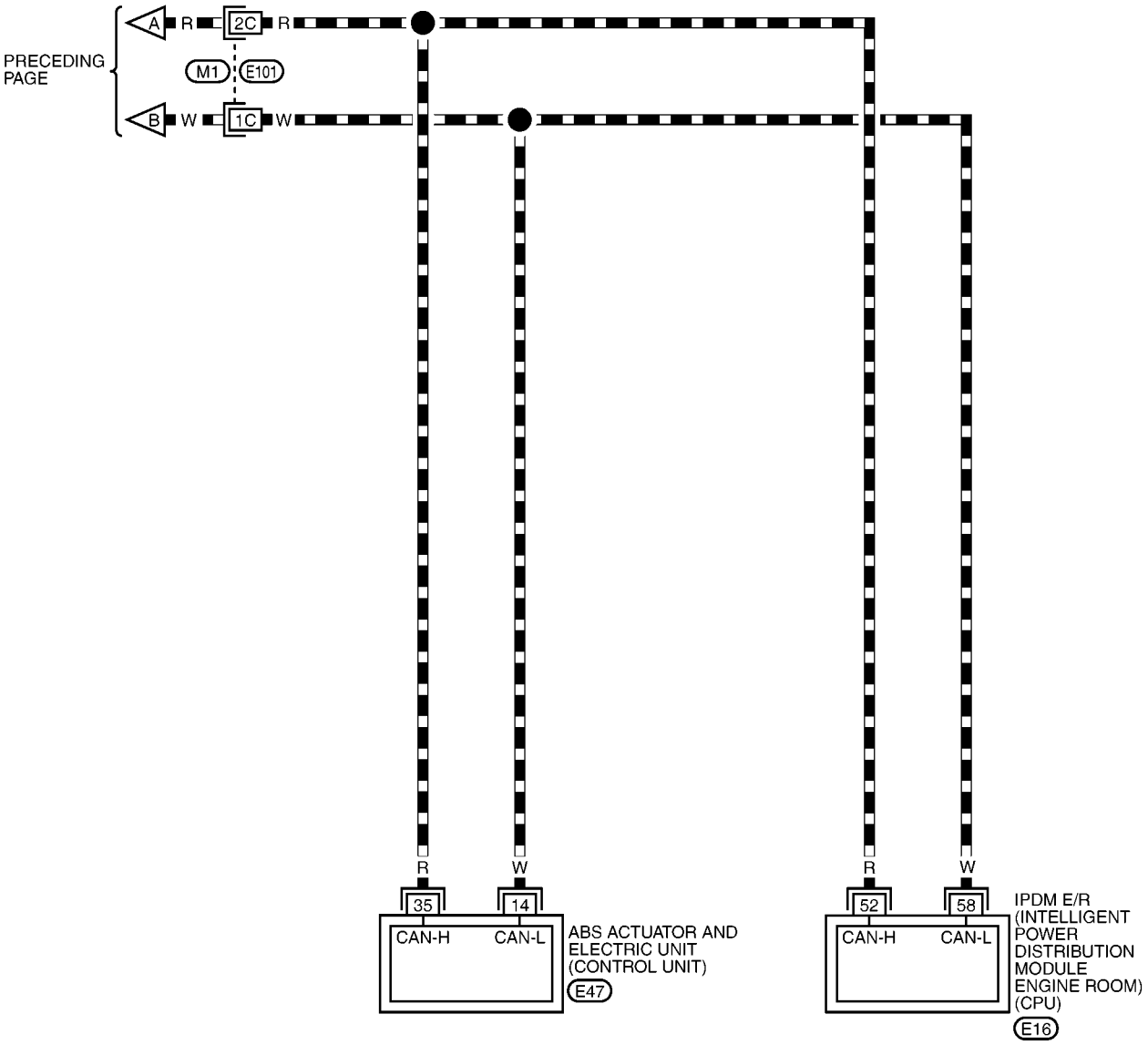


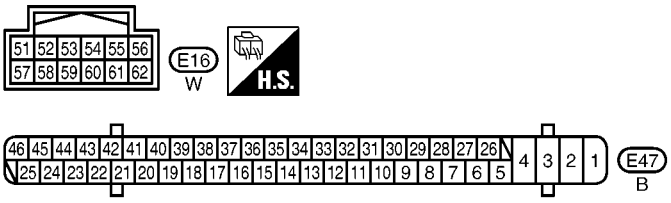
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
E49 -ELECTRICAL UNITS

MKWA2715E

LAN-CAN-16

: DATA LINE





REFER TO THE FOLLOWING.

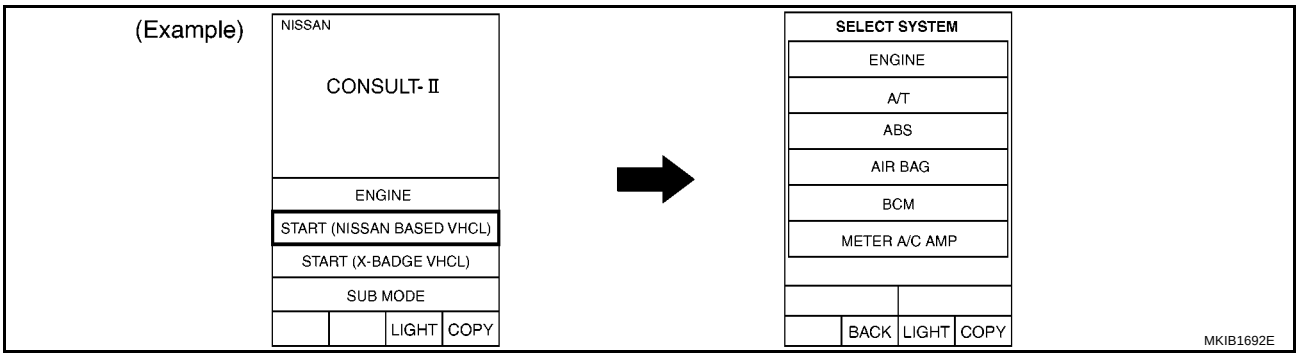
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2716E

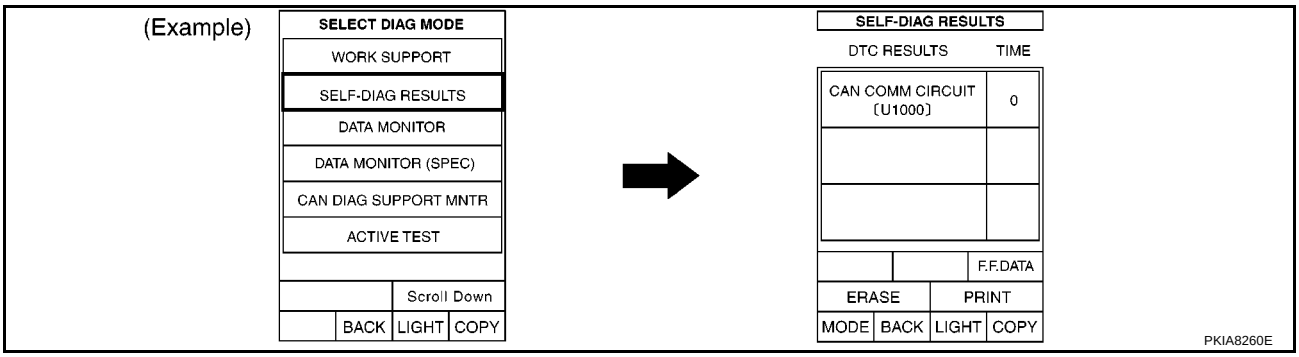
Work Flow

EKS00JPL

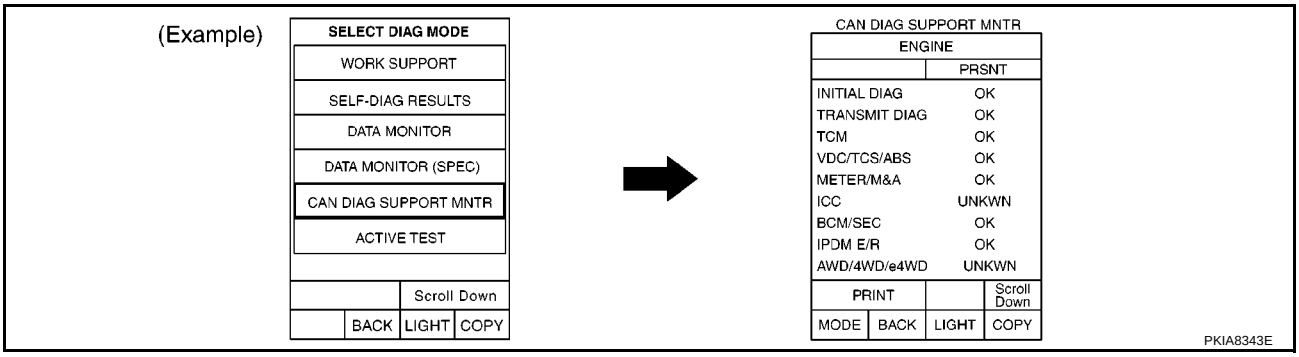
1. When there are no indications of “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.

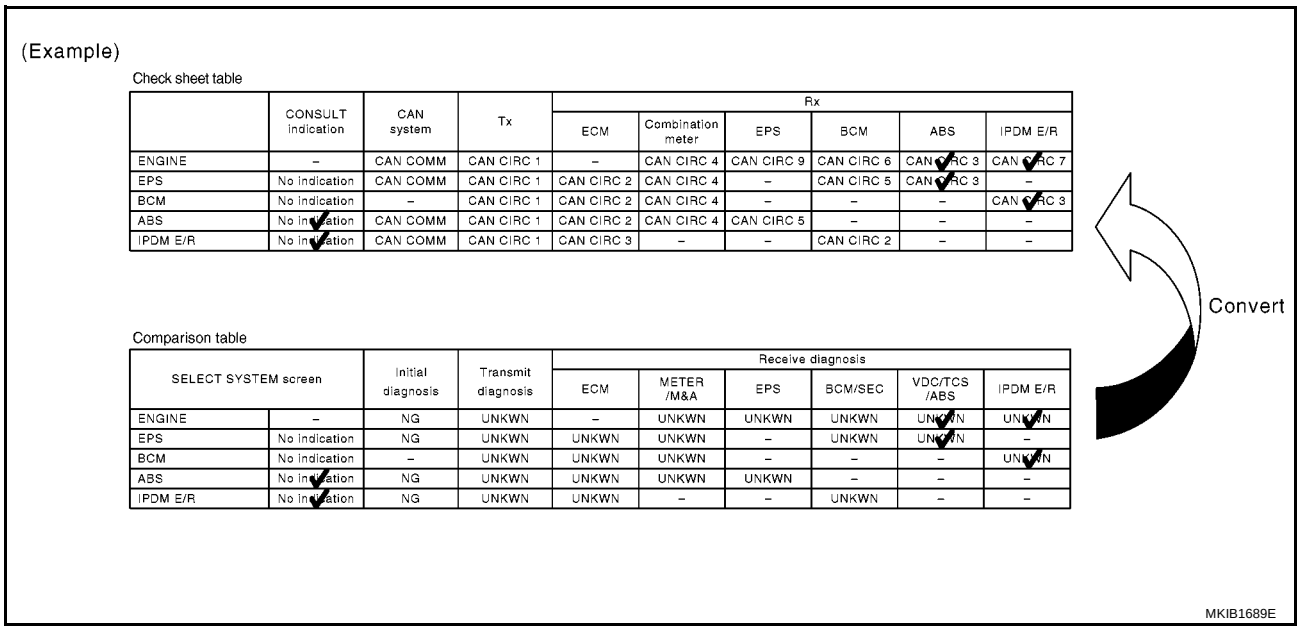


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-237, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-237, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



Check sheet table

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3 ✓	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3 ✓
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

Comparison table

SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis					
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN ✓	UNKWN ✓
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	UNKWN ✓	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN ✓
ABS	No indication ✓	NG	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–
IPDM E/R	No indication ✓	NG	UNKWN	UNKWN	–	–	UNKWN	–	–

7. According to the check sheet results (example), start inspection. Refer to LAN-239, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

Comparison table

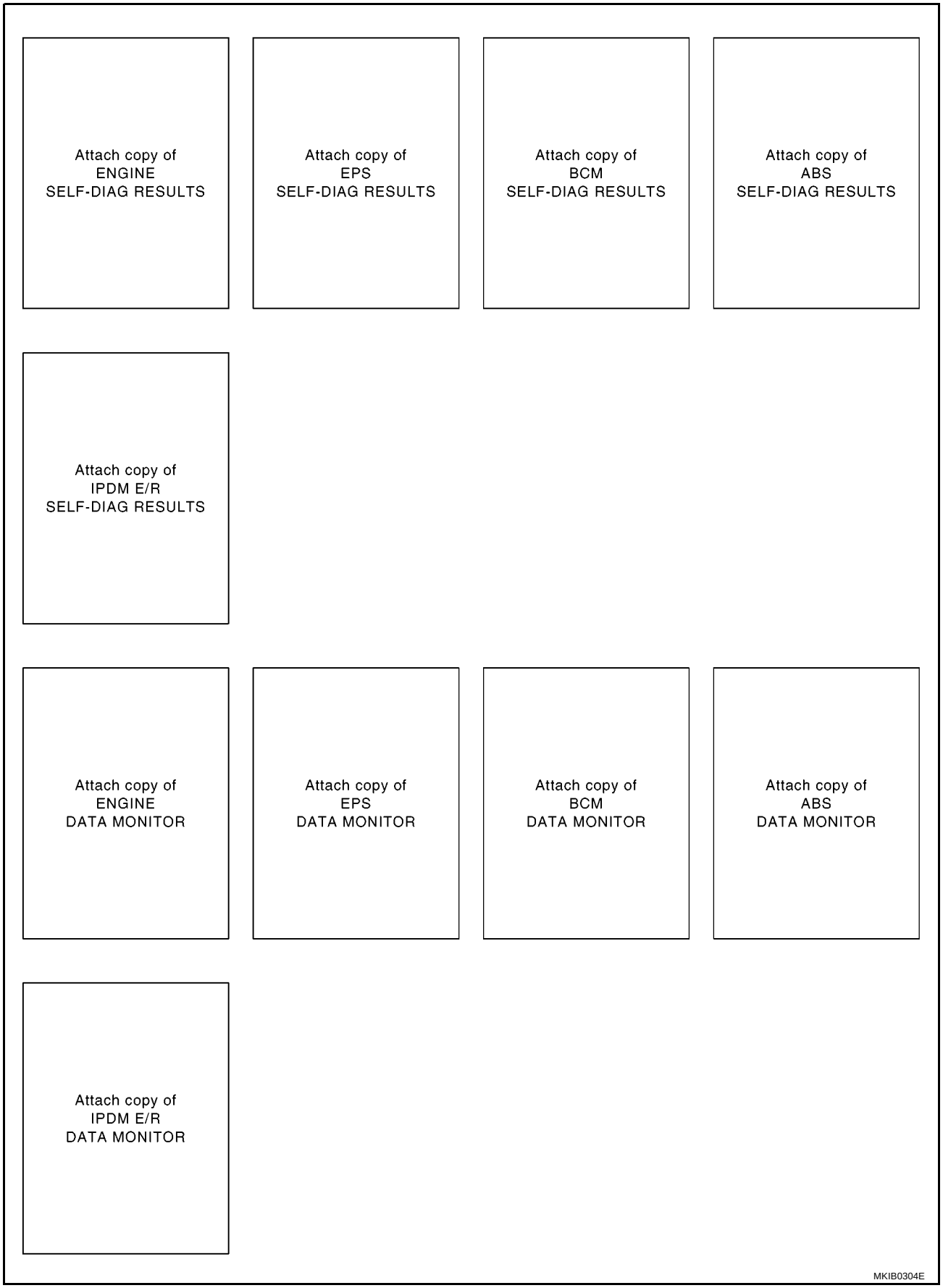
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis					
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	–	NG	UNKWN	–	UNKWN	UNKWN	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	–	UNKWN	UNKWN	–
BCM	No indication	–	UNKWN	UNKWN	UNKWN	–	–	–	UNKWN
ABS	No indication	NG	UNKWN	UNKWN	UNKWN	UNKWN	–	–	–
IPDM E/R	No indication	NG	UNKWN	UNKWN	–	–	UNKWN	–	–

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1608E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
Attach copy of
ENGINE
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
IPDM E/R
DATA MONITOR
MKIB0304E

CHECK SHEET RESULTS (EXAMPLE)

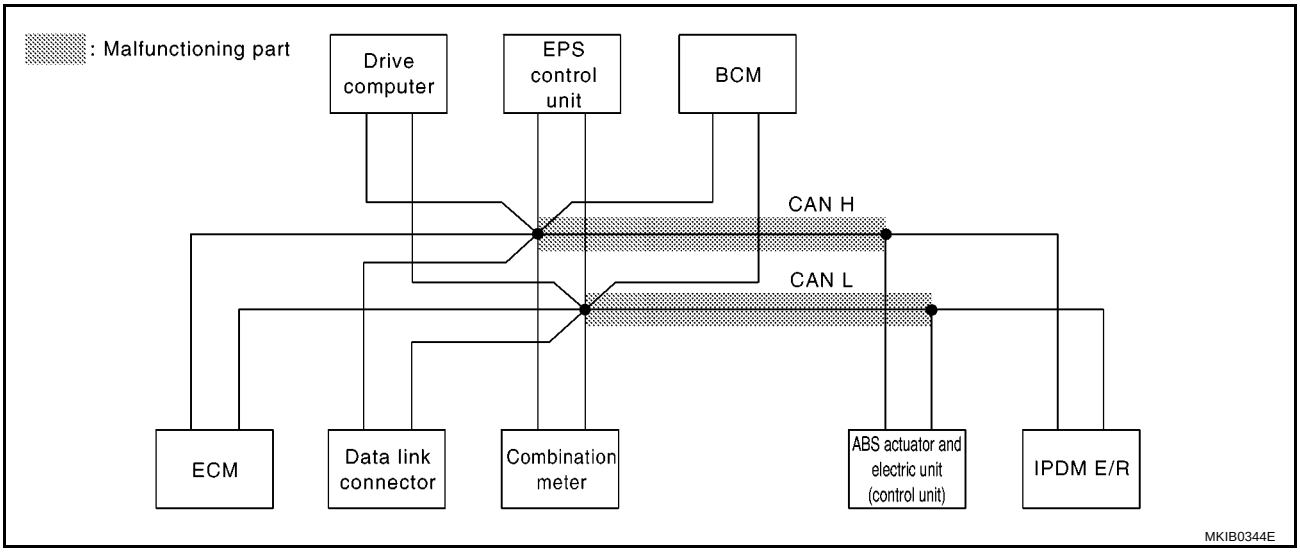
NOTE:
If “NG” is displayed on “CAN COMM” as “DATA MONITOR (CAN DIAG SUPPORT MNTR)” for the diagnosed control unit, replace the control unit.

Case1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-248, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3 ✓	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3 ✓
ABS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0820E



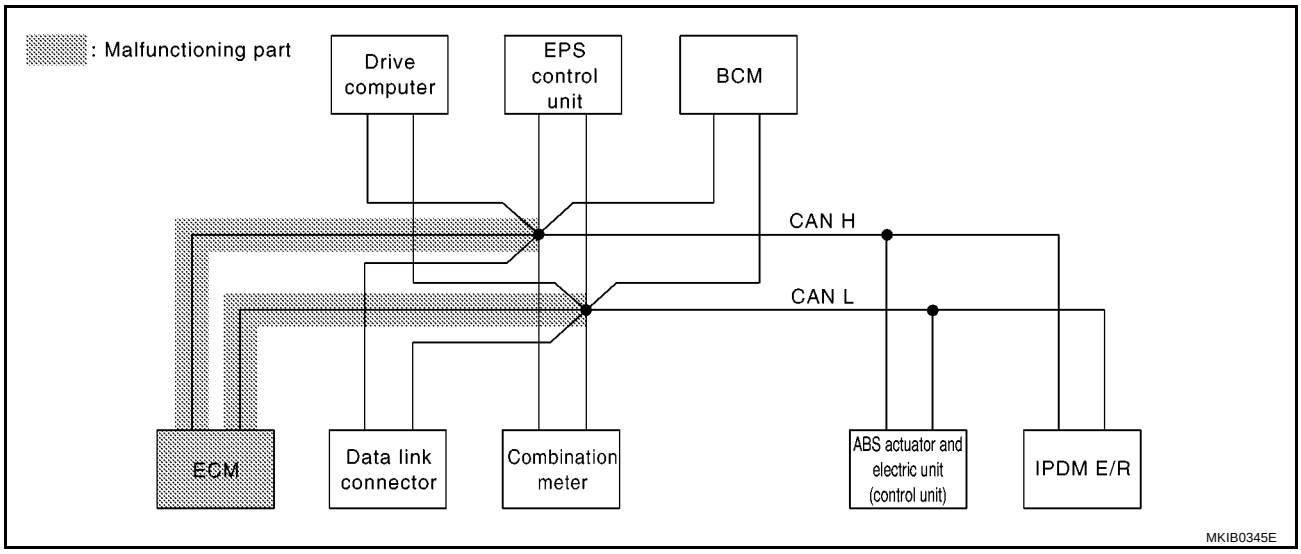
MKIB0344E

Case2

Check ECM circuit. Refer to LAN-249, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0821E



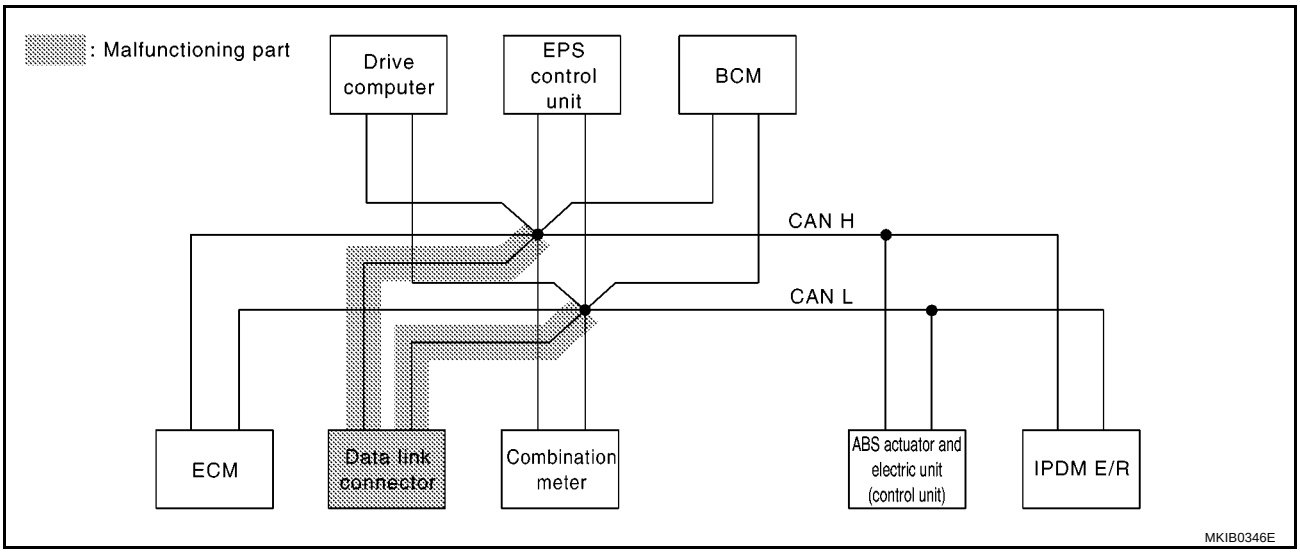
MKIB0345E

Case3

Check data link connector circuit. Refer to LAN-250, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0822E



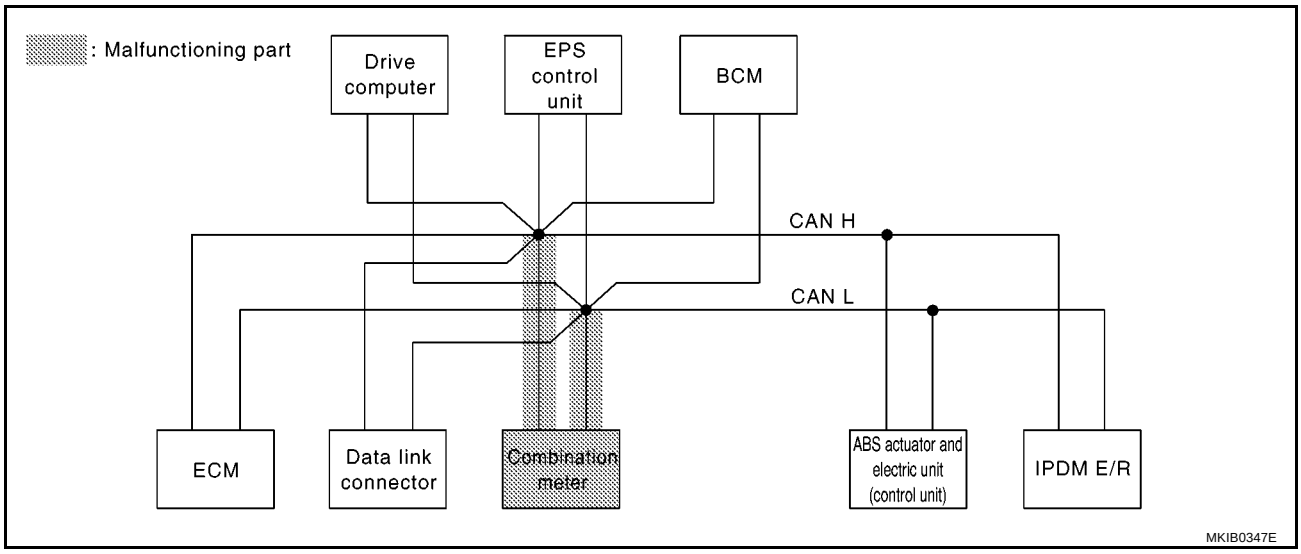
MKIB0346E

Case4

Check combination meter circuit. Refer to LAN-251, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0823E



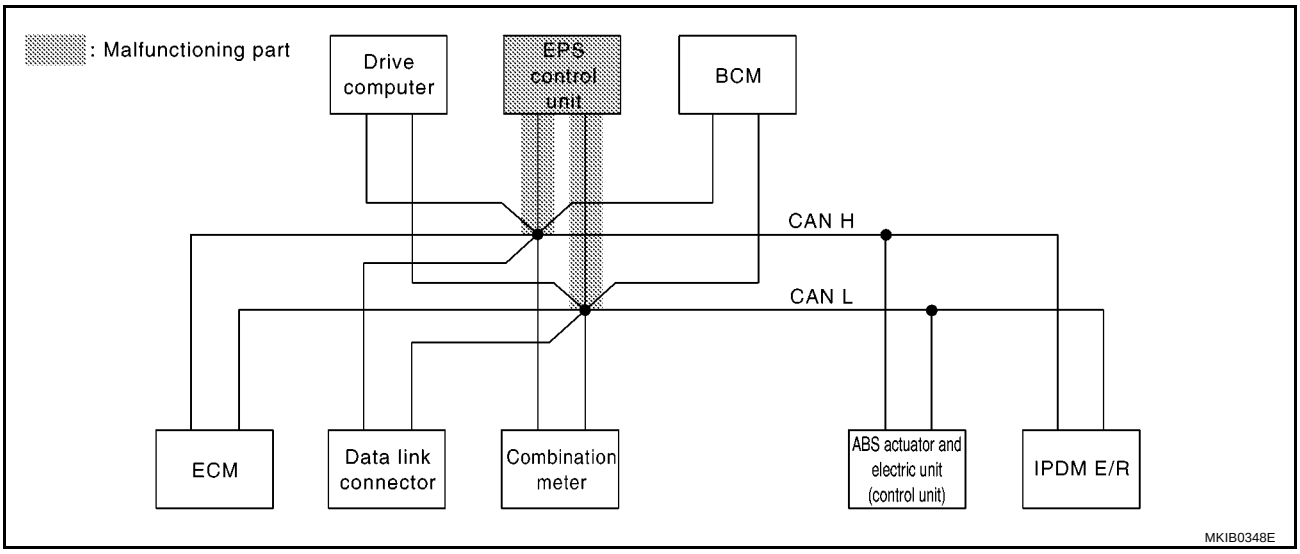
MKIB0347E

Case5

Check EPS control unit circuit. Refer to LAN-252, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0824E



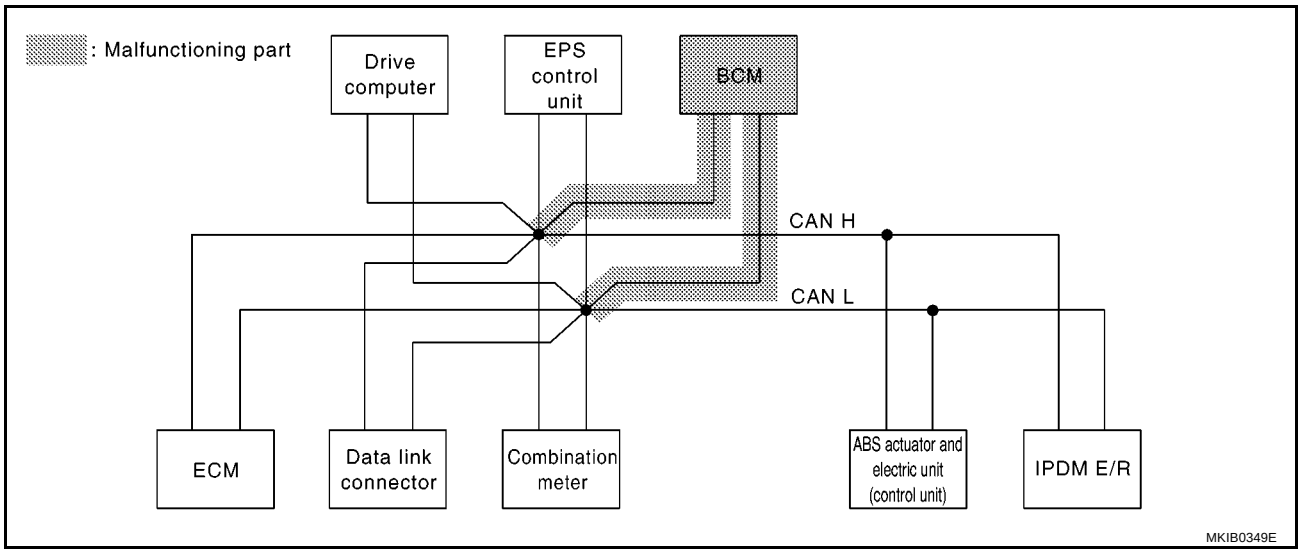
MKIB0348E

Case6

Check BCM circuit. Refer to LAN-253, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6 ✔	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5 ✔	CAN CIRC 3	–
BCM	No indication ✔	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2 ✔	–	–

MKIB0825E



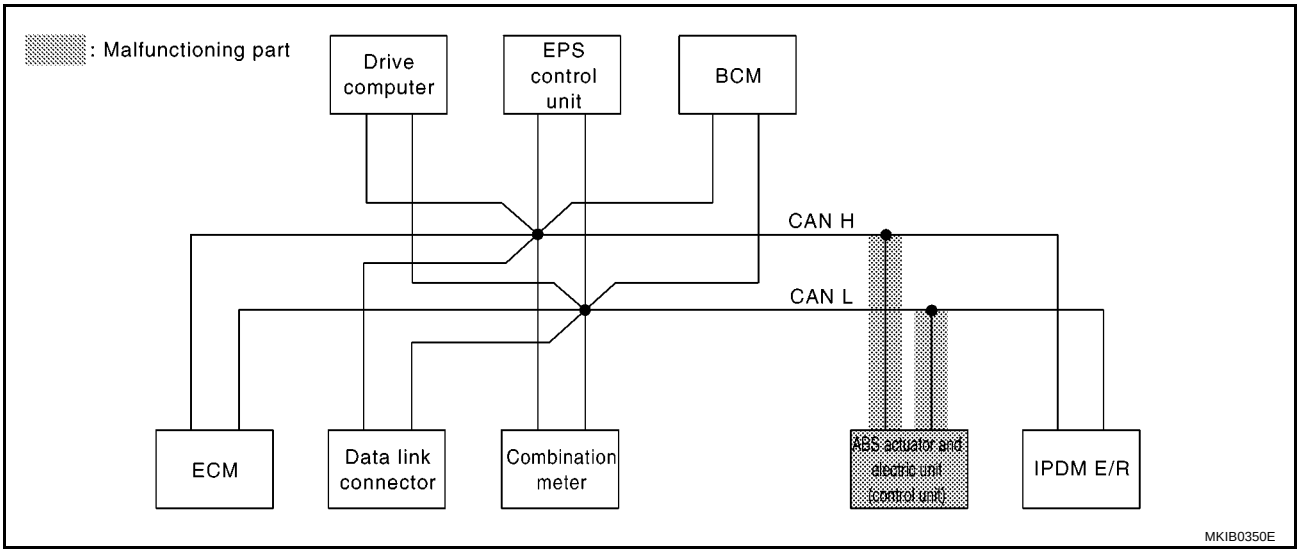
MKIB0349E

Case7

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-254, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3 ✔	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3 ✔	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0826E



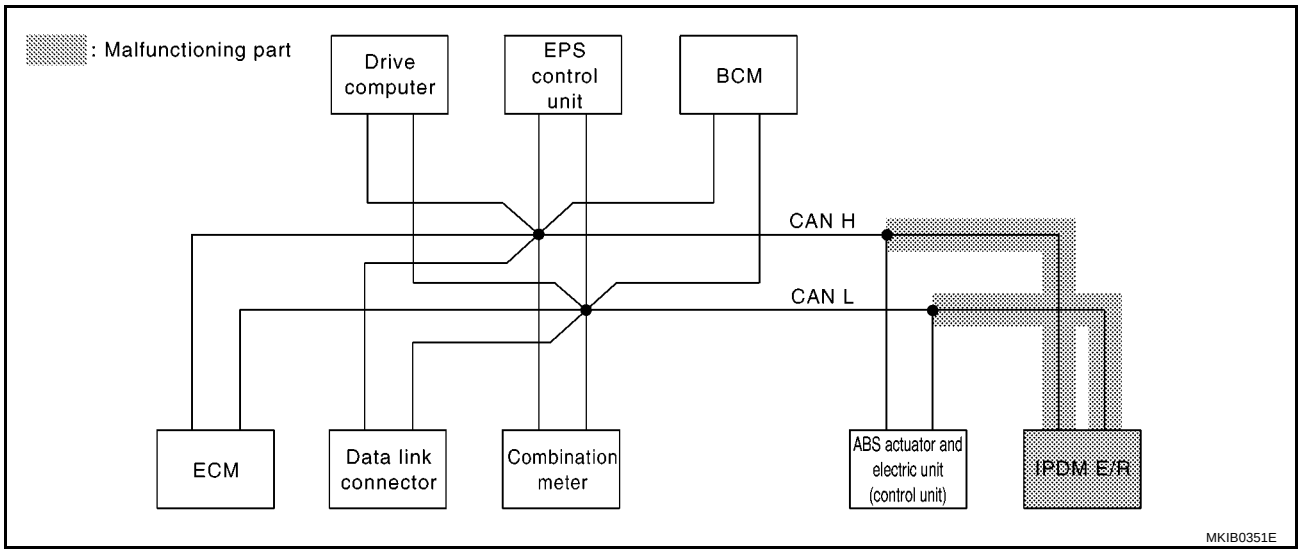
MKIB0350E

Case8

Check IPDM E/R circuit. Refer to LAN-255, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3 ✓
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0827E



MKIB0351E

Case9

Check CAN communication circuit. Refer to LAN-256, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0828E

Case10

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-259, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0829E

Case11

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-259, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	–	CAN COMM	CAN CIRC 1	–	CAN CIRC 4	CAN CIRC 9	CAN CIRC 6	CAN CIRC 3	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	CAN CIRC 5	CAN CIRC 3	–
BCM	No indication	–	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	–	–	–	CAN CIRC 3
ABS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	–	–	–
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	–	–	CAN CIRC 2	–	–

MKIB0830E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JPM

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

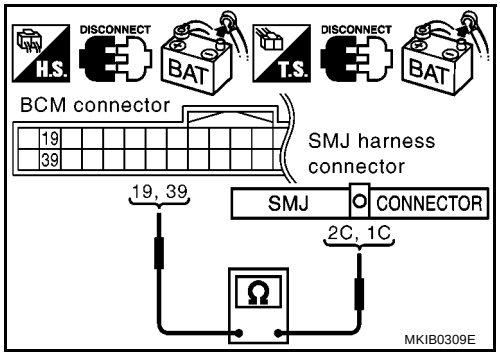
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



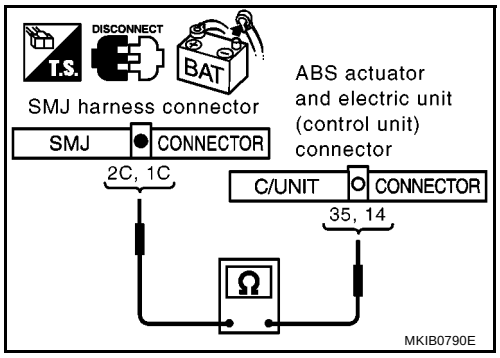
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R), 14 (W).

2C (R) – 35 (R) : Continuity should exist.
1C (W) – 14 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-235, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JPN

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

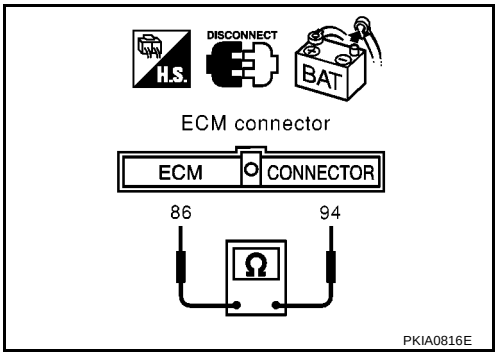
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JPO

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check data link connector and terminals for damage, bend and loose connection (connector side and harness side).

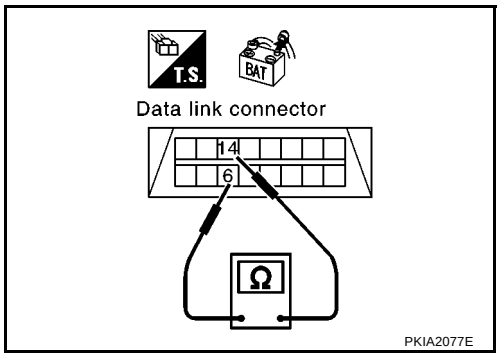
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-235, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JPP

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

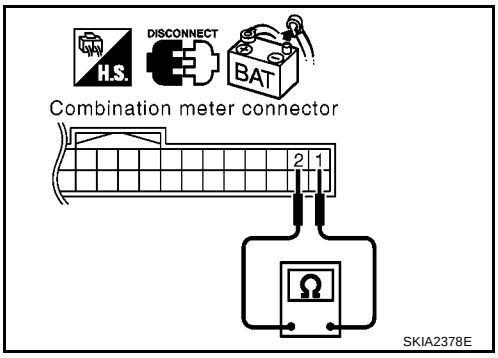
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

EPS Control Unit Circuit Check

EKS00JPQ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

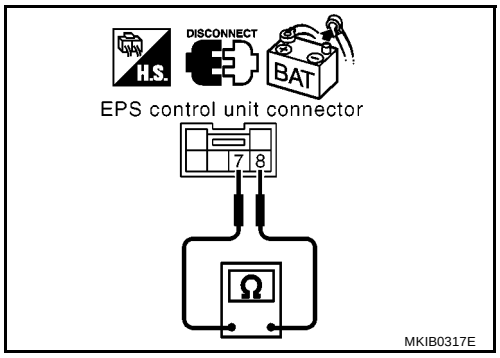
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JPR

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

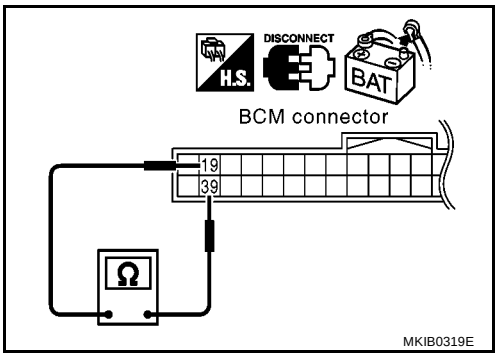
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JPS

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

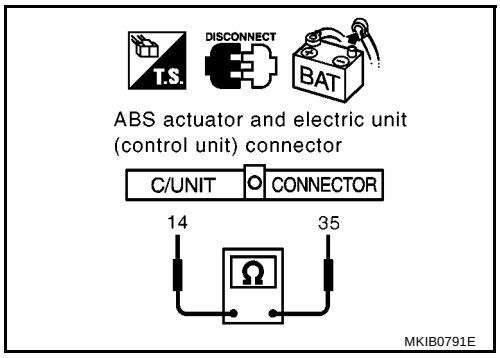
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.



IPDM E/R Circuit Check

EKS00JPT

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

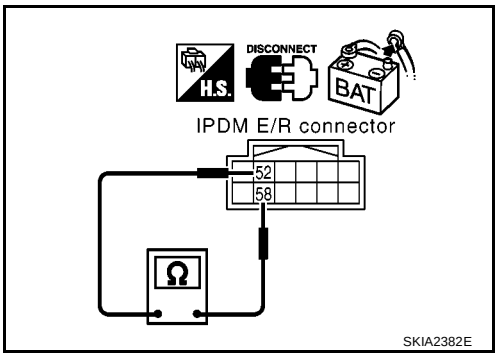
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS00JPU

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

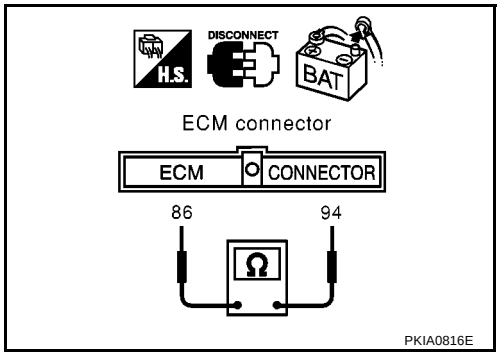
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E49 terminals 94 (R) and 86 (W).

94 (R) – 86 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



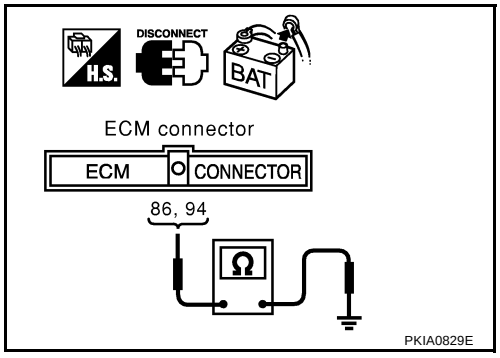
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E49 terminals 94 (R), 86 (W) and ground.

94 (R) – Ground : Continuity should not exist.
86 (W) – Ground : Continuity should not exist.

OK or NG

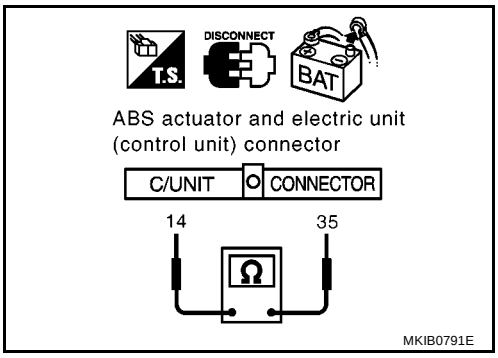
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E47 terminals 35 (R) and 14 (W).

35 (R) – 14 (W) : Continuity should not exist.



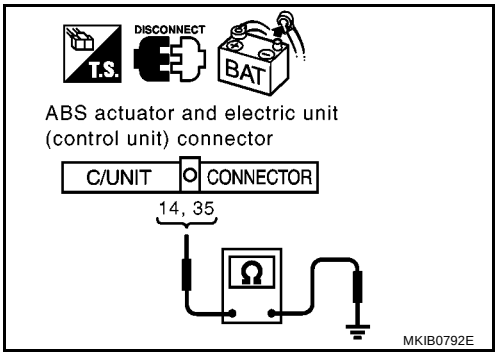
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E47 terminals 35 (R), 14 (W) and ground.

35 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

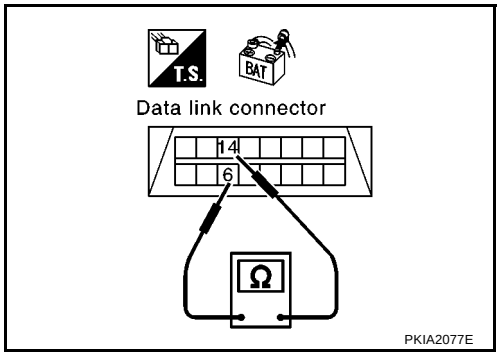
OK >> GO TO 6.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 7.

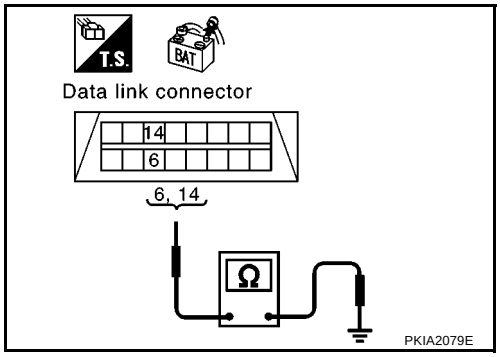
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.

14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.

NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-259, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-235, "Work Flow" .

NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JPV

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

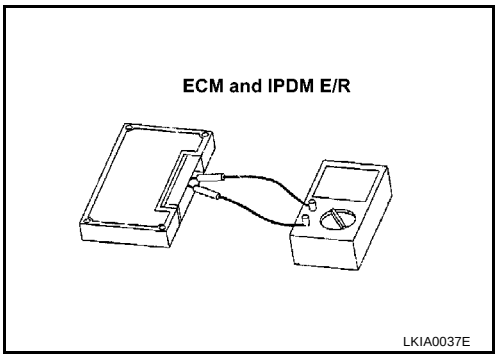
Component Inspection

EKS00JPW

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 94 and 86.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	94 – 86	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 9)

PFP:23710

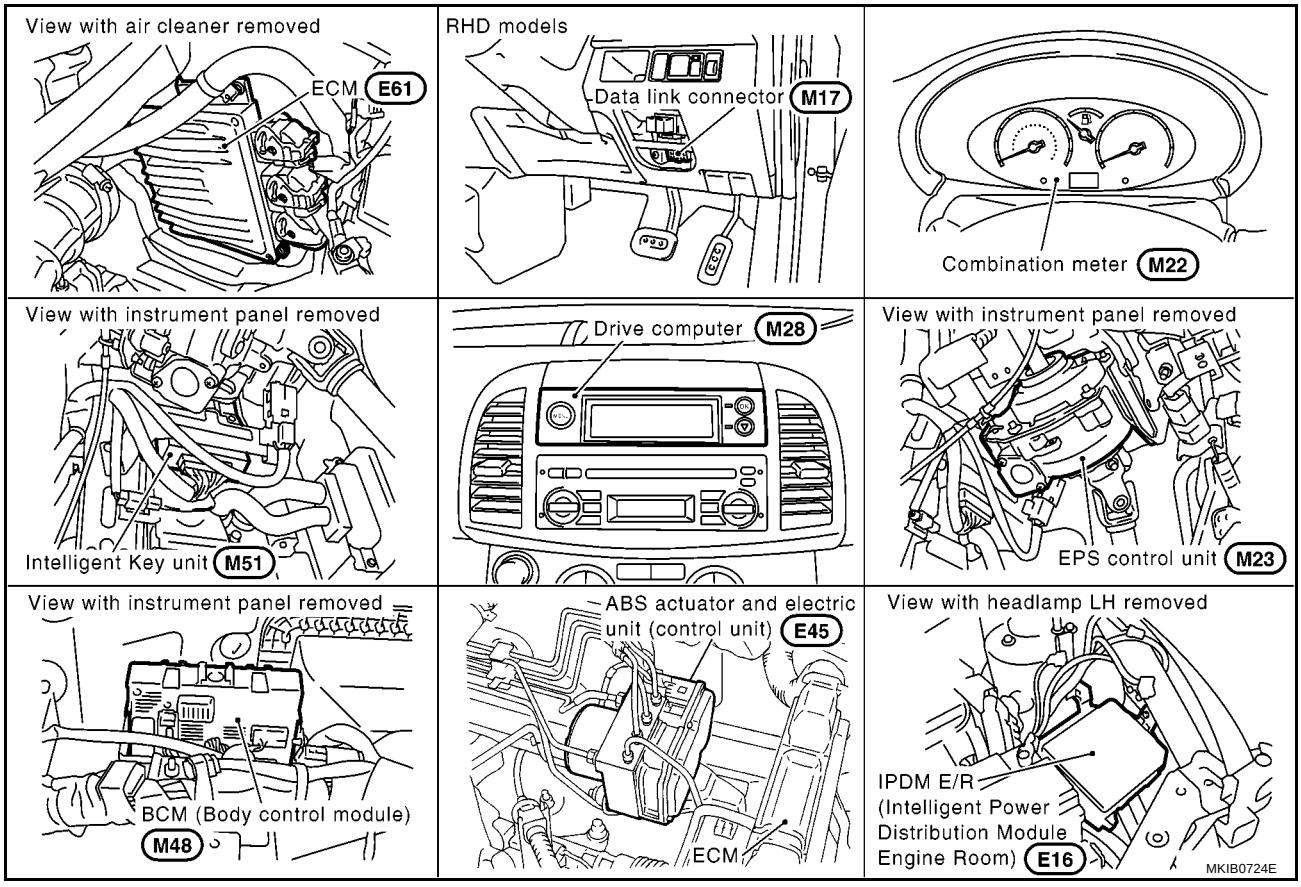
System Description

EKS00JPX

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

Component Parts and Harness Connector Location

EKS00JPY



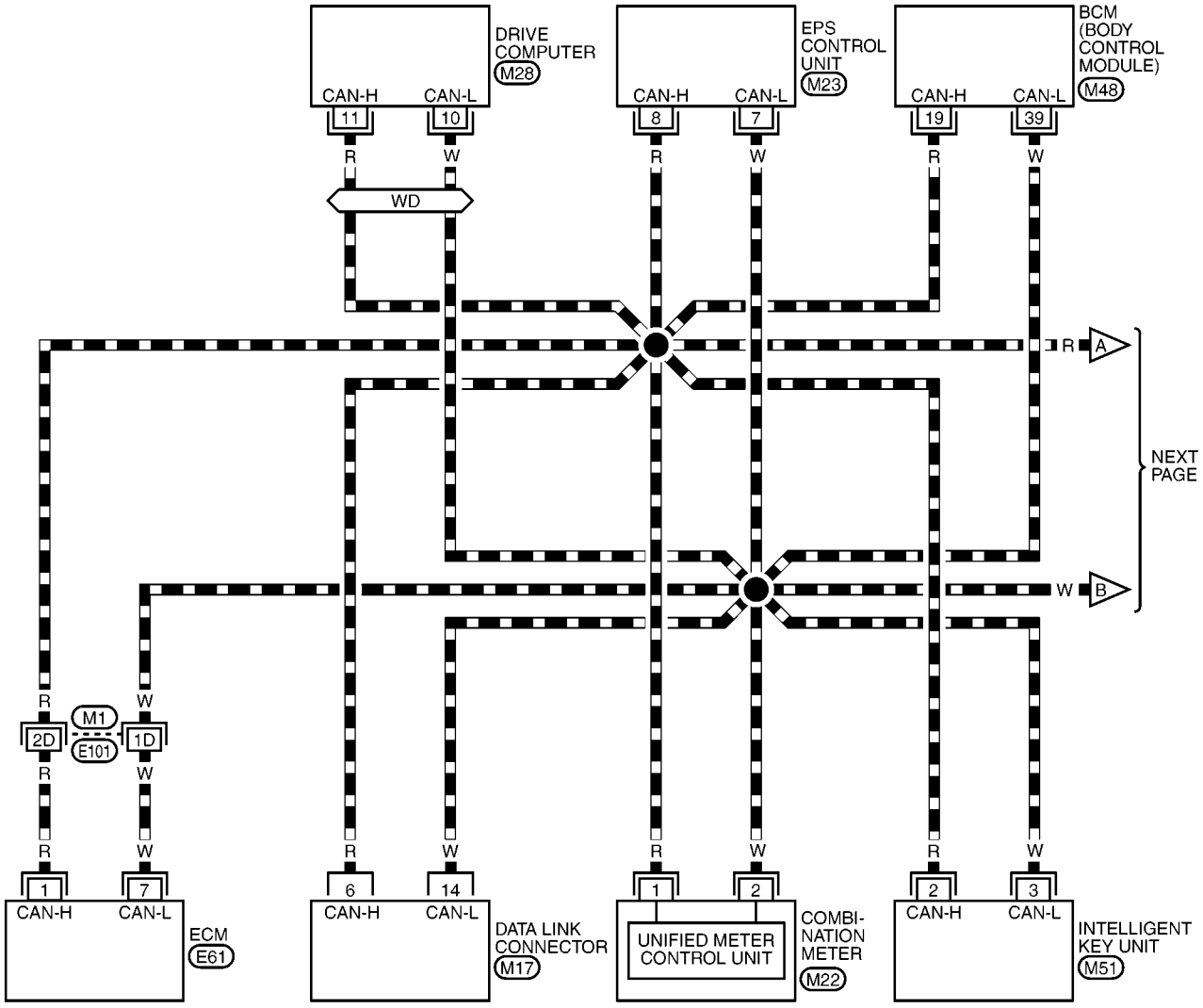
Wiring Diagram — CAN —

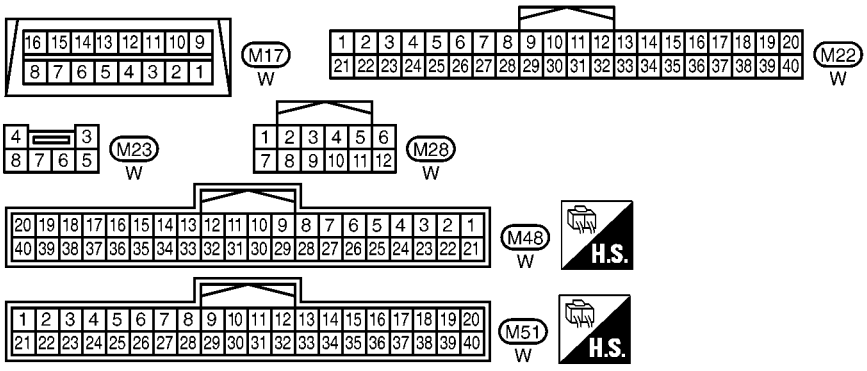
EKS00JPZ

LAN-CAN-17

: DATA LINE

WD : WITH DRIVE COMPUTER





REFER TO THE FOLLOWING.

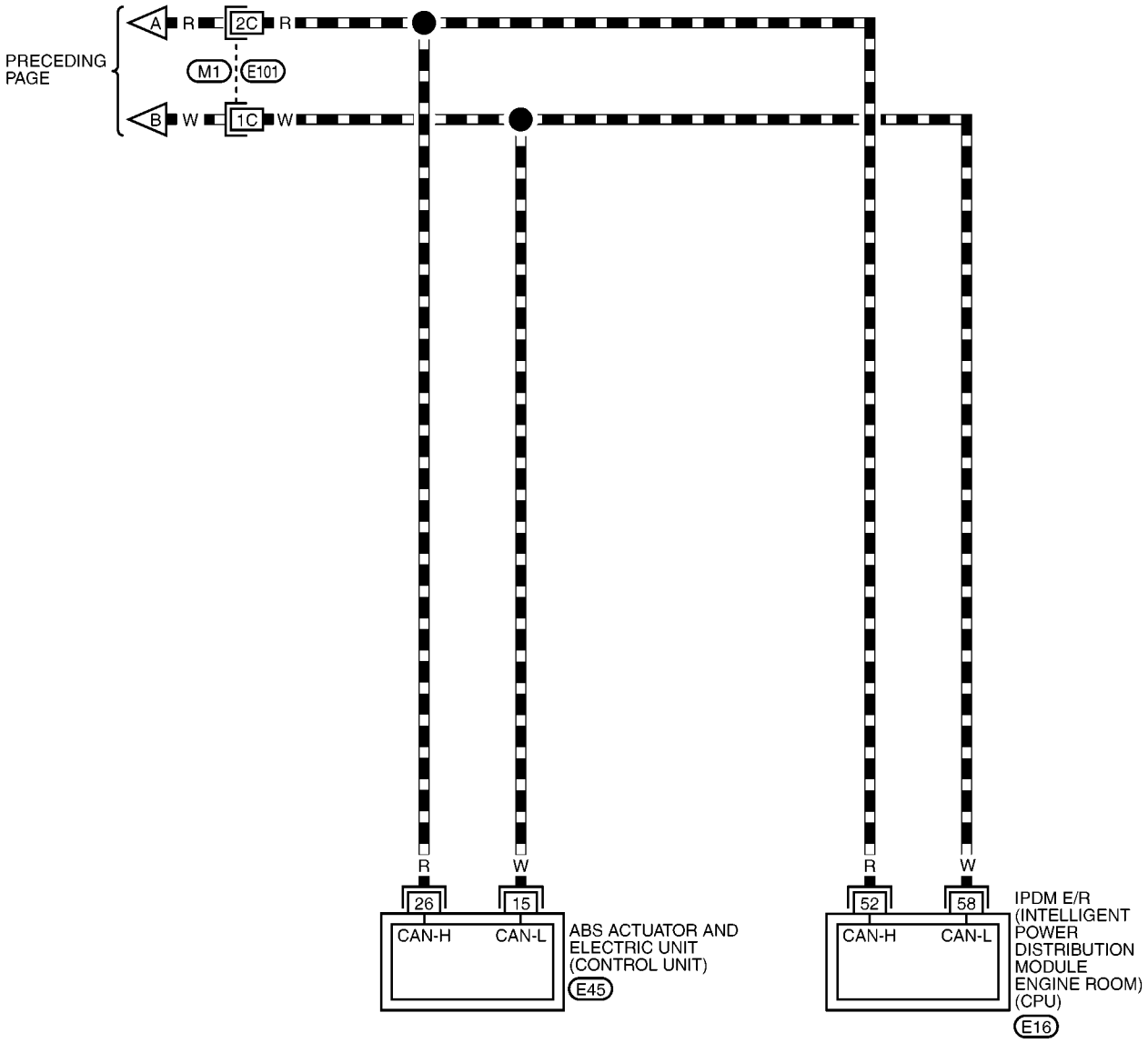
M1 -SUPER MULTIPLE JUNCTION (SMJ)

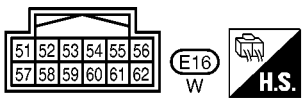
E61 -ELECTRICAL UNITS

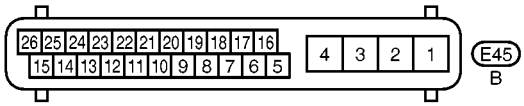
MKWA2705E

LAN-CAN-18

: DATA LINE







REFER TO THE FOLLOWING.

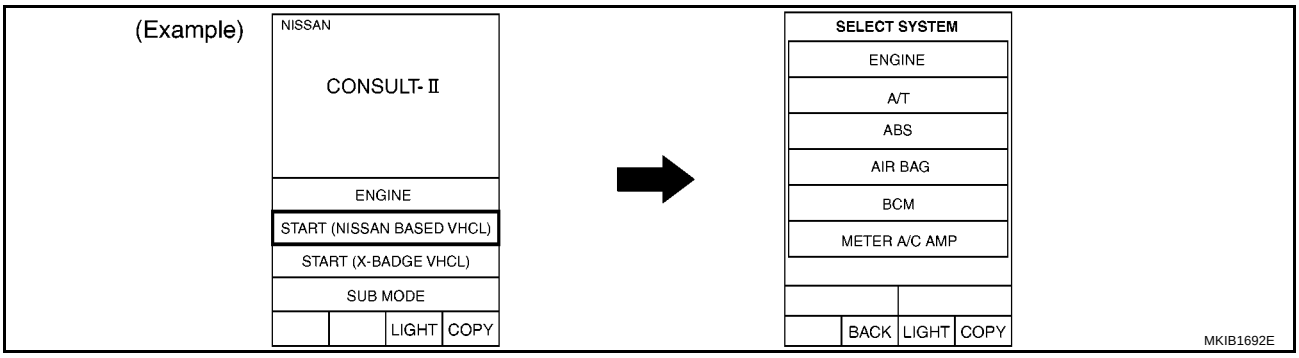
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2706E

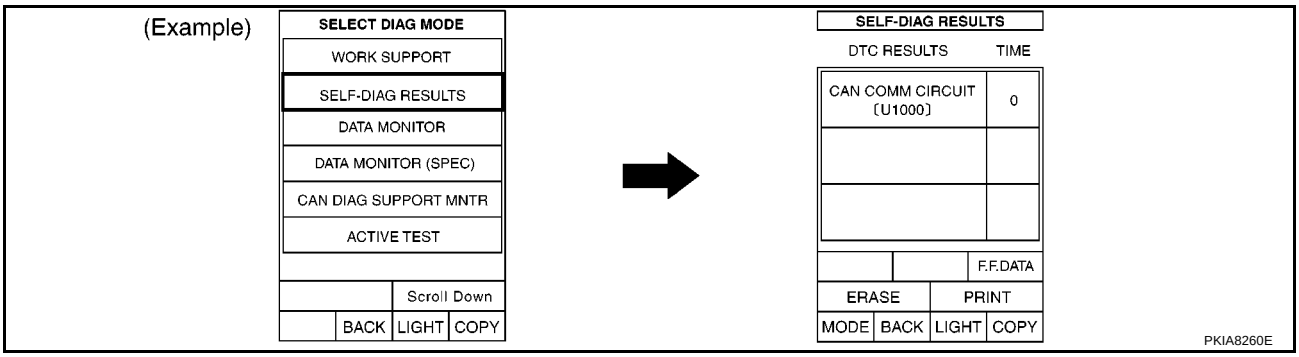
Work Flow

EKS00JQ0

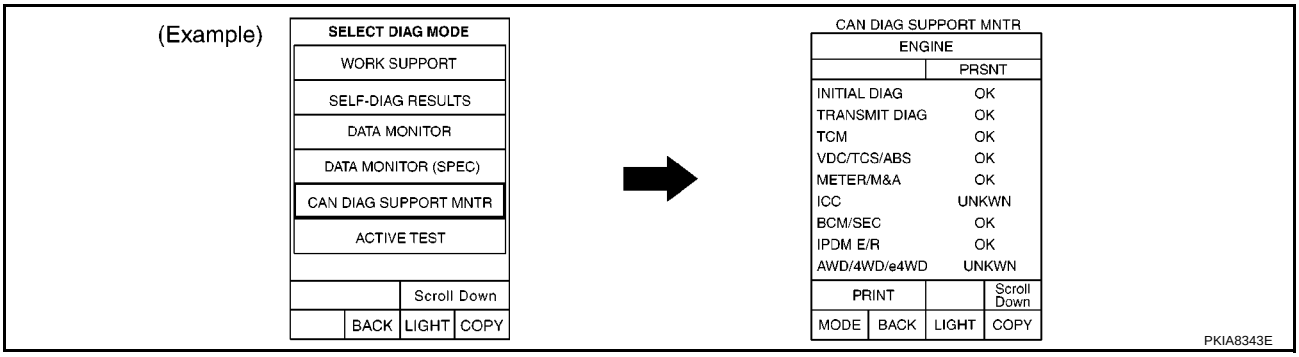
1. When there are no indications of “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “INTELLIGENT KEY”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.

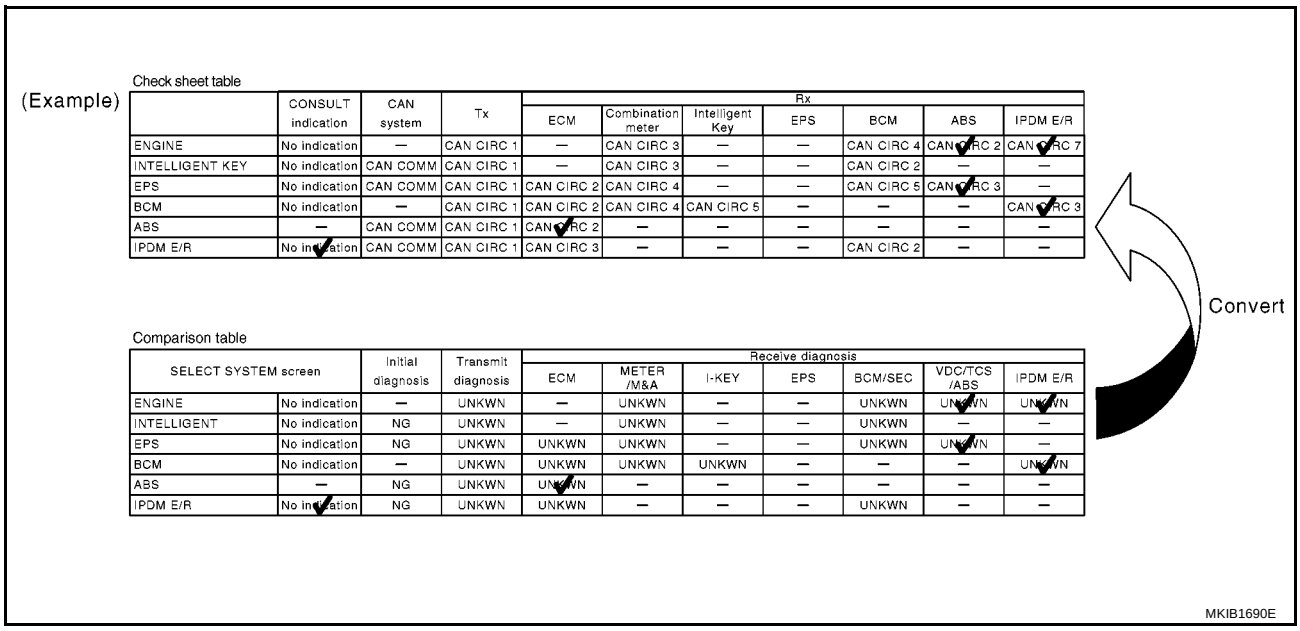


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-265, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-265, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



7. According to the check sheet results (example), start inspection. Refer to LAN-267, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

Comparison table

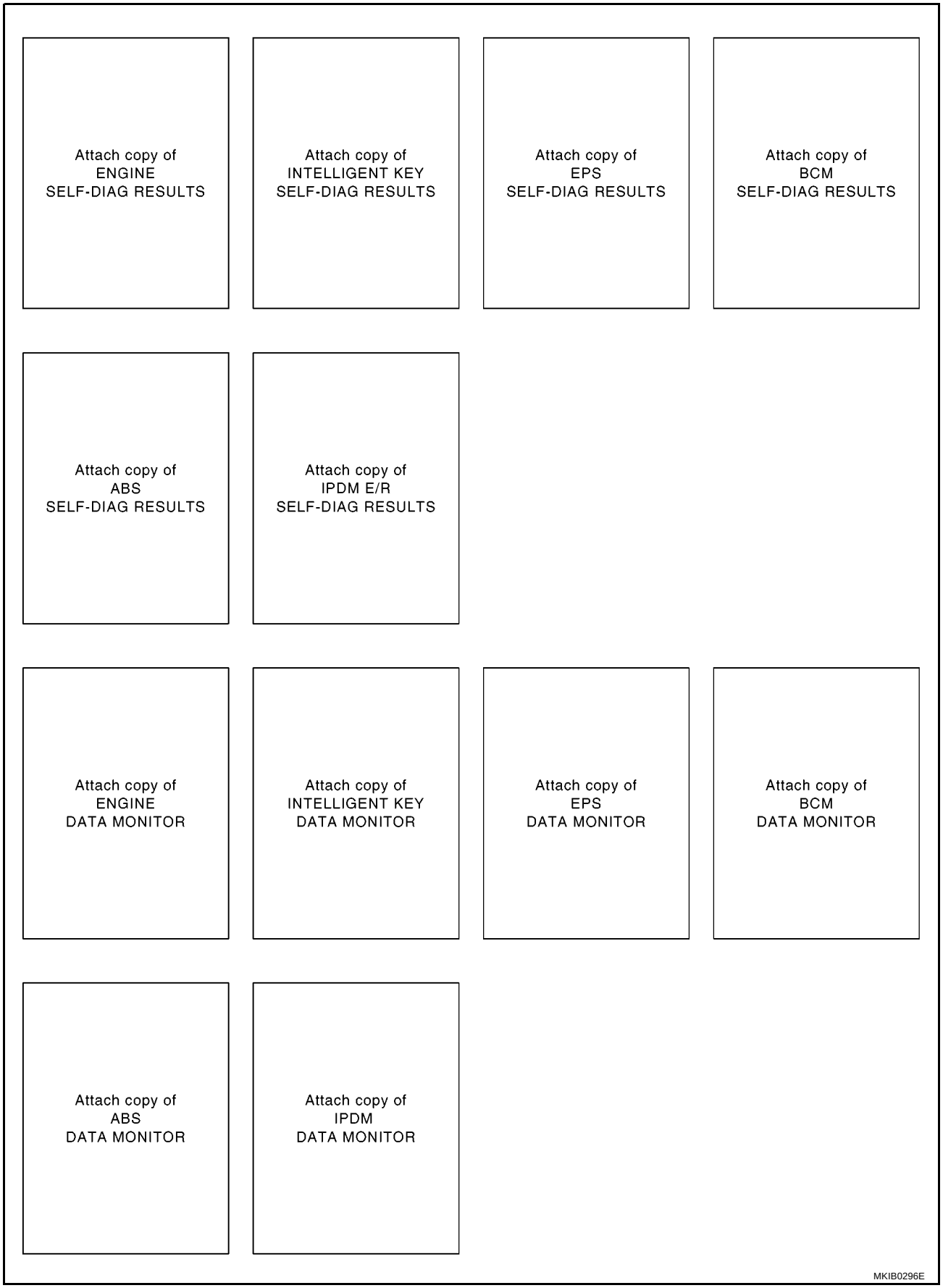
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis						
				ECM	METER /M&A	I-KEY	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	No indication	—	UNKWN	—	UNKWN	—	—	UNKWN	UNKWN	UNKWN
INTELLIGENT	No indication	NG	UNKWN	—	UNKWN	—	—	UNKWN	—	—
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—	—
IPDM E/R	No indication	NG	UNKWN	UNKWN	—	—	—	UNKWN	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1609E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
INTELLIGENT KEY
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
Attach copy of
ENGINE
DATA MONITOR
Attach copy of
INTELLIGENT KEY
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
IPDM
DATA MONITOR
MKIB0296E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

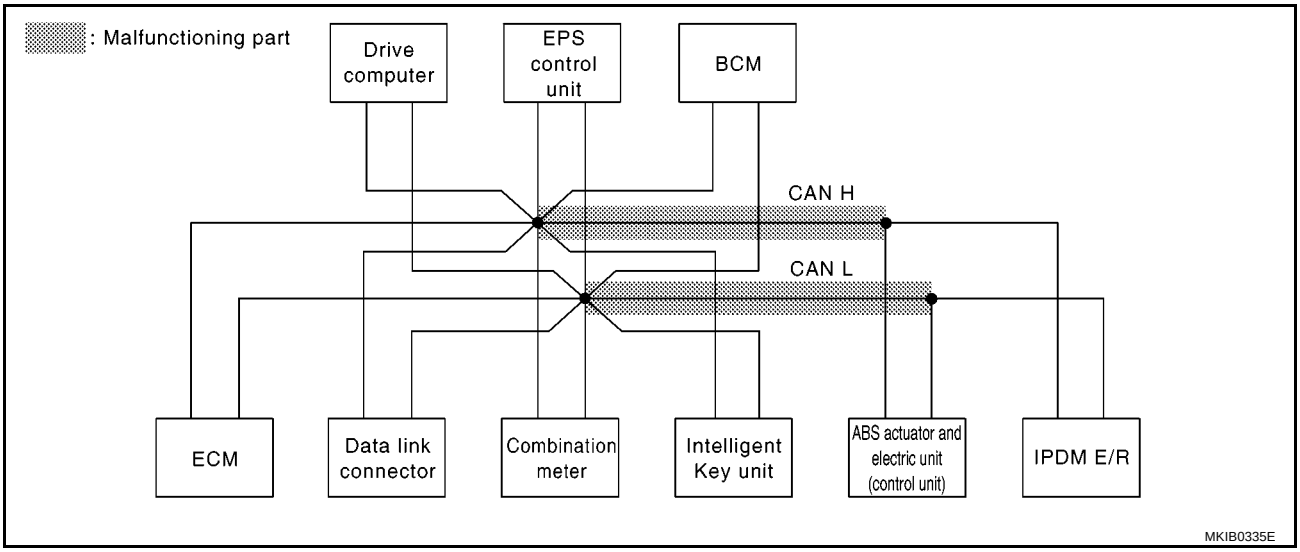
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-277, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2 ✔	CAN CIRC 7 ✔
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✔	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3 ✔
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✔	—	—	—	—	—	—
IPDM E/R	No indication ✔	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1659E



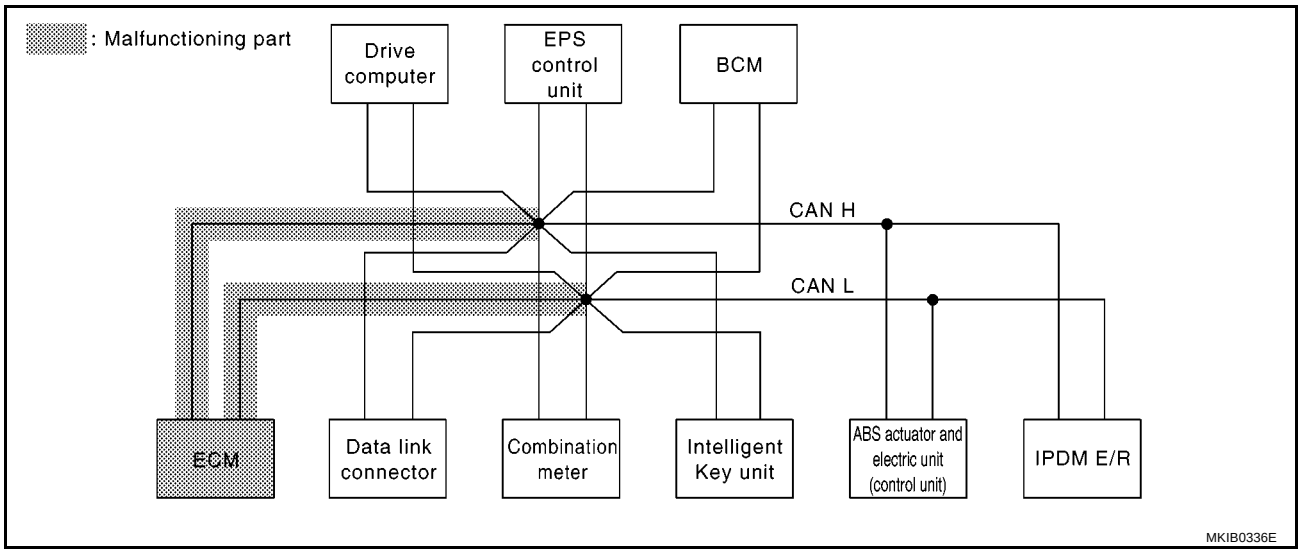
MKIB0335E

Case 2

Check ECM circuit. Refer to LAN-278, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1660E



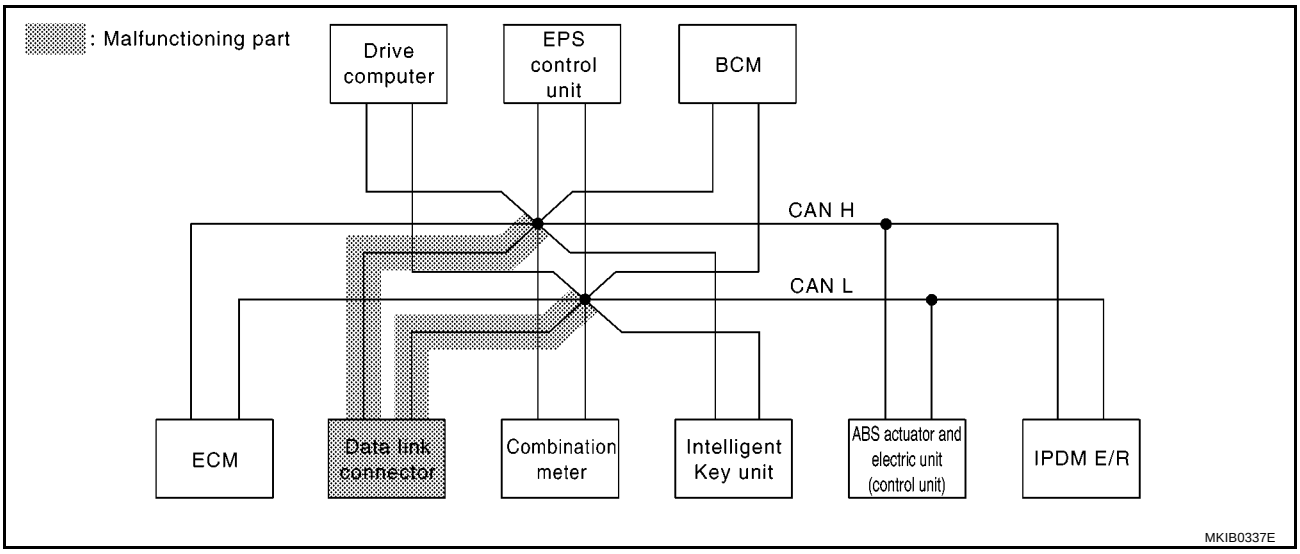
MKIB0336E

Case 3

Check data link connector circuit. Refer to LAN-279, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1661E



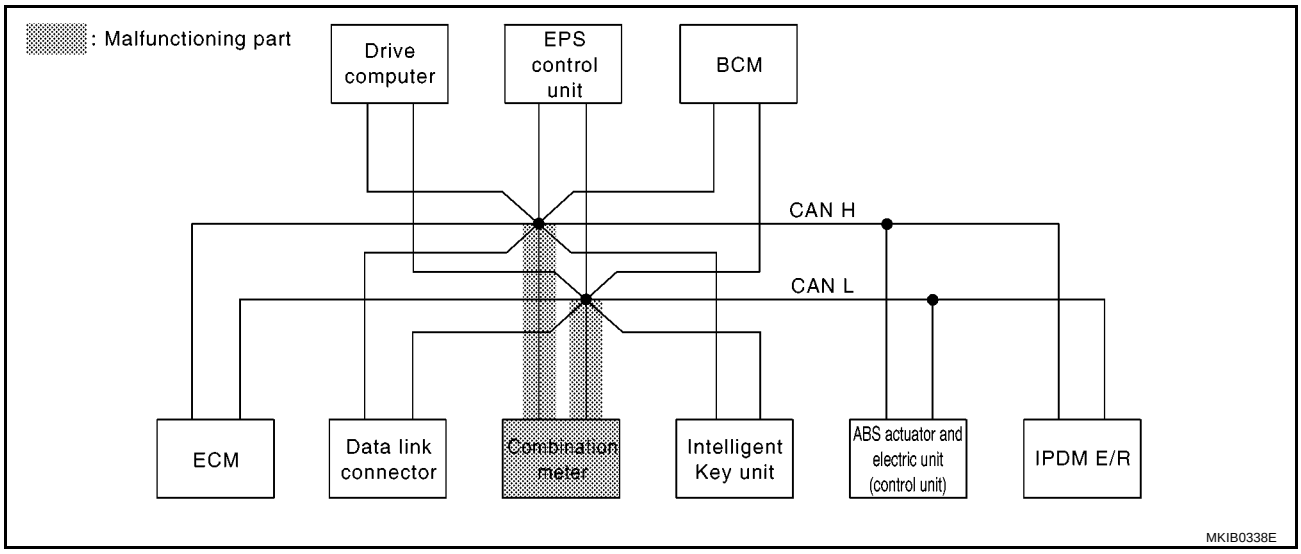
MKIB0337E

Case 4

Check combination meter circuit. Refer to LAN-280, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1662E



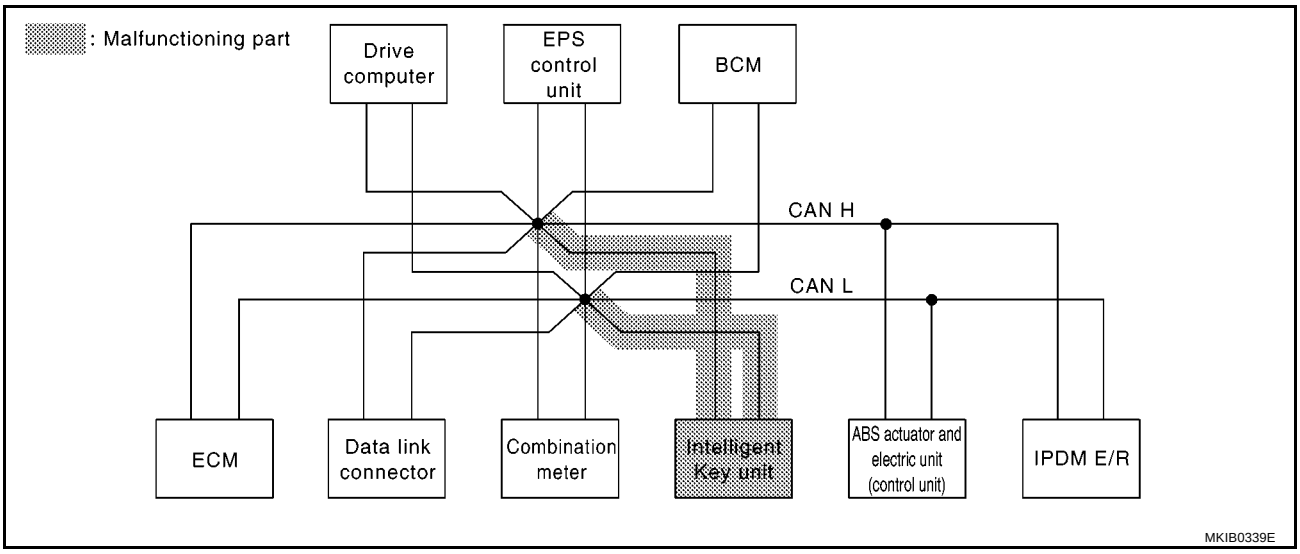
MKIB0338E

Case 5

Check Intelligent Key unit circuit. Refer to LAN-281, "Intelligent Key Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1663E



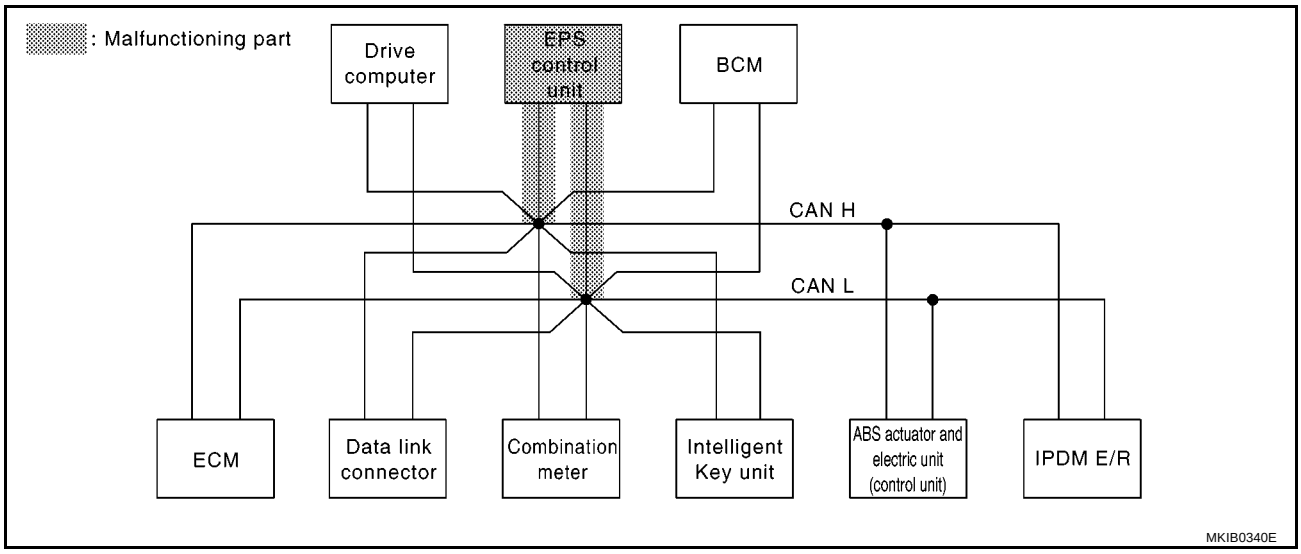
MKIB0339E

Case 6

Check EPS control unit circuit. Refer to LAN-282, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1664E



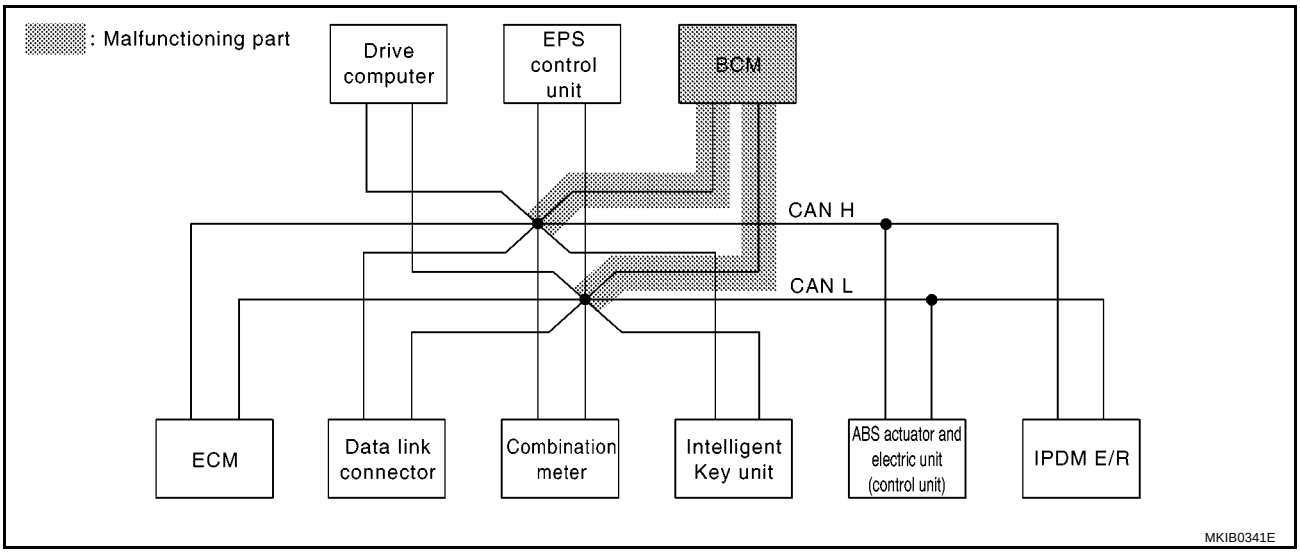
MKIB0340E

Case 7

Check BCM circuit. Refer to LAN-283, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1665E



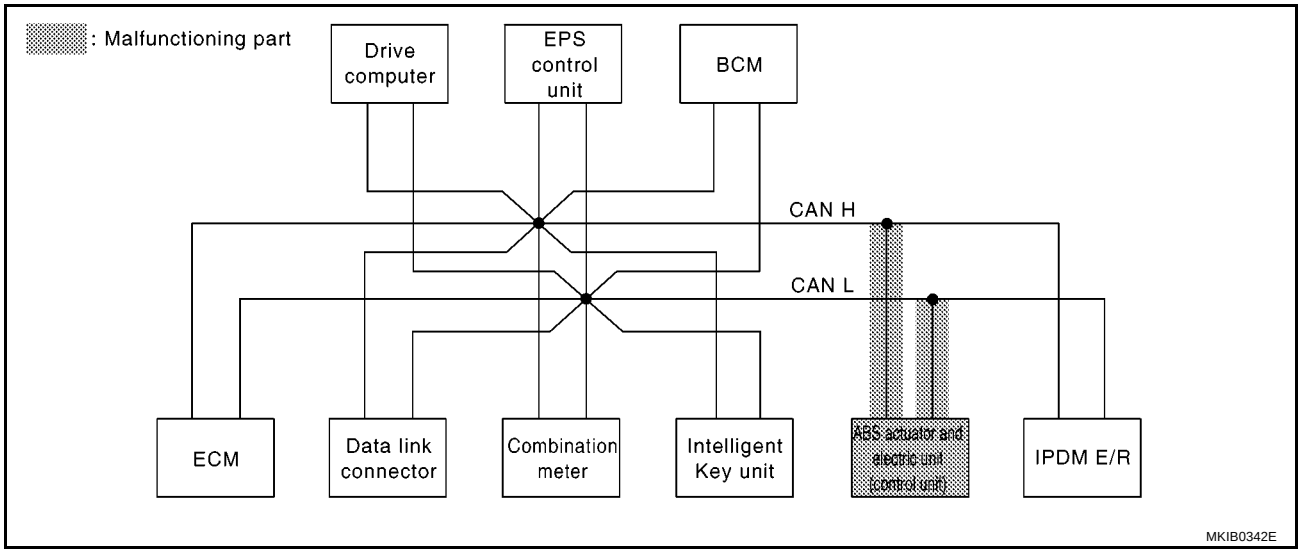
MKIB0341E

Case 8

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-284, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2 ✓	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1666E



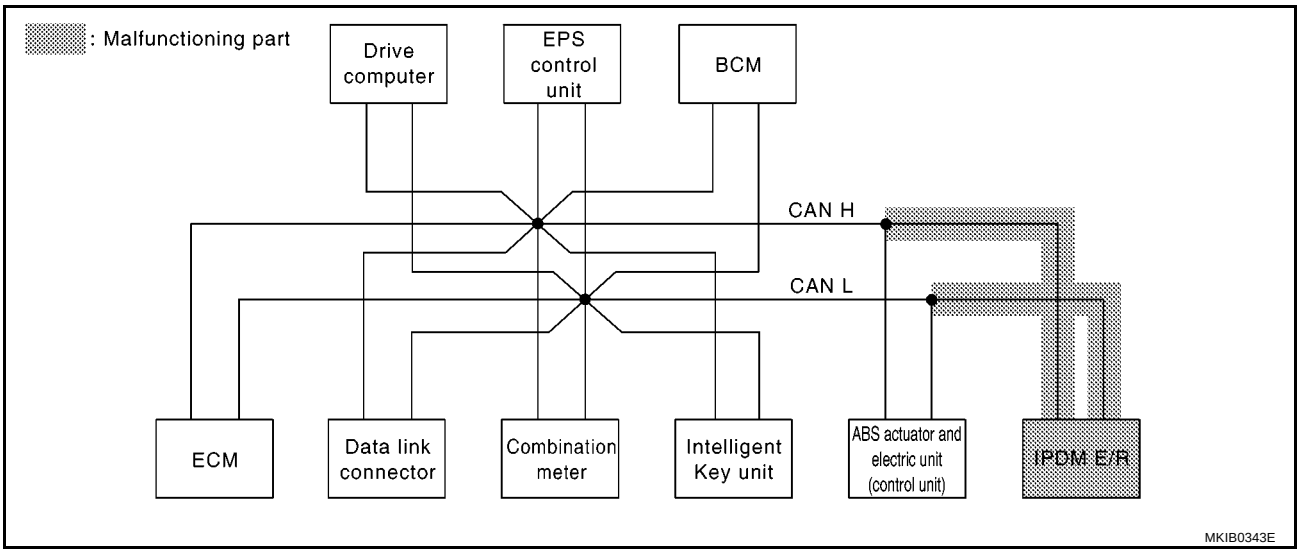
MKIB0342E

Case 9

Check IPDM E/R circuit. Refer to LAN-285, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7 ✓
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1667E



MKIB0343E

Case 10

Check CAN communication circuit. Refer to LAN-286, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication ✓	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication ✓	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication ✓	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1 ✓	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1668E

Case 11

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-289, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2 ✓	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1670E

Case 12

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-289, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx						
				ECM	Combination meter	Intelligent Key	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
INTELLIGENT KEY	No indication	CAN COMM	CAN CIRC 1	—	CAN CIRC 3	—	—	CAN CIRC 2	—	—
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	CAN CIRC 5	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	—	CAN CIRC 2	—	—

MKIB1669E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JQ1

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

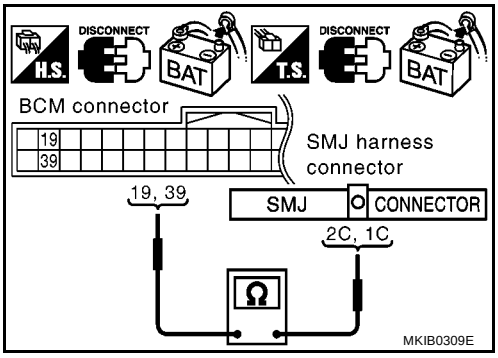
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



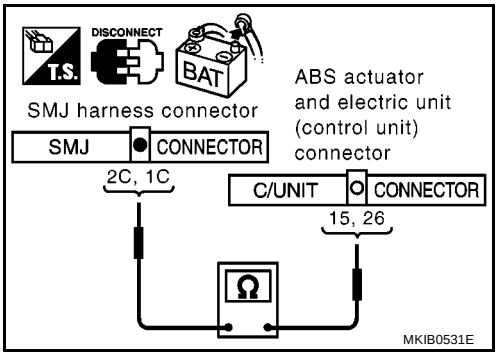
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-263, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JQ2

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

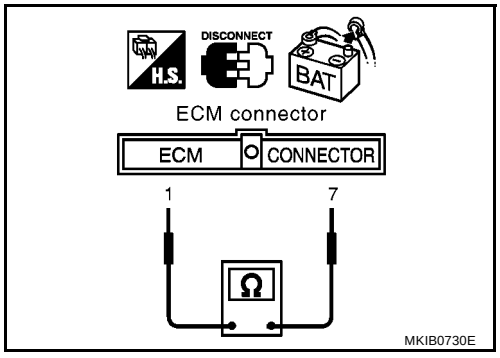
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E61 terminals 1 (R) and 7 (W).

1 (R) – 7 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JQ3

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check the data link connector and terminals for damage, bend and loose connection (connector side and harness side).

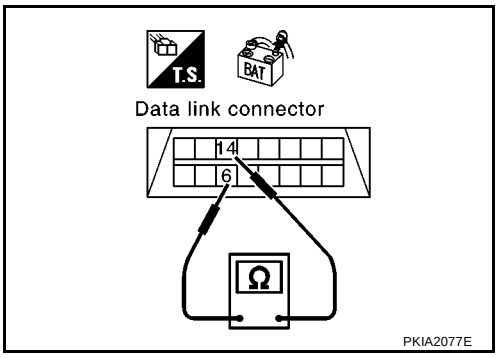
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-263, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JQ4

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

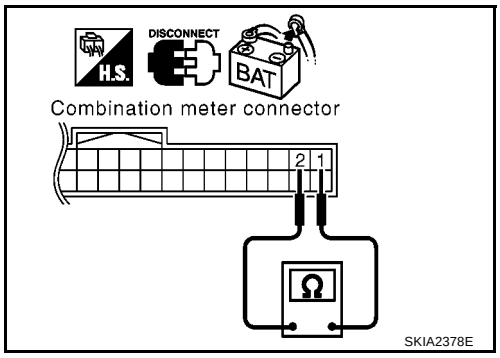
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and data link connector.

Intelligent Key Unit Circuit Check

EKS00JQ5

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of Intelligent Key unit for damage, bend and loose connection (control unit side and harness side).

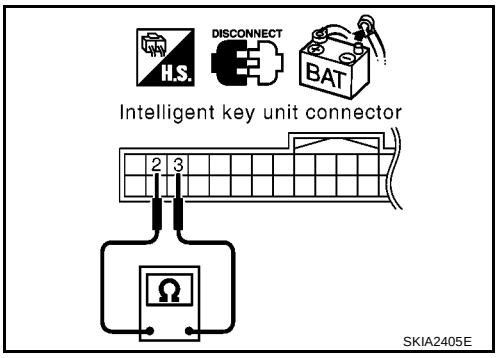
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect Intelligent Key unit connector.
2. Check resistance between Intelligent Key unit harness connector M51 terminals 2 (R) and 3 (W).

2 (R) – 3 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace Intelligent Key unit.
NG >> Repair harness between Intelligent Key unit and data link connector.

EPS Control Unit Circuit Check

EKS00JQ6

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

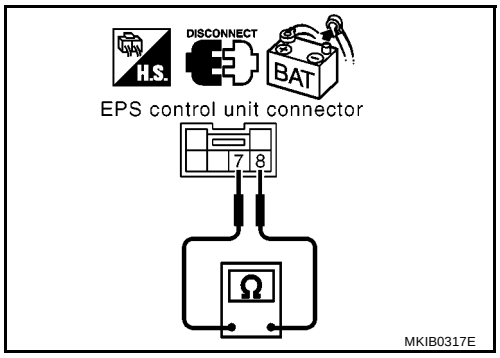
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JQ7

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

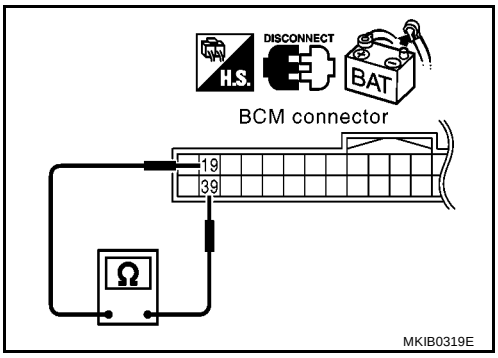
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JQ8

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

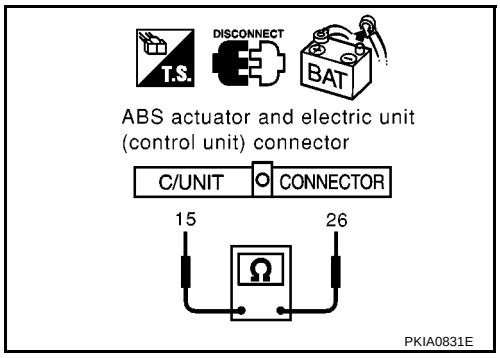
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.

IPDM E/R Circuit Check

EKS00JQ9

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

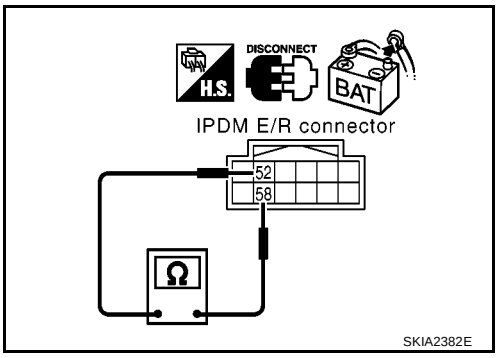
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS00JQA

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Intelligent Key unit
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

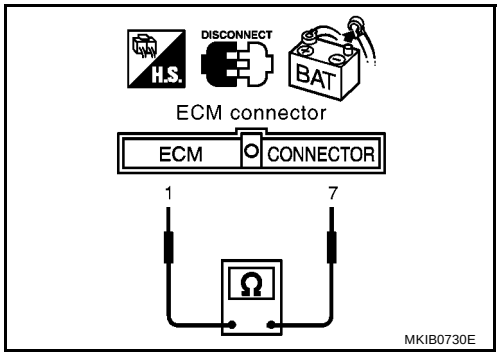
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E61 terminals 1 (R) and 7 (W).

1 (R) – 7 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



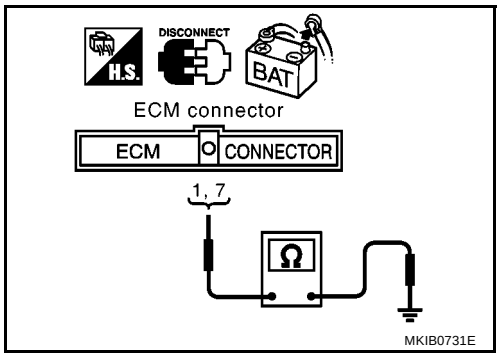
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E61 terminals 1 (R), 7 (W) and ground.

1 (R) – Ground : Continuity should not exist.
7 (W) – Ground : Continuity should not exist.

OK or NG

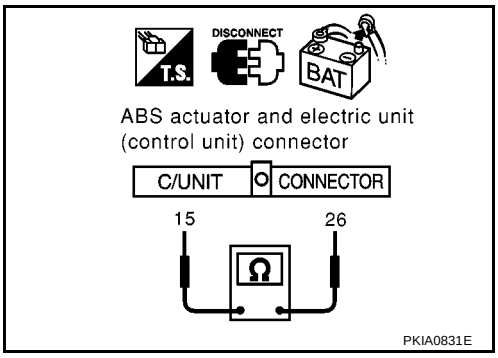
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



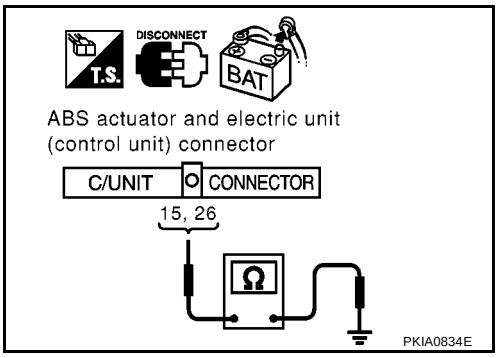
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.
15 (W) – Ground : Continuity should not exist.



OK or NG

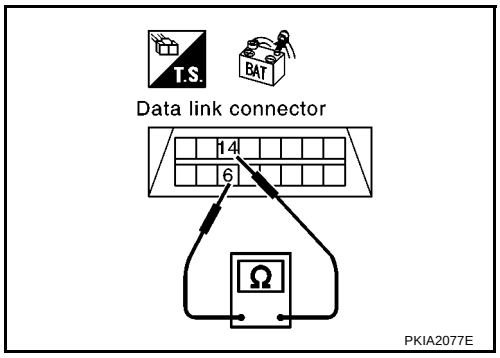
OK >> GO TO 6.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Intelligent Key unit connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



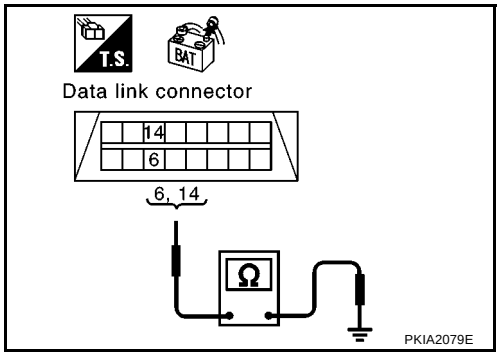
OK or NG

OK >> GO TO 7.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.
14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 8.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and Intelligent Key unit
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-289, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-263, "Work Flow" .
NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JQB

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer toPG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

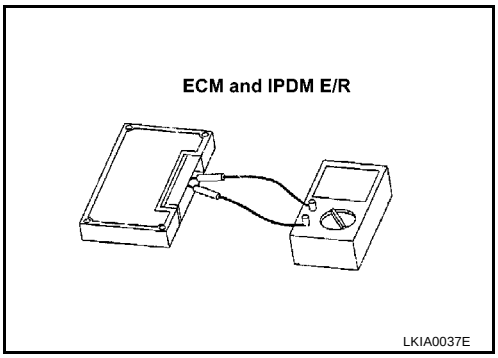
Component Inspection

EKS00JQC

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 1 and 7.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	1 – 7	108 - 132
IPDM E/R	52 – 58	



CAN SYSTEM (TYPE 10)

PFP:23710

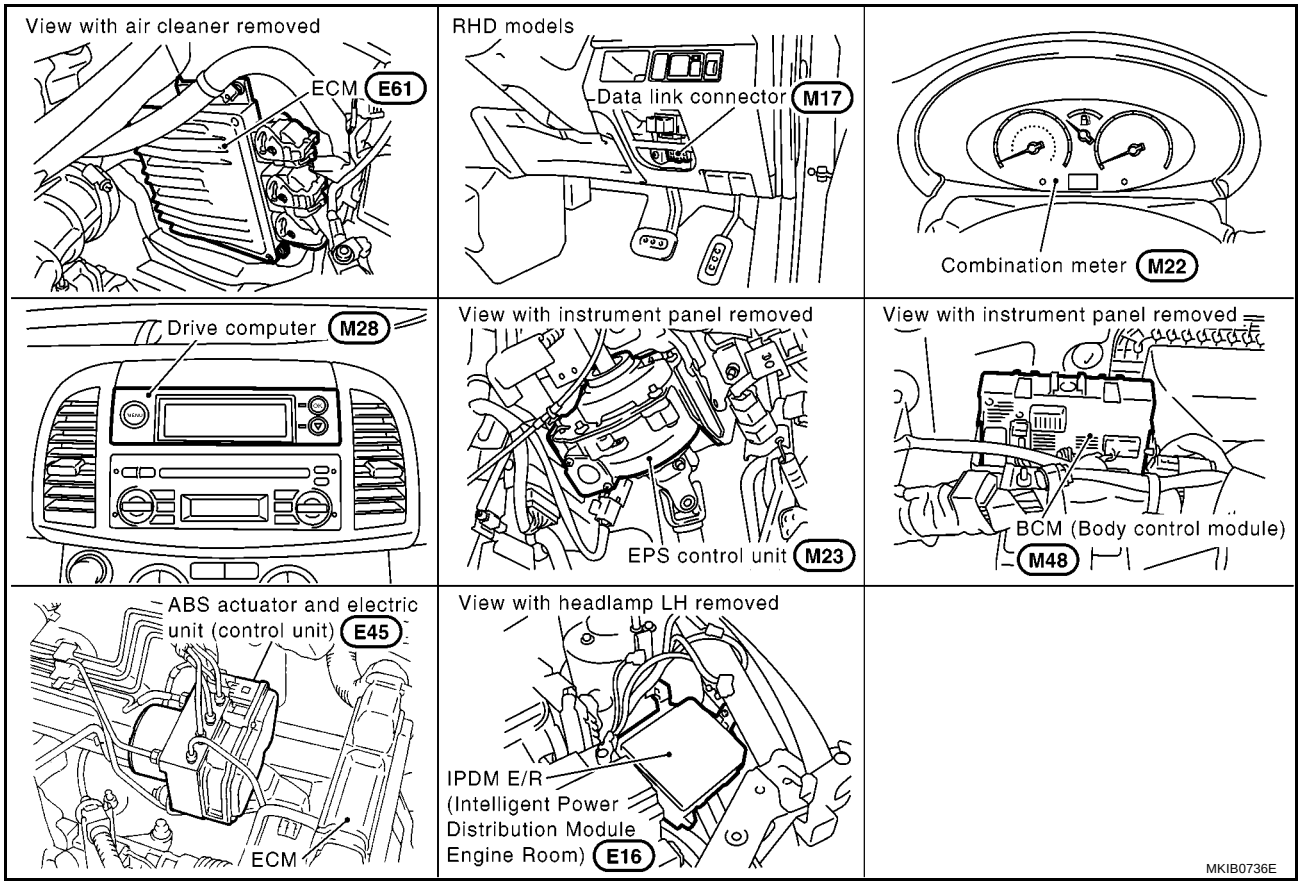
System Description

EKS00JQD

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

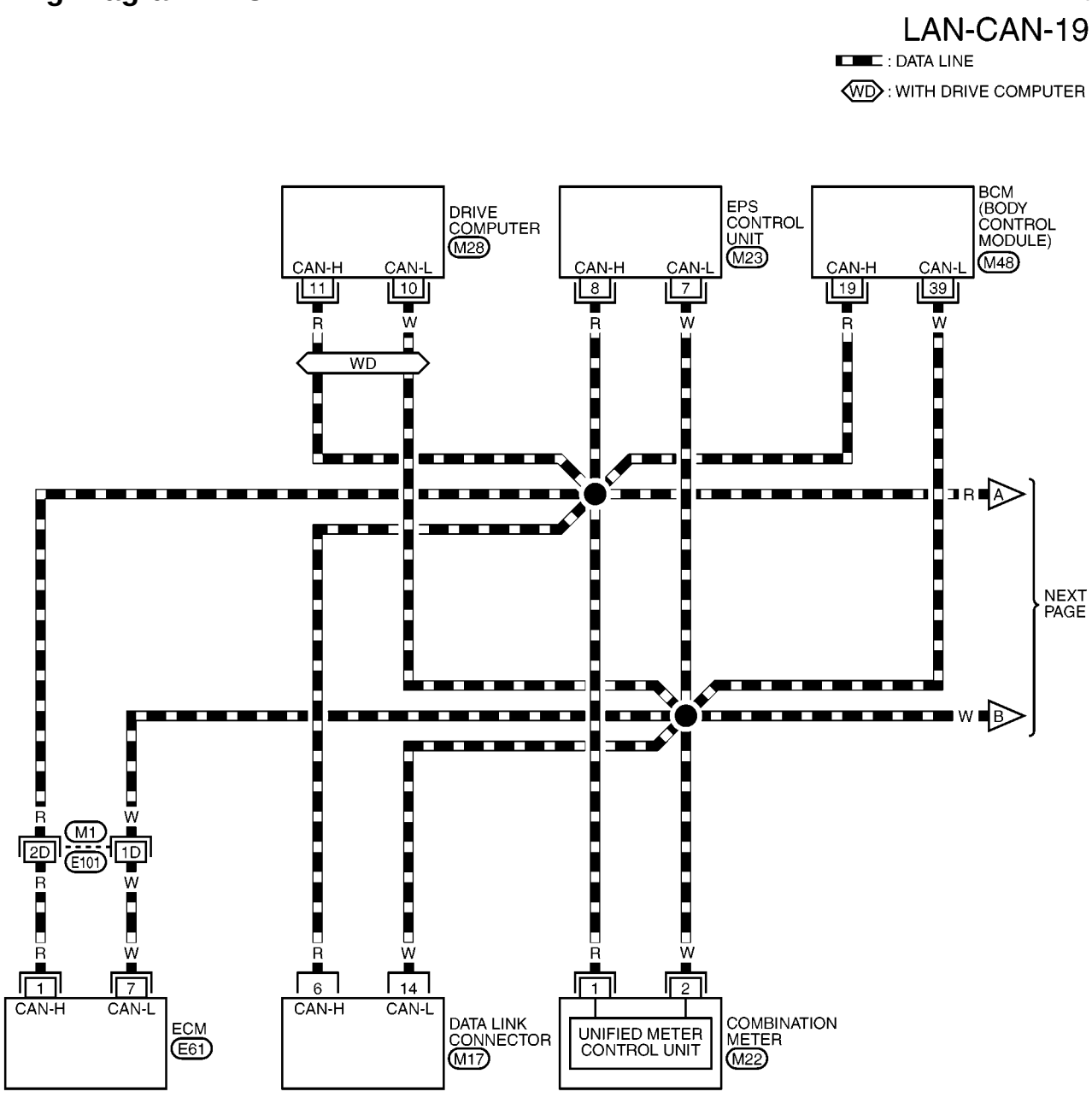
Component Parts and Harness Connector Location

EKS00JQE



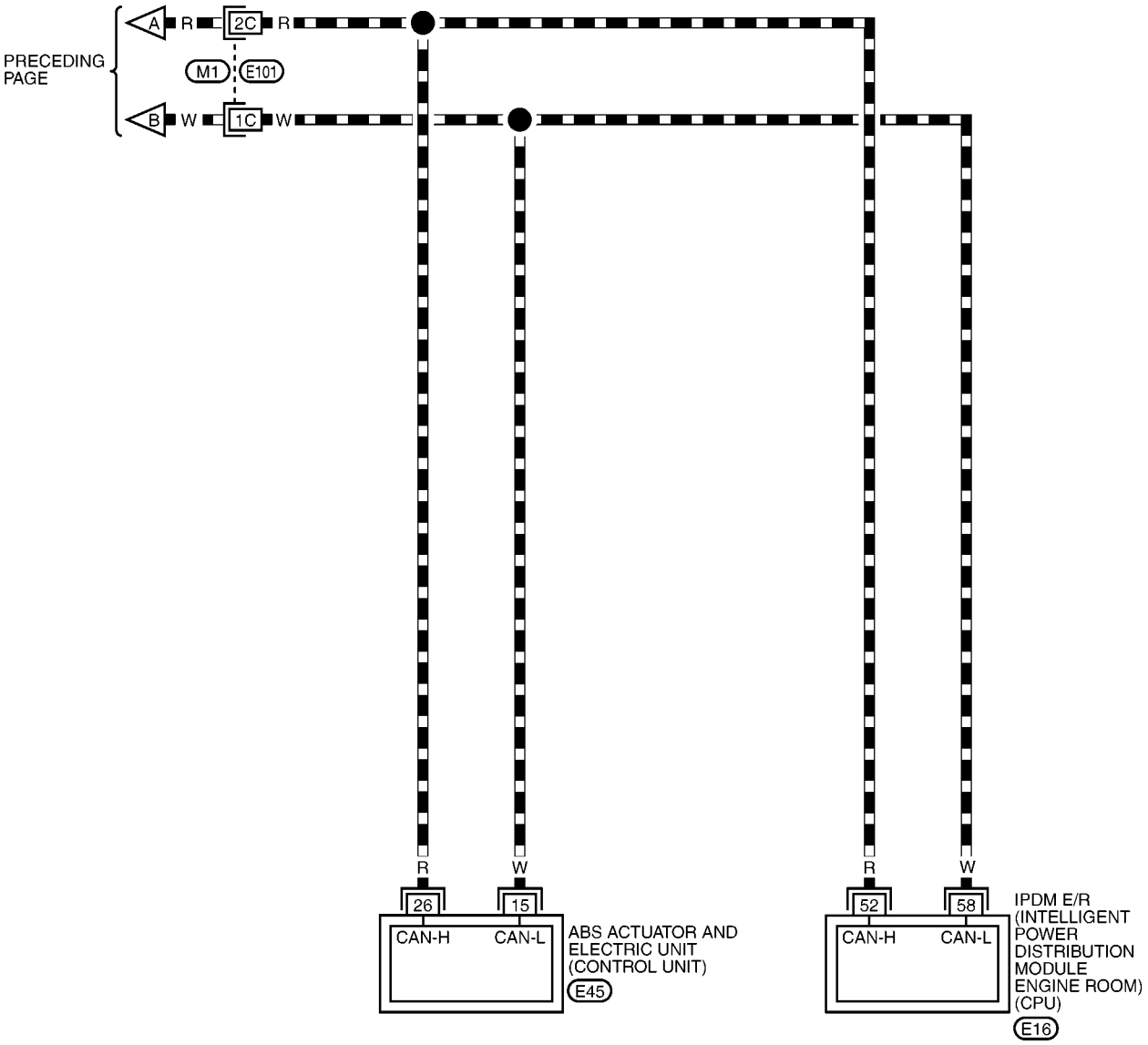
Wiring Diagram — CAN —

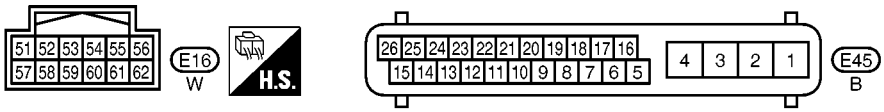
EKS00JQF



LAN-CAN-20

: DATA LINE





REFER TO THE FOLLOWING.

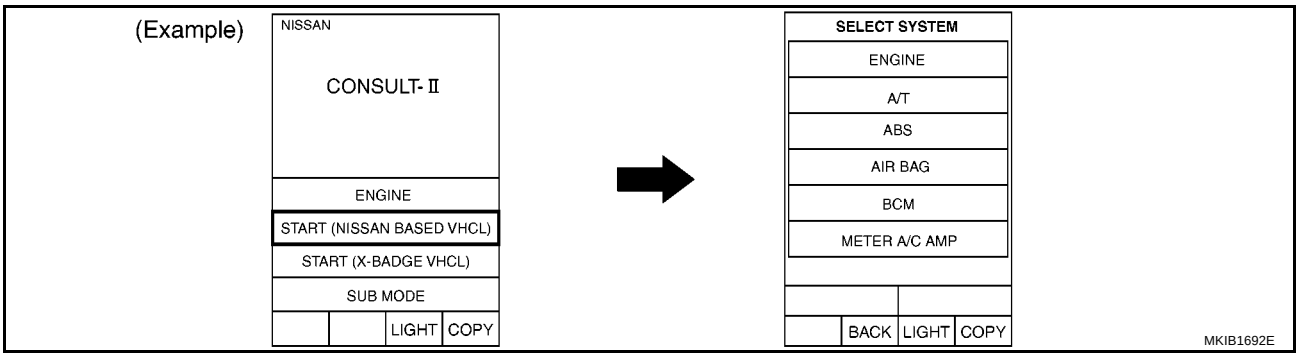
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA2708E

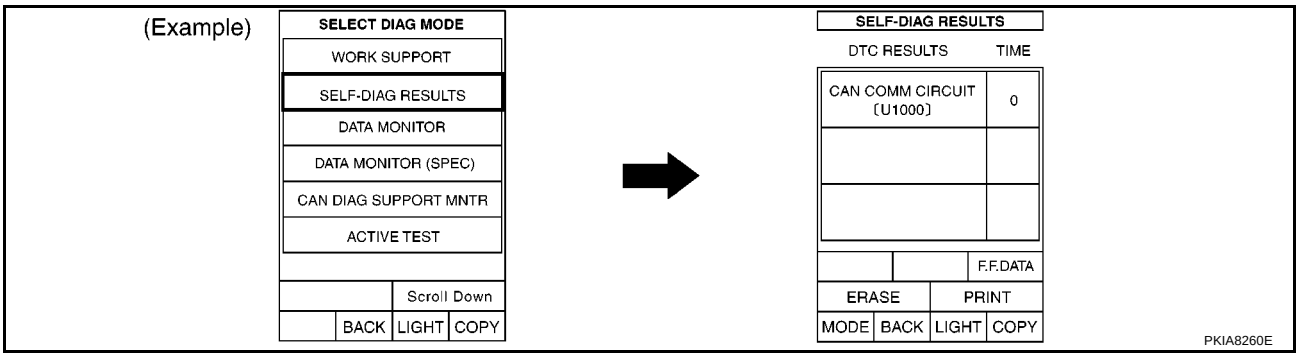
Work Flow

EKS00JQG

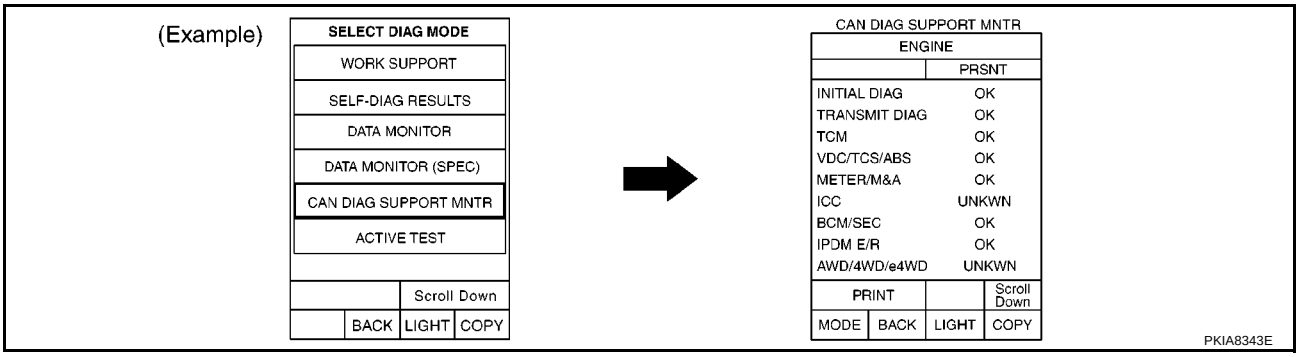
1. When there are no indications of “ENGINE”, “EPS”, “BCM” or “IPDM E/R” on “SELECT SYSTEM” display of CONSULT-II, print the “SELECT SYSTEM”.



2. Print all the data of “SELF-DIAG RESULTS” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.



3. Print all the data of “CAN DIAG SUPPORT MNTR” for “ENGINE”, “EPS”, “BCM”, “ABS” and “IPDM E/R” displayed on CONSULT-II.

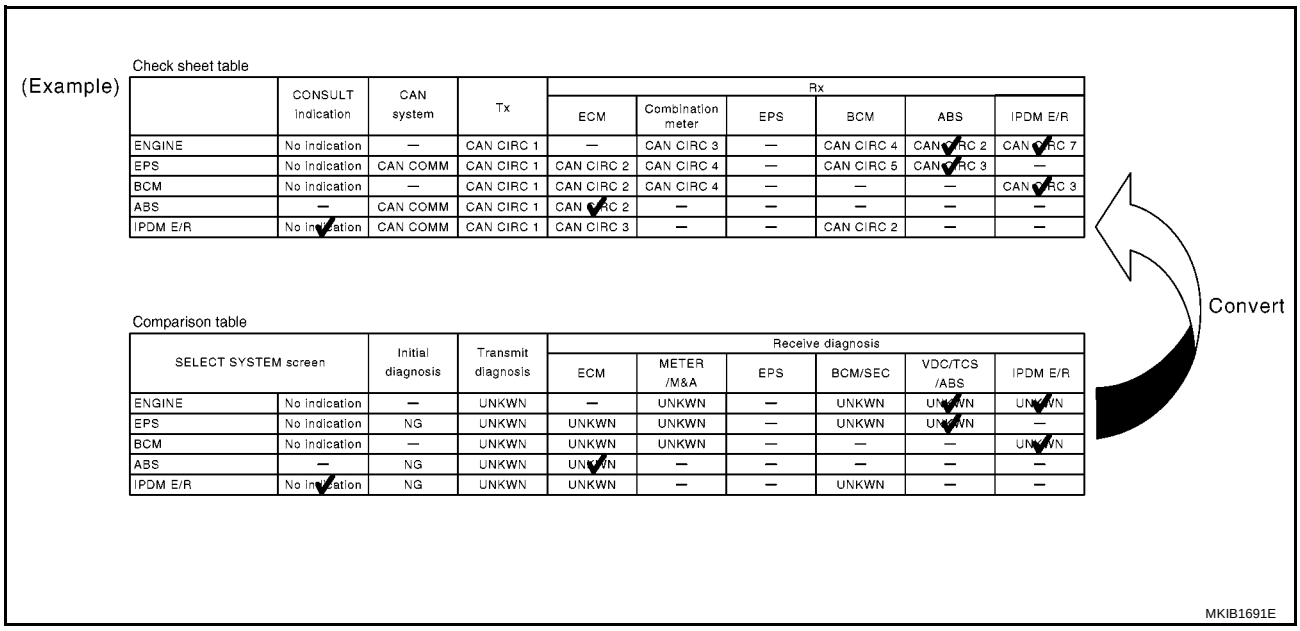


4. Attach the printed sheet of “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “CAN DIAG SUPPORT MNTR” onto the check sheet. Refer to LAN-295, "CHECK SHEET" .
5. Based on the indications of “SELECT SYSTEM” and the results of “CAN DIAG SUPPORT MNTR”, put marks “v” onto the items with “No indication”, “NG”, or “UNKWN” in the check sheet table. Refer to LAN-295, "CHECK SHEET" .

NOTE:

- If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.
- The “CAN DIAG SUPPORT MNTR” items, which are not in check sheet table, are not related to diagnostic procedure on service manual.
  So it is not necessary to check the status of “CAN DIAG SUPPORT MNTR” items which are not indicated in check sheet table.

6. Convert “v” mark on comparison table to check sheet table.



7. According to the check sheet results (example), start inspection. Refer to LAN-297, "CHECK SHEET RESULTS (EXAMPLE)" .

CHECK SHEET

Check sheet table

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

Comparison table

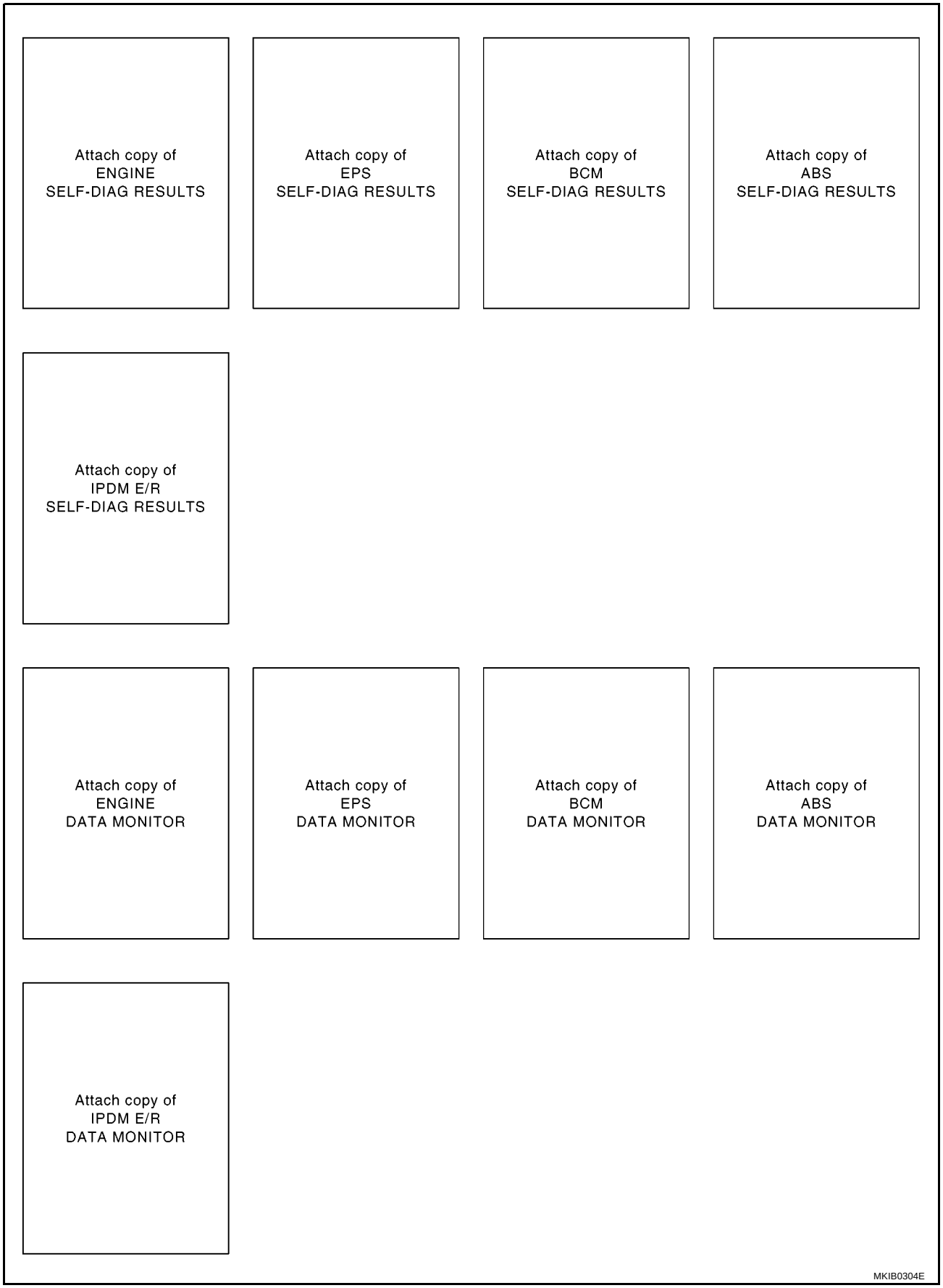
SELECT SYSTEM screen		Initial diagnosis	Transmit diagnosis	Receive diagnosis					
				ECM	METER /M&A	EPS	BCM/SEC	VDC/TCS /ABS	IPDM E/R
ENGINE	No indication	—	UNKWN	—	UNKWN	—	UNKWN	UNKWN	UNKWN
EPS	No indication	NG	UNKWN	UNKWN	UNKWN	—	UNKWN	UNKWN	—
BCM	No indication	—	UNKWN	UNKWN	UNKWN	—	—	—	UNKWN
ABS	—	NG	UNKWN	UNKWN	—	—	—	—	—
IPDM E/R	No indication	NG	UNKWN	UNKWN	—	—	UNKWN	—	—

Symptoms:

Attach copy of SELECT SYSTEM

Attach copy of SELECT SYSTEM

MKIB1610E


Attach copy of
ENGINE
SELF-DIAG RESULTS
Attach copy of
EPS
SELF-DIAG RESULTS
Attach copy of
BCM
SELF-DIAG RESULTS
Attach copy of
ABS
SELF-DIAG RESULTS
Attach copy of
IPDM E/R
SELF-DIAG RESULTS
Attach copy of
ENGINE
DATA MONITOR
Attach copy of
EPS
DATA MONITOR
Attach copy of
BCM
DATA MONITOR
Attach copy of
ABS
DATA MONITOR
Attach copy of
IPDM E/R
DATA MONITOR
MKIB0304E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

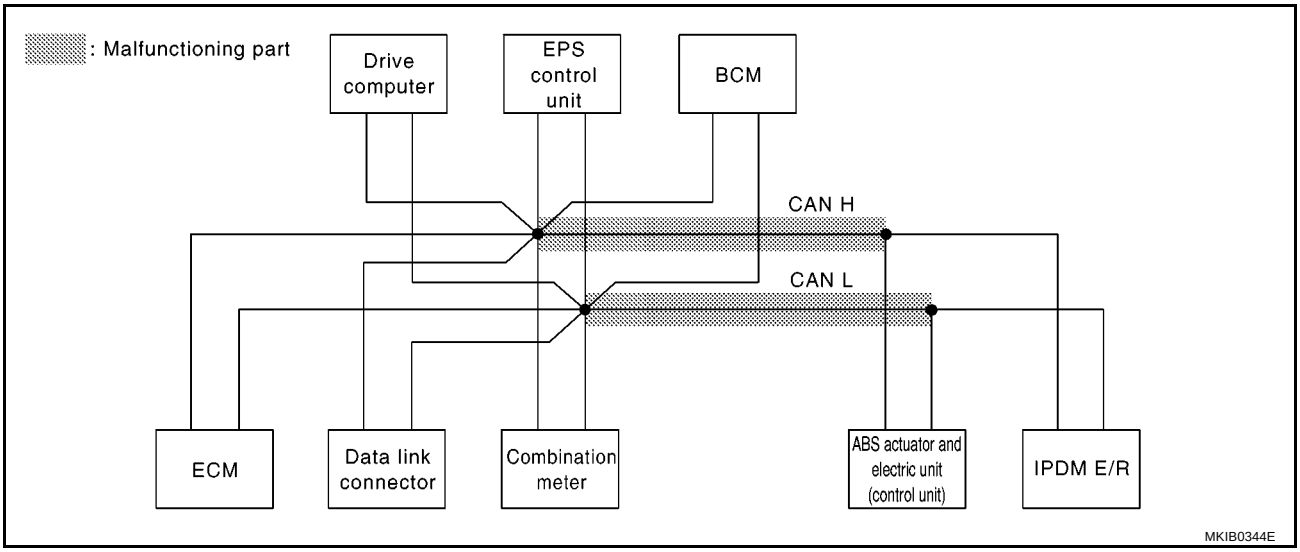
If “NG” is displayed on “INITIAL DIAG (Initial diagnosis)” as “CAN DIAG SUPPORT MNTR” for the diagnosed control unit, replace the control unit.

Case 1

Check harness between BCM and ABS actuator and electric unit (control unit). Refer to LAN-306, "Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2 ✓	CAN CIRC 7 ✓
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3 ✓	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3 ✓
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2 ✓	—	—	—	—	—
IPDM E/R	No indication ✓	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1671E



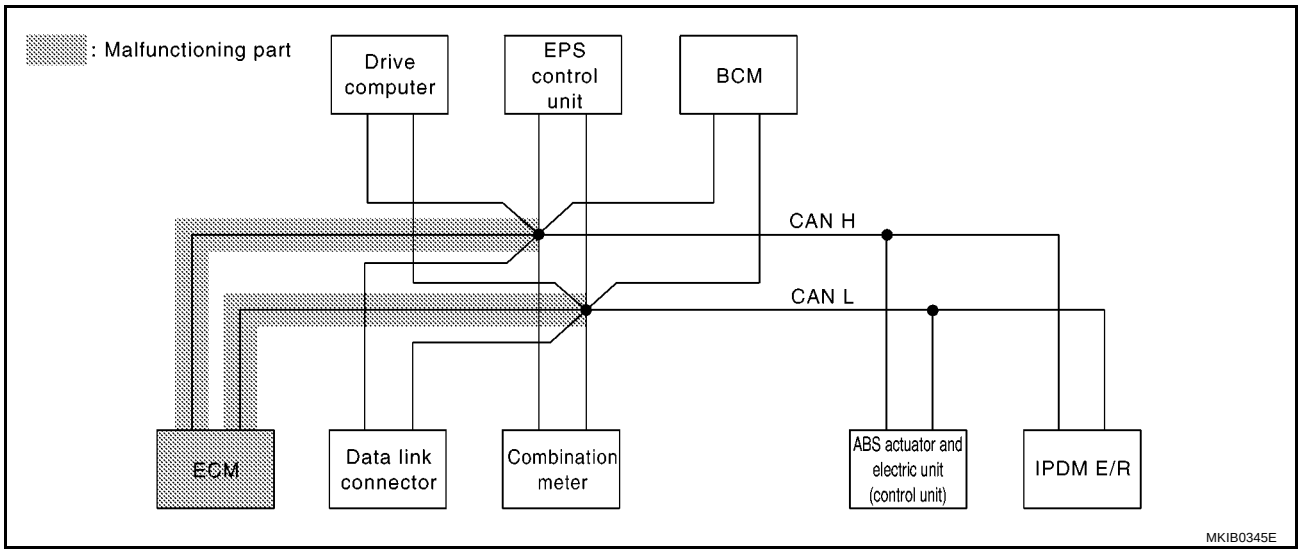
MKIB0344E

Case 2

Check ECM circuit. Refer to LAN-307, "ECM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1672E



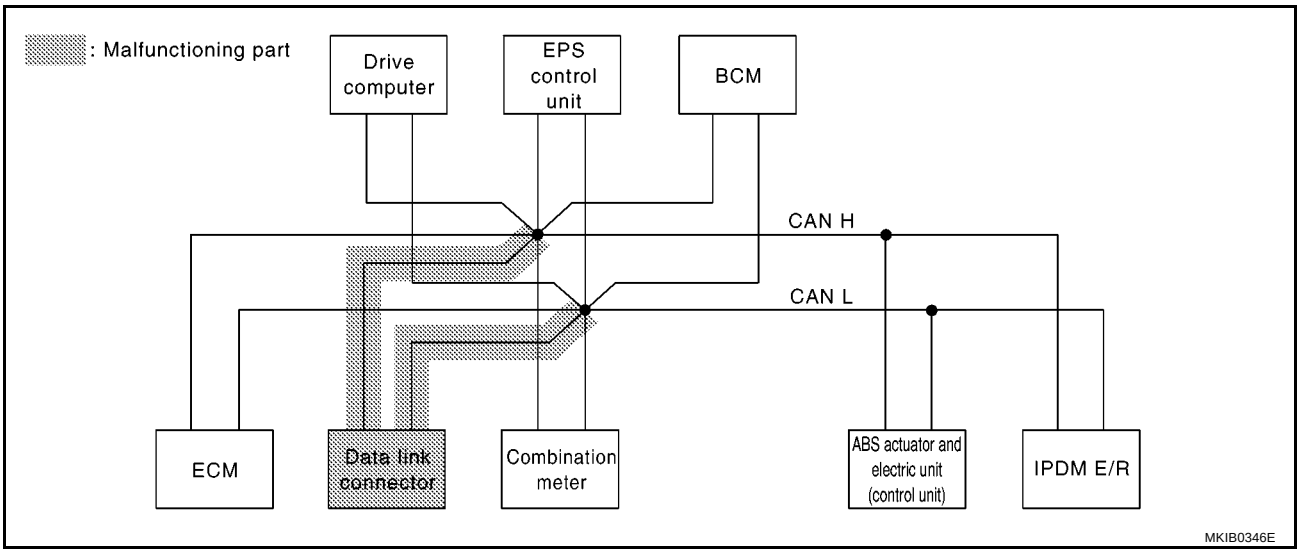
MKIB0345E

Case 3

Check data link connector circuit. Refer to LAN-308, "Data Link Connector Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1673E



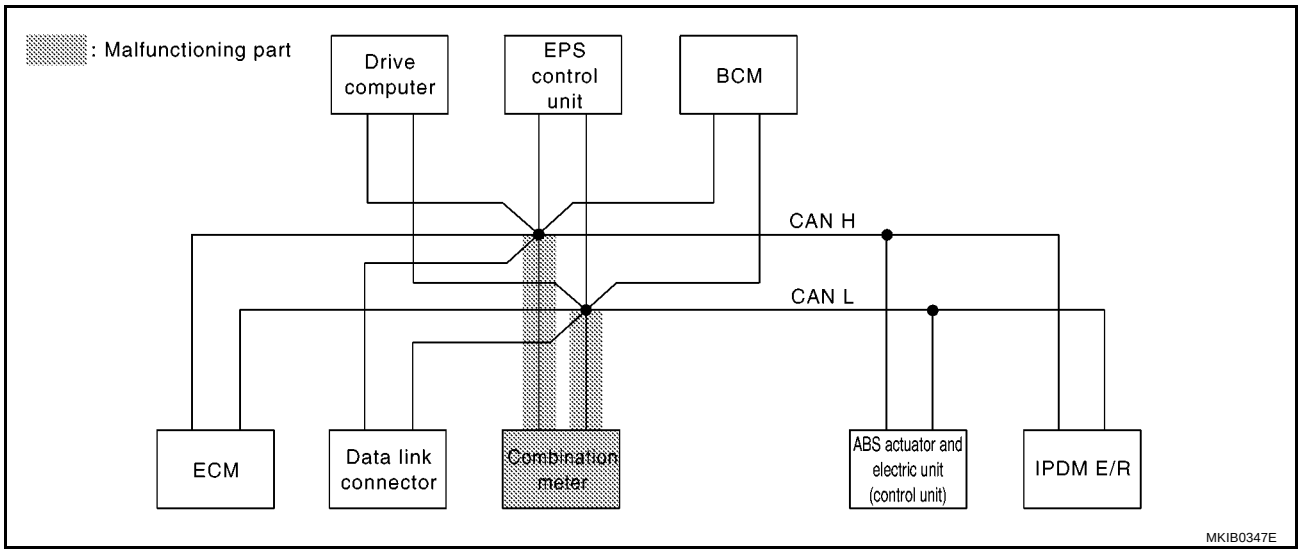
MKIB0346E

Case 4

Check combination meter circuit. Refer to LAN-309, "Combination Meter Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1674E



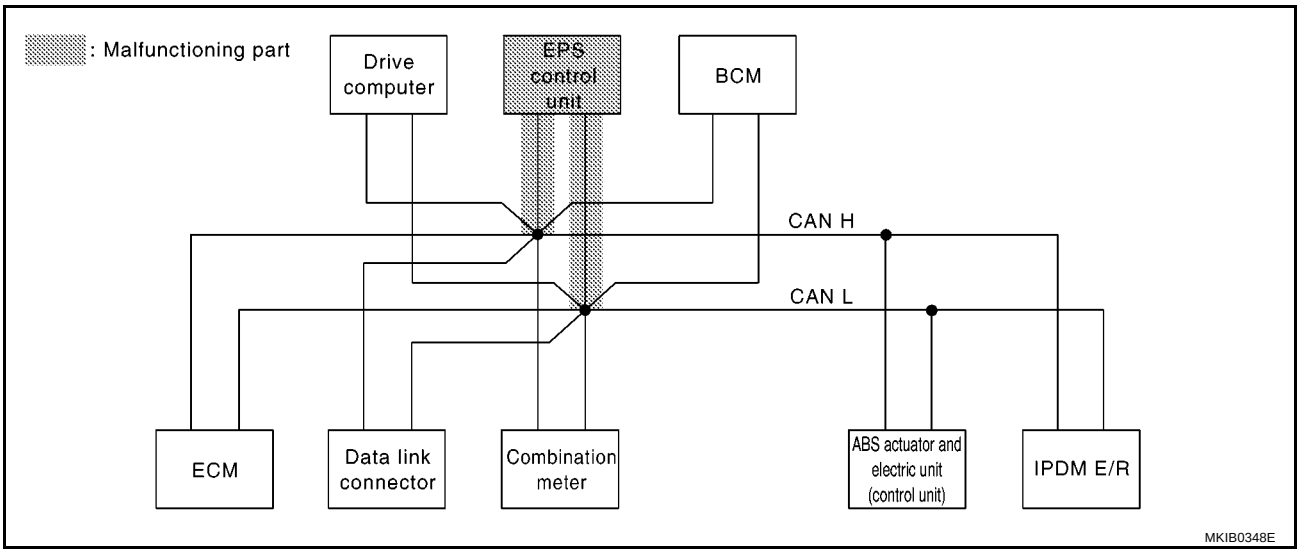
MKIB0347E

Case 5

Check EPS control unit circuit. Refer to LAN-310, "EPS Control Unit Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1675E



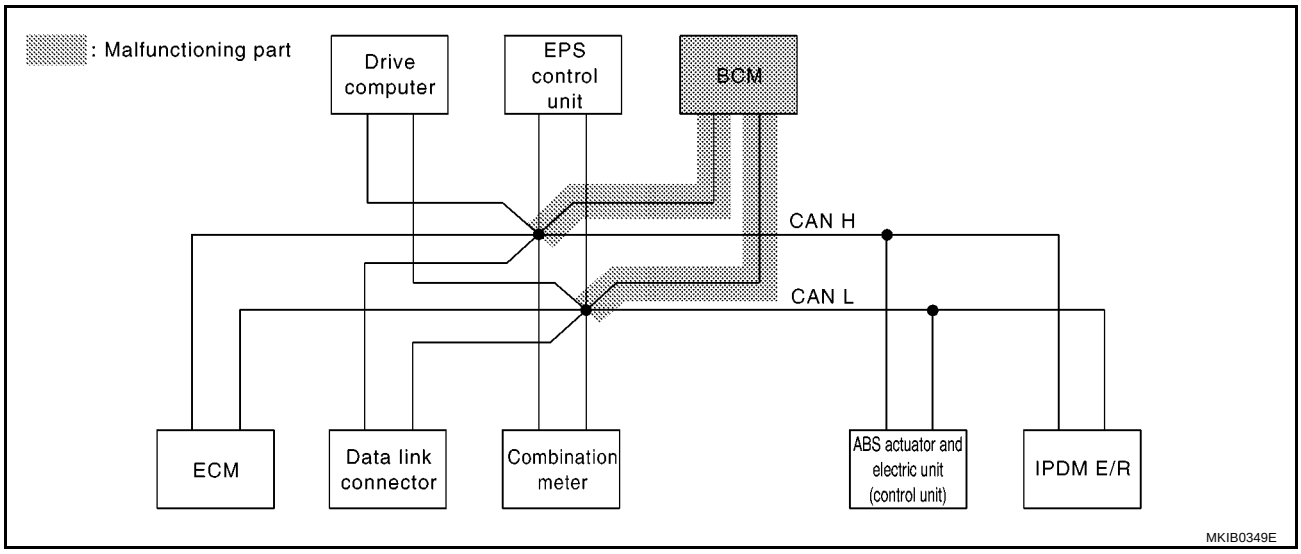
MKIB0348E

Case 6

Check BCM circuit. Refer to LAN-311, "BCM Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1676E



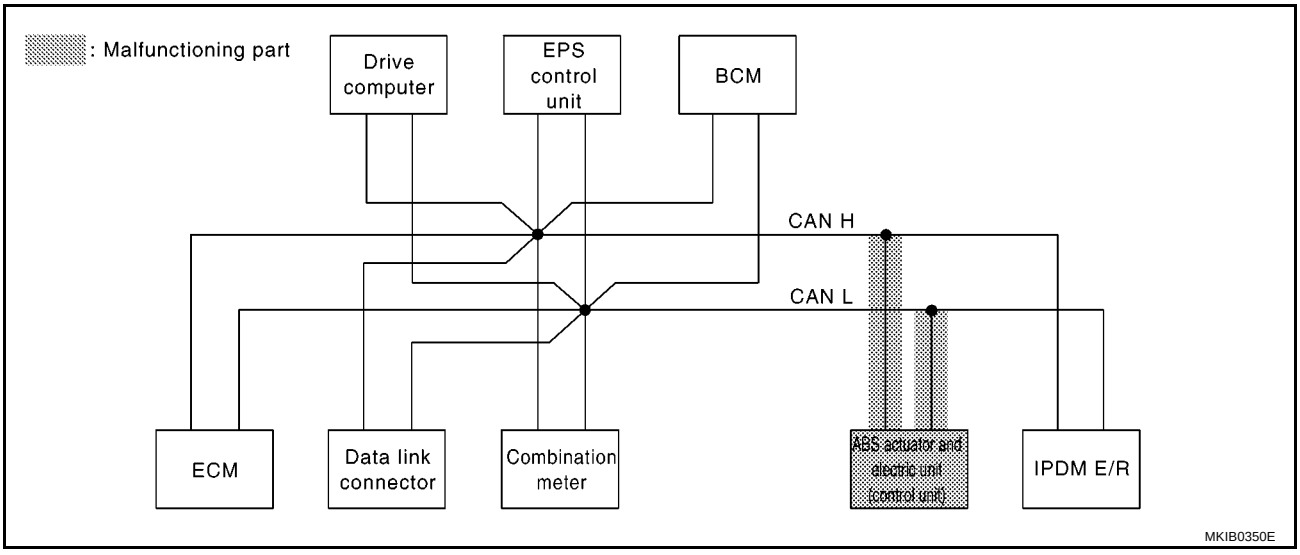
MKIB0349E

Case 7

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-312, "ABS Actuator and Electric Unit (Control Unit) Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1677E



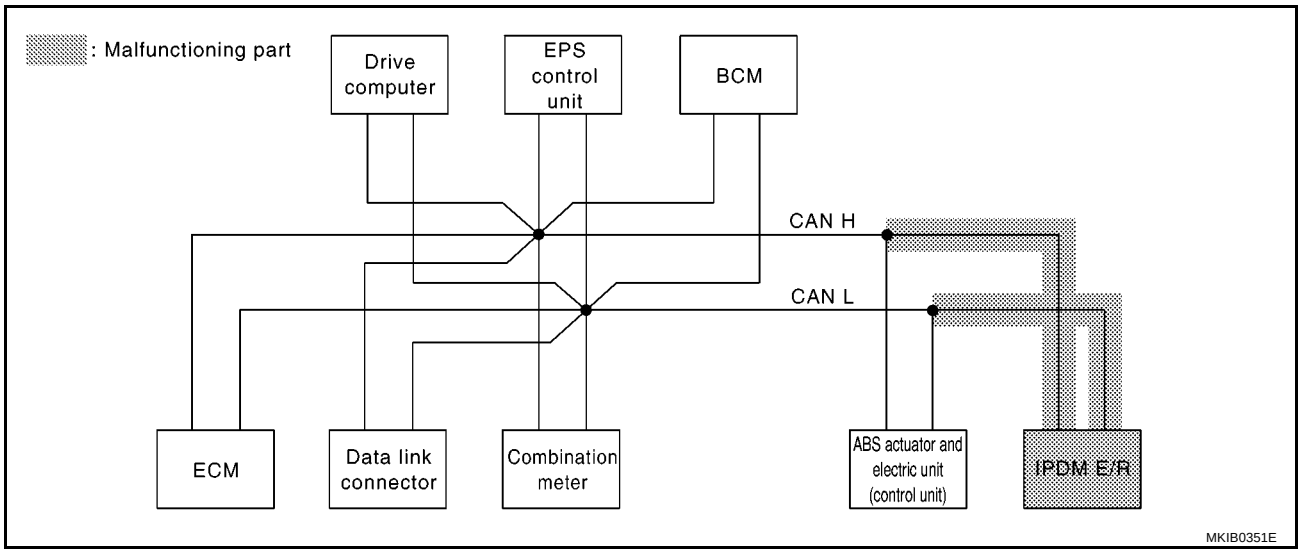
MKIB0350E

Case 8

Check IPDM E/R circuit. Refer to LAN-313, "IPDM E/R Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1678E



MKIB0351E

Case 9

Check CAN communication circuit. Refer to LAN-314, "CAN Communication Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1679E

Case 10

Check IPDM E/R ignition relay circuit continuously sticks “OFF”. Refer to LAN-317, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1681E

Case 11

Check IPDM E/R ignition relay circuit continuously sticks “ON”. Refer to LAN-317, "IPDM E/R Ignition Relay Circuit Check" .

	CONSULT indication	CAN system	Tx	Rx					
				ECM	Combination meter	EPS	BCM	ABS	IPDM E/R
ENGINE	No indication	—	CAN CIRC 1	—	CAN CIRC 3	—	CAN CIRC 4	CAN CIRC 2	CAN CIRC 7
EPS	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	CAN CIRC 5	CAN CIRC 3	—
BCM	No indication	—	CAN CIRC 1	CAN CIRC 2	CAN CIRC 4	—	—	—	CAN CIRC 3
ABS	—	CAN COMM	CAN CIRC 1	CAN CIRC 2	—	—	—	—	—
IPDM E/R	No indication	CAN COMM	CAN CIRC 1	CAN CIRC 3	—	—	CAN CIRC 2	—	—

MKIB1680E

Circuit Check Between BCM and ABS Actuator and Electric Unit (Control Unit)

EKS00JQH

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

- Harness connector M1
- Harness connector E101

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

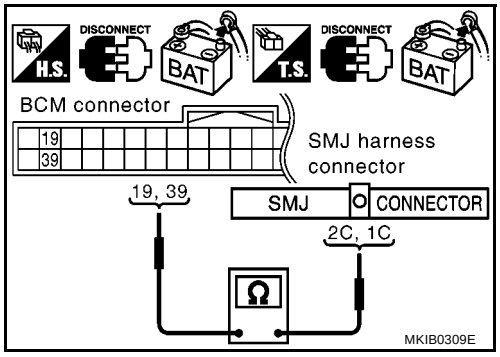
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect following connector.

- Harness connector M1
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between BCM harness connector M48 terminals 19 (R), 39 (W) and harness connector M1 terminals 2C (R), 1C (W).

19 (R) – 2C (R) : Continuity should exist.
39 (W) –1C (W) : Continuity should exist.



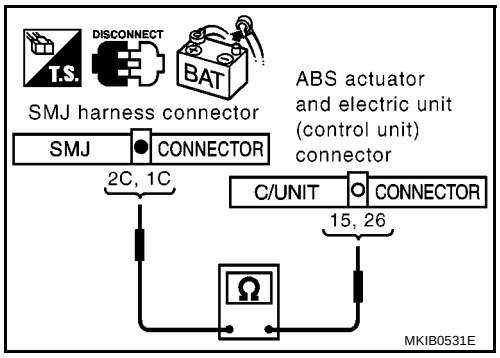
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

Check continuity between harness connector E101 terminals 2C (R), 1C (W) and ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R), 15 (W).

2C (R) – 26 (R) : Continuity should exist.
1C (W) – 15 (W) : Continuity should exist.



OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-293, "Work Flow" .
NG >> Repair harness.

ECM Circuit Check

EKS00JQI

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M1
- Harness connector E101

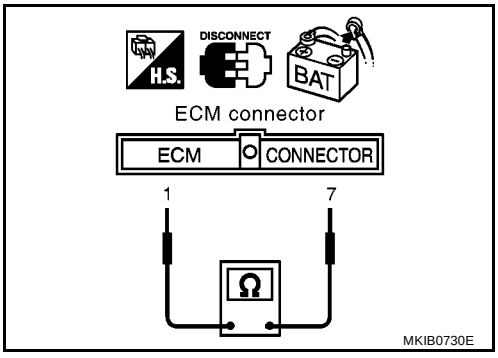
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector E61 terminals 1 (R) and 7 (W).

1 (R) – 7 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and data link connector.

Data Link Connector Circuit Check

EKS00JQJ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check data link connector and terminals for damage, bend and loose connection (connector side and harness side).

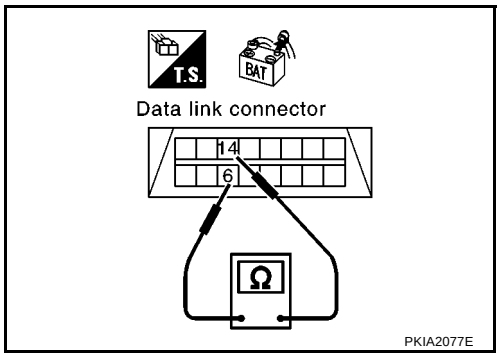
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check resistance between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-293, "Work Flow" .
NG >> Repair harness between data link connector and combination meter

Combination Meter Circuit Check

EKS00JQK

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

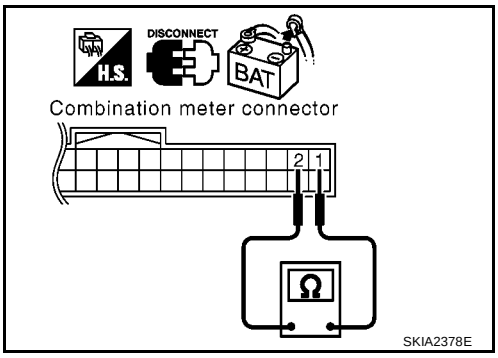
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M22 terminals 1 (R) and 2 (W).

1 (R) – 2 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace combination meter
NG >> Repair harness between combination meter and data link connector.

EPS Control Unit Circuit Check

EKS00JQL

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of EPS control unit for damage, bend and loose connection (control unit side and harness side).

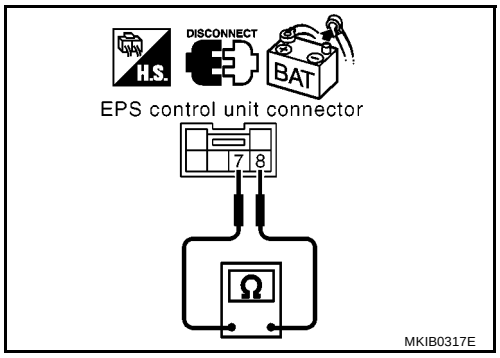
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect EPS control unit connector.
2. Check resistance between EPS control unit harness connector M23 terminals 8 (R) and 7 (W).

8 (R) – 7 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace EPS control unit.
NG >> Repair harness between EPS control unit and data link connector.

BCM Circuit Check

EKS00JQM

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of BCM for damage, bend and loose connection (control module side and harness side).

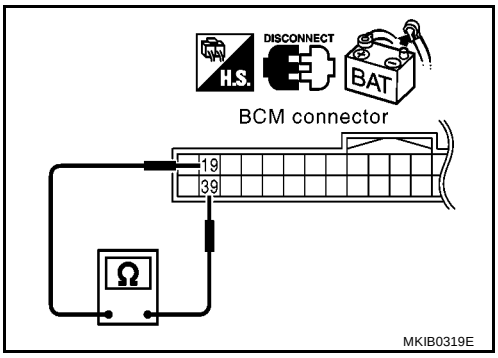
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect BCM connector.
2. Check resistance between BCM harness connector M48 terminals 19 (R) and 39 (W).

19 (R) – 39 (W) : Approx. 54 – 66Ω



OK or NG

OK >> Replace BCM. Refer to BCS-31, "Removal and Installation of BCM" .
NG >> Repair harness between BCM and data link connector.

ABS Actuator and Electric Unit (Control Unit) Circuit Check

EKS00JQN

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

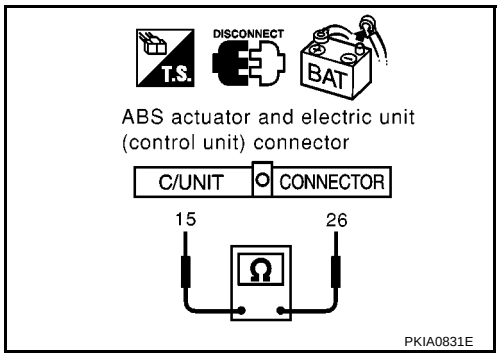
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and IPDM E/R.



IPDM E/R Circuit Check

EKS00JQO

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check terminals and connector of IPDM E/R for damage, bend and loose connection (control module side and harness side).

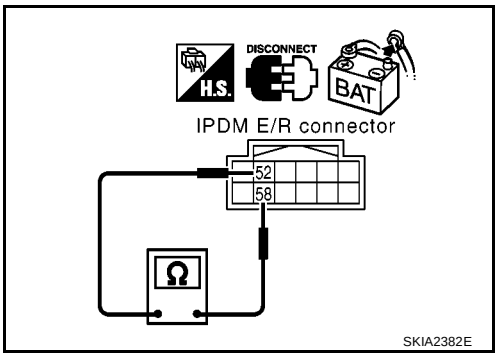
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check resistance between IPDM E/R harness connector E16 terminals 52 (R) and 58 (W).

52 (R) – 58 (W) : Approx. 108 – 132Ω



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness between IPDM E/R and ABS actuator and electric unit (control unit).

CAN Communication Circuit Check

EKS00JQP

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect the negative battery terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, meter side, control unit side and harness side).

- ECM
- Combination meter
- Drive computer
- EPS control unit
- BCM
- ABS actuator and electric unit (control unit)
- IPDM E/R
- Between ECM and IPDM E/R

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

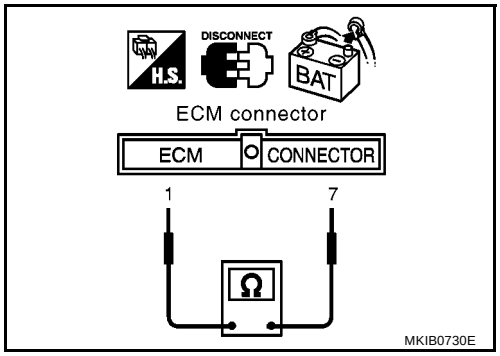
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector E101.
2. Check continuity between ECM harness connector E61 terminals 1 (R) and 7 (W).

1 (R) – 7 (W) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector E101.



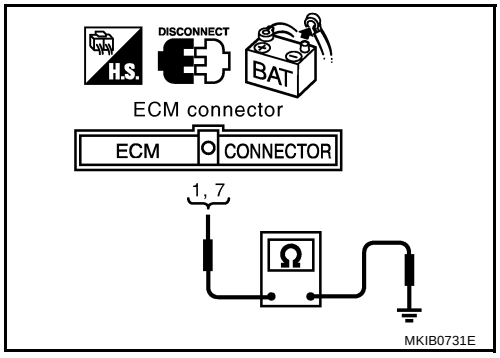
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E61 terminals 1 (R), 7 (W) and ground.

1 (R) – Ground : Continuity should not exist.
7 (W) – Ground : Continuity should not exist.

OK or NG

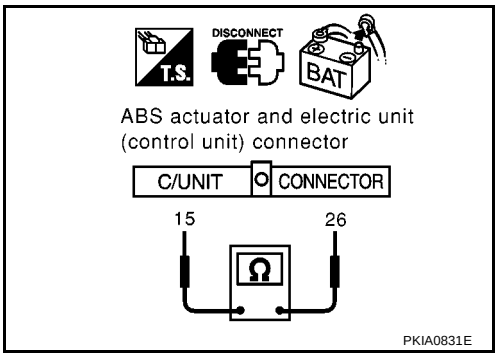
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector E101.



4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- ABS actuator and electric unit (control unit) connector
- IPDM E/R connector
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E45 terminals 26 (R) and 15 (W).

26 (R) – 15 (W) : Continuity should not exist.



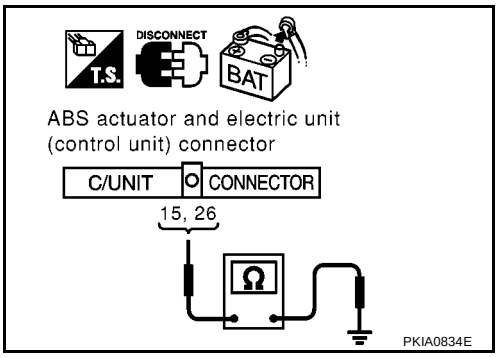
OK or NG

OK >> GO TO 5.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector E45 terminals 26 (R), 15 (W) and ground.

26 (R) – Ground : Continuity should not exist.
15 (W) – Ground : Continuity should not exist.



OK or NG

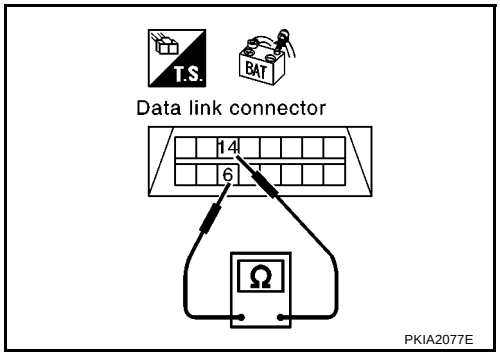
OK >> GO TO 4.
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between ABS actuator and electric unit (control unit) and harness connector E101
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Combination meter connector
- Drive computer connector
- EPS control unit connector
- BCM connector

2. Check continuity between data link connector M17 terminals 6 (R) and 14 (W).

6 (R) – 14 (W) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

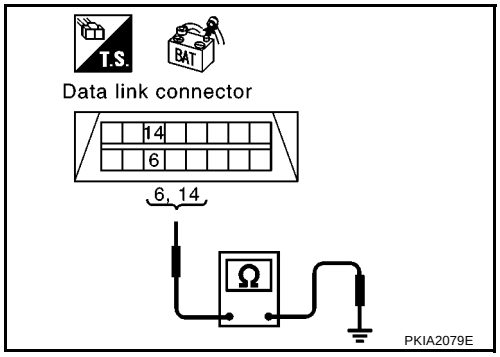
NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between data link connector M17 terminals 6 (R), 14 (W) and ground.

6 (R) – Ground : Continuity should not exist.

14 (W) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 6.

NG >> Check the following harnesses. If any harness is damaged, repair the harness.
- Harness between data link connector and harness connector M1
- Harness between data link connector and combination meter
- Harness between data link connector and drive computer
- Harness between data link connector and EPS control unit
- Harness between data link connector and BCM

8. ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

Check components inspection. Refer to LAN-317, "ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION" .

OK or NG

OK >> Reconnect all connectors to perform “SELECT SYSTEM”, “SELF-DIAG RESULTS” and “DATA MONITOR (CAN DIAG SUPPORT MNTR)” displayed on CONSULT-II. Refer to LAN-293, "Work Flow" .

NG >> Replace ECM and/or IPDM E/R.

IPDM E/R Ignition Relay Circuit Check

EKS00JQQ

Perform the self-diagnosis for IPDM E/R. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" . If the result is OK, carry out following inspections.

- IPDM E/R power supply circuit. Refer to PG-49, "IPDM E/R Power Supply and Ground Circuit Check" .
- Ignition power supply circuit. Refer to PG-12, "IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”" .

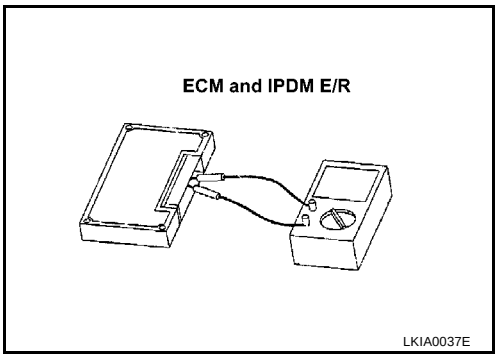
Component Inspection

EKS00JQR

ECM/IPDM E/R INTERNAL CIRCUIT INSPECTION

- Remove ECM and IPDM E/R from vehicle.
- Check resistance between ECM terminals 1 and 7.
- Check resistance between IPDM E/R terminals 52 and 58.

Unit	Terminal	Resistance value (Ω) (Approx.)
ECM	1 – 7	108 - 132
IPDM E/R	52 – 58	



SECTION LT
LIGHTING SYSTEM

CONTENTS

PRECAUTIONS 5
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 5
HEADLAMP -CONVENTIONAL TYPE- 6
Component Parts and Harness Connector Location 6
System Description 6
OUTLINE 6
COMBINATION SWITCH READING FUNCTION 7
FRIENDLY LIGHTING FUNCTION 7
FAIL-SAFE FUNCTION 7
CAN Communication 8
SYSTEM DESCRIPTION 8
CAN Communication Unit 8
TYPE 1/TYPE 2 9
TYPE 3/TYPE 4 12
TYPE 5/TYPE 6 14
TYPE 7/TYPE 8 17
TYPE 9/TYPE 10 19
Wiring Diagram — H/LAMP— 22
Terminals and Reference Value for BCM 24
Terminals and Reference Values for IPDM E/R 25
How to Proceed With Trouble Diagnosis 26
Preliminary Check 26
CHECK POWER SUPPLY AND GROUND CIRCUIT 26
CONSULT-II Functions (BCM) 28
CONSULT-II BASIC OPERATION 28
WORK SUPPORT 29
DATA MONITOR 29
ACTIVE TEST 30
SELF-DIAGNOSTIC RESULTS 30
CONSULT-II Functions (IPDM E/R) 31
CONSULT-II BASIC OPERATION 31
SELF-DIAG RESULTS 32
DATA MONITOR 32
ACTIVE TEST 33
Headlamp High Beam Does Not Illuminate (Both Sides) 33
Headlamp High Beam Does Not Illuminate (One Side) 34
High-Beam Indicator Does Not Illuminate 35
Headlamp Low Beam Does Not Illuminate (Both Sides) 35
Headlamp Low Beam Does Not Illuminate (One Side) 38
Headlamp Low Beam And High Beam Does Not Illuminate (One Side) 38
Headlamps Do Not Turn OFF 39
Aiming Adjustment 40
PREPARATION BEFORE ADJUSTING 40
LOW BEAM AND HIGH BEAM 40
ADJUSTMENT USING AN ADJUSTMENT SCREEN (LIGHT/DARK BORDERLINE) 40
Bulb Replacement 41
HEADLAMP 41
CLEARANCE LAMPS (PARKING LAMPS) 41
Removal and Installation 41
REMOVAL 41
INSTALLATION 41
HEADLAMP - DAYTIME LIGHT SYSTEM - 42
Component Parts and Harness Connector Location 42
System Description 42
HEADLAMP OPERATION 43
COMBINATION SWITCH READING FUNCTION 44
DAYTIME LIGHT OPERATION 44
FRIENDLY LIGHTING FUNCTION 44
FAIL-SAFE FUNCTION 44
CAN Communication 45
SYSTEM DESCRIPTION 45
CAN Communication Unit 45
TYPE 1/TYPE 2 46
TYPE 3/TYPE 4 49
TYPE 5/TYPE 6 51
TYPE 7/TYPE 8 54
TYPE 9/TYPE 10 56
Wiring Diagram — DTRL — 59
WITH GASOLINE ENGINE 59
WITH DIESEL ENGINE 61
Terminals and Reference Value for BCM 63

Terminals and Reference Values for IPDM E/R 64
How to Proceed With Trouble Diagnosis 64
Preliminary Check 64
CHECK POWER SUPPLY AND GROUND CIRCUIT 64
CONSULT-II Function (BCM) 65
CONSULT-II Function (IPDM E/R) 65
Daytime Light Control Does Not Operate Properly... 65
Headlamp High Beam Does Not Illuminate (Both Sides) 67
RH High beam Does Not Illuminate 67
Headlamp LH High Beam Does Not Illuminate 68
Headlamp Low Beam Does Not Illuminate (Both Sides) 68
RH Low Beam Does Not Illuminate 68
Headlamp LH Low Beam Does Not Illuminate 70
High-Beam Indicator Lamp Does Not Illuminate 70
Headlamps Do Not Turn OFF 70
Aiming Adjustment 70
Bulb Replacement 70
Removal and Installation 70
HEADLAMP AIMING CONTROL 71
Wiring Diagram— H/AIM — 71
Switch Circuit Inspection 73
Removal and Installation 73
FRONT FOG LAMP 74
System Description 74
OUTLINE 74
COMBINATION SWITCH READING FUNCTION.. 74
FAIL-SAFE FUNCTION 74
CAN Communication 75
SYSTEM DESCRIPTION 75
CAN Communication Unit 75
TYPE 1/TYPE 2 76
TYPE 3/TYPE 4 79
TYPE 5/TYPE 6 81
TYPE 7/TYPE 8 84
TYPE 9/TYPE 10 86
Wiring Diagram — F/FOG — 89
WITH GASOLINE ENGINE 89
WITH DIESEL ENGINE 91
Terminals and Reference Value for BCM 93
Terminals and Reference Values for IPDM E/R 93
How to Proceed With Trouble Diagnosis 94
Preliminary Check 94
CHECK POWER SUPPLY AND GROUND CIRCUIT 94
CONSULT-II Function (BCM) 95
CONSULT-II Function (IPDM) 95
Front fog lamps Does Not Illuminate (Both Sides).. 95
Front Fog Lamp Does Not Illuminate (One Side) ... 96
Aiming Adjustment 98
Bulb Replacement 98
Removal and Installation 98
REMOVAL 98
INSTALLTION 99
REAR FOG LAMP 100
System Description 100
OUTLINE 100
COMBINATION SWITCH READING FUNCTION 100
CAN Communication 101
SYSTEM DESCRIPTION 101
CAN Communication Unit 101
TYPE 1/TYPE 2 102
TYPE 3/TYPE 4 105
TYPE 5/TYPE 6 107
TYPE 7/TYPE 8 110
TYPE 9/TYPE 10 112
Wiring Diagram — R/FOG — 115
Terminals and Reference Value for BCM 117
How to Proceed With Trouble Diagnosis 118
Preliminary Check 118
CHECK POWER SUPPLY AND GROUND CIRCUIT 118
CONSULT-II Function (BCM) 119
Rear Fog Lamp Does Not Illuminate 119
Bulb Replacement 120
Removal and Installation 120
TURN SIGNAL AND HAZARD WARNING LAMPS. 121
System Description 121
TURN SIGNAL OPERATION 121
HAZARD LAMP OPERATION 121
MULTI-REMOTE CONTROL SYSTEM OPERATION 122
COMBINATION SWITCH READING FUNCTION 123
CAN Communication 124
SYSTEM DESCRIPTION 124
CAN Communication Unit 124
TYPE 1/TYPE 2 125
TYPE 3/TYPE 4 128
TYPE 5/TYPE 6 130
TYPE 7/TYPE 8 133
TYPE 9/TYPE 10 135
Wiring Diagram — TURN — 138
Terminals and Reference Value for BCM 140
How to Proceed With Trouble Diagnosis 142
Preliminary Check 142
CHECK POWER SUPPLY AND GROUND CIRCUIT 142
CONSULT-II Functions (BCM) 144
CONSULT-II BASIC OPERATION 144
WORK SUPPORT 145
DATA MONITOR 145
ACTIVE TEST 146
Turn Signal Lamp Does Not Operate 147
Hazard Lamp Does Not Operate 148
Turn Signal Indicator Lamp Does Not Operate 150
Bulb Replacement 150
FRONT TURN SIGNAL LAMP 150
SIDE TURN SIGNAL LAMP 150
REAR TURN SIGNAL LAMP 150
Removal and Installation 150
FRONT TURN SIGNAL LAMP 150
SIDE TURN SIGNAL LAMP 151
REAR TURN SIGNAL LAMP 151
PARKING, LICENSE PLATE AND TAIL LAMPS ... 152
System Description 152
OPERATION BY LIGHTING SWITCH 152

COMBINATION SWITCH READING FUNCTION 152
FAIL-SAFE FUNCTION 153
CAN Communication 154
SYSTEM DESCRIPTION 154
CAN Communication Unit 154
TYPE 1/TYPE 2 155
TYPE 3/TYPE 4 158
TYPE 5/TYPE 6 160
TYPE 7/TYPE 8 163
TYPE 9/TYPE 10 165
Schematic 168
Wiring Diagram — TAIL/L — 169
Terminals and Reference Value for BCM 172
Terminals and Reference Value for IPDM E/R 172
How to Proceed With Trouble Diagnosis 173
Preliminary Check 173
CHECK POWER SUPPLY AND GROUND CIRCUIT 173
CONSULT-II Function (BCM) 174
CONSULT-II Function (IPDM E/R) 174
Parking, License Plate And Tail Lamps Does Not Illuminate 174
Parking Lamp Does Not Illuminate (One Side) ... 175
Rear Combination Lamp (Tail lamp) Does Not Illuminate (One Side) 176
License plate Lamp Does Not Illuminate 178
Parking, License Plate and Tail Lamps Do Not Turn OFF (After Approx. 10 Minutes) 179
Bulb Replacement 179
PARKING LAMP 179
TAIL LAMP 179
LICENSE PLATE LAMP 179
Removal and Installation of Parking Lamp, Tail Lamp and License Plate Lamp 180
PARKING LAMP 180
TAIL LAMP 180
LICENSE PLATE LAMP 180
STOP LAMP 181
Wiring Diagram— STOP/L — 181
Bulb Replacement 182
STOP LAMP 182
HIGH-MOUNTED STOP LAMP 182
Removal and Installation 182
STOP LAMP 182
HIGH-MOUNTED STOP LAMP 182
BACK-UP LAMP 183
Wiring Diagram — BACK/L — 183
Bulb Replacement 185
Removal and Installation 185
REAR COMBINATION LAMP 186
Bulb Replacement 186
REAR TURN SIGNAL LAMP BULB, BACK-UP LAMP BULB, STOP/TAIL LAMP BULB,REAR FOG LAMP BULB 186
Removal and Installation 186
REMOVAL 186
INSTALLATION 186
LIGHTING AND TURN SIGNAL SWITCH 187
Removal and Installation 187
HAZARD SWITCH 188
Removal and Installation 188
REMOVAL 188
INSTALLATION 188
COMBINATION SWITCH 189
System Description 189
COMBINATION SWITCH READING FUNCTION 189
Wiring Diagram — COMBSW — 192
CONSULT-II Functions (BCM) 193
CONSULT-II BASIC OPERATION 193
DATA MONITOR 195
Check Combination Switch 196
Removal and Installation 199
REMOVAL 199
INSTALLATION 199
INTERIOR ROOM LAMP 200
System Description 200
POWER SUPPLY AND GROUND 200
SWITCH OPERATION 201
INTERIOR ROOM LAMP TIMER OPERATION. 201
ON-OFF CONTROL 201
CAN Communication 202
SYSTEM DESCRIPTION 202
CAN Communication Unit 202
TYPE 1/TYPE 2 203
TYPE 3/TYPE 4 206
TYPE 5/TYPE 6 208
TYPE 7/TYPE 8 211
TYPE 9/TYPE 10 213
Schematic 216
Wiring Diagram — INT/L — 217
Terminals and Reference Value for BCM 220
How to Proceed With Trouble Diagnosis 220
Preliminary Check 221
CHECK POWER SUPPLY AND GROUND CIRCUIT 221
CONSULT-II Functions (BCM) 222
CONSULT-II BASIC OPERATION 222
DATA MONITOR 223
ACTIVE TEST 224
Room Lamp Does Not Operate 225
Luggage Room Lamp Does Not Illuminate 227
Bulb Replacement 229
Removal and Installation 229
REMOVAL 229
INSTALLATION 229
ILLUMINATION 230
System Description 230
ILLUMINATION OPERATION BY LIGHTING SWITCH 230
COMBINATION SWITCH READING FUNCTION 231
CAN Communication 232
SYSTEM DESCRIPTION 232
CAN Communication Unit 232
TYPE 1/TYPE 2 233
TYPE 3/TYPE 4 236
TYPE 5/TYPE 6 238
TYPE 7/TYPE 8 241
TYPE 9/TYPE 10 243

Schematic 246
Wiring Diagram — ILL — 247
Removal and Installation 254
GLOVE BOX LAMP 254
BULB SPECIFICATIONS 255
Headlamp 255
Exterior Lamp 255
Interior Lamp/Illumination 255

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS0085Y

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

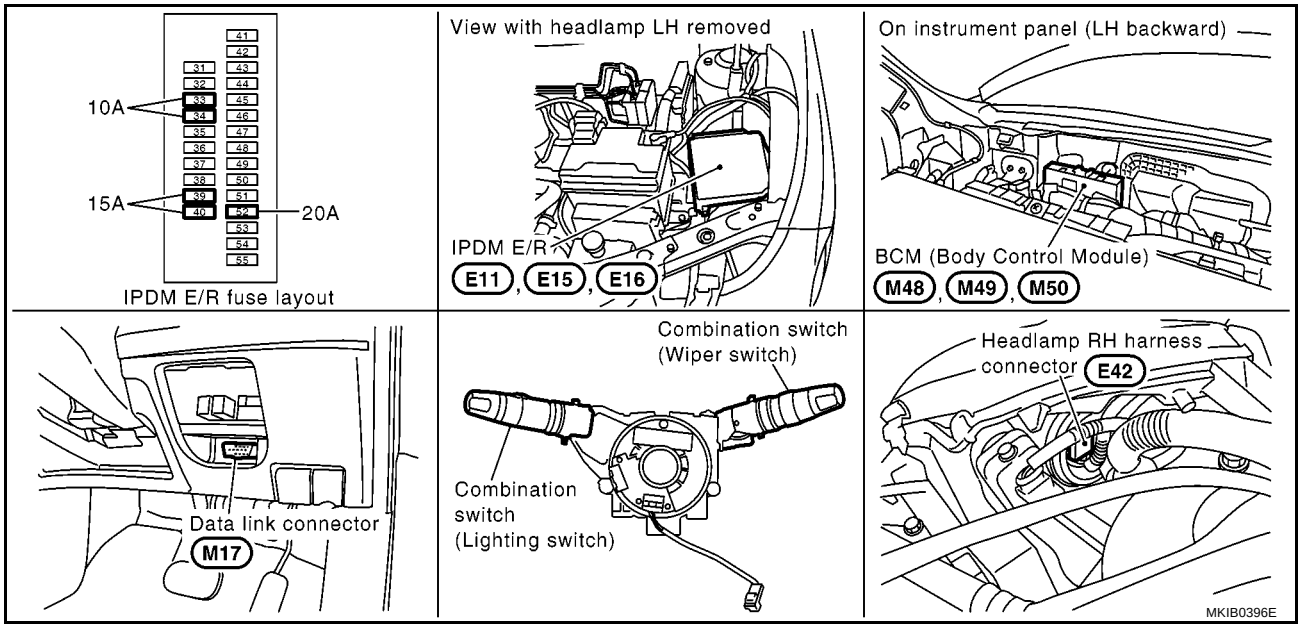
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal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

HEADLAMP -CONVENTIONAL TYPE-

PFP:26010

Component Parts and Harness Connector Location

EKS00EKT



System Description

EKS00EKU

The headlamp operation is controlled by the lighting switch which built into the combination switch, BCM and IPDM E/R (intelligent power distribution module engine room).Headlamp low relay, headlamp LH and RH relays are built into IPDM E/R.BCM read combination switch condition.refer to LT-189, "System Description" .

OUTLINE

Power is supplied at all times

- to headlamp high LH relay, located in the IPDM E/R, and
- to headlamp high RH relay, located in the IPDM E/R, and
- to headlamp low relay, located in the IPDM E/R, and
- to BCM (body control module) terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box),
- to IPDM E/R
- through 20A fusible link (No.52, located in the IPDM E/R),
- to combination meter terminal 27
- through 10A fuse [No. 8, located in the fuse block (J/B)].

With the ignition switch in the ON or START position, power is supplied

- to BCM (body control module) terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)],
- to combination meter terminal 28
- through 10A fuse [No. 2, located in the fuse block (J/B)],
- to IPDM E/R.

Ground is supplied

- to BCM (body control module) terminal 2 and 70
- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20, and
- to IPDM E/R terminals 3 and 54
- through body grounds E25(Gasoline engine models), E26 and E40.

Low Beam Operation

When the lighting switch is turned to 2ND position and placed in LOW position, BCM reads combination switch condition (refer to LT-189, "System Description"). And BCM sends low beam request signal to IPDM E/R with

CAN communication line. Then IPDM E/R turns on headlamp low relay. With headlamp low relay is energized, power is supplied.

- through 15A fuse (No. 39, located in the IPDM E/R)
- through terminal 50 of the IPDM E/R
- to terminal 1 of headlamp LH, and
- through 15A fuse (No. 40, located in the IPDM E/R)
- through terminal 48 of the IPDM E/R
- to terminal 1 of headlamp RH.

Ground is supplied

- to terminal 3 of each headlamp
- through body grounds E25(Gasoline engine models), E26 and E40.

With power and ground supplied, low beam headlamps will illuminate.

High Beam Operation/Flash-to-Pass Operation

With the lighting switch is turned to 2ND position and placed in HIGH or PASS position, BCM reads combination switch condition (refer to LT-189, "System Description"). And BCM sends high beam request signal to IPDM E/R and combination meter with CAN communication line. Then IPDM E/R turns on headlamp high relay LH and RH. With headlamp high relays are energized, power is supplied.

- through 10A fuse (No. 34, located in the IPDM E/R)
- through terminal 47 of the IPDM E/R
- to terminal 2 of headlamp LH, and
- through 10A fuse (No. 33, located in the IPDM E/R)
- through terminal 46 of the IPDM E/R
- to terminal 2 of headlamp RH.

Ground is supplied

- to terminal 3 of each headlamp
- through body grounds E25(Gasoline engine models), E26 and E40.

With power and ground supplied, the high beam headlamps will illuminate.
When combination meter receives high beam request signal from BCM across the CAN communication lines, combination meter will illuminate high beam indicator.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description" .

FRIENDLY LIGHTING FUNCTION

Low beam headlamps will illuminate for 30 seconds when,

- ignition switch is in OFF position,
- lighting switch is placed in OFF position, and
- lighting switch is placed in PASS position.

BCM re-starts to count for 30 seconds, when all doors are locked with remote controller or Intelligent Key during friendly lighting function is activating.
Friendry lighting function time can be changed using “WORK SUPPORT” mode in “HEADLAMP”.

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, headlamps illuminate with low beam when the ignition switch is turned from OFF to ON and headlamps are turned off when the ignition switch is turn from ON to OFF. If the fail-safe system is operating, headlamps does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control.(Refer to PG-19, "FAIL-SAFE FUNCTION")

CAN Communication

EKS00ERC

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LT7

Go to CAN system, when selecting your car model from the following table.

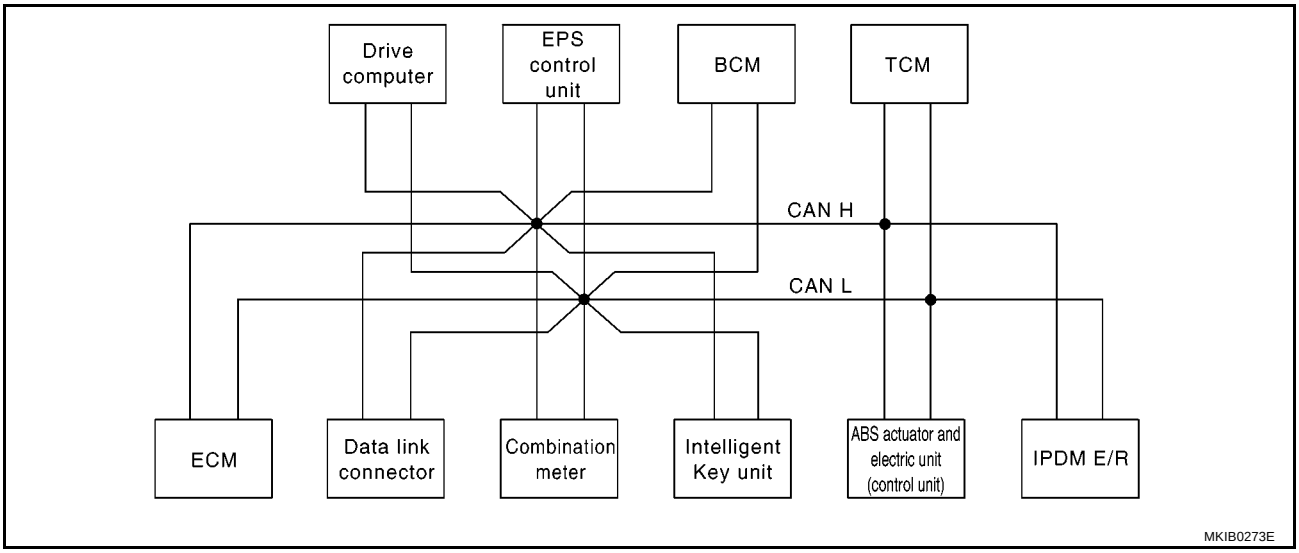
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-9, "TYPE 1/ TYPE 2"				LT-12, "TYPE 3/ TYPE 4"				LT-14, "TYPE 5/ TYPE 6"				LT-17, "TYPE 7/ TYPE 8"				LT-19, "TYPE 9/ TYPE 10"			

×: Applicable

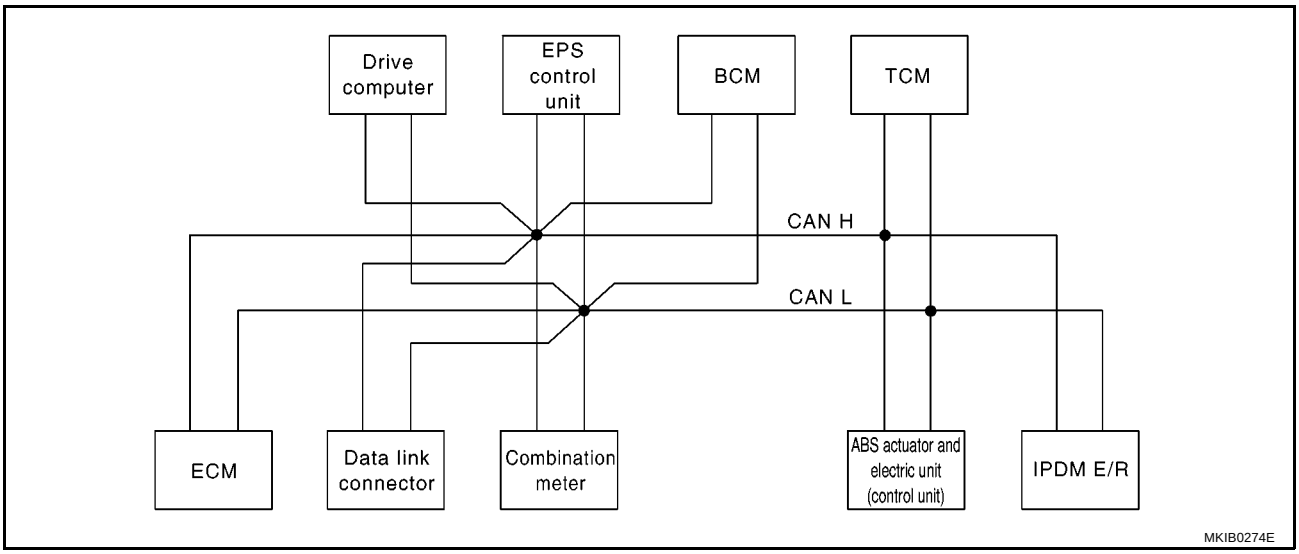
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

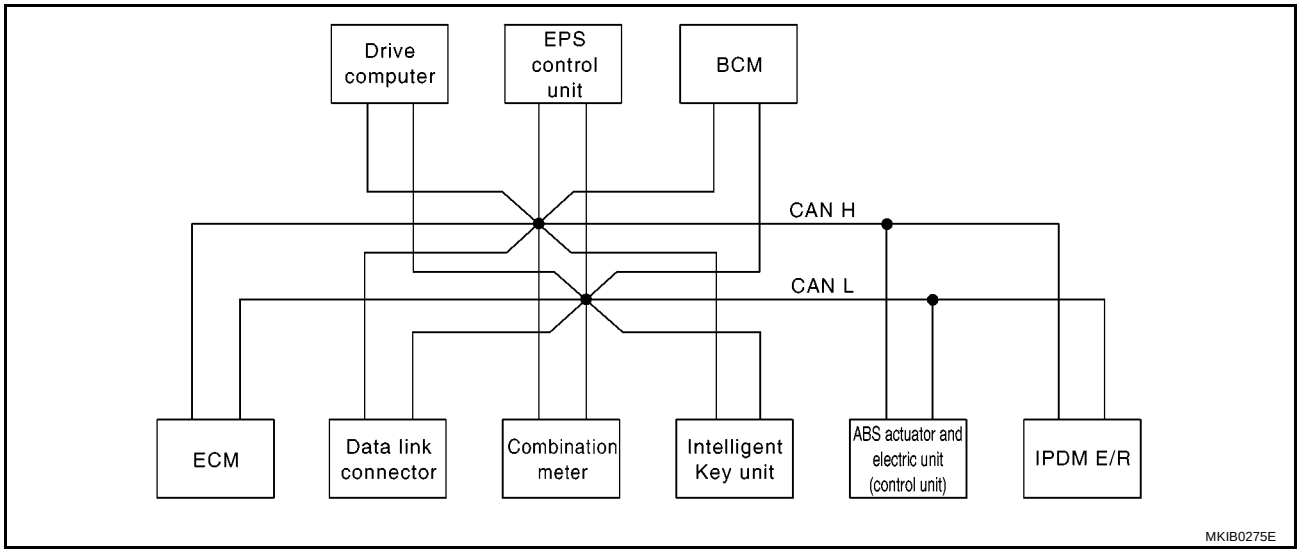
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

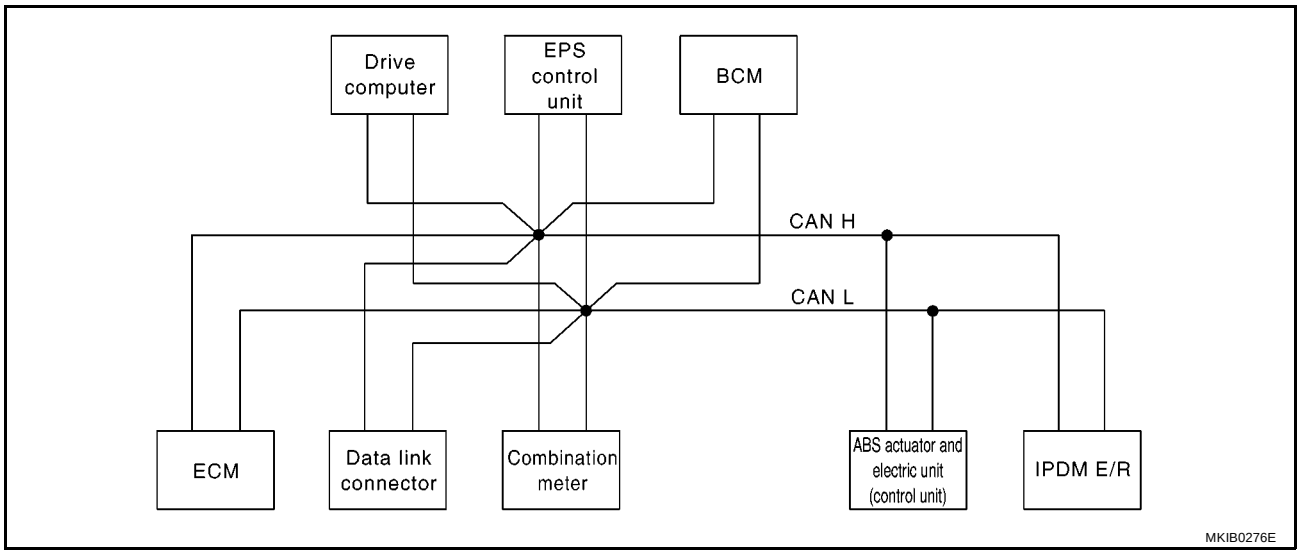
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

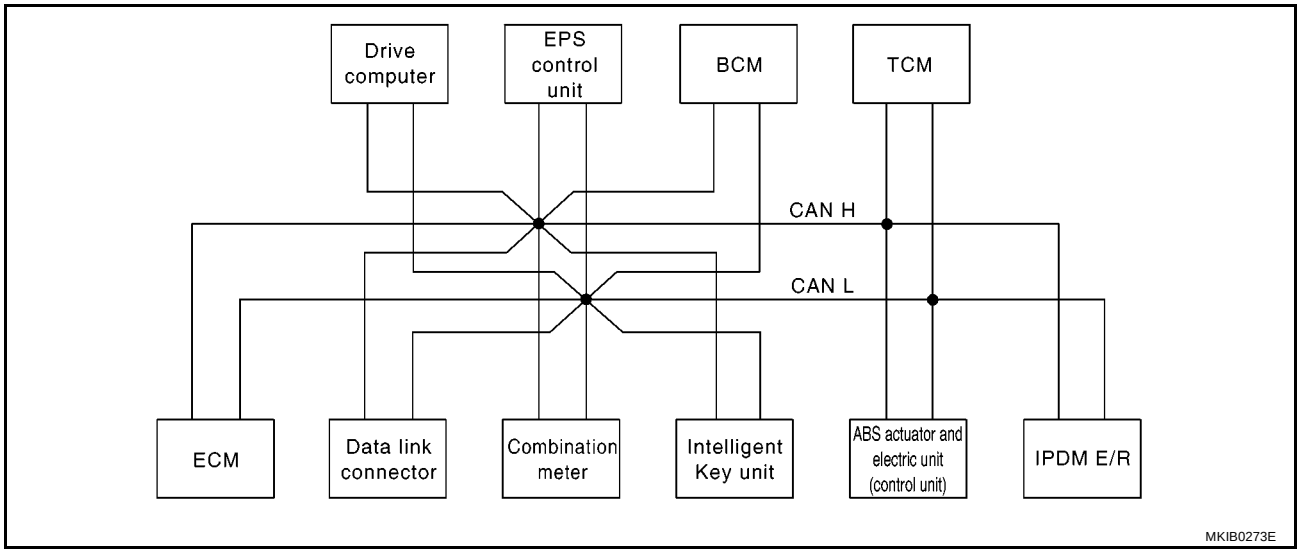
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

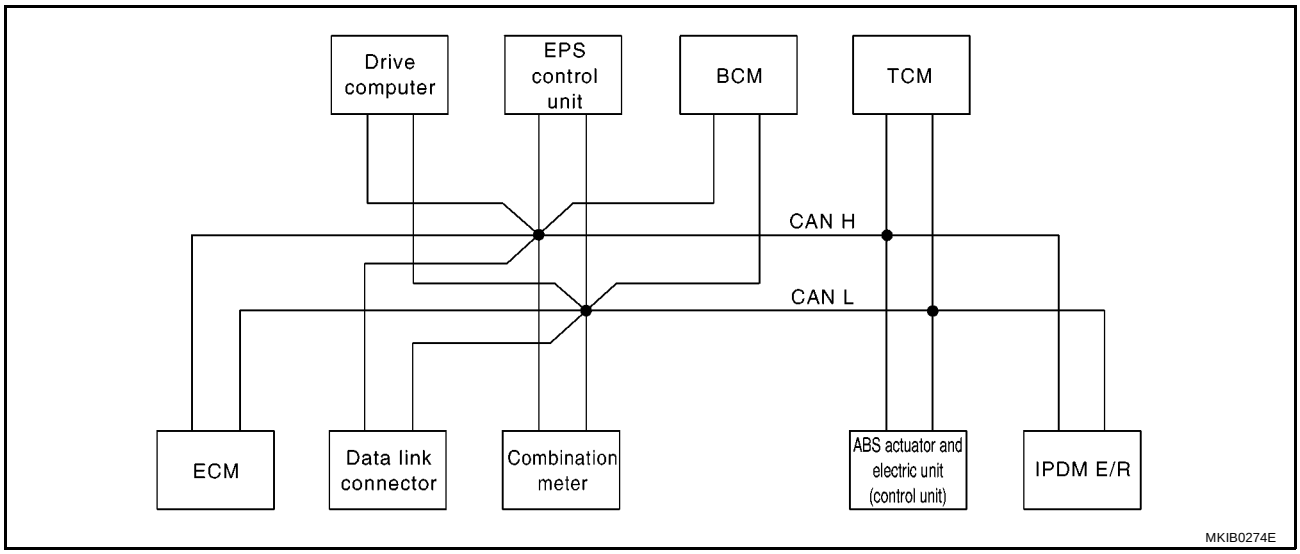
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

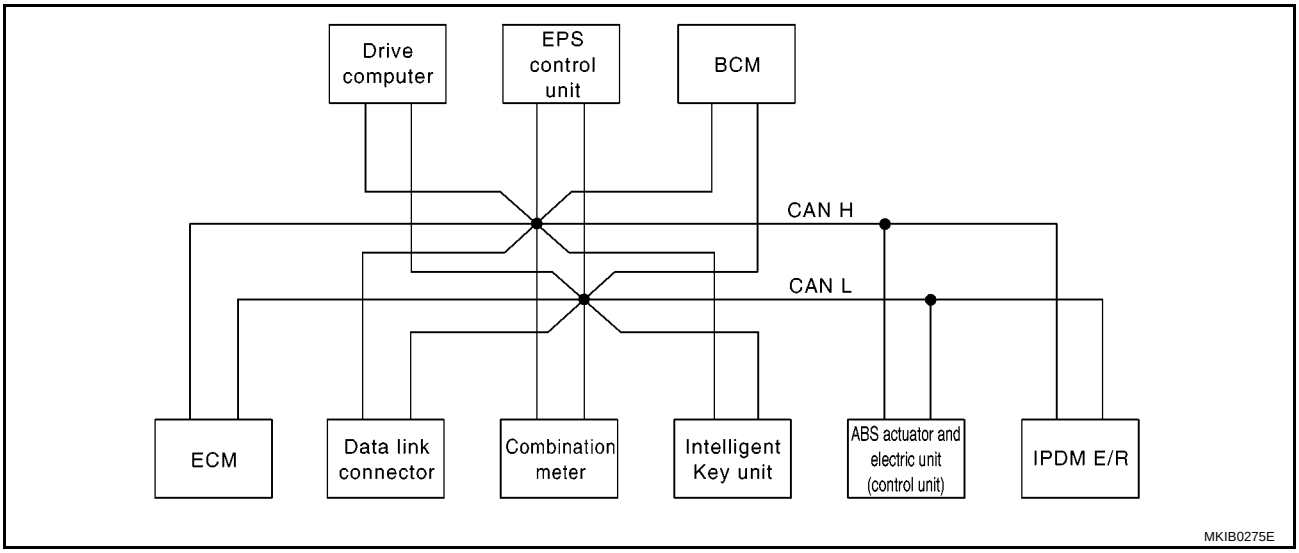
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

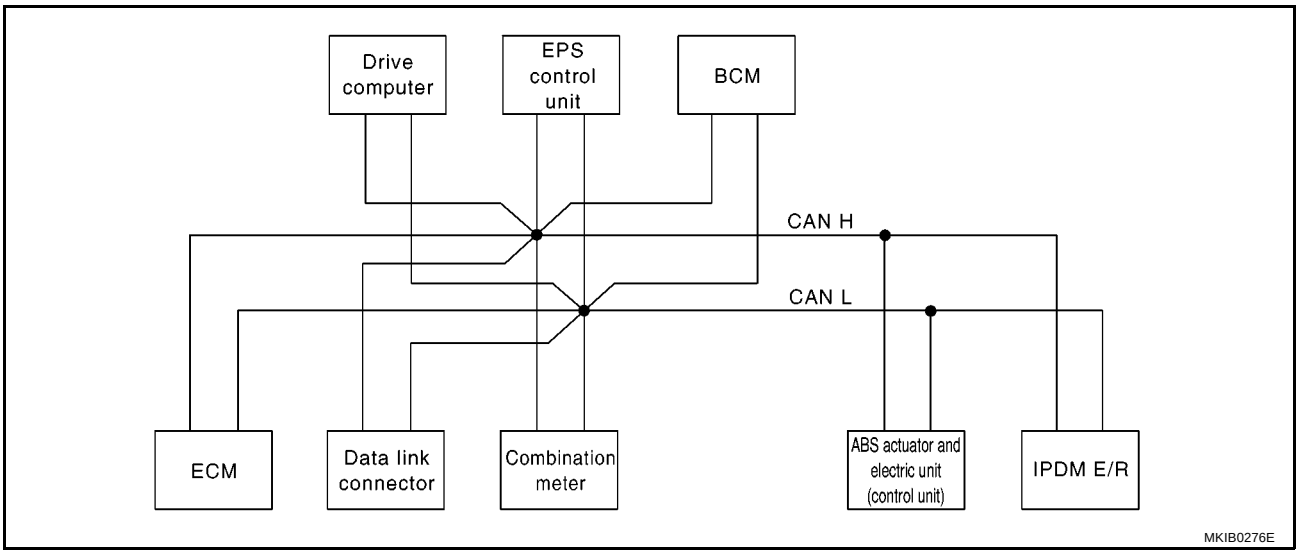
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

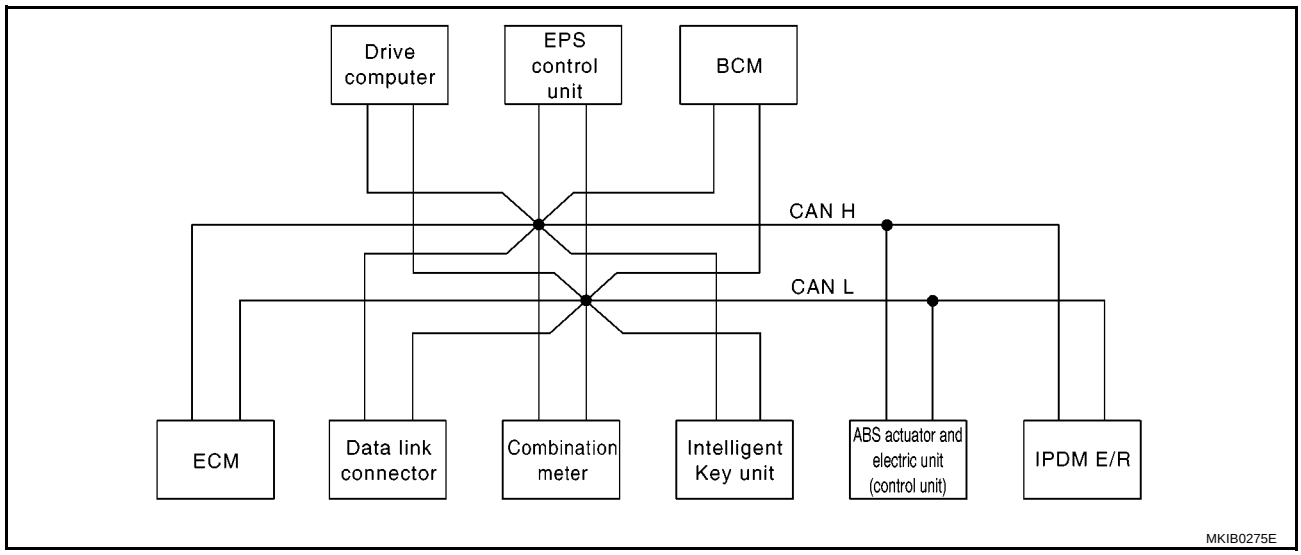
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

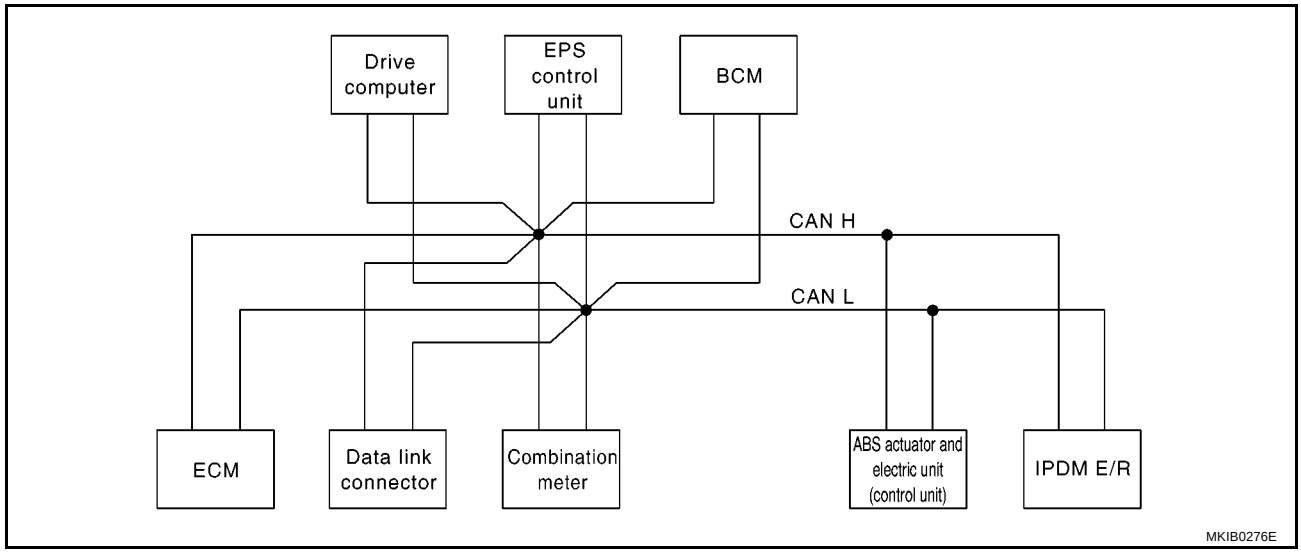
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

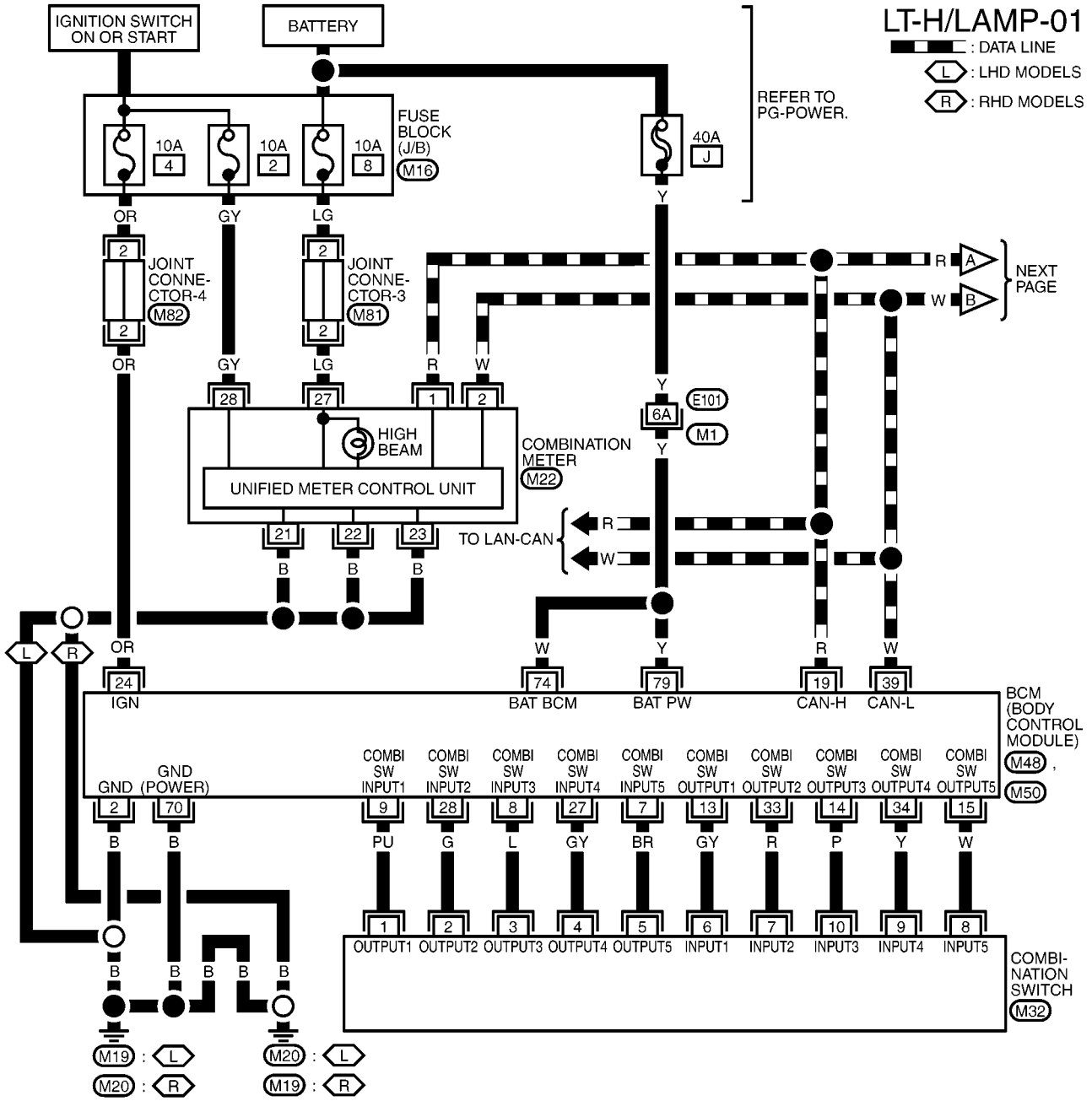
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

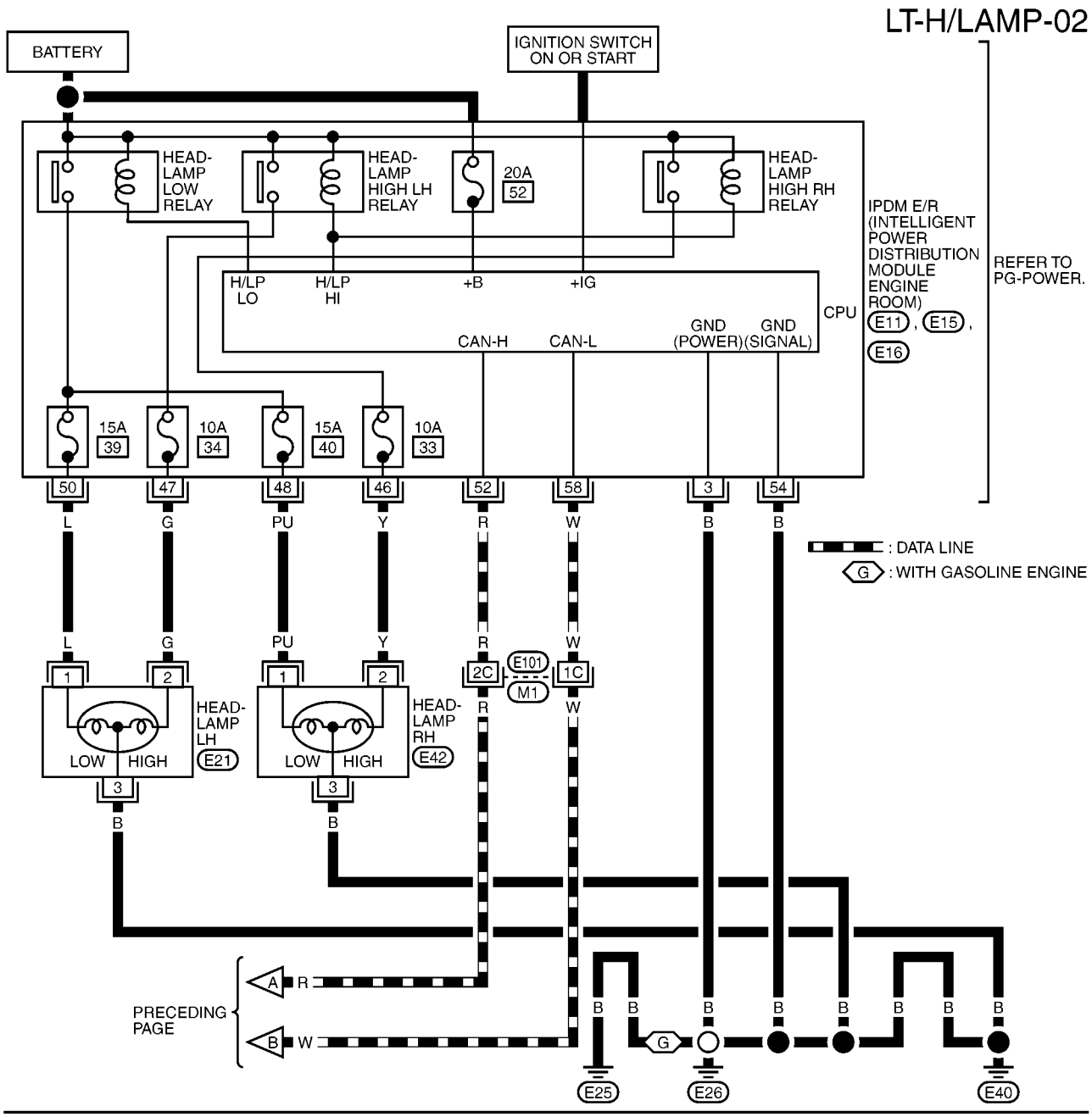
Wiring Diagram — H/LAMP—

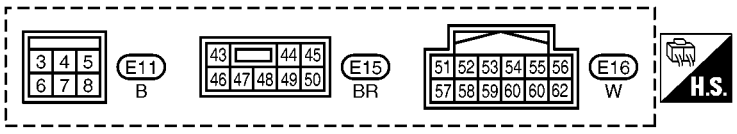
EKS00EKW

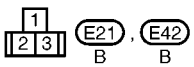


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M48, M50 -ELECTRICAL UNITS

MKWA1523E





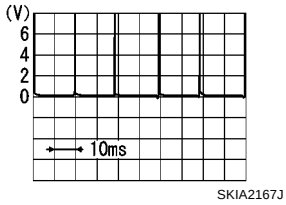
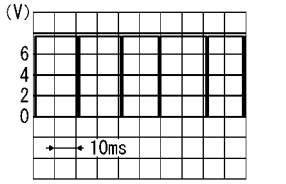
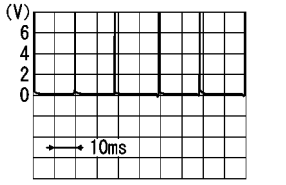


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1435E

Terminals and Reference Value for BCM

EKS00EKX

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signals, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signals, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	OFF	—	Approx. 12
79	Y	Battery power supply	OFF	—	Approx. 12

Terminals and Reference Values for IPDM E/R

EKS00EKY

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
46	Y	Headlamp high beam (RH)	ON	Lighting switch (high beam)	ON	Approx. 12
					OFF	Approx. 0
47	G	Headlamp high beam (LH)	ON		ON	Approx. 12
					OFF	Approx. 0
48	PU	Headlamp low beam (RH)	ON	Lighting switch (low beam)	ON	Approx. 12
					OFF	Approx. 0
50	L	Headlamp low beam (LH)	ON		ON	Approx. 12
					OFF	Approx. 0
52	R	CAN H	—	—		—
54	B	Ground	ON	—		Approx. 0
58	W	CAN L	—	—		—

How to Proceed With Trouble Diagnosis

EKS00EKZ

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Headlamp LT-6, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-26, "Preliminary Check" .
4. Confirm headlamp does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION" .
5. Check symptom and repair or replace the cause of malfunction.
6. Dose the headlamp operate normally? Yes: GO TO 7. No: GO TO 5.
7. INSPECTION END.

Preliminary Check

EKS00EL0

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4

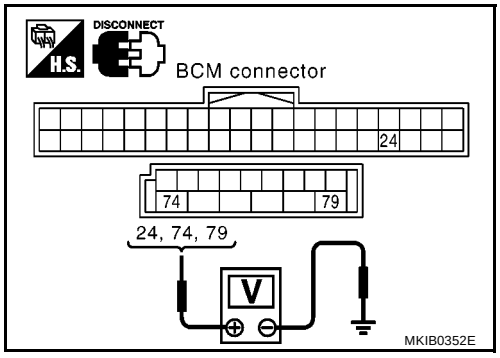
Refer to LT-22, "Wiring Diagram — H/LAMP—" .

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

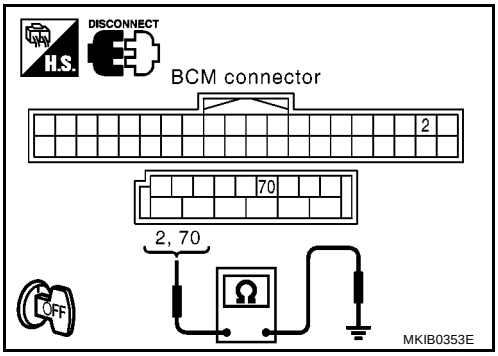
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse. If NG, repair or replace the harness or fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.

Terminals			Continuity
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)	Ground	Yes



OK or NG

OK >> INSPECTION END.
NG >> Repair or replace the harness.

CONSULT-II Functions (BCM)

EKS00EL1

CONSULT-II can display each diagnosis itemusing the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

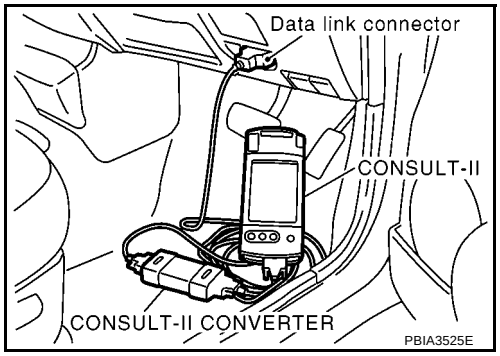
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Headlamp	Work support	Changes the setting for each function.
	Data monitor	Displays BCM input data in real time.
	Active test	Sends a drive signal to electronic components to check their operation.
BCM C/U	Self-diagnosis	BCM performs self-diagnosis of CAN communication and combination switch

CONSULT-II BASIC OPERATION

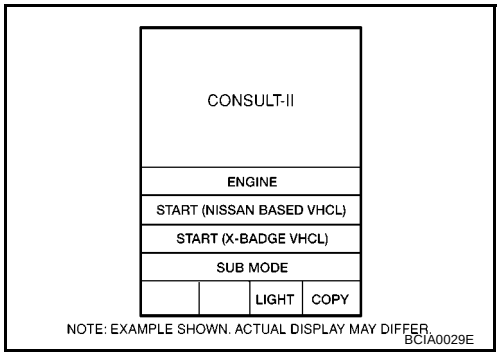
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

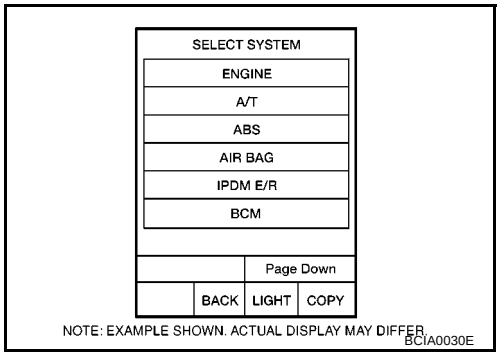
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector.



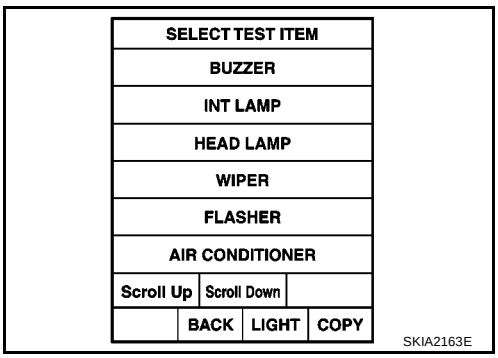
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



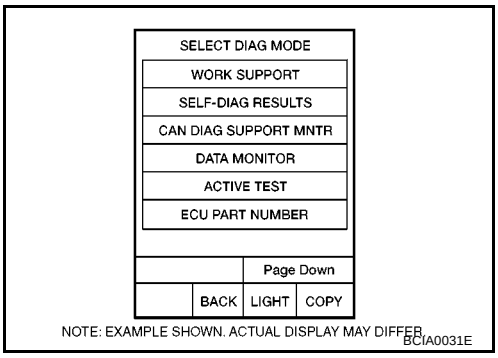
5. Touch “BCM” on the “SELECT SYSTEM” screen.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “HEAD LAMP” on “SELECT TEST ITEM” screen.



7. Touch “WORK SUPPORT”, “DATA MONITOR”, or “ACTIVE TEST” on the “SELECT DIAG MODE” screen.



WORK SUPPORT

Operation Procedure

1. Touch “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Touch “WORK SUPPORT” on “SELECT DIAG MODE” screen.
3. Touch “BATTERY SAVER” on “SELECT WORK ITEM” screen.
4. Touch “START”.
5. Touch “CHANGE SET”.
6. The setting will be changed and “CUSTOMIZING COMPLETED” will be displayed.
7. Touch “END”.

Display Item List

Item	Description	CONSULT-II	Factory setting
BATTERY SAVER	Battery saver can be selected.	ON	—
		OFF	❍

DATA MONITOR

Operation Procedure

1. Touch “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.
3. Touch “ALL SIGNALS” or “SELETION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
SELECTION FROM MENU	Selects and monitors individual items.

4. Touch “START”.
5. When “SELECTION FROM MENU” is selected, touch items to be monitored. When “ALL SIGNALS” is selected, all the items will be monitored.
6. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

Display Item List

Monitor item UNIT.		Display content
IGN ON SW	[ON/OFF]	Displays status (Ignition switch ON: ON/Others OFF, ACC: OFF) as judged from the ignition switch signal.
HI BEAM SW	[ON/OFF]	Displays status (High beam switch: ON/Others: OFF) as judged from lighting switch signal.
HEADLAMP SW	[ON/OFF]	Displays status (Headlamp switch: ON/Others: OFF) as judged from lighting switch signal.
LIGHT SW 1ST	[ON/OFF]	Displays status (Lighting switch 1st position: ON/Others: OFF) as judged from lighting switch signal.
PASSING SW	[ON/OFF]	Displays status (Flash-to-pass switch: ON/Others: OFF) as judged from lighting switch signal.
FR FOG SW	[ON/OFF]	Displays status (Front fog lamp switch: ON/Others: OFF) as judged from lighting switch signal.
RR FOG SW	[ON/OFF]	Displays status (Rear fog lamp switch: ON/Others: OFF) as judged from lighting switch signal.
DOOR SW DR	[ON/OFF]	Displays status (Door open: ON/door closed: OFF) as judged from the door switch DR signal.
H/L WASH SW	[ON/OFF]	Displays status (Headlamp washer switch: ON/Others: OFF) as judged from headlamp washer switch signal.
ENGINE STATUS	[STOP/ STALL/ RUN/ CRA]	Displays status (Engine stop: STOP/engine stall: STALL/engine running: RUN/engine cranking: CRA) as judged from the engine status.

ACTIVE TEST

Operation Procedure

1. Touch “HEAD LAMP” on “SELECT TEST ITEM” screen.
2. Touch “ACTIVE TEST” on the “SELECT DIAG MODE” screen.
3. Touch item to be tested and check operation of the selected item.
4. During operation check, touching “STOP” deactivates operation.

Display Item List

Test item	CONSULT-II screen display	Description
Tail lamp relay output	TAIL LAMP	Tail lamp relay can be operated by any ON–OFF operation.
Headlamp relay output	HEADLAMP	Headlamp relay can be operated by any ON–OFF operation.
Front fog lamp relay output	FR FOG LAMP	Front fog lamp relay can be operated by any ON–OFF operation.
Rear fog lamp relay output	RR FOG LAMP	Rear fog lamp relay can be operated by any ON–OFF operation.

SELF-DIAGNOSTIC RESULTS

Operation Procedure

1. Touch “BCM C/U” on “SELECT TEST ITEM” screen.
2. Touch “SELF-DIAGNOSTIC RESULTS” on “SELECT DIAG MODE” screen.
3. Self-diagnostic results are displayed.

Display Item List

Item to be displayed	CONSULT-II display	Description
CAN communication	CAN COMMUNICATION [U1000]	Malfunction is detected in CAN communication.
CAN communication system	CAN COMMUNICATION SYSTEM TO 6 [U1000]	Malfunction is detected in CAN system.
Combination switch	Diagnosis 1-5 systems open circuit	Malfunction is detected in combination switch system.

CONSULT-II Functions (IPDM E/R)

EKS00EL2

CONSULT-II can display each diagnosis itemusing the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

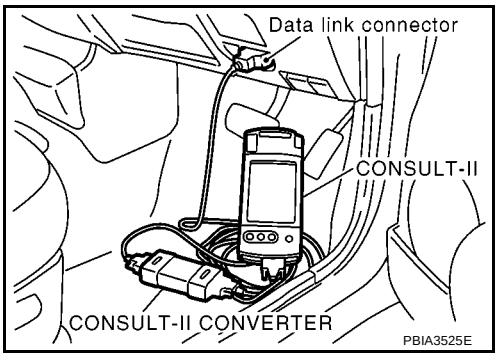
Inspection Item, Diagnosis Mode	Description
Self-diagnostic results	Refer to PG-34, "SELF-DIAG RESULTS" .
Data monitor	Displays the real-time input/output data from IPDM E/R I/O data.
Active test	IPDM E/R can Sends a drive signal to electronic components to check their operation.

CONSULT-II BASIC OPERATION

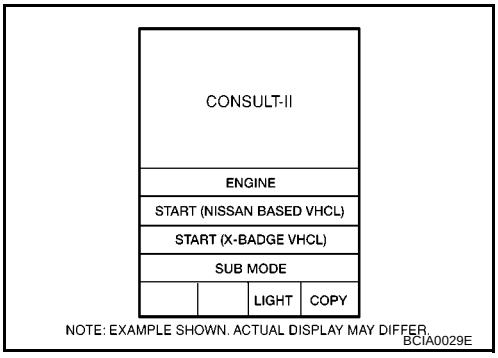
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

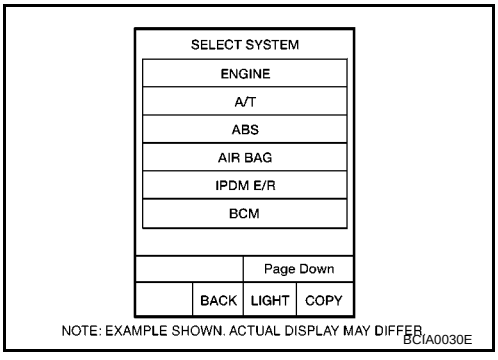
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector.



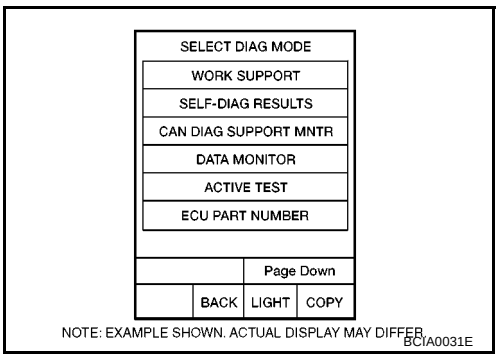
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “IPDM E/R” on the “SELECT SYSTEM” screen.
   If “IPDM E/R” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “SELF-DIAG RESULTS”, “DATA MONITOR”, “ACTIVE TEST” on the “SELECT DIAG MODE” screen.



SELF-DIAG RESULTS

IPDM E/R perform self-diagnosis of CAN communication. Refer to PG-34, "SELF-DIAG RESULTS" .

DATA MONITOR

Operation Procedure

1. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.
2. Touch “ALL SIGNALS”,“MAIN SIGNALS” or “SELETION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
MAIN SIGNALS	Monitors previously selected items.
SELECTION FROM MENU	Items are freely selected and monitored.

3. Touch “START”.
4. For “SELECTION FROM MENU”, touch the required monitor items. For “ALL SIGNALS”, all items are monitored. For “MAIN SIGNALS”, the previously selected items are monitored.
5. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

All Signals, Main Signals, Selection From Menu

Monitor item name	Display and unit	Monitor item selection			Display content
		All signals	Main signals	selection from menu	
TAIL & CLR REQ	ON/OFF	×	×	×	Signal status input from BCM
HL LO REQ	ON/OFF	×	×	×	Signal status input from BCM
HL HI REQ	ON/OFF	×	×	×	Signal status input from BCM
FR FOG REQ	ON/OFF	×	×	×	Signal status input from BCM
IGN RLY	ON/OFF	×	×	×	Status of ignition relay being monitored by IPDM E/R
BAT VOLT	V	×		×	Value measured at IPDM E/R

NOTE:

- IPDM E/R data monitoring is performed with ignition switch ON. When monitored at ACC position, the display might not be normal.

ACTIVE TEST

Operation Procedure

1. Touch “ACTIVE TEST” on the “SELECT DIAG MODE” screen.
2. Touch item to be tested and check operation of the selected item.
3. Touch “START”.
4. Touch “STOP” while testing to stop the operation.

Test item	CONSULT-II screen display	Description
Headlamp relay (HI, LO) output	HEADLAMP	Headlamp relay (LO, HI) can be operated using random operation (OFF, HI ON, LO ON).
Front fog lamp relay output	FRONT FOGLAMP	Fog lamp relay can be operated by any ON–OFF operation.
Tail lamp relay output	TAIL LAMP	Tail lamp relay can be operated by any ON–OFF operation.

Headlamp High Beam Does Not Illuminate (Both Sides)

EKS00EL3

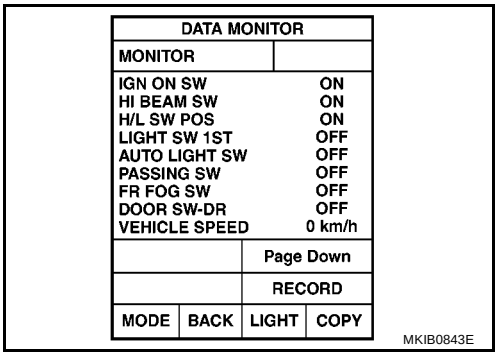
1. CHECK BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

Select BCM on CONSULT-II.Check lighting switch (“HI BEAM SW”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 2nd position and placed in HIGH or PASS position : HI BEAM SW ON

When lighting switch is in OFF position : HI BEAM SW OFF



Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

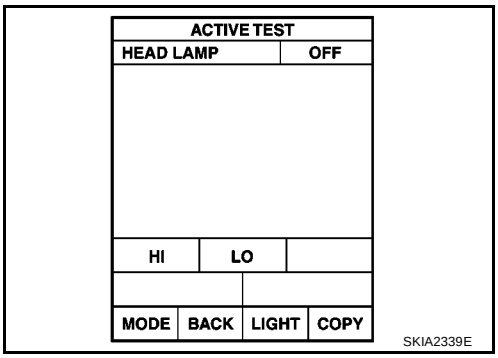
OK or NG

OK >> GO TO 2.
NG >> Refer to LT-196, "Check Combination Switch" .

2. CHECK BETWEEN IPDM E/R TO HEADLAMP

With CONSULT-II

1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “HEADLAMP” on “ACTIVE TEST” screen.
3. Make sure that headlamp (high beam) operate normally.



Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that headlamp (high beam) operate normally.

OK or NG

OK >> GO TO 3.
NG >> Check the following:

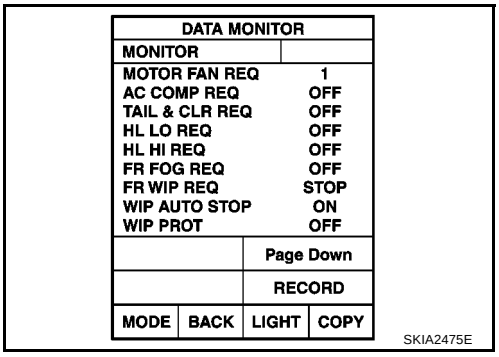
- Headlamp LH/RH bulb
- Headlamp ground circuit harness
- Open or short for the harness between headlamp LH/RH and IPDM E/R. If there are no malfunctions, replace IPDM E/R.

3. CHECK BETWEEN IPDM E/R AND BCM

Select IPDM E/R on CONSULT-II. Check lighting switch (“HL HI REQ”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 2nd position and placed in HIGH or PASS position : HL HI REQ ON

When lighting switch is in OFF position : HL HI REQ OFF



OK or NG

OK >> Replace IPDM E/R.
NG >> Replace BCM.

Headlamp High Beam Does Not Illuminate (One Side)

EKS00EL4

1. CHECK BULB

Check headlamp bulb which does not illuminate.

OK or NG

OK >> GO TO 2.
NG >> Replace headlamp bulb.

2. CHECK FUSE

Check the following

- 10A fuse (No. 33, located in the IPDM E/R).
- 10A fuse (No. 34, located in the IPDM E/R).

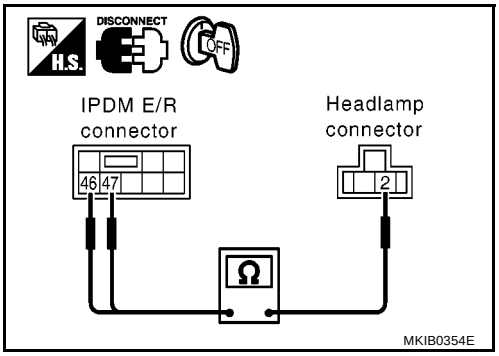
OK or NG

OK >> GO TO 3.
NG >> If fuse is blown be sure to eliminate cause of malfunction before installing new fuse.

3. CHECK BETWEEN IPDM E/R AND HEADLAMP

1. Disconnect IPDM E/R connector and headlamp connector.
2. Check continuity between harness connector terminals of IPDM E/R and harness connector terminal of headlamp.

Terminals					Continuity
Headlamp			IPDM E/R		
Connector		Terminal (Wire color)	Connector	Terminal (Wire color)	
RH	E42	2 (Y)	E15	46 (Y)	Yes
LH	E21	2 (G)		47 (G)	



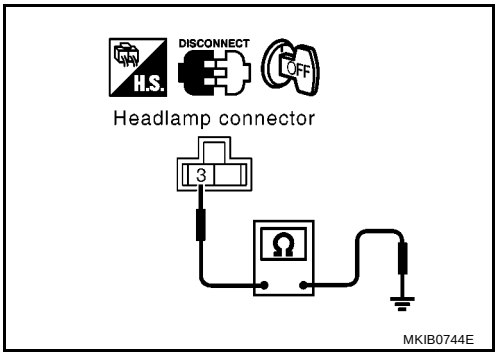
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK BETWEEN HEADLAMP AND GROUND

Check continuity between harness connector of headlamp and ground.

Headlamp			Continuity
Connector		Terminal (Wire color)	
RH	E42	3 (B)	Yes
LH	E21	3 (B)	



OK or NG

OK >> Replace IPDM E/R.
NO >> Repair harness or connector.

High-Beam Indicator Does Not Illuminate

EKS00EL5

1. CHECK BULB

Check high-beam indicator bulb.

OK or NG

OK >> Replace combination meter.
NG >> Replace indicator bulb.

Headlamp Low Beam Does Not Illuminate (Both Sides)

EKS00EL6

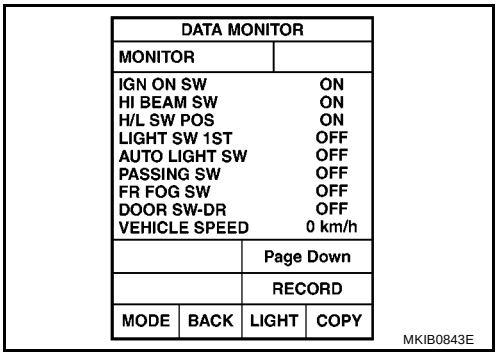
1. CHECK BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

Select BCM on CONSULT-II.Check lighting switch (“H/L SW POS”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 2nd position : H/L SW POS ON

When lighting switch is in OFF position : H/L SW POS OFF



Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

OK or NG

OK >> GO TO 2.
NG >> Refer to LT-196, "Check Combination Switch" .

2. CHECK BETWEEN IPDM E/R AND HEADLAMP

With CONSULT-II

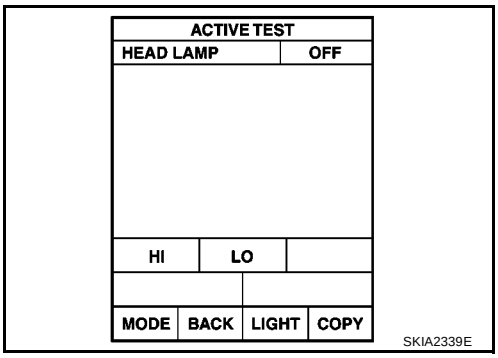
1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “HEADLAMP” on “ACTIVE TEST” screen.
3. Make sure that headlamp (low beam) operate normally.

Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that headlamp (low beam) operate normally.

OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

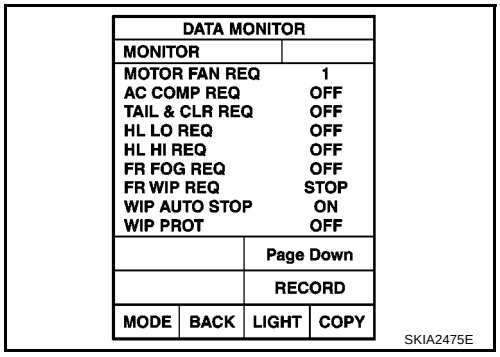


3. CHECK BETWEEN IPDM E/R AND BCM

Select IPDM E/R on CONSULT-II.Check lighting switch (“HL LO REQ”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 2nd position : HL LO REQ ON

When lighting switch is in OFF position : HL LO REQ OFF



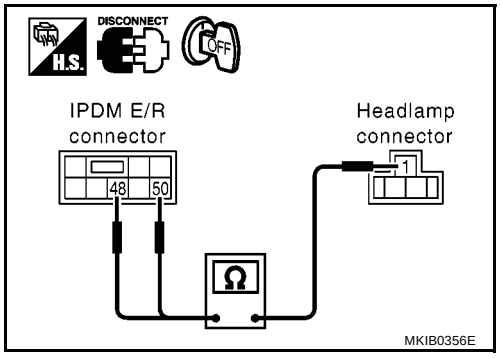
OK or NG

OK >> Replace IPDM E/R.
NG >> Replace BCM.

4. CHECK BETWEEN IPDM E/R AND HEADLAMPS

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and LH/RH headlamp connector.
3. Check continuity between harness connector of IPDM E/R and harness connector of LH/RH headlamp.

Terminals					Continuity
Headlamp			IPDM E/R		
Connector		Terminal (Wire color)	Connector	Terminal (Wire color)	
RH	E42	1 (PU)	E15	48 (PU)	Yes
LH	E21	1 (L)		50 (L)	



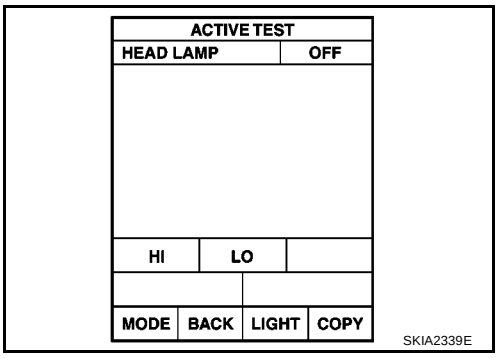
OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connector.

5. CHECK IPDM E/R

With CONSULT-II

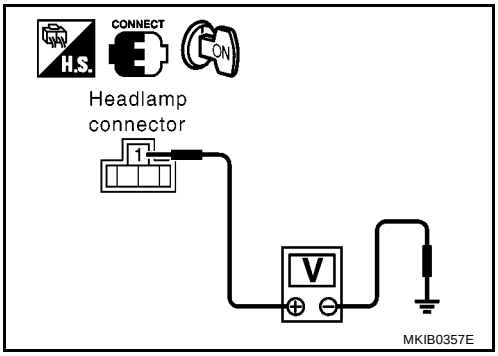
1. Connect IPDM E/R connector and headlamp LH/RH connector.
2. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
3. Select “HEADLAMP” on “ACTIVE TEST” screen.
4. Check voltage between headlamp LH/RH connector terminals and ground.



Terminals				Voltage [V]
(+)			(-)	
Connector		Terminal (Wire color)		
RH	E42	1 (PU)	Ground	Battery voltage
LH	E21	1 (L)		

Without CONSULT-II

1. Connect IPDM E/R connector and headlamp LH/RH connector.
2. Start auto active test. Refer to PG-42, "Auto Active Test" , check voltage between headlamp LH/RH connector terminals and ground.



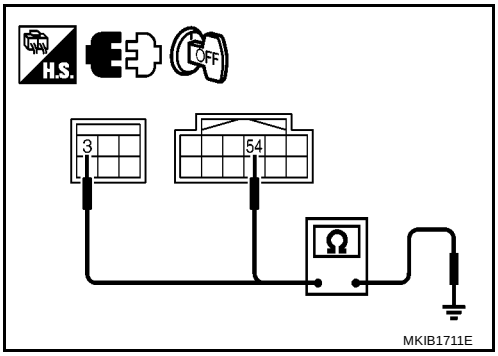
Terminals				Voltage [V]
(+)			(-)	
Connector		Terminal (Wire color)		
RH	E42	1 (PU)	Ground	Battery voltage
LH	E21	1 (L)		

OK or NG

OK >> GO TO 6.
NG >> Replace IPDM E/R.

6. CHECK IPDM E/R AND GROUND

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R connector terminals and ground.



Terminals			Continuity
Connector	Terminal (Wire color)		
E11	3 (B)	Ground	Yes
E16	54 (B)		

OK or NG

OK >> Check the condition of the harness and connectors.
NG >> Repair or replace the harness.

Headlamp Low Beam Does Not Illuminate (One Side)

EKS00EL7

1. CHECK BULB

Check headlamp bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace headlamp bulb.

2. FUSE CHECK

Check the following
15A fuse (No. 39, located in the IPDM E/R).
15A fuse (No. 40, located in the IPDM E/R).

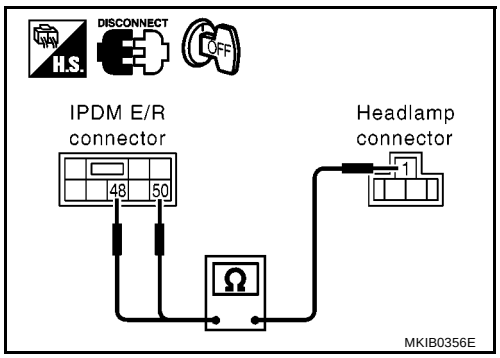
OK or NG

OK >> GO TO 3.
NG >> If fuse is blown, be sure to elimate cause of malfunction before installing new fuse.

3. CHECK BETWEEN IPDM E/R AND HEADLAMPS

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and headlamp connector.
3. Check continuity between harness connector of IPDM E/R and harness connector terminal of headlamp.

Terminals					Continuity
Headlamp			Terminals		
Connector		Terminal (Wire color)	Connector	Terminal (Wire color)	
RH	E42	1 (PU)	E15	48 (PU)	Yes
LH	E21	1 (L)		50 (L)	



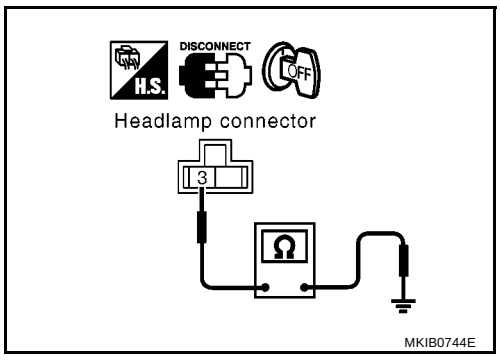
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK BETWEEN HEADLAMP AND GROUND

Check continuity between harness connector of headlamp and ground.

Headlamp			Continuity
Connector		Terminal (Wire color)	
RH	E42	3 (B)	Yes
LH	E21	3 (B)	



OK or NG

OK >> Replace IPDM E/R.
NO >> Repair or replace harness or connector.

Headlamp Low Beam And High Beam Does Not Illuminate (One Side)

EKS00EL8

1. CHECK BULB

Check headlamp bulb.

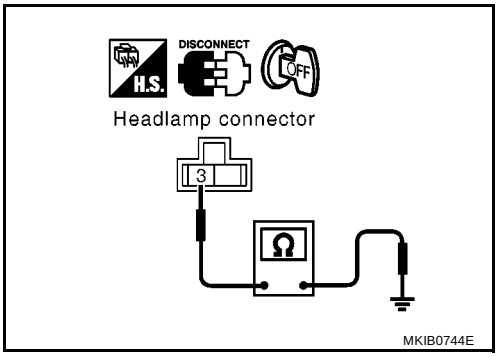
OK or NG

OK >> GO TO 2.
NG >> Replace headlamp bulb.

2. CHECK BETWEEN HEADLAMP AND GROUND

1. Disconnect headlamp connector.
2. Check continuity between harness connector of headlamp and ground.

Headlamp			Continuity
Connector		Terminal (Wire color)	
RH	E42	3 (B)	Yes
LH	E21	3 (B)	



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair or replace harness or connector.

Headlamps Do Not Turn OFF

EKS00EL9

1. CHECK IPDM E/R

- Check whether symptom is caused by IPDM E/R fail-safe operation or by factors other than fail-safe operation.Refer to PG-19, "FAIL-SAFE FUNCTION" and check CAN system.

OK or NG

Fail-safe operation>>Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" .
Other than fail-safe operation>>Refer to PG-51, "Diagnosis of IPDM E/R Integrated Relay" .

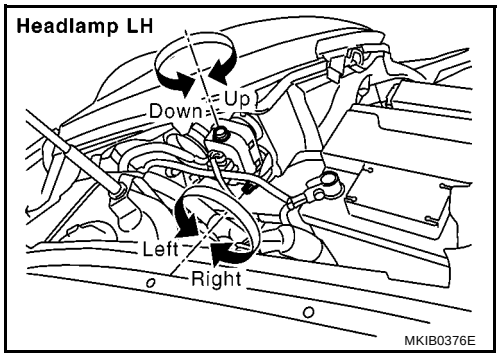
Aiming Adjustment

EKS00ELA

- Turn the aiming adjusting screw to adjust.
- For positions of the adjustment screws, refer to the figures.

CAUTION:

Adjustment with the aiming adjusting screw must be done in the tightening direction. (When adjusting in the loosening direction, first loosen the screw, then tighten again.)



PREPARATION BEFORE ADJUSTING

For details, refer to the regulations in your own country.

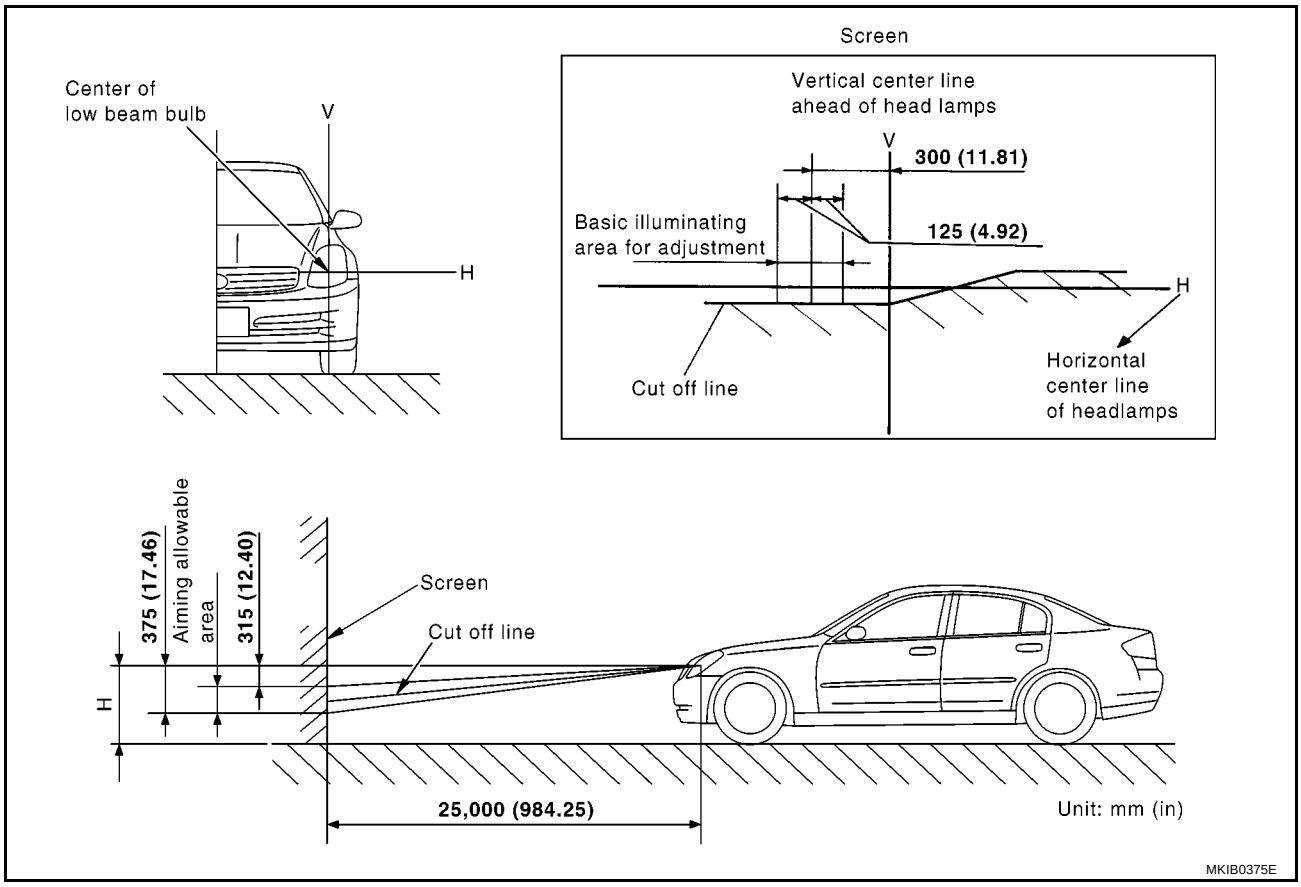
Before performing aiming adjustment, check the following.

1. Keep all tyres inflated to correct pressures.
2. Place vehicle on flat surface.
3. Set that there is no-load in vehicle other than the driver (or equivalent weight placed in driver's position). Coolant, engine oil filled up to correct level and full fuel tank.

LOW BEAM AND HIGH BEAM

1. Turn headlamp low beam on.
2. Use adjusting screws to perform aiming adjustment.

ADJUSTMENT USING AN ADJUSTMENT SCREEN (LIGHT/DARK BORDERLINE)



If the vehicle front body has been repaired and/or the headlamp assembly has been replaced, check aiming. Use the aiming chart shown in the figure.

- Basic illumination area for adjustment should be within the range shown on the aiming chart.

Adjust headlamp accordingly.

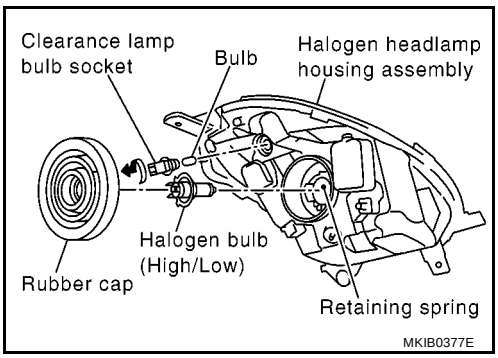
Bulb Replacement

EKS00ELB

HEADLAMP

1. Turn ignition switch OFF.
2. Disconnect headlamp connector.
3. Remove rubber cover.
4. Remove the retaining spring lock, then remove the bulb.
5. Install in reverse order of remove.

Headlamps (High beam, Low beam) : 12V 60/55W (H4)



CLEARANCE LAMPS (PARKING LAMPS)

1. Turn ignition switch OFF.
2. Turn bulb socket counterclockwise and unlock it.
3. Remove bulb.
4. Install in reverse order of remove.

Parking lamps : 12V 5W

CAUTION:

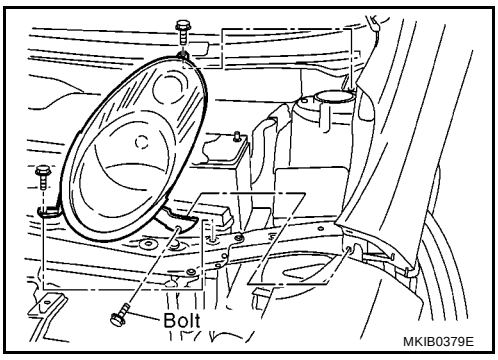
After the bulb is installed, the rubber cover must be attached securely to insure the assembly is water-tight.

Removal and Installation

EKS00ELC

REMOVAL

1. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
2. Remove bolt of front fender front end and bolt of front bumper fascia. Remove front bumper fascia. Refer to EI-4, "FRONT BUMPER" .
3. Disconnect the headlamp, clearance lamp and headlamp aiming connector.
4. Remove headlamp bolts.
5. Pull the entire headlamp forward while raising top mounting bracket.



INSTALLATION

Install in the reverse order of removal, paying attention to the following.

Headlamp bolt

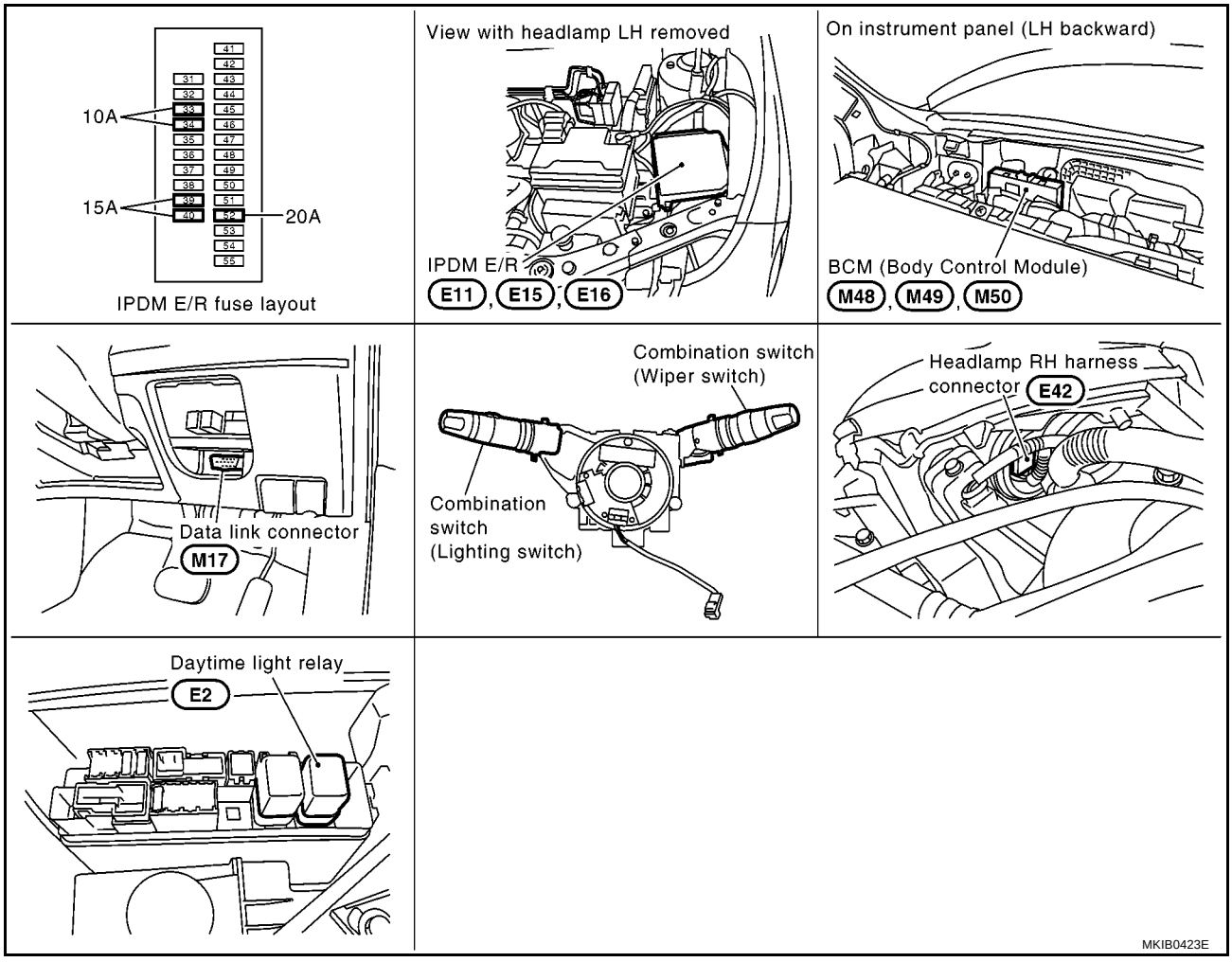
Tightening torque : 4.4 - 6.5 N·m (0.45 - 0.66 kg-m, 39 - 58 in-lb)

HEADLAMP - DAYTIME LIGHT SYSTEM -

PFP:26010

Component Parts and Harness Connector Location

EKS00ELD



System Description

EKS00ELE

The headlamp system for Northern Europe vehicles is equipped with a daytime light system that activates the low beam headlamps at approximately half illumination whenever the engine is running.
Power is supplied at all times

- to headlamp high LH and RH relay located in the IPDM E/R (intelligent power distribution module engine room).
- to headlamp low relay located in the IPDM E/R.

Power is also supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box),
- to IPDM E/R
- through 20A fuse (No.52, located in the IPDM E/R),
- to daytime light relay terminals 1 and 5
- through 10A fuse (No.27, located in the fuse and fusible link box) and
- to combination meter terminal 27
- through 10A fuse [No. 8, located in the fuse block (J/B)].

With the ignition switch in the ON or START position, power is supplied

- to BCM terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)],
- to combination meter terminal 28

- through 10A fuse [No. 2, located in the fuse block (J/B)]
- to IPDM E/R.

With the ignition switch in the START position, power is supplied

- to BCM terminal 3
- through 10A fuse [No. 14, located in the fuse block (J/B)].

Ground is supplied

- to BCM terminals 2 and 70, and
- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20,
- to IPDM E/R terminals 3 and 54
- through body grounds E25(Gasoline engine models), E26 and E40.

HEADLAMP OPERATION

Low Beam Operation

When the lighting switch is turned to 2ND position and placed in LOW position, BCM read combination switch condition (refer to LT-189, "System Description"). And BCM send low beam request signal to IPDM E/R with CAN communication line. Then IPDM E/R is turned on headlamp low relay. Headlamp low relay is energized and then power is supplied

- through 15A fuse (No. 39, located in the IPDM E/R)
- through terminal 50 of the IPDM E/R
- to terminal 1 of headlamp LH, and
- through 15A fuse (No. 40, located in the IPDM E/R)
- through terminal 48 of the IPDM E/R
- to terminal 1 of headlamp RH.

Ground is supplied at all times

- to terminal 3 of headlamp LH
- through body grounds E25(Gasoline engine models), E26 and E40, and
- to terminal 3 of headlamp RH
- through daytime light relay 3 and 4
- through body grounds E25(Gasoline engine models), E26, E40.

With power and ground supplied, low beam headlamps will illuminate.

High Beam Operation (When engine stopped)/Flash-to-Pass Operation

With the lighting switch in 2ND position and placed in HIGH or PASS position, BCM read combination switch condition (refer to LT-189, "System Description"). And BCM send high beam request signal to IPDM E/R and combination meter with CAN communication line. Then IPDM E/R is turned on headlamp high LH and RH relay. Headlamp high relays are energized and then power is supplied

- through 10A fuse (No. 34, located in the IPDM E/R)
- through terminal 47 of the IPDM E/R
- to terminal 2 of the headlamp LH and
- through 10A fuse (No. 33, located in the IPDM E/R)
- through terminal 46 of the IPDM E/R
- to terminal 2 of the headlamp RH.

Ground is supplied

- to terminal 3 of headlamp LH
- through body grounds E25(Gasoline engine models), E26 and E40
- to terminal 3 of headlamp RH
- through daytime light relay 3 and 4
- through body grounds E25, E26 and E40

When power and ground supplied, the high beam headlamps will illuminate.
When combination meter received high beam request signal, combination meter will illuminate high beam indicator.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

DAYTIME LIGHT OPERATION

With the engine running and the lighting switch in the OFF position. BCM sends daytime light request signal to IPDM E/R with CAN communication line. Ground is supplied

- through terminal 65 of IPDM E/R
- to terminal 2 of daytime light relay.

Daytime light relay is energized, power is supplied.

- through daytime light relay terminals 3 and 5
- to terminal 3 of headlamp RH
- through terminal 1 of headlamp RH
- to IPDM E/R terminal 48
- through IPDM E/R terminal 50
- to terminal 1 of headlamp LH.

Ground is supplied

- to terminal 3 of headlamp LH and
- to IPDM E/R terminals 3 and 54
- through body grounds E25(Gasoline engine models), E26 and E40.

Because the low beam headlamps are now wired in series, they operate at half illumination.
If the lighting switch is in the 1st and 2nd position, daytime light operation is canceled.

FRIENDLY LIGHTING FUNCTION

High beam headlamps will illuminate for 30 seconds when,

- ignition switch is in OFF position,
- lighting switch is placed in OFF position, and
- lighting switch is placed in PASS position.

BCM re-starts to count for 30 seconds, when all doors are locked with remote controller or Intelligent Key during Friendly lighting function is activating.
Friendry lighting function time can be changed using “WORK SUPPORT” mode in “HEADLAMP”.

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, headlamps illuminate when the ignition switch is turned from OFF to ON or ACC and headlamps are turned off when the ignition switch is turn from ON or ACC to OFF. If the fail-safe system is operating, headlamps does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control. (Refer to PG-19, "FAIL-SAFE FUNCTION")

CAN Communication

EKS00ERE

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LT8

Go to CAN system, when selecting your car model from the following table.

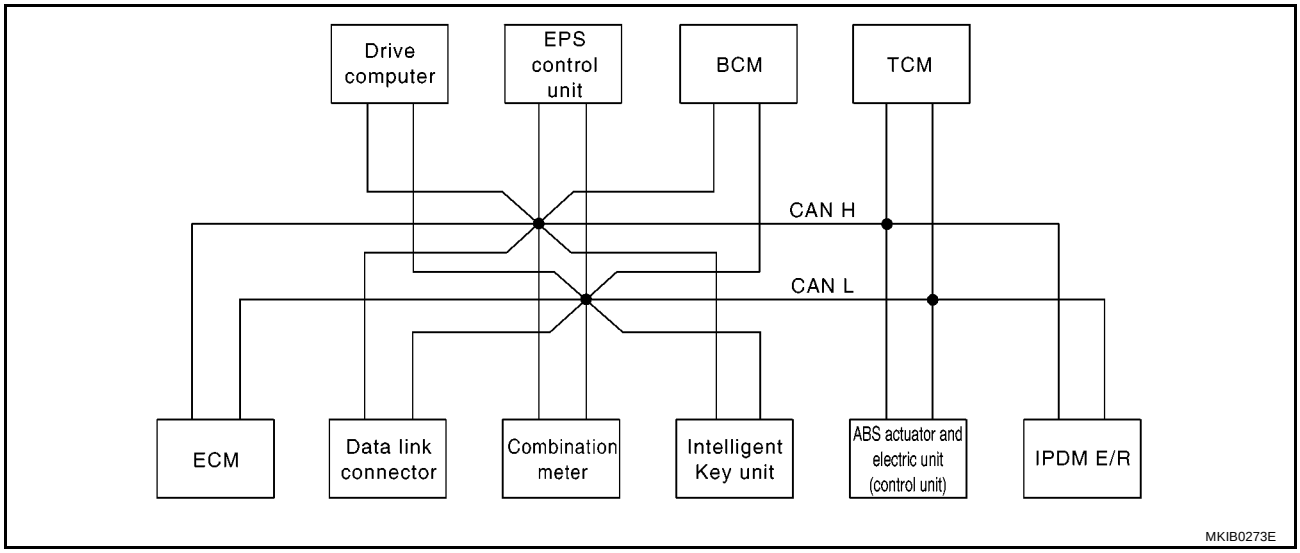
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-46, "TYPE 1/ TYPE 2"				LT-49, "TYPE 3/ TYPE 4"				LT-51, "TYPE 5/ TYPE 6"				LT-54, "TYPE 7/ TYPE 8"				LT-56, "TYPE 9/ TYPE 10"			

×: Applicable

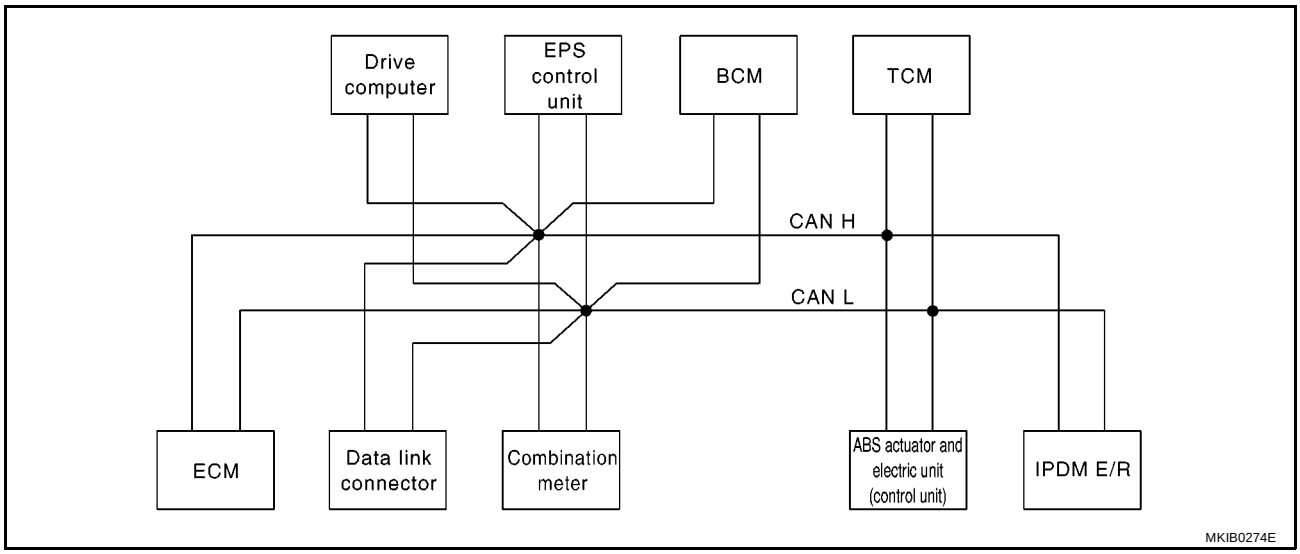
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

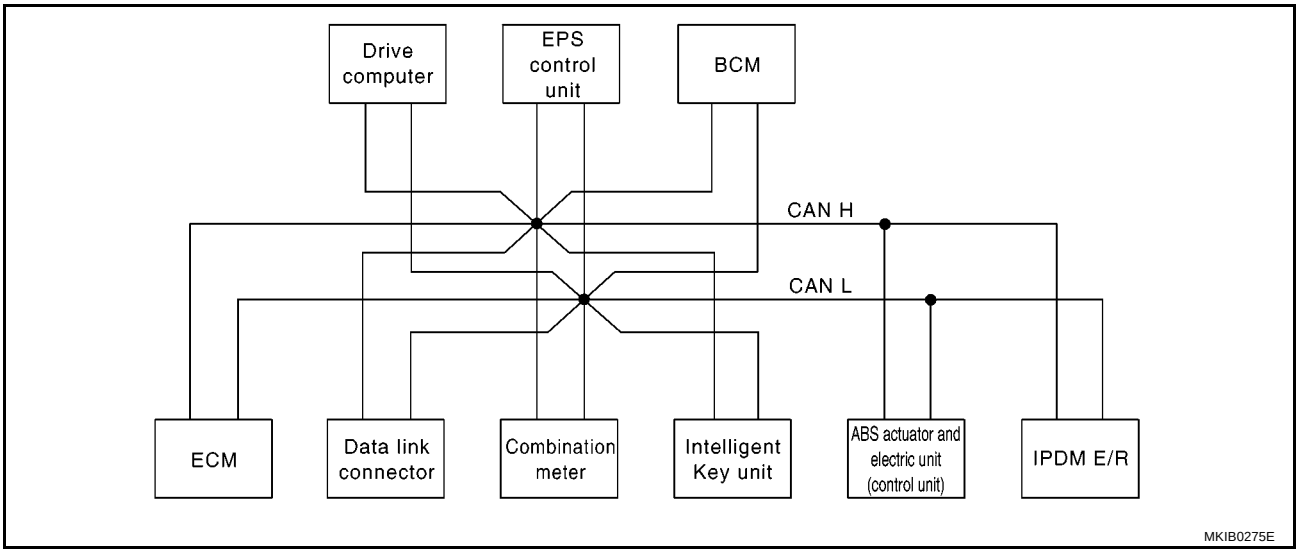
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

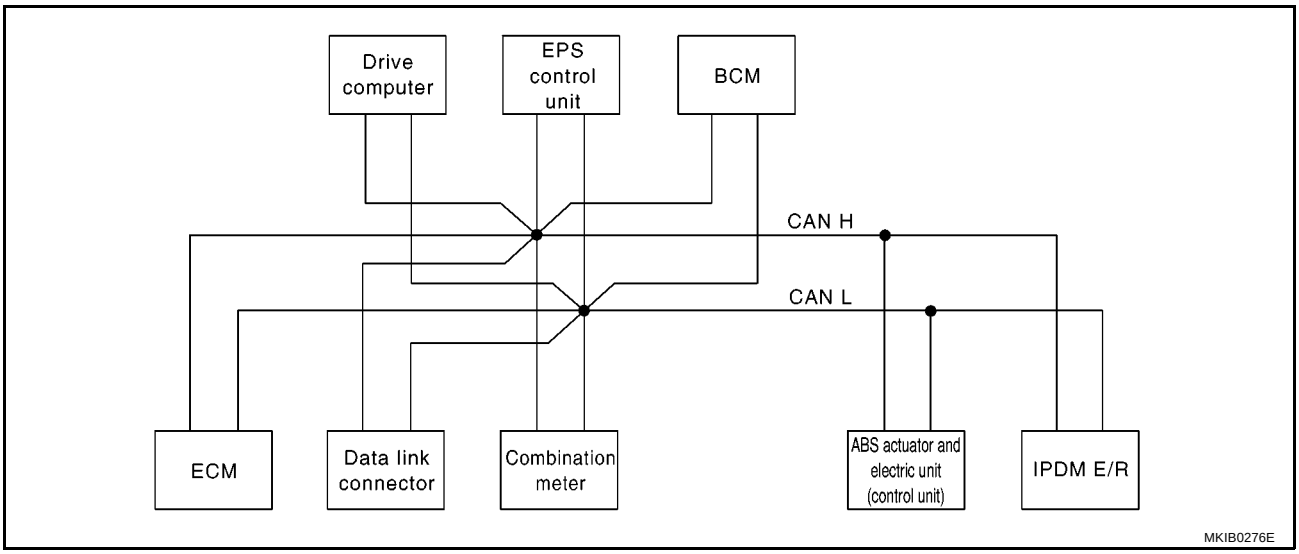
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

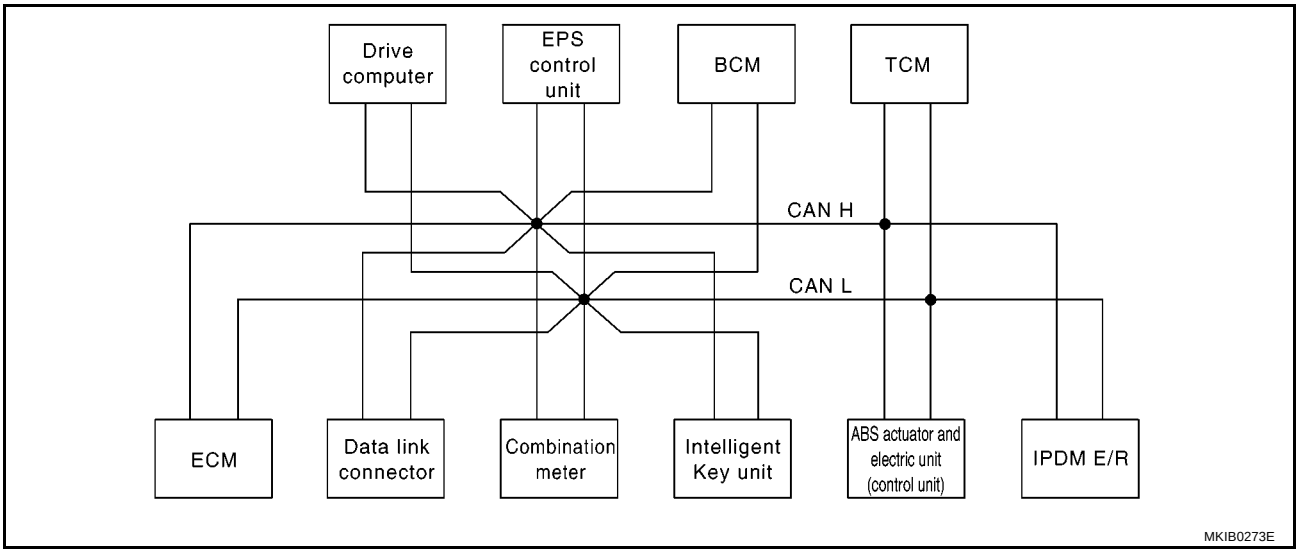
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

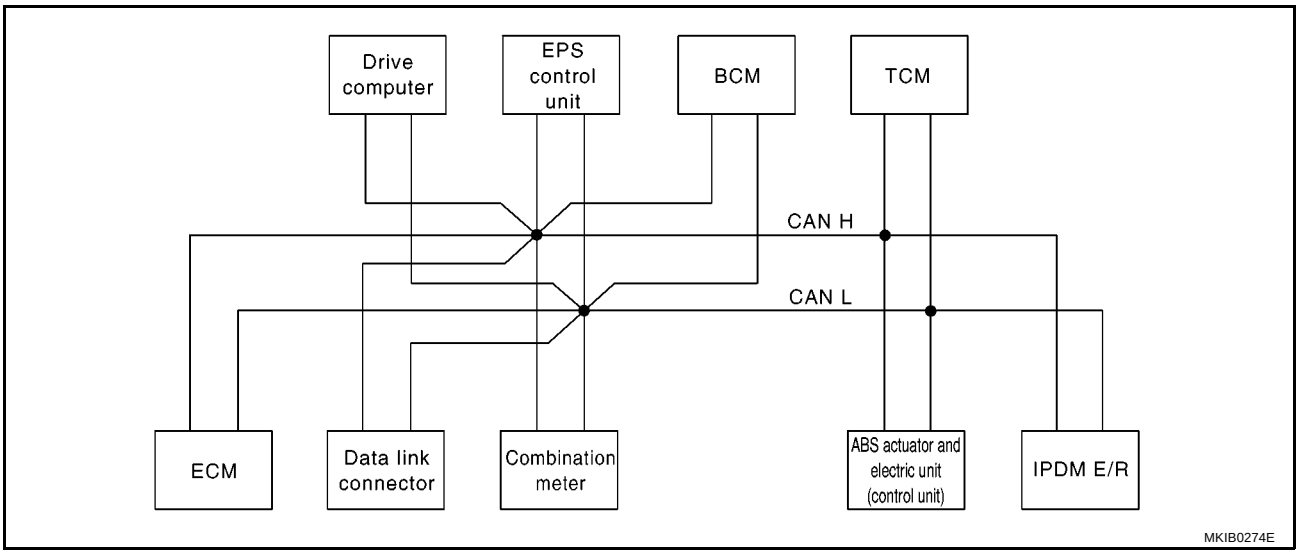
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

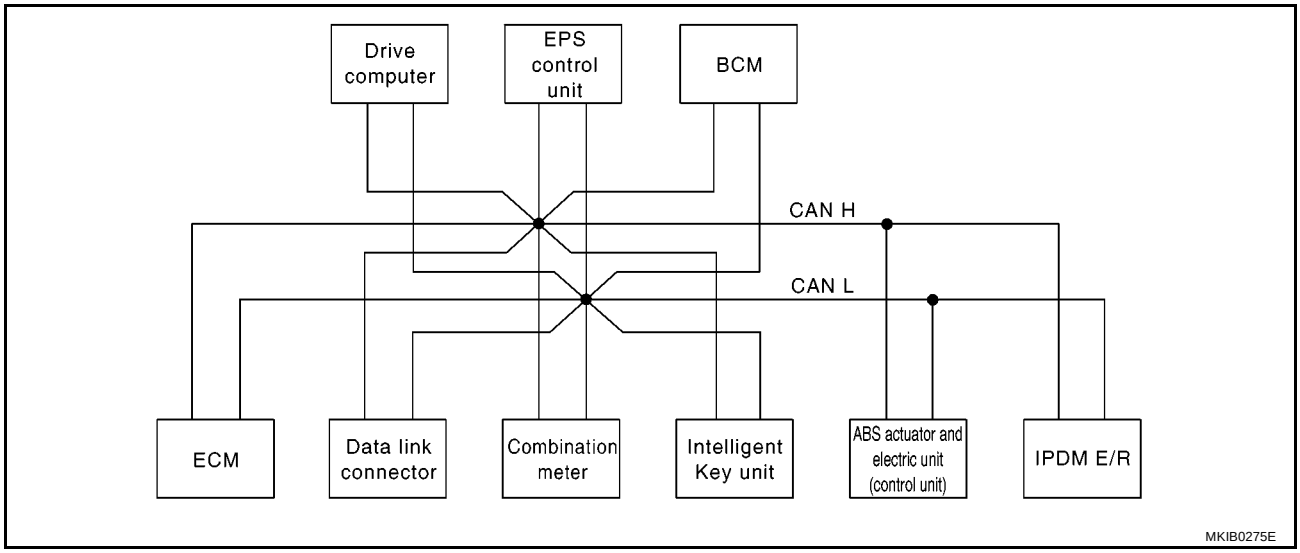
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

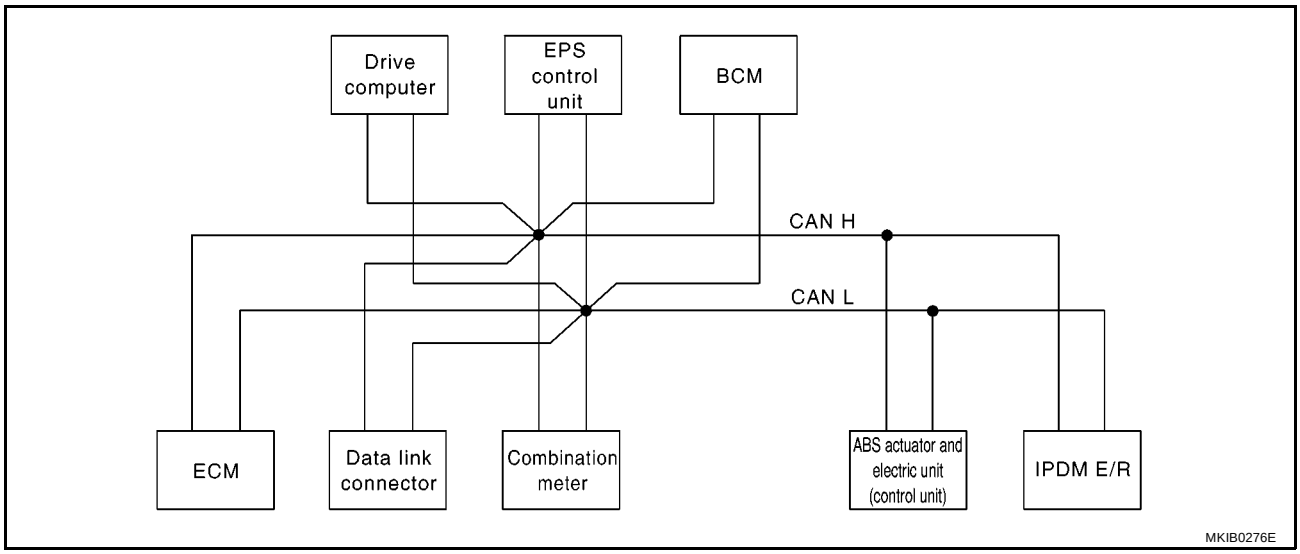
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

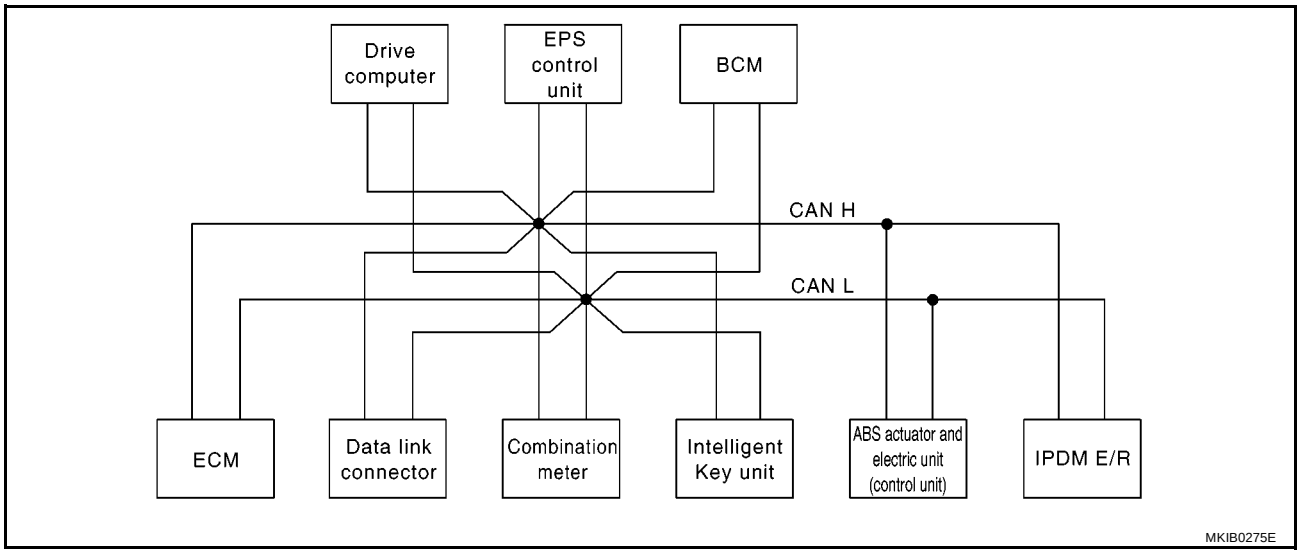
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

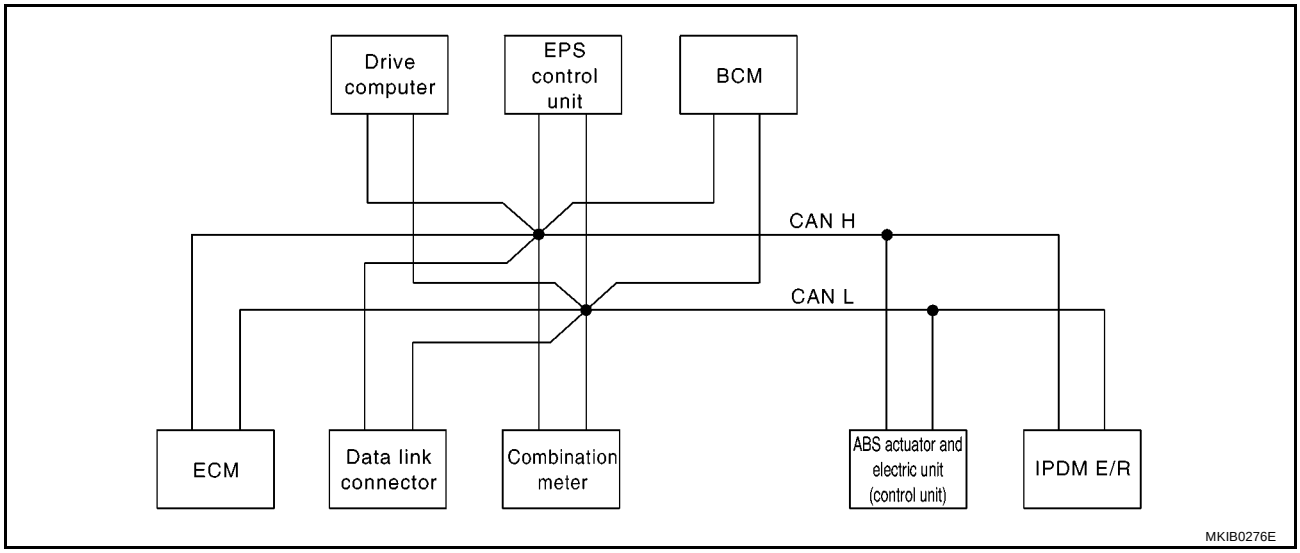
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

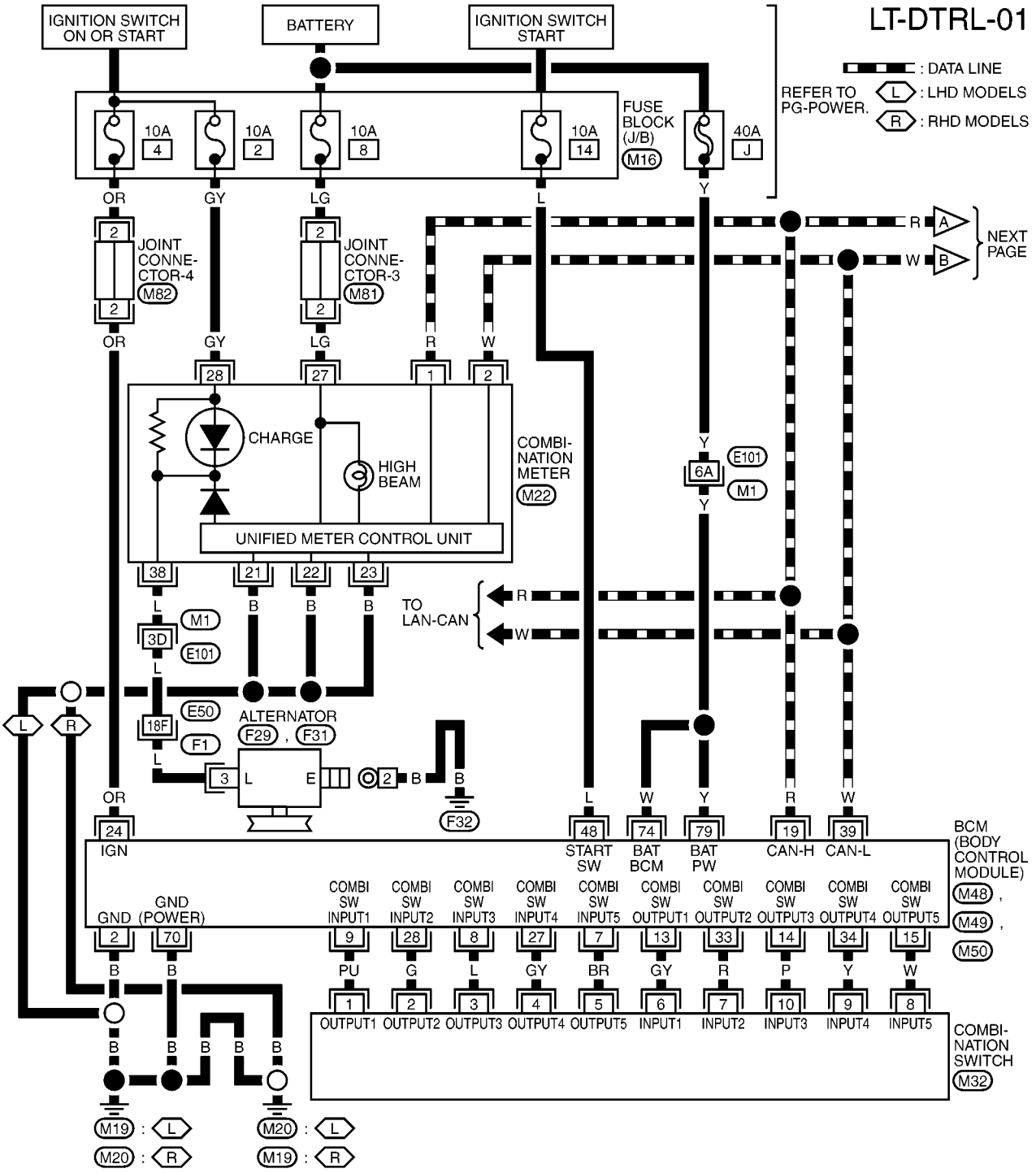
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

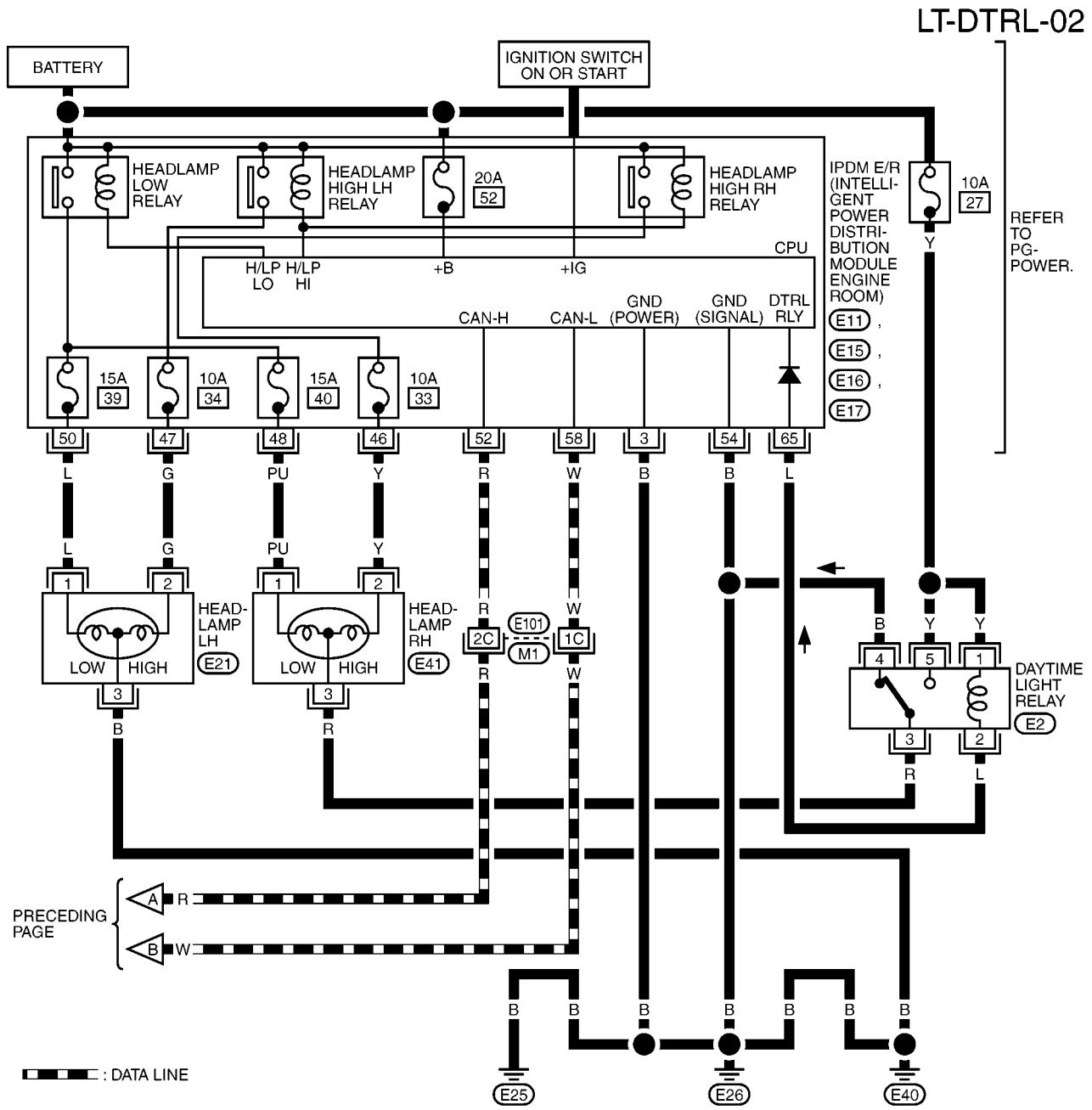
Wiring Diagram — DTRL —

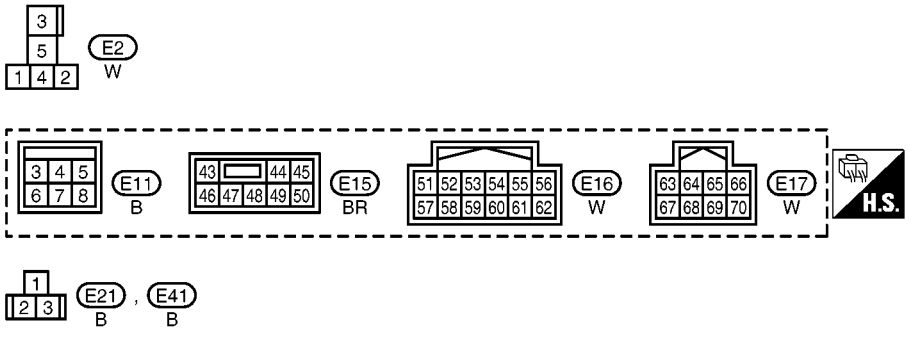
EKS00ELG

WITH GASOLINE ENGINE



MKWA3236E

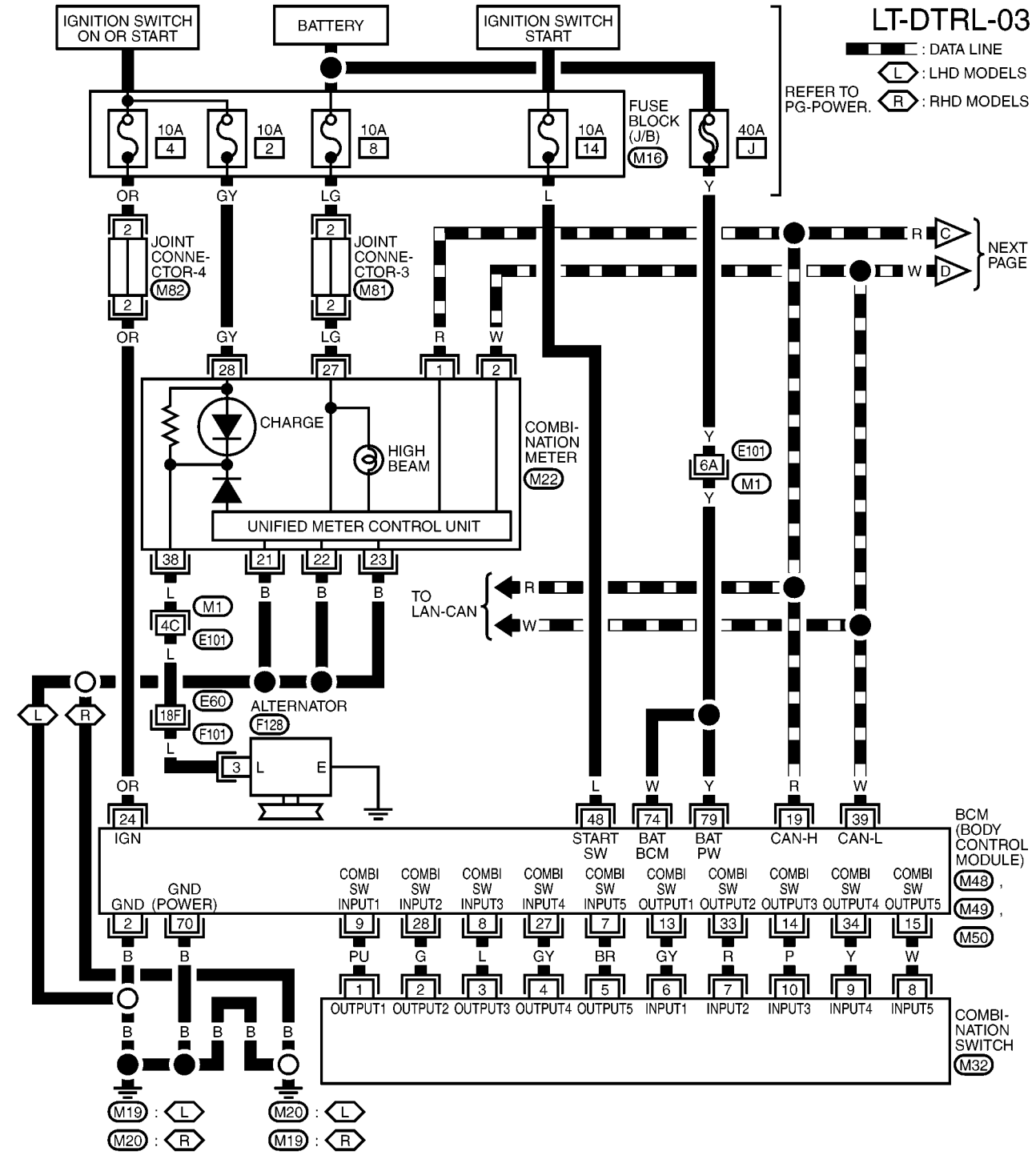




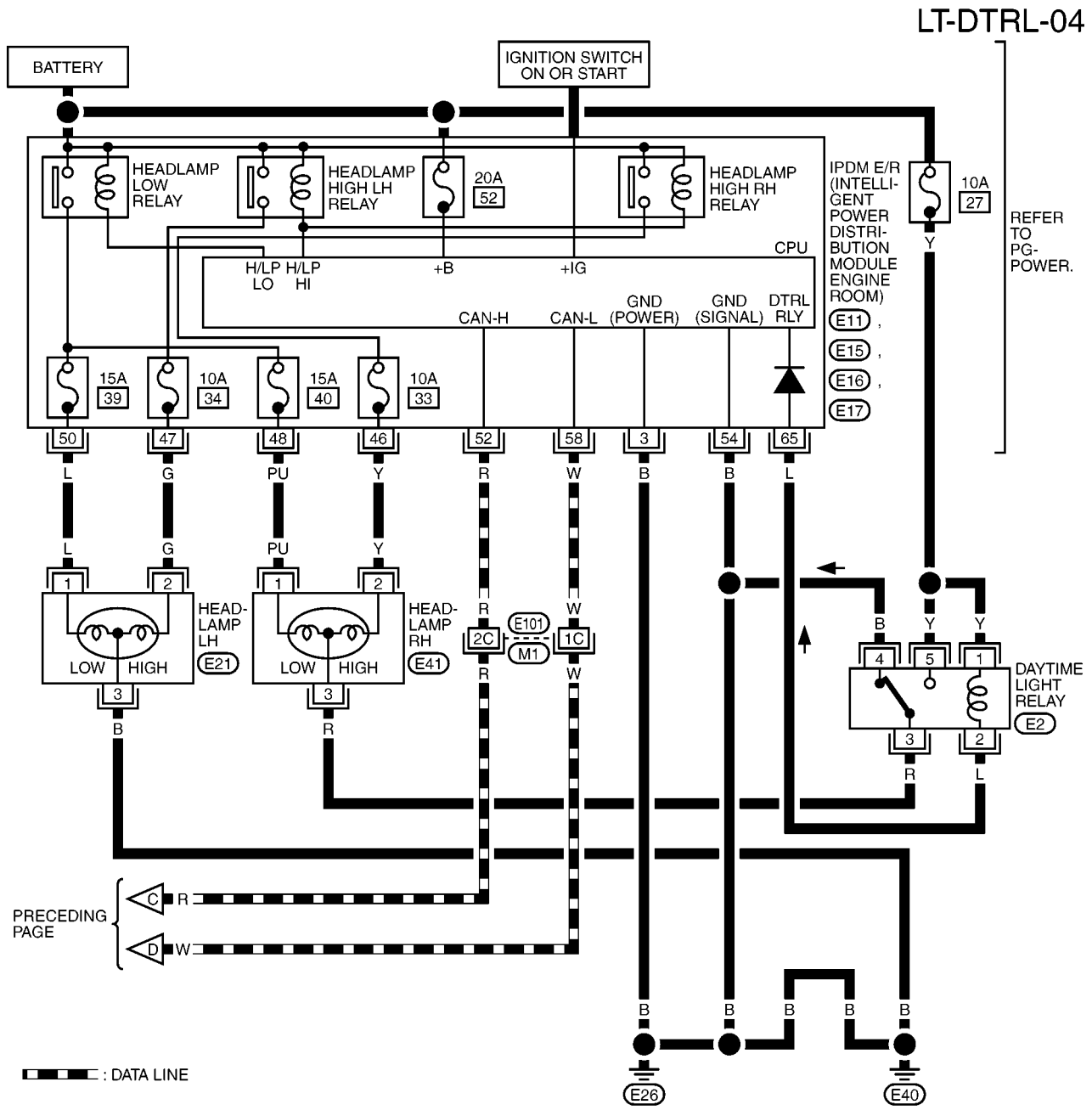
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

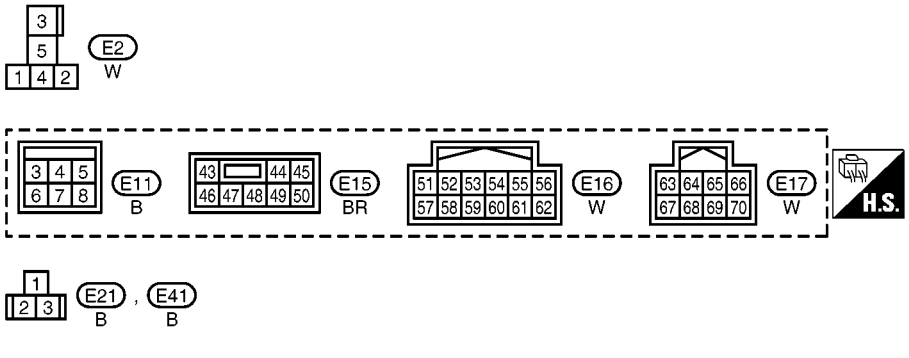
MKWA0810E

WITH DIESEL ENGINE



MKWA1437E



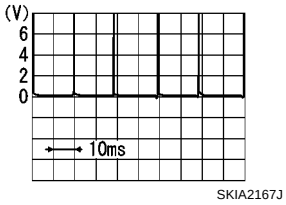
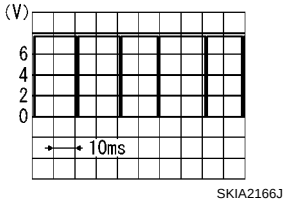
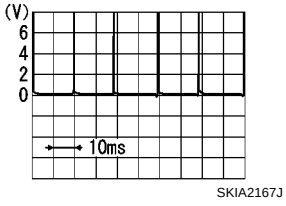


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1438E

Terminals and Reference Value for BCM

EKS00ELI

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
48	L	Start signal	OFF	—	Approx. 0
			ON	—	Approx. 0
			START	—	Approx. 12
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	OFF	—	Approx. 12
79	Y	Battery power supply	OFF	—	Approx. 12

Terminals and Reference Values for IPDM E/R

EKS00ELJ

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
46	Y	Headlamp HI (RH)	ON	Lighting switch (high beam)	ON	Approx. 12
47	G	Headlamp HI (LH)	ON		OFF	Approx. 0
48	PU	Headlamp LO (RH)	ON	Lighting switch (low beam)	ON	Approx. 12
50	L	Headlamp LO (LH)	ON		OFF	Approx. 0
52	R	CAN H	—	—		—
54	B	Ground	ON	—		Approx. 0
58	W	CAN L	—	—		—
65	L	Daytime light relay	ON	Engine status (Lighting switch OFF)	RUNNING	Approx. 0
					STOP	Approx. 12

How to Proceed With Trouble Diagnosis

EKS00ELK

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Headlamp LT-42, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-64, "Preliminary Check"
4. Confirm headlamp does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION"
5. Check symptom and repair or replace the cause of malfunction.
6. Dose the headlamp operate normally? Yes: GO TO 7. No: GO TO 5.
7. INSPECTION END.

Preliminary Check

EKS00ELL

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch (ON)	4
	Ignition switch (START)	14

Refer to LT-59, "Wiring Diagram — DTRL —" .

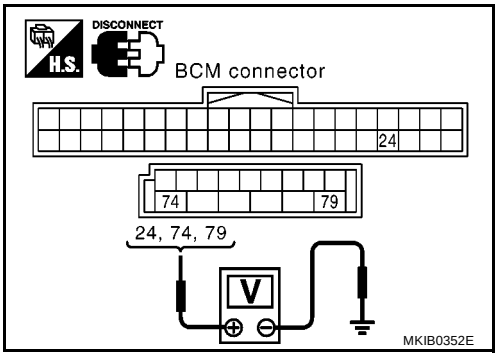
OK or NG

OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



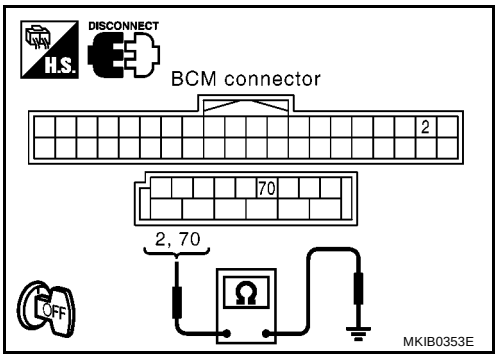
Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.



Terminals			Continuity
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		

OK or NG

OK >> INSPECTION END
NG >> Repair or replace the harness.

CONSULT-II Function (BCM)

EKS00ELM

Refer to LT-28, "CONSULT-II Functions (BCM)" .

CONSULT-II Function (IPDM E/R)

EKS00ELN

Refer to LT-31, "CONSULT-II Functions (IPDM E/R)" .

Daytime Light Control Does Not Operate Properly

EKS00ELO

1. CHECK HEADLAMP OPERATION

Lighting switch is turned to 2nd position.

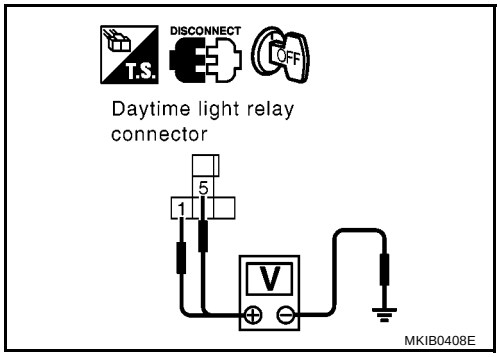
Does headlamp operate normally?

Yes >> GO TO 2.
No >> Check the following.

- Headlamp does not illuminate (both sides). GO TO LT-35, "Headlamp Low Beam Does Not Illuminate (Both Sides)" .
- Headlamp does not illuminate (one side). GO TO LT-38, "Headlamp Low Beam Does Not Illuminate (One Side)" .

2. CHECK DAYTIME LIGHT RELAY

1. Turn ignition switch OFF.
2. Disconnect daytime light relay connector.
3. Check voltage between daytime light relay harness connector and ground.



Terminals			Voltage [V]
(+)		(–)	
Connector	Terminal (Wire color)		
E2	1 (Y)	Ground	Battery voltage
	5 (Y)		

OK or NG

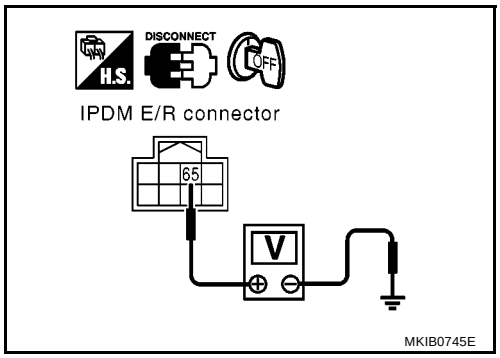
OK >> GO TO 3.
NG >> Check the following.

- 10A fuse (No. 27, located in fuse and fusible link box).
- Harness for open or short between daytime relay and fuse.

3. CHECK IPDM E/R OUTPUT SIGNAL

1. Disconnect IPDM E/R connector and connector daytime light relay.
2. Check voltage between IPDM E/R harness connector E17 terminal 65(L) and ground.

Battery voltage should exist.

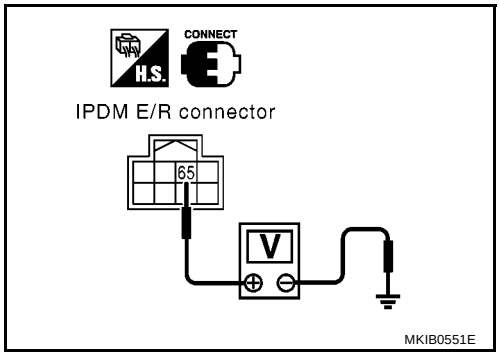


OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK IPDM E/R OUTPUT SIGNAL

1. Connect IPDM E/R connector.
2. Check voltage between IPDM and ground.



Connector	Terminal (Wire color)	Condition	Voltage [V]
E17	65 (L)	Engine stop	Approx. 12
		Engine running	Approx. 0

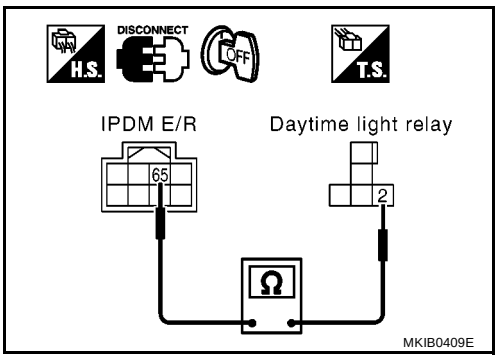
OK or NG

OK >> Replace daytime relay.
NG >> Replace IPDM E/R.

5. CHECK IPDM E/R OUTPUT SIGNAL CIRCUIT

1. Disconnect daytime light relay connector.
2. Check continuity between harness connector E2 terminal 2 (L) of daytime light relay and harness connector E17 terminal 65 (L) of IPDM E/R.

Continuity should exist.



OK or NG

OK >> Replace daytime light relay.
NG >> Repair or replace harness or connector.

Headlamp High Beam Does Not Illuminate (Both Sides)

EKS00ELP

Refer to LT-33, "Headlamp High Beam Does Not Illuminate (Both Sides)" .

RH High beam Does Not Illuminate

EKS00ELQ

1. CHECK BULB

Check bulb of headlamp RH.

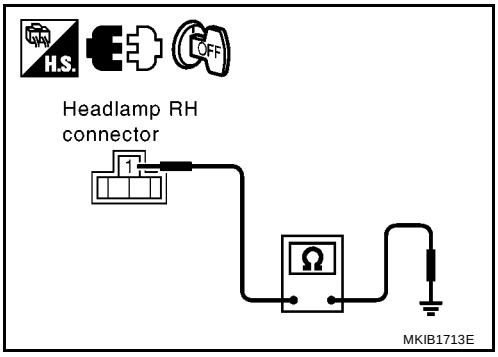
OK or NG

OK >> GO TO 2.
NG >> Replace bulb of headlamp.

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect headlamp RH connector.
3. Check voltage between headlamp RH harness connector E41 termional 2 (Y) and ground.

Terminals			Condition	Voltage [V]
(+)		(–)		
Connector	Terminal (Wire color)			
E41	2 (Y)	Ground	Lighting switch high beam ON	Battery voltage



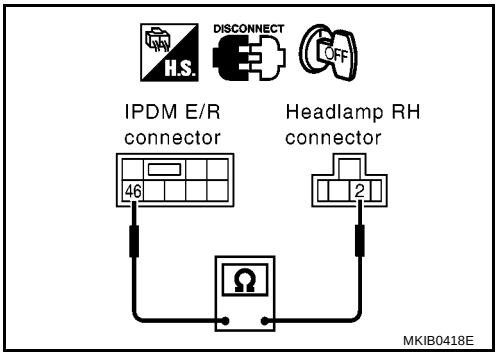
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK IPDM E/R CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between harness connector E15 terminal 46 (Y) of IPDM E/R and harness connector E41 terminal 2 (Y) of headlamp RH.

Continuity should exist.



OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK FUSE

Check 10A fuse [No. 33, located in IPDM E/R].

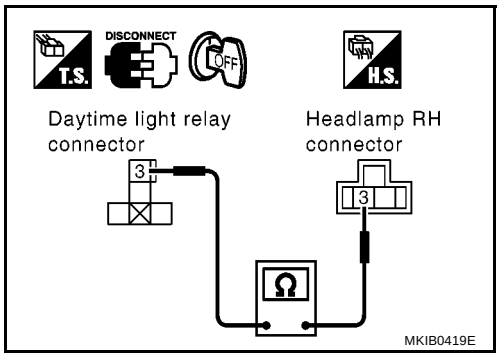
OK or NG

OK >> Replace IPDM E/R.
NG >> Replace fuse. If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

5. CHECK HEADLAMP RH GROUND CIRCUIT

Check continuity between harness connector E2 terminal 3 (R) of daytime light relay and harness connector E41 terminal 3 (R) of headlamp RH.

Continuity should exist.



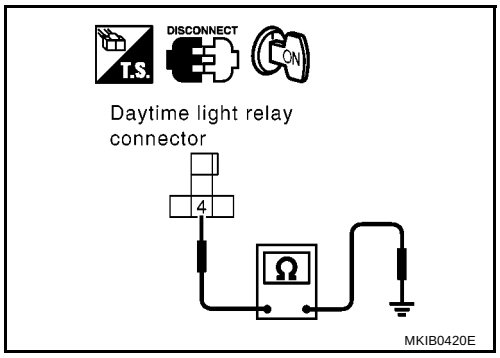
OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness or connector.

6. CHECK DAYTIME LIGHT GROUND CIRCUIT

Check continuity daytime light relay harness connector E2 terminal 4 (B) and ground.

Continuity should exist.



OK or NG

OK >> Replace daytime light relay.
NG >> Repair or replace harness or connector.

Headlamp LH High Beam Does Not Illuminate

EKS00ELR

Refer to LT-34, "Headlamp High Beam Does Not Illuminate (One Side)" .

Headlamp Low Beam Does Not Illuminate (Both Sides)

EKS00ELS

Refer to LT-35, "Headlamp Low Beam Does Not Illuminate (Both Sides)" .

RH Low Beam Does Not Illuminate

EKS00ELT

1. CHECK BULB

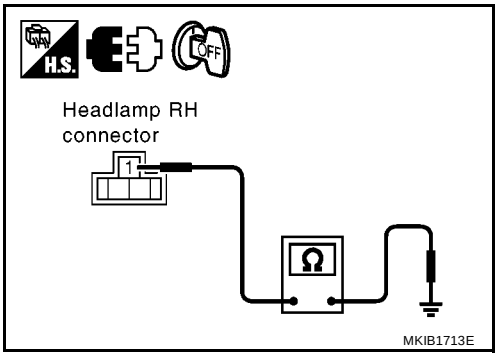
Check bulb of headlamp RH.

OK or NG

OK >> GO TO 2.
NG >> Replace bulb of lamp.

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect headlamp RH connector.
3. Check voltage between headlamp RH harness connector E41 termional 1 (PU) and ground.



Terminals			Condition	Voltage [V]
(+)		(–)		
Connector	Terminal (Wire color)			
E41	1 (PU)	Ground	Lighting switch low beam ON	Battery voltage

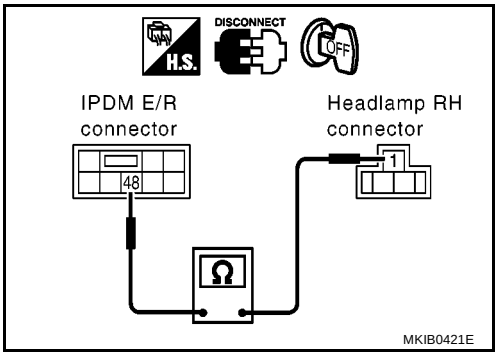
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK IPDM E/R CIRCUIT

1. Disconnect IPDM E/R connector.
2. Check continuity between harness connector E15 terminal 48 (PU) of IPDM E/R and harness connector E41 terminal 1 (PU) of headlamp RH.

Continuity should exist.



OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK FUSE

Check 15A fuse (No. 40 located in IPDM E/R). Refer to PG-49, "IPDM E/R Terminal Inspection" .

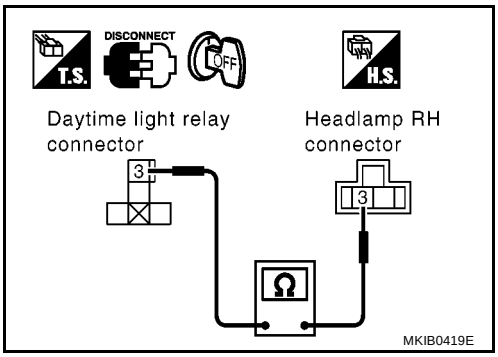
OK or NG

OK >> Replace IPDM E/R.
NG >> Replace fuse. If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

5. CHECK HEADLAMP RH GROUND CIRCUIT

Check continuity between harness connector E2 terminal 3 (R) of daytime light relay and harness connector E41 terminal 3 (R) of headlamp RH.

Continuity should exist.



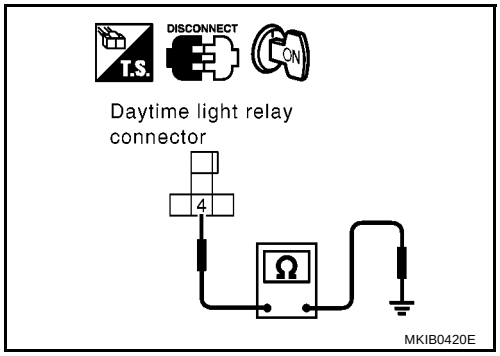
OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness or connector.

6. CHECK DAYTIME LIGHT GROUND CIRCUIT

Check continuity daytime light relay harness connector E2 terminal 4 (B) and ground.

Continuity should exist.



OK or NG

OK >> Replace daytime light relay.
NG >> Repair or replace harness connector.

Headlamp LH Low Beam Does Not Illuminate

EKS00ELU

Refer to LT-38, "Headlamp Low Beam Does Not Illuminate (One Side)" .

High-Beam Indicator Lamp Does Not Illuminate

EKS00ELV

Refer to LT-35, "High-Beam Indicator Does Not Illuminate" .

Headlamps Do Not Turn OFF

EKS00ELW

Refer to LT-39, "Headlamps Do Not Turn OFF" .

Aiming Adjustment

EKS00ELX

Refer to LT-40, "Aiming Adjustment" .

Bulb Replacement

EKS00ELY

Refer to LT-41, "Bulb Replacement" .

Removal and Installation

EKS00ELZ

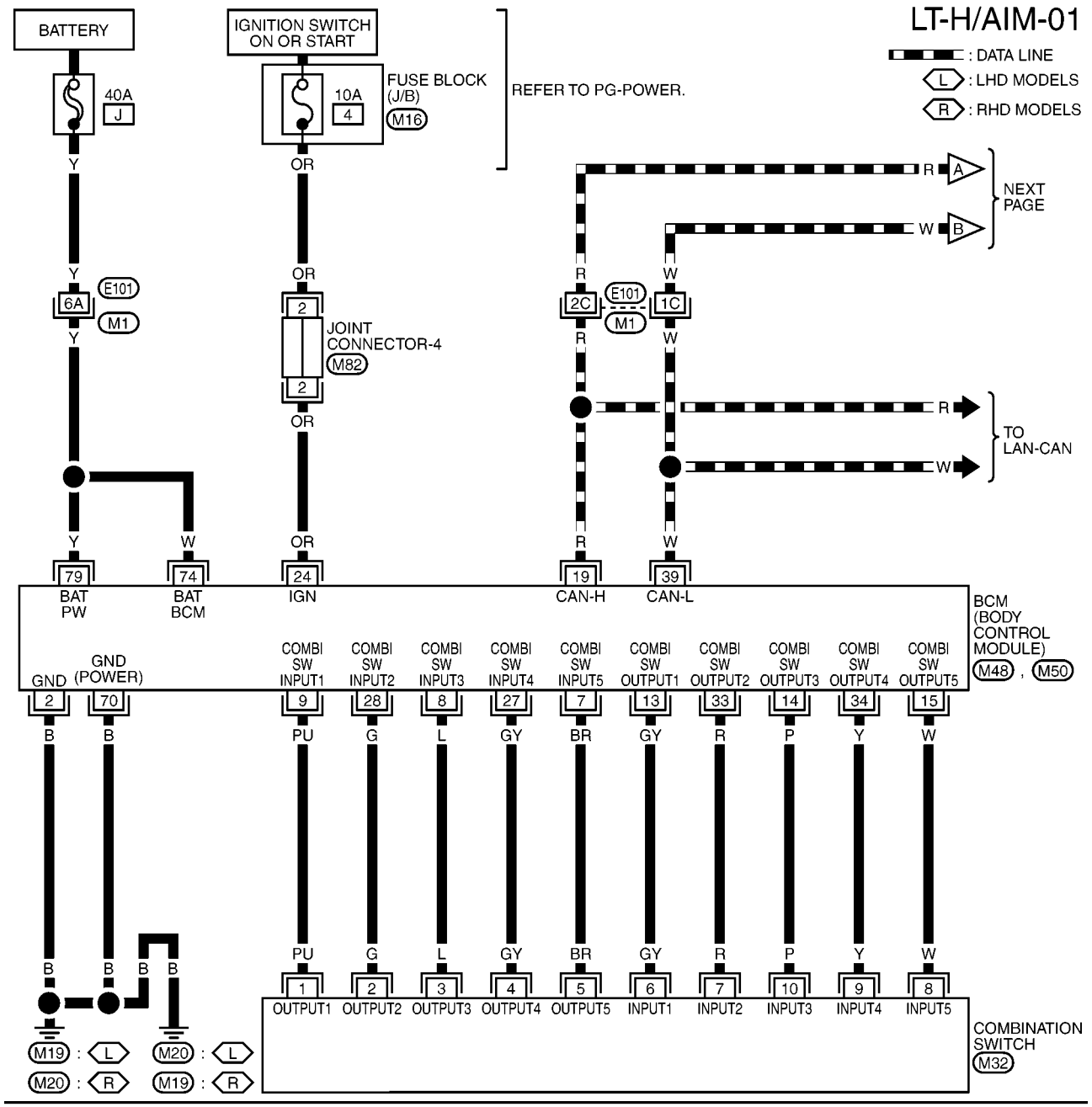
Refer to LT-41, "Removal and Installation" .

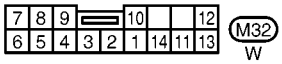
HEADLAMP AIMING CONTROL

PFP:26010

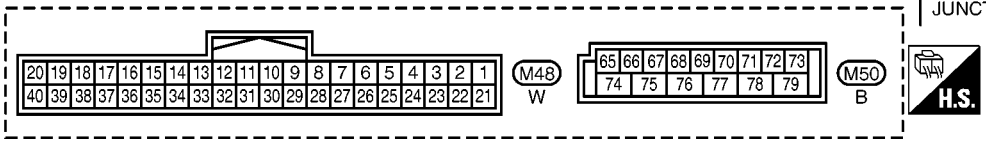
Wiring Diagram— H/AIM —

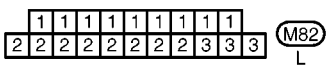
EKS00EM0



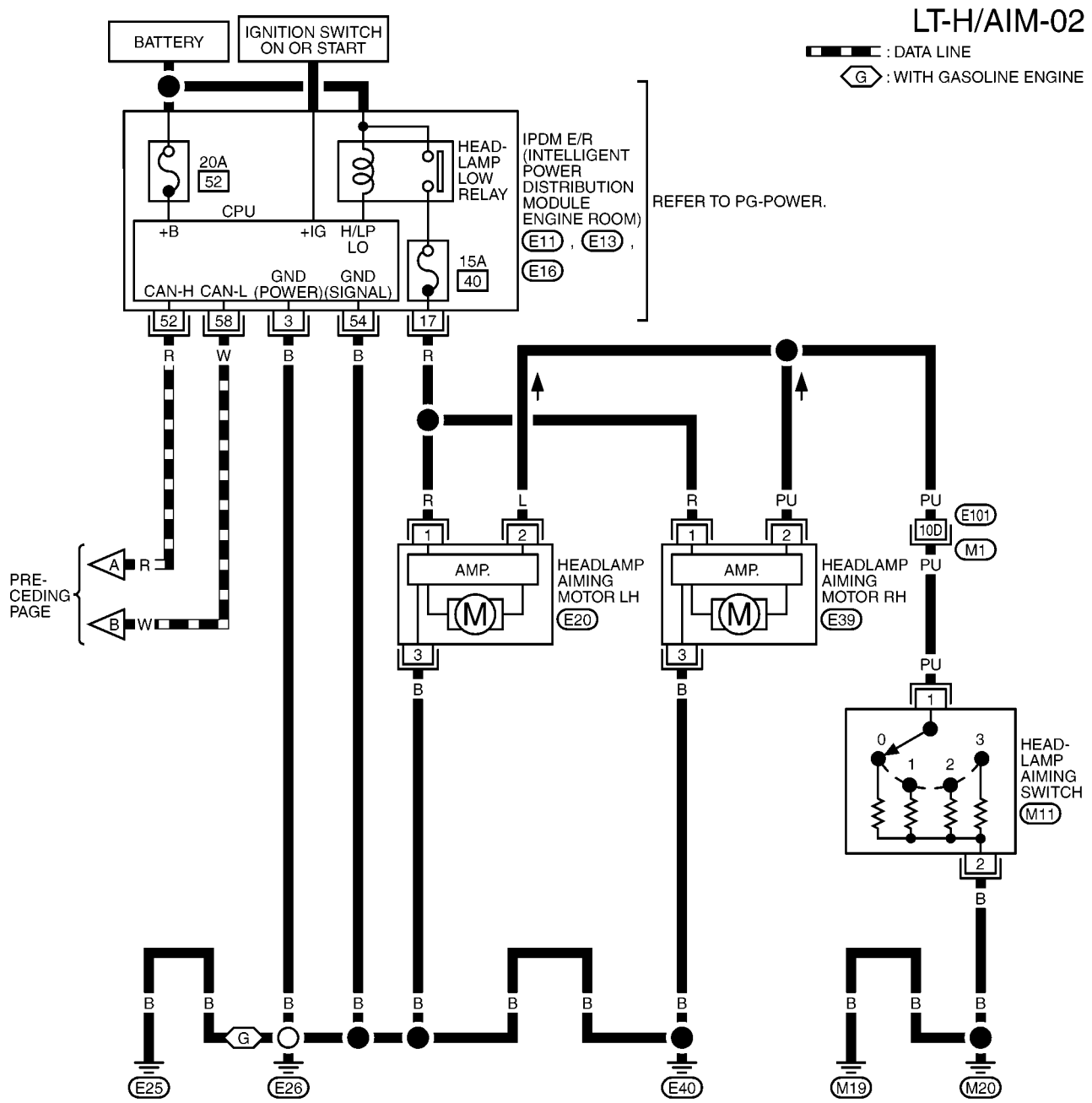


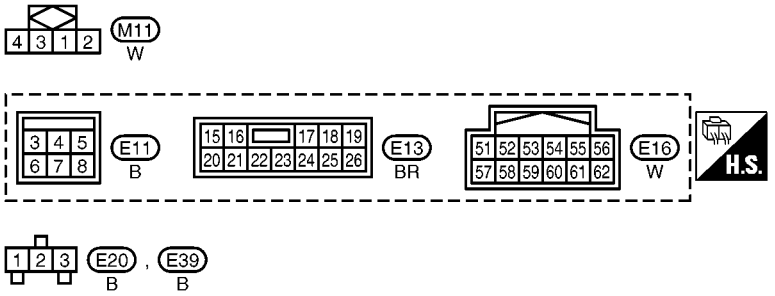
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)





MKWA1524E





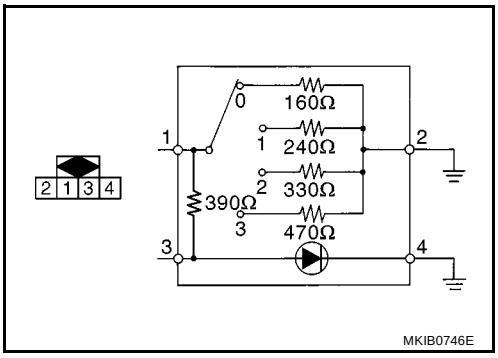
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1439E

Switch Circuit Inspection

EKS00EM1

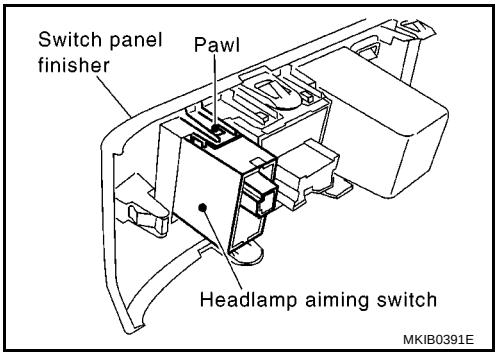
Using a circuit tester, check continuity between the headlamp aiming switch connector terminals in each operation status of the aiming switch.



Removal and Installation

EKS00EM2

1. Remove switch panel finisher. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Pull forward while expands switch panel finisher hooks, and remove from switch panel finisher.



FRONT FOG LAMP

PFP:26150

System Description

EKS00EM3

The front fog lamp operation is controlled by the lighting switch which built into the combination switch, BCM (body control module) and IPDM E/R (intelligent power distribution module engine/room).Front fog lamp relay is built into IPDM E/R.BCM read combination switch condition.Refer toLT-189, "System Description"

OUTLINE

Power is supplied at all times

- to front fog lamp relay, located in the IPDM E/R
- to IPDM E/R
- through 20A fusible link (No.52, located in the IPDM E/R).

Power is also supplied at all times

- to terminals 74 and 79 of the BCM
- through 40A fusible link (letter **J** , fuse and fusible link box).

When the ignition switch is ON or START position, power is supplied

- to terminal 24 of the BCM
- through 10A fuse [No. 4, located in fuse block (J/B)],
- to IPDM E/R

Ground is supplied

- to BCM terminals 2 and 70
- through body grounds M19, and M20,
- to IPDM E/R terminals 3 and 54
- through body grounds E25(Gasoline engine models), E26 and E40.

FOG LAMP OPERATION

The fog lamp switch is built into the combination switch. The lighting switch must be in the 1ST position and the fog lamp switch must be ON for fog lamp operation.
When the lighting switch is turned to 1ST position and front fog lamp switch in ON position, BCM reads combination switch condition (refer to LT-189, "System Description"). And BCM sends low beam request signal to IPDM E/R with CAN communication line. Then IPDM E/R is turned on front fog lamp relay. Front fog lamp relay is energized and then power is supplied.

- to front fog lamp LH terminal 1
- through IPDM E/R terminal 44, and
- to front fog lamp RH terminal 1
- through IPDM E/R terminal 43.

Ground is supplied

- to front fog lamp LH terminal 2
- through body grounds E25(Gasoline engine models), E26, E40, and
- to front fog lamp RH terminal 2
- through body grounds E25(Gasoline engine models), E26 and E40.

With power and grounds supplied, the front fog lamps illuminate.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, front fog lamps does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control.

CAN Communication

EKS00ERG

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LT9

Go to CAN system, when selecting your car model from the following table.

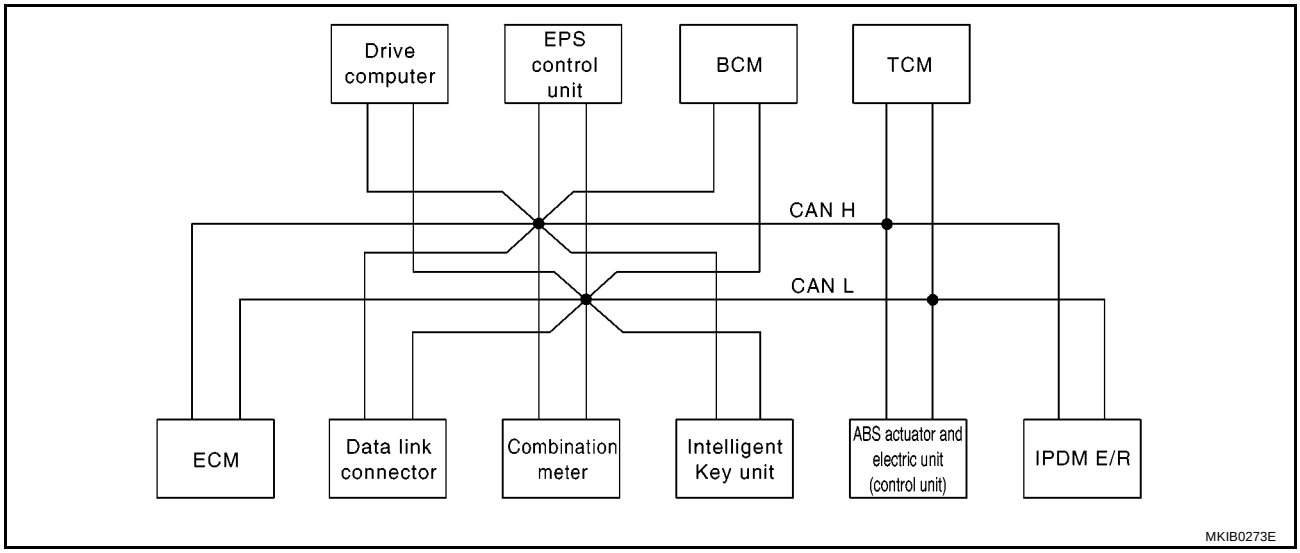
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-76, "TYPE 1/ TYPE 2"				LT-79, "TYPE 3/ TYPE 4"				LT-81, "TYPE 5/ TYPE 6"				LT-84, "TYPE 7/ TYPE 8"				LT-86, "TYPE 9/ TYPE 10"			

×: Applicable

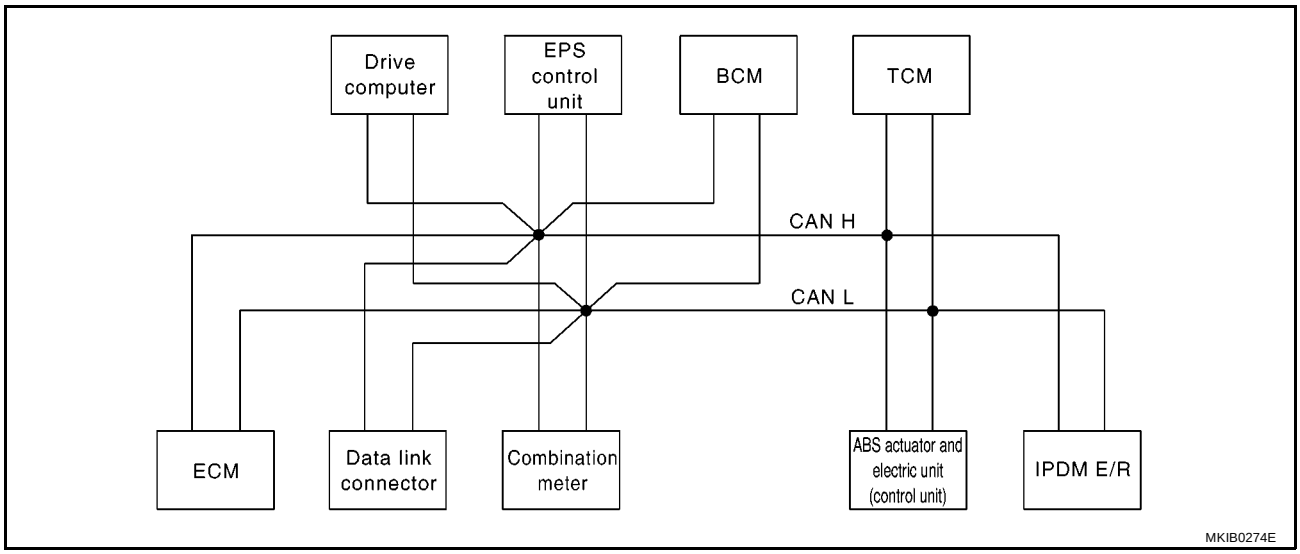
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

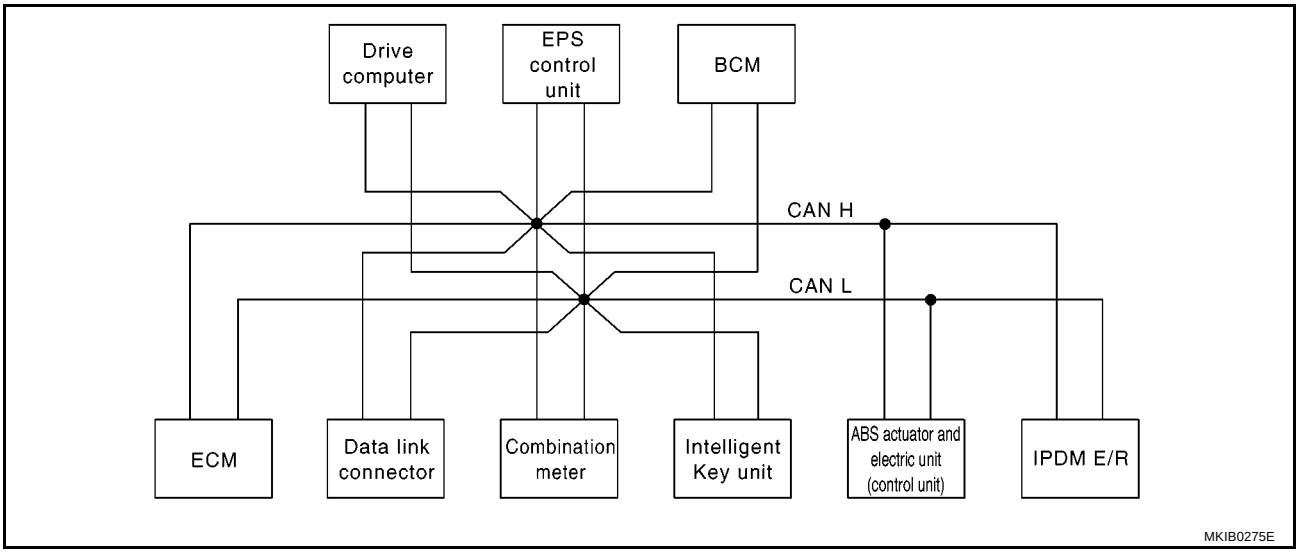
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

TYPE 3/TYPE 4

System diagram

- Type 3



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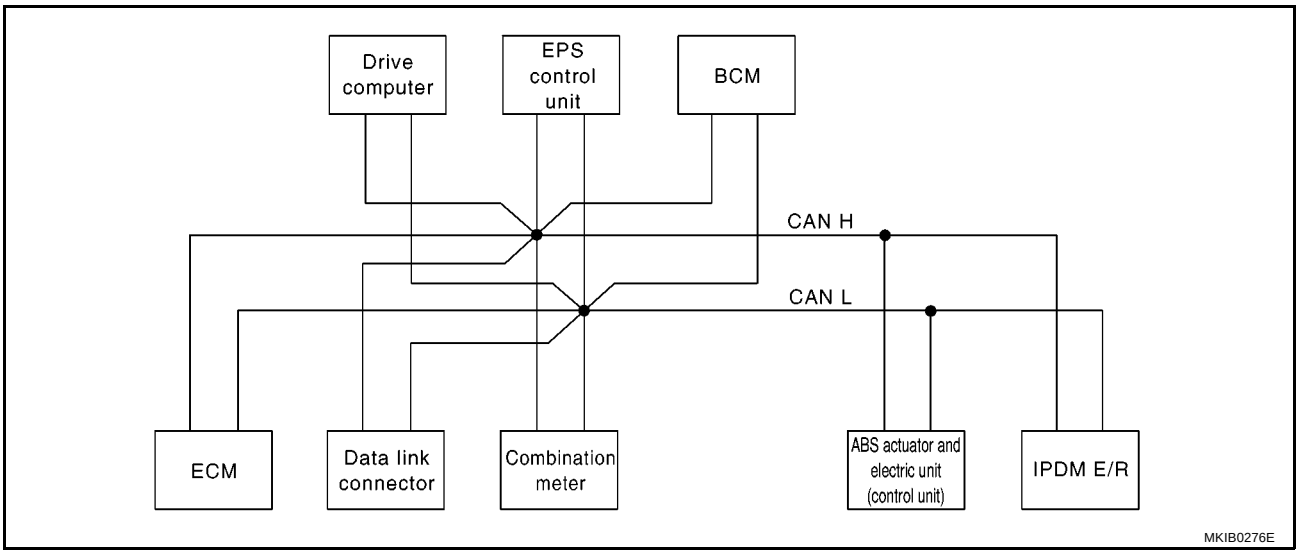


Input/output signal chart

T: Transmit R: Receive

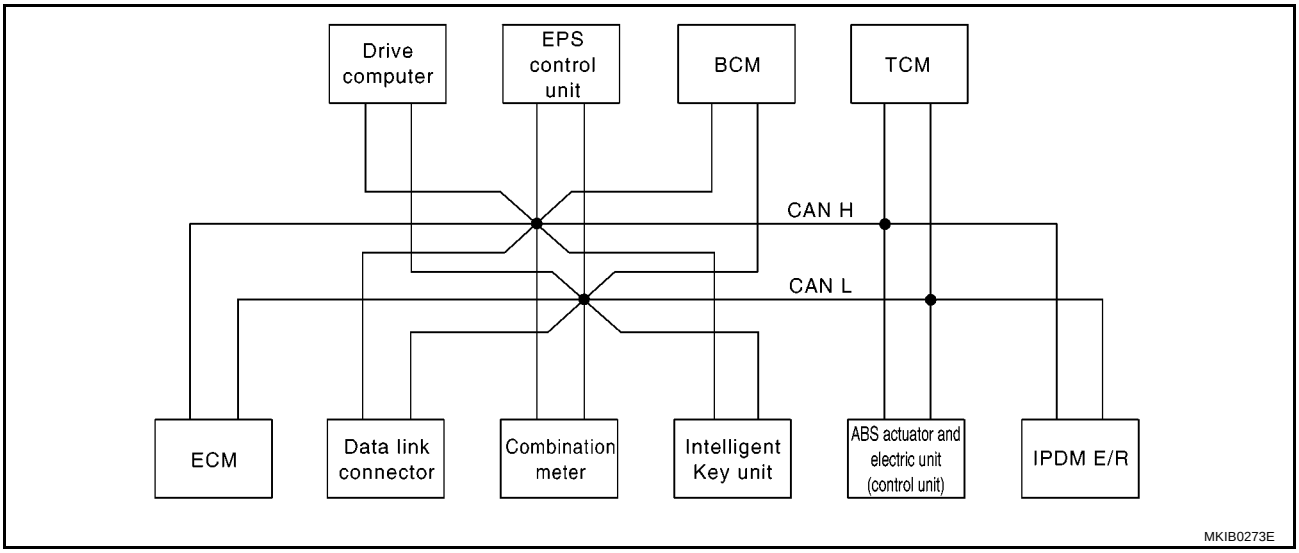
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

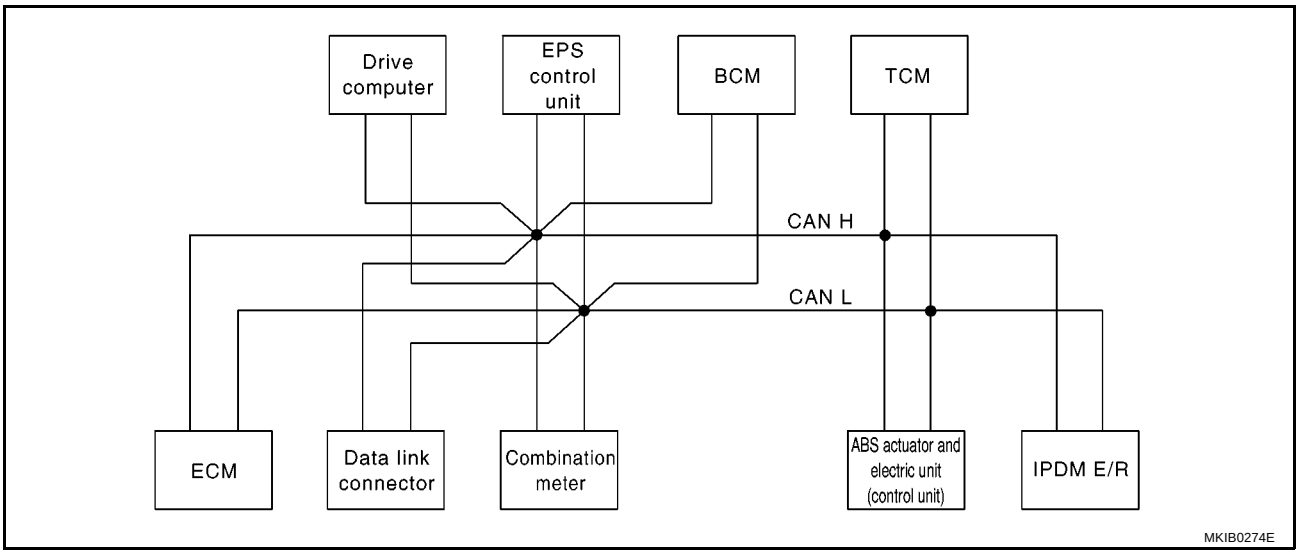
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

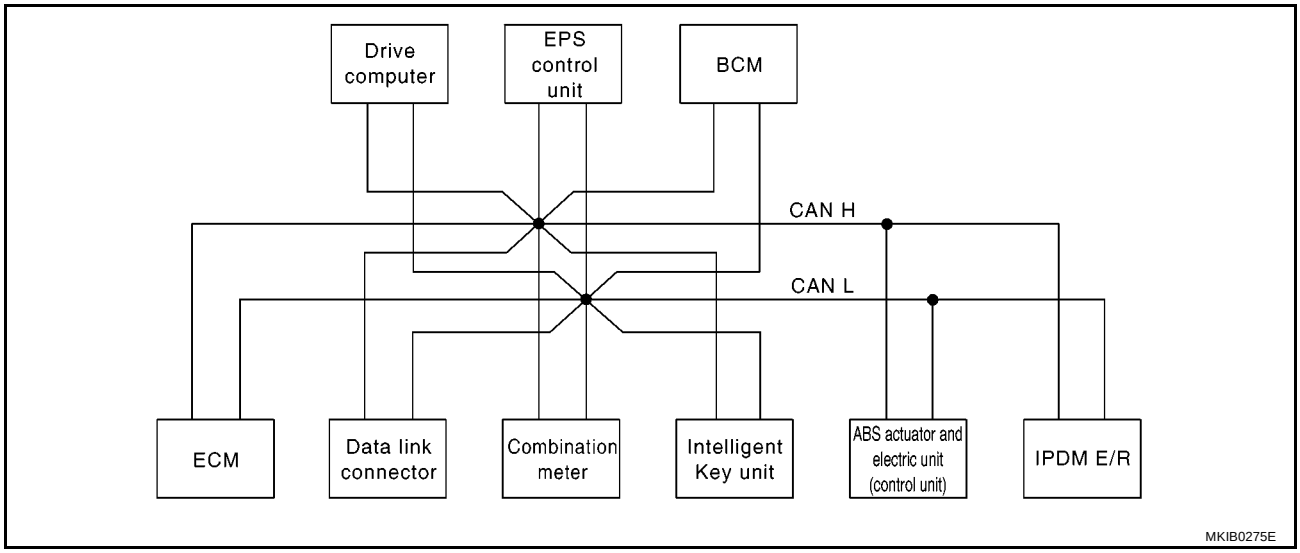
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

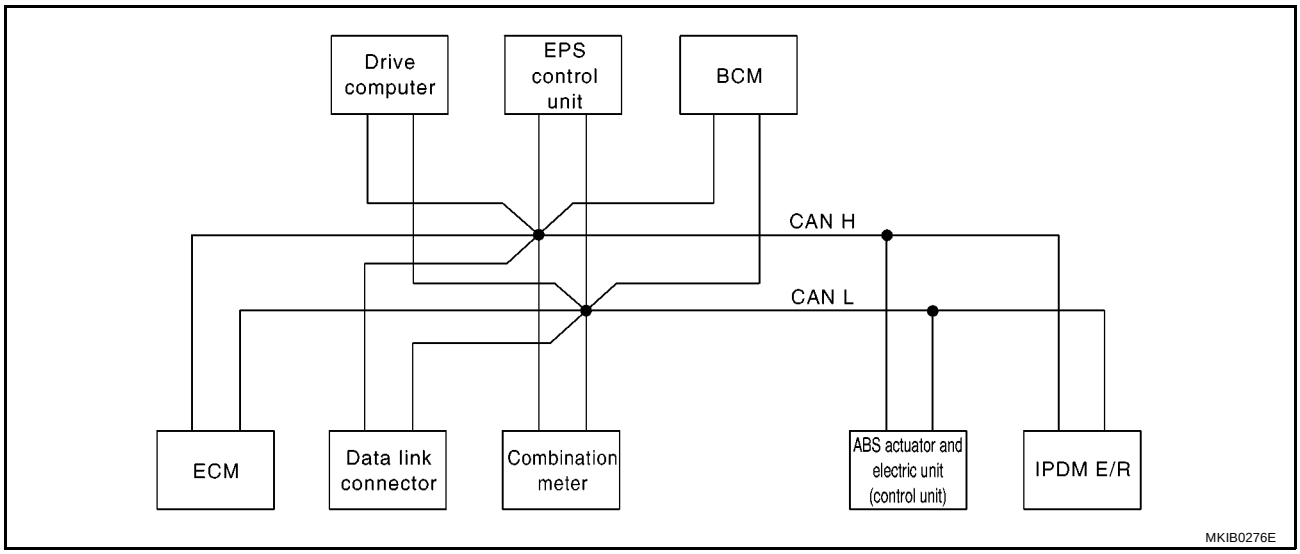
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

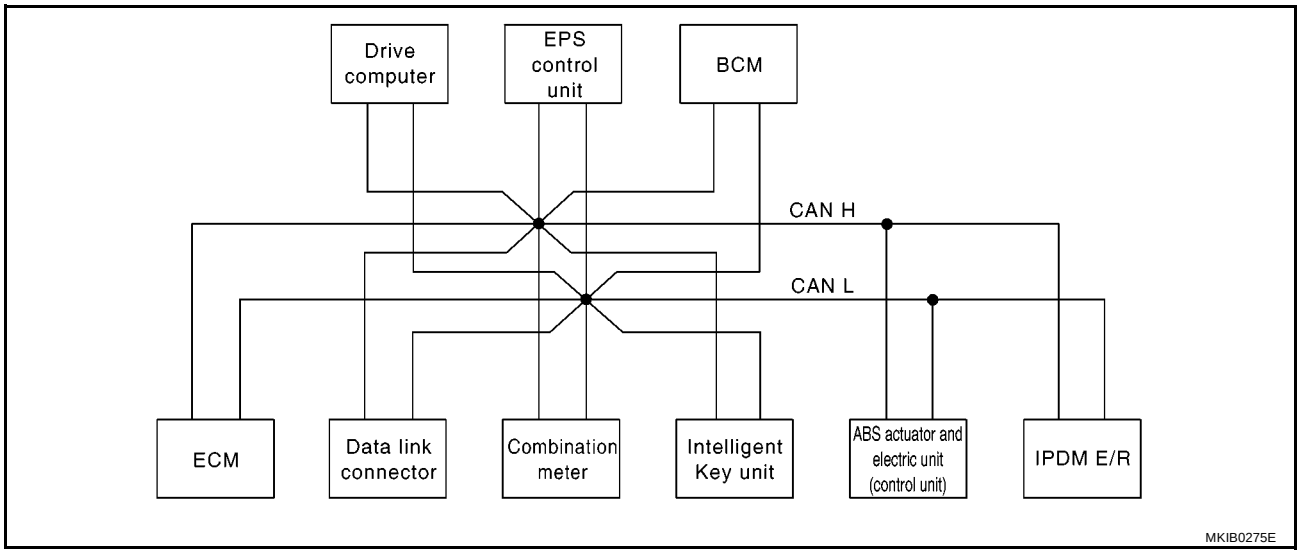
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

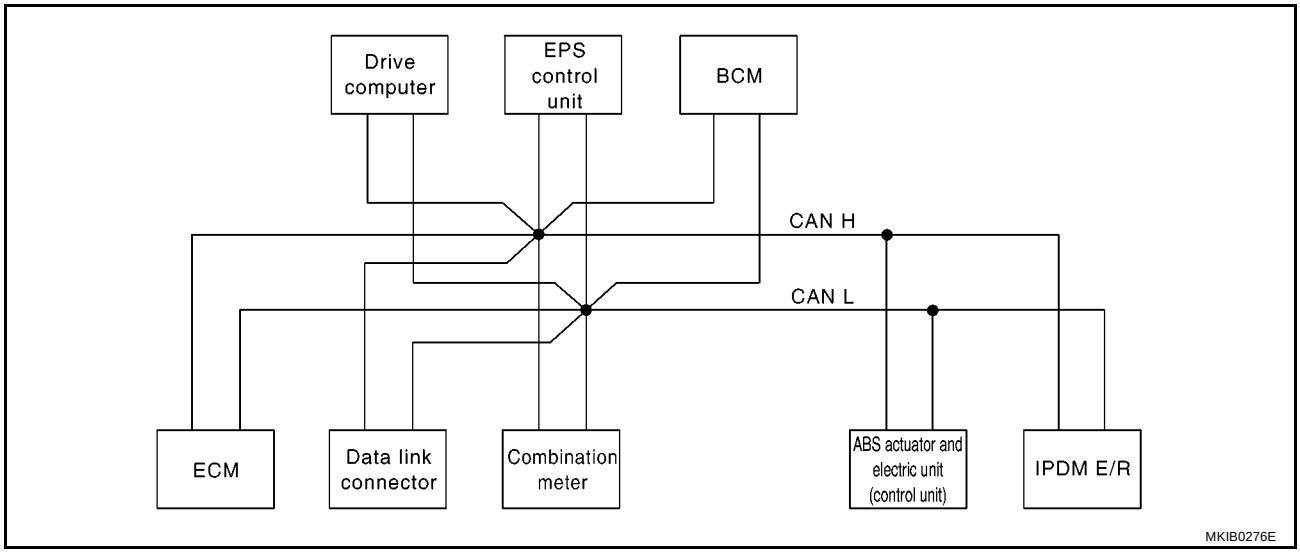
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

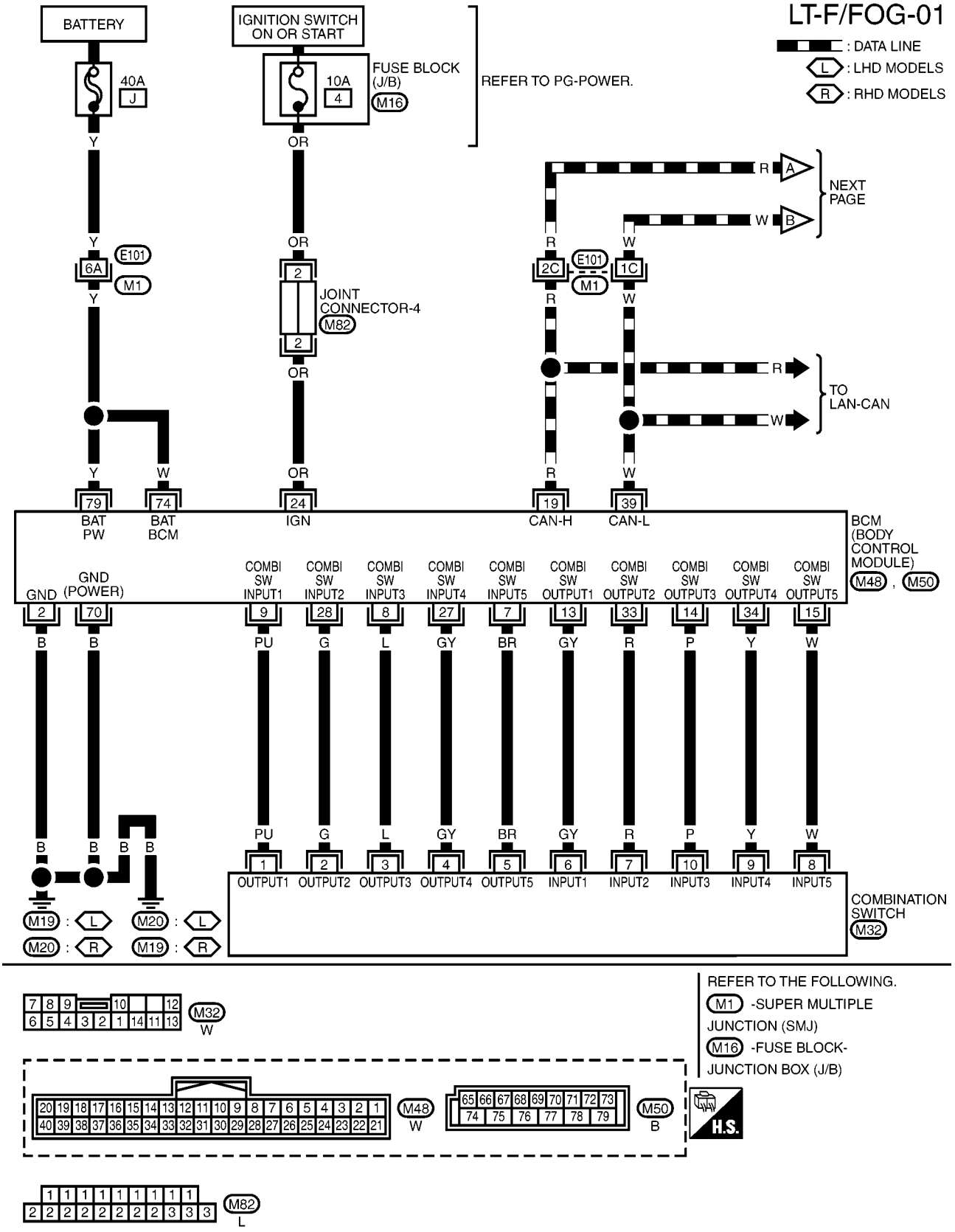
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

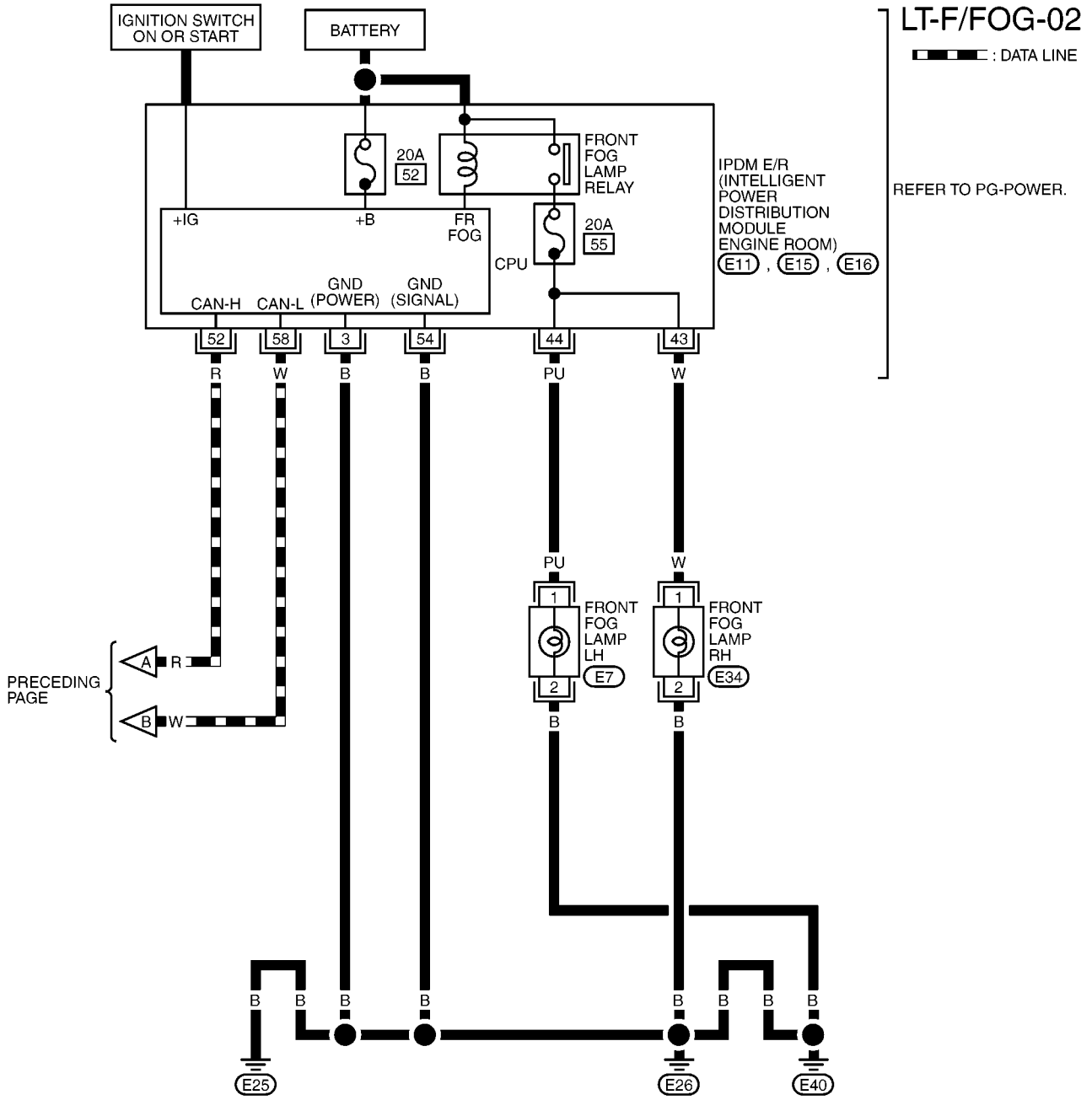
Wiring Diagram — F/FOG —

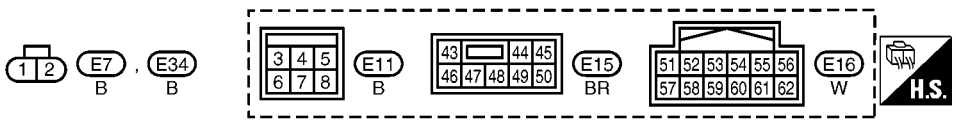
EKS00EM5

WITH GASOLINE ENGINE



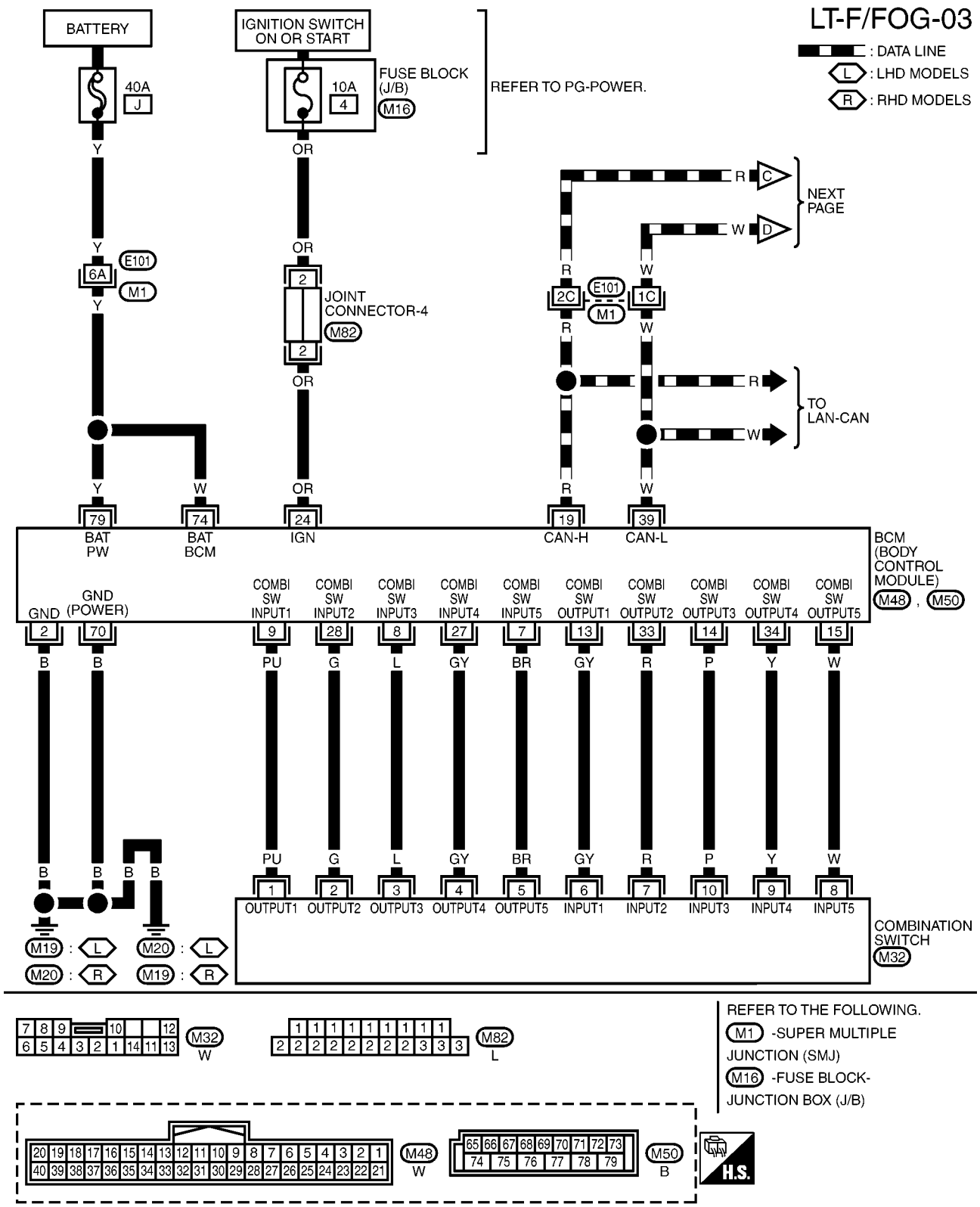
MKWA1527E


IGNITION SWITCH ON OR START
BATTERY
LT-F/FOG-02
: DATA LINE
20A 52
FRONT FOG LAMP RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11 , E15 , E16
REFER TO PG-POWER.
+IG
+B
FR FOG
CPU
20A 55
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
52
58
3
54
44
43
R
W
B
B
PU
W
PRECEDING PAGE
A R
B W
FRONT FOG LAMP LH E7
FRONT FOG LAMP RH E34
E25
E26
E40

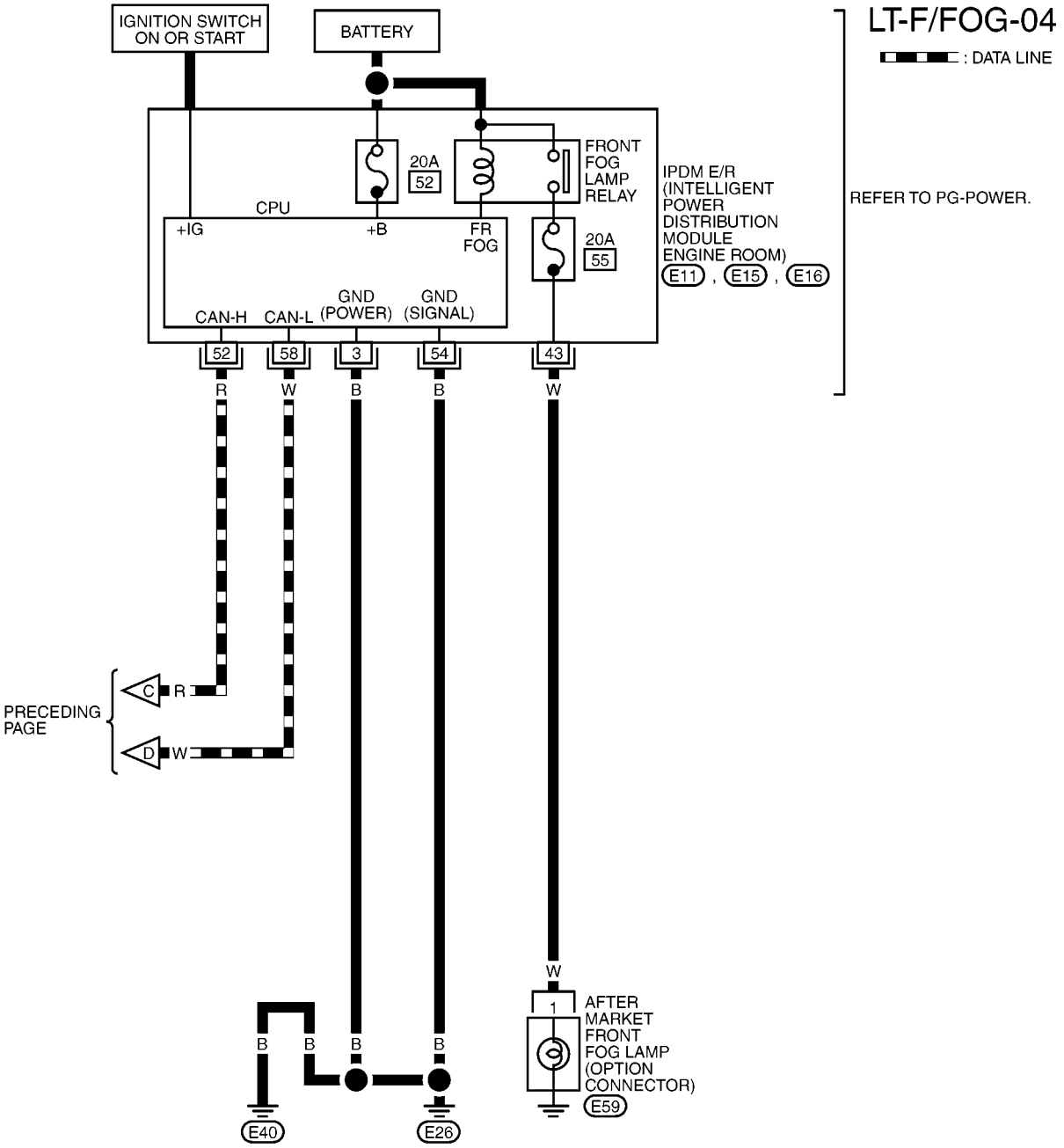

E7 , E34
B
E11
B
E15
BR
E16
W
H.S.

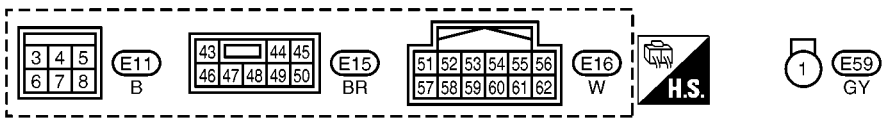
MKWA1528E

WITH DIESEL ENGINE



MKWA1446E

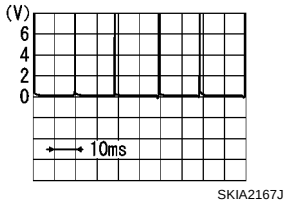
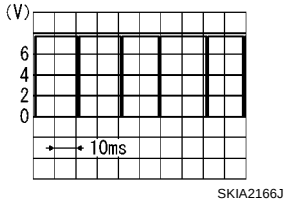
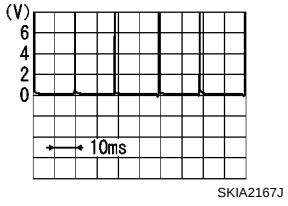

IGNITION SWITCH ON OR START
BATTERY
LT-F/FOG-04
: DATA LINE
20A 52
FRONT FOG LAMP RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11 , E15 , E16
REFER TO PG-POWER.
CPU
+IG
+B
FR FOG
20A 55
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
52
58
3
54
43
R
W
B
B
W
PRECEDING PAGE
C R
D W
B
B
B
B
W
1
AFTER MARKET FRONT FOG LAMP (OPTION CONNECTOR) E59
E40
E26


3 4 5 6 7 8
E11
B
43 44 45 46 47 48 49 50
E15
BR
51 52 53 54 55 56 57 58 59 60 61 62
E16
W
H.S.
1
E59
GY

MKWA1447E

Terminals and Reference Value for BCM

EKS00EM7

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
70	B	Ground	ON	—	Approx. 0
74	W	BAT power supply	—	—	Approx. 12
79	Y	Battery power supply	—	—	Approx. 12

Terminals and Reference Values for IPDM E/R

EKS00EM8

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
43	W	Front fog lamp (RH)	ON	Front fog lamp switch	ON	Approx. 12
					OFF	Approx. 0
44	PU	Front fog lamp (LH)	ON		ON	Approx. 12
					OFF	Approx. 0
52	R	CAN H	—	—		—
54	B	Ground	ON	—		Approx. 0
58	W	CAN L	—	—		—

How to Proceed With Trouble Diagnosis

EKS00EM9

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Front fog lamp LT-74, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-94, "Preliminary Check"
4. Confirm headlamp does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION" .
5. Check symptom and repair or replace the cause of malfunction.
6. Dose the front fog lamp operate normally? Yes: GO TO 7. No: GO TO 5.
7. INSPECTION END.

Preliminary Check

EKS00EMA

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4

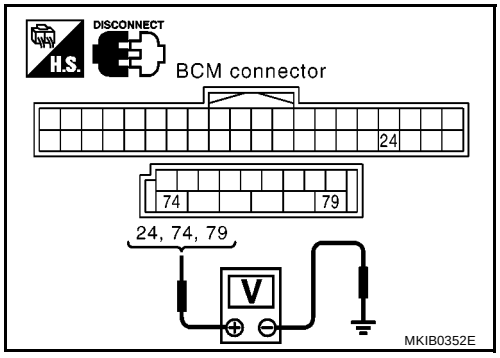
Refer to LT-89, "Wiring Diagram — F/FOG —" .

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. POWER SUPPLY CIRCUIT CHECK

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM connector and ground.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

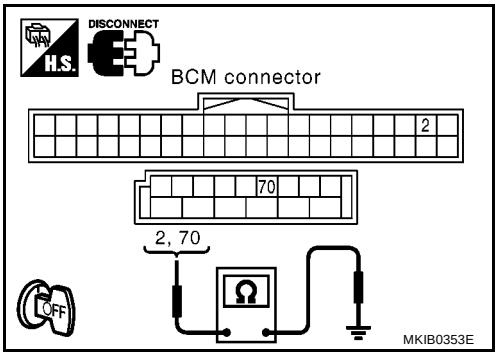
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse. If NG, repair or replace the harness or fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		



OK or NG

OK >> INSPECTION END.
NG >> Repair or replace the harness.

CONSULT-II Function (BCM)

EKS00EMB

Refer to LT-28, "CONSULT-II Functions (BCM)" .

CONSULT-II Function (IPDM)

EKS00EMC

Refer to LT-31, "CONSULT-II Functions (IPDM E/R)" .

Front fog lamps Does Not Illuminate (Both Sides)

EKS00EMD

1. CHECK FUSE

Check the following
20A fuse (No. 55, located in the IPDM E/R).

OK or NG

OK >> GO TO 2.
NG >> Replace front fog lamp fuses, if fuses are blown, it verified that harness are malfunctions for short between IPDM E/R and front fog lamps.

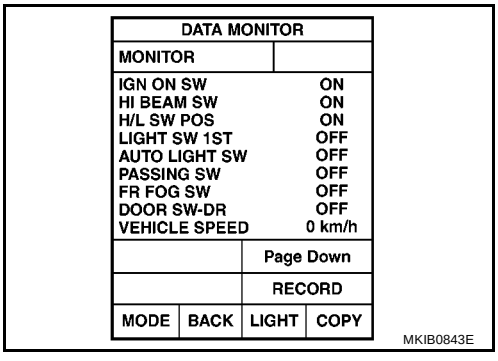
2. CHECK BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

Select BCM on CONSULT-II.Check lighting switch (“FR FOG SW”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 1st position and fog lamp switch in ON position : FR FOG SW ON

When lighting switch is in OFF position : FR FOG SW OFF



Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

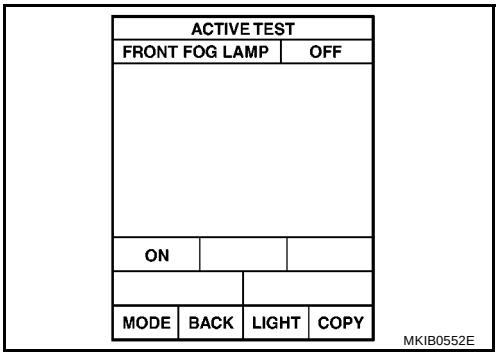
OK or NG

OK >> GO TO 3.
NG >> Refer to LT-196, "Check Combination Switch" .

3. CHECK BETWEEN IPDM E/R AND FRONT FOG LAMP

With CONSULT-II

1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT FOG” on “SELECT TEST ITEM” screen.
3. Make sure that front fog lamp operate normally.



Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that front fog lamp operate normally.

OK or NG

OK >> GO TO 4.
NG >> Check the following:

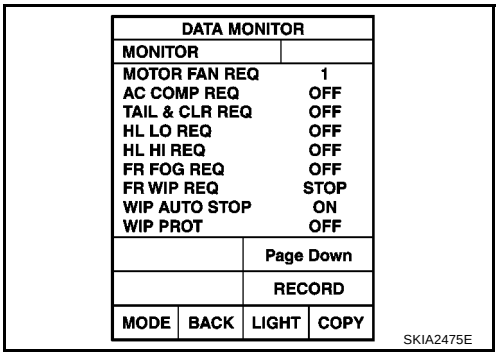
- Fog lamp bulbs
- Fog lamp ground circuit harness
- Harness between fog lamps and IPDM E/R

4. CHECK BETWEEN IPDM E/R AND BCM

Select IPDM E/R on CONSULT-II. Check lighting switch (“FR FOG REQ”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 1st position and fog lamp switch in ON position : FR FOG REQ ON

When lighting switch is in OFF position : FR FOG REQ OFF



OK or NG

OK >> Replace IPDM E/R.
NG >> Replace BCM.

Front Fog Lamp Does Not Illuminate (One Side)

EKS00EME

1. CHECK BULB

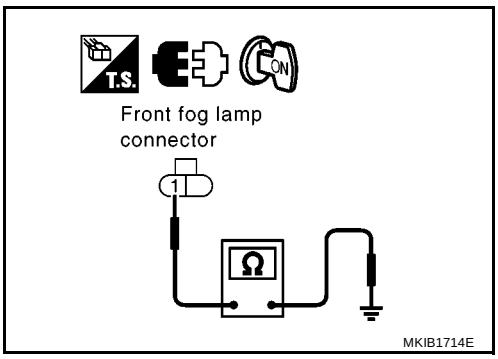
Check front fog bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace front fog lamp bulb.

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front fog lamp connector.
3. Turn ignition switch ON.
4. Check voltage between front fog lamp harness connector terminal and ground.



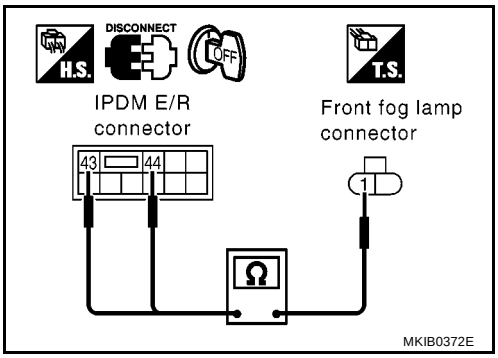
Terminals			Condition	Voltage [V]
(+)		(–)		
Connector	Terminal (Wire color)			
E7	1 (PU)	Ground	Lighting switch high beam ON	Battery voltage
E37	1 (W)			

OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3. CHECK BETWEEN IPDM E/R AND FRONT FOG LAMPS

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between harness connector terminals of IPDM E/R and harness connector terminal of front fog lamps.



Terminals					Continuity
IPDM E/R		Front fog lamp			
Connector	Terminal (Wire color)	Connector		Terminal (Wire color)	
E15	43 (W)	RH	E34	1 (W)	Yes
	44 (PU)	LH	E7	1 (PU)	

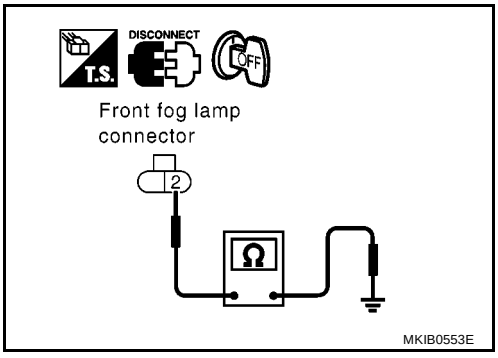
OK or NG

OK >> Replace IPDM E/R.
NG >> Repair or replace harness or connector.

4. CHECK FRONT FOG LAMP AND GROUND CIRCUIT

Check continuity between front fog lamp harness connector E7 (LH) or E34 (RH) terminal 2 (B) and ground.

Continuity should exist.



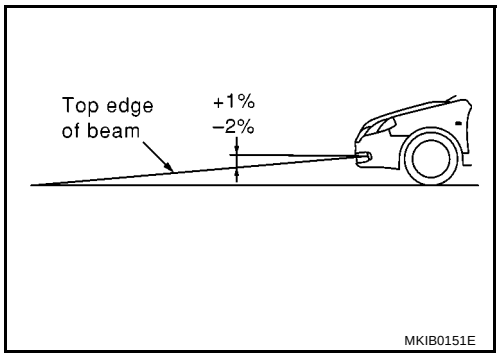
OK or NG

OK >> Check the condition of harness and the connector.
NG >> Repair or replace harness or connector.

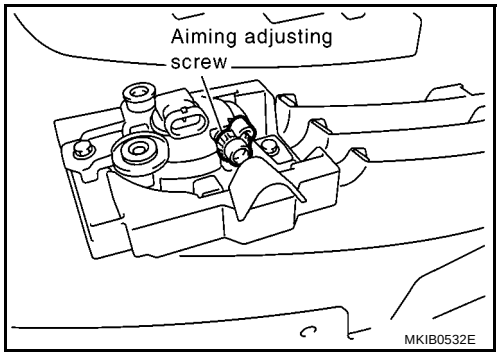
Aiming Adjustment

EKS00EMF

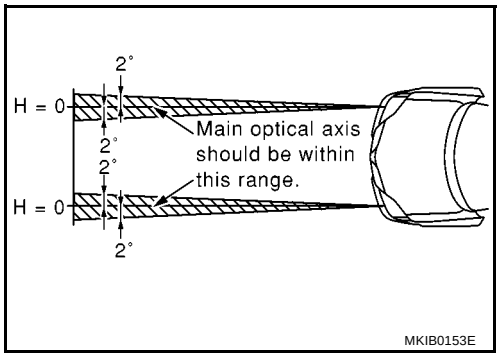
1. Set the top edge of the fog lamp lens as shown in the figure.



2. Turn front fog lamps ON.



3. Adjust front fog lamps as shown in the figure.
   - When performing adjustment, if necessary, cover the headlamps and opposite fog lamp.



Bulb Replacement

EKS00EMG

1. Turn ignition switch OFF
2. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
3. Remove front bumper. Refer to EI-4, "FRONT BUMPER" .
4. Turn bulb socket counterclockwise and unlock it.
5. Remove bulb from socket.

Front fog lamp: 12V-55W (H11)

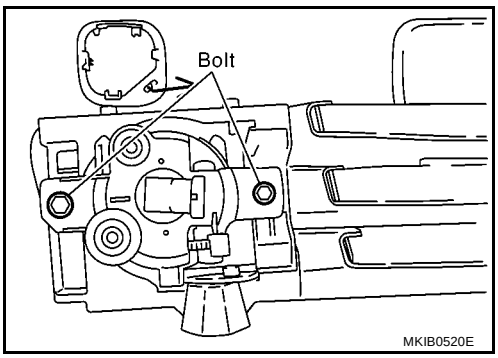
Removal and Installation

EKS00EMH

REMOVAL

1. Turn ignition switch OFF
2. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
3. Remove front bumper. Refer to EI-4, "FRONT BUMPER" .

4. Remove front fog lamp mounting bolt.



INSTALLTION

Install in the reverse order of removal.

REAR FOG LAMP

PFP:26550

System Description

EKS00EMI

The rear fog lamp operation is controlled by the lighting switch which built into the combination switch and BCM (body control module).BCM read combination switch condition.Refer toLT-189, "System Description"

OUTLINE

Power is supplied at all times

- through 40A fusible link (letter **J** , located in fuse and fusible link box)
- to terminals 74 and 79 of the BCM.

When the ignition switch is in ON or START position, power is supplied

- through 10A fuse [No. 4, located in fuse block (J/B)]
- to terminal 24 of the BCM.

Ground is supplied

- to BCM terminals 2 and 70
- through body grounds M19 and M20.

REAR FOG LAMP OPERATION

When the lighting switch is turned to 2ND position or front fog lamp switch ON position and rear fog lamp switch in ON position, BCM read combination switch condition (refer to LT-189, "System Description"). Rear fog lamp is energized and then power is supplied.
With the rear fog lamp switch in the ON position, BCM supplies the power supply to rear fog lamp.

- to rear combination lamp LH/RH terminal 6
- through BCM terminal 69

Ground is supplied

- to rear combination lamp LH/RH terminal 4
- through body grounds B17, B23, B44 and B51

With power and grounds supplied, the rear fog lamps illuminate.
Rear fog indicator illuminate when combination meter receives input requesting rear fog indicator illuminate. This is communicated to BCM across the CAN communication lines.
When combination meter received rear fog lamp request signal, combination meter will illuminate rear fog indicator.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

CAN Communication

EKS00ERI

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LTA

Go to CAN system, when selecting your car model from the following table.

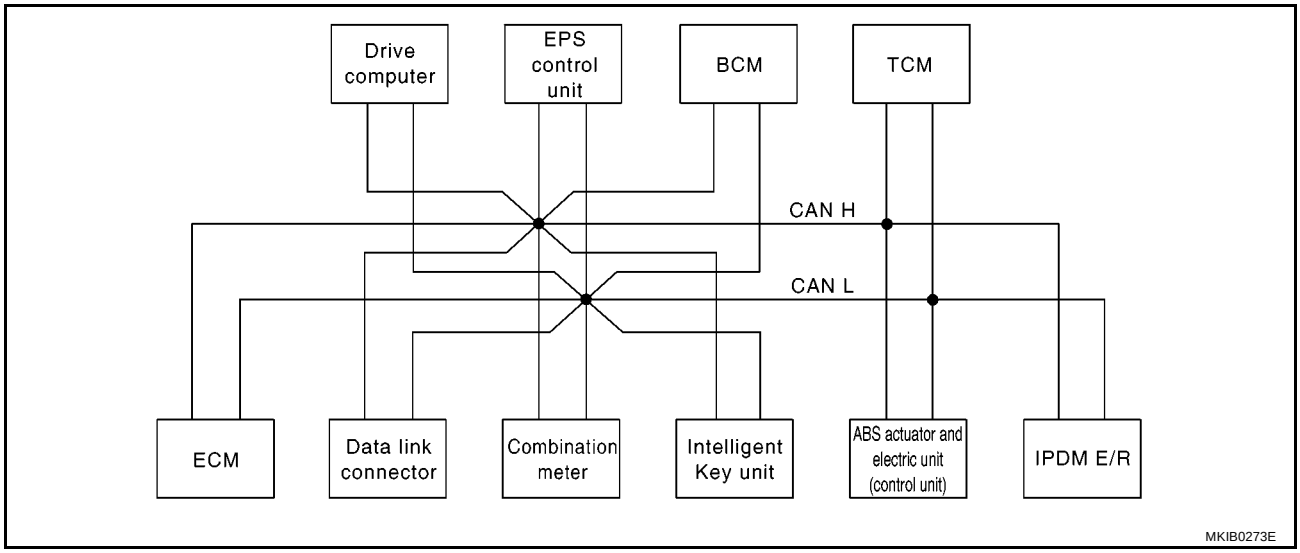
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-102, "TYPE 1/ TYPE 2"				LT-105, "TYPE 3/ TYPE 4"				LT-107, "TYPE 5/ TYPE 6"				LT-110, "TYPE 7/ TYPE 8"				LT-112, "TYPE 9/ TYPE 10"			

×: Applicable

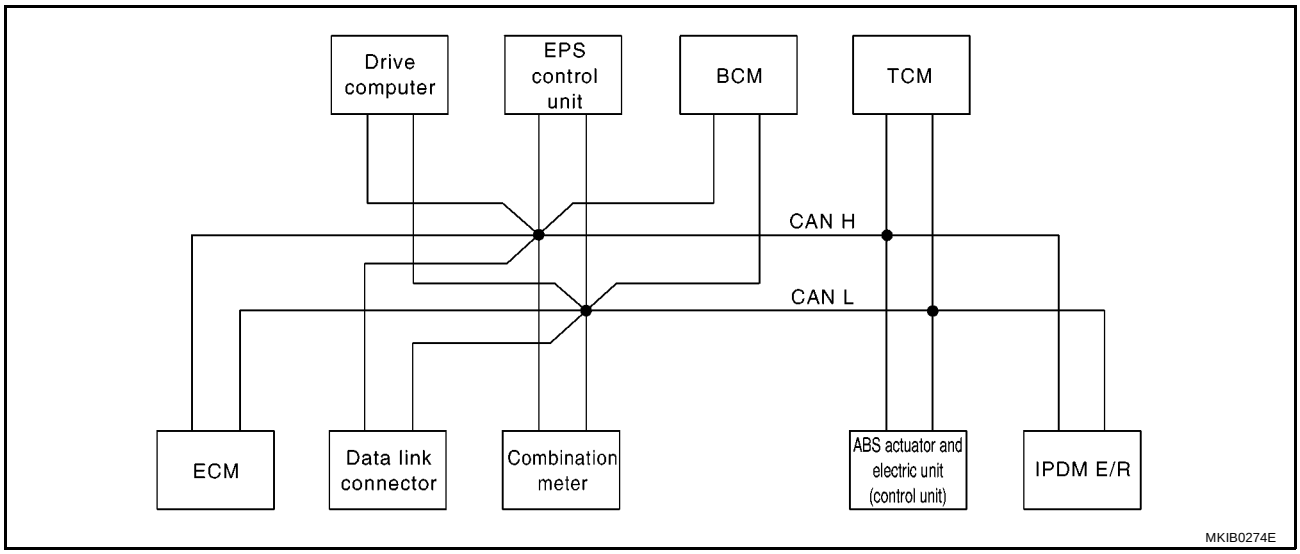
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

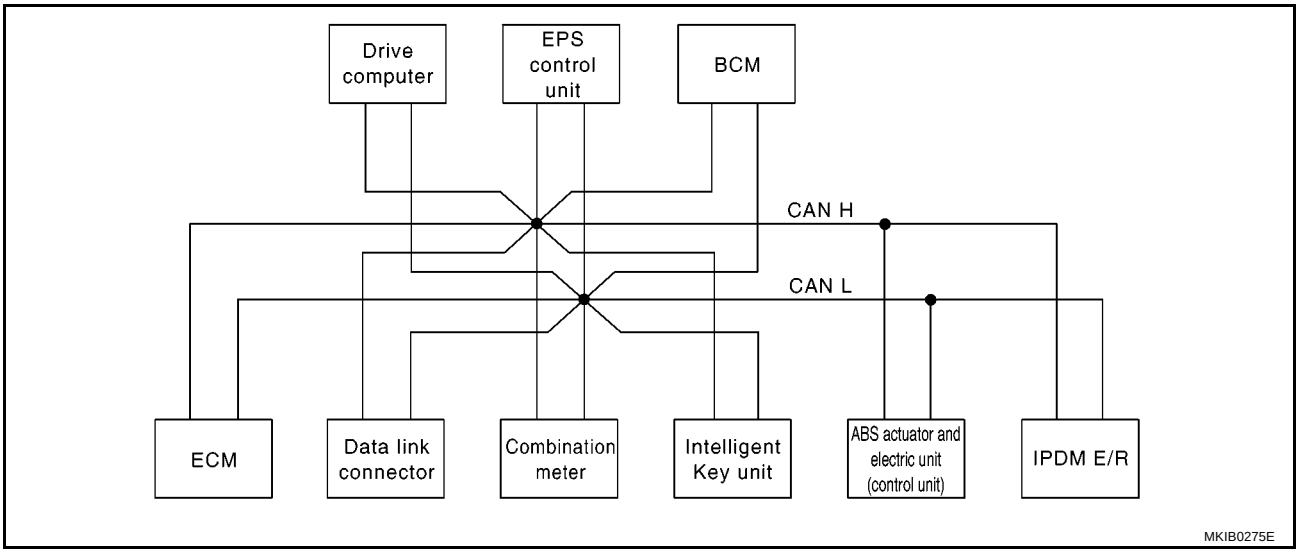
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

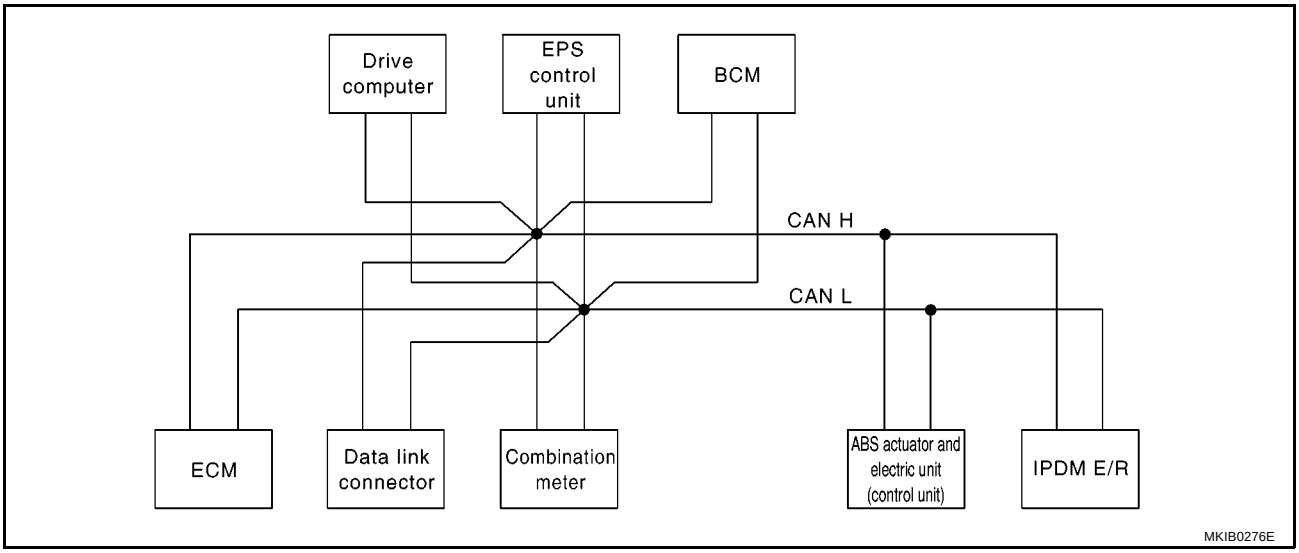
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

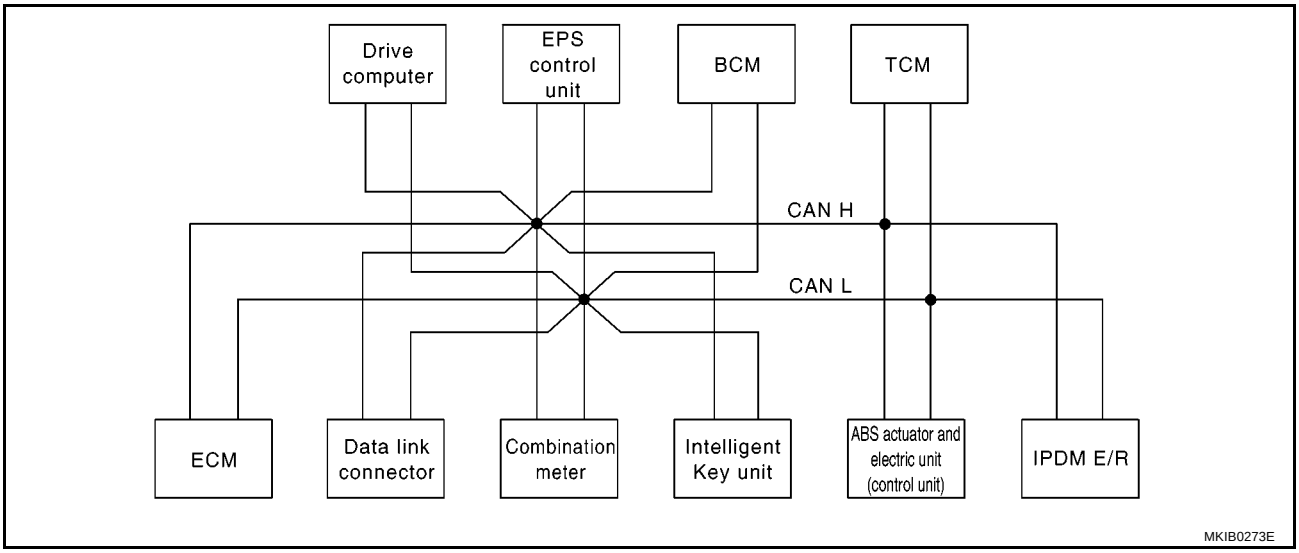
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

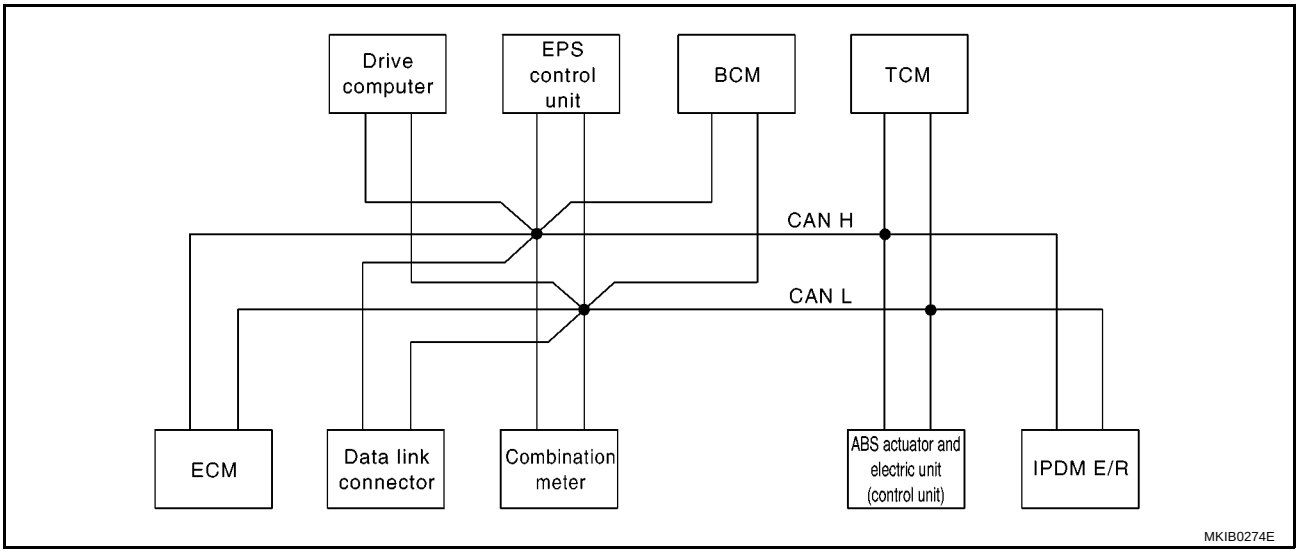
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

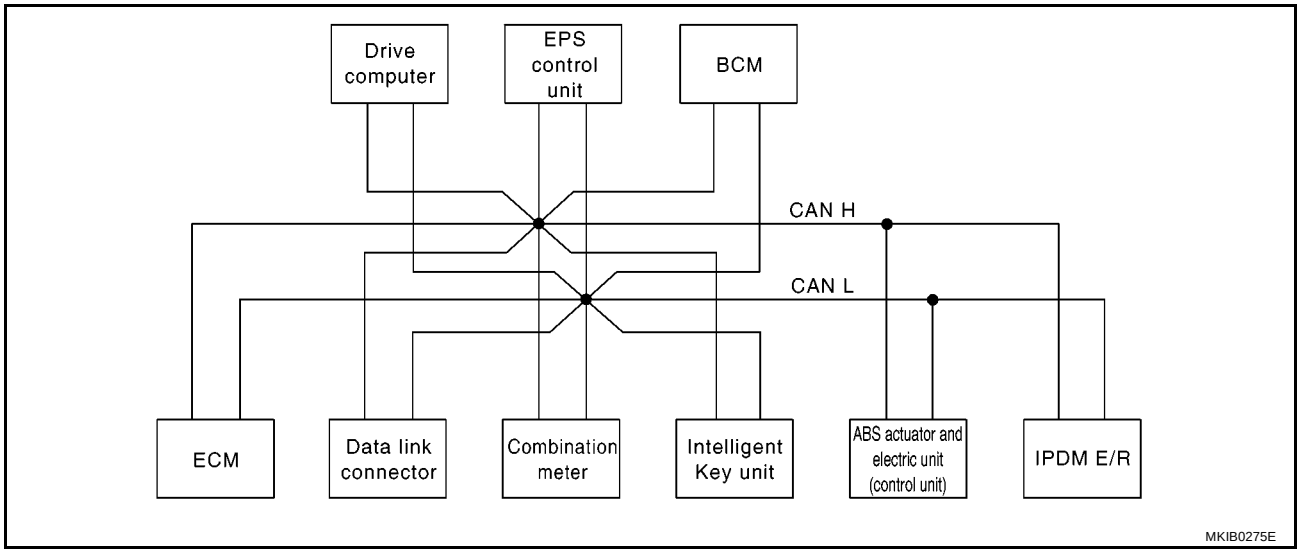
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

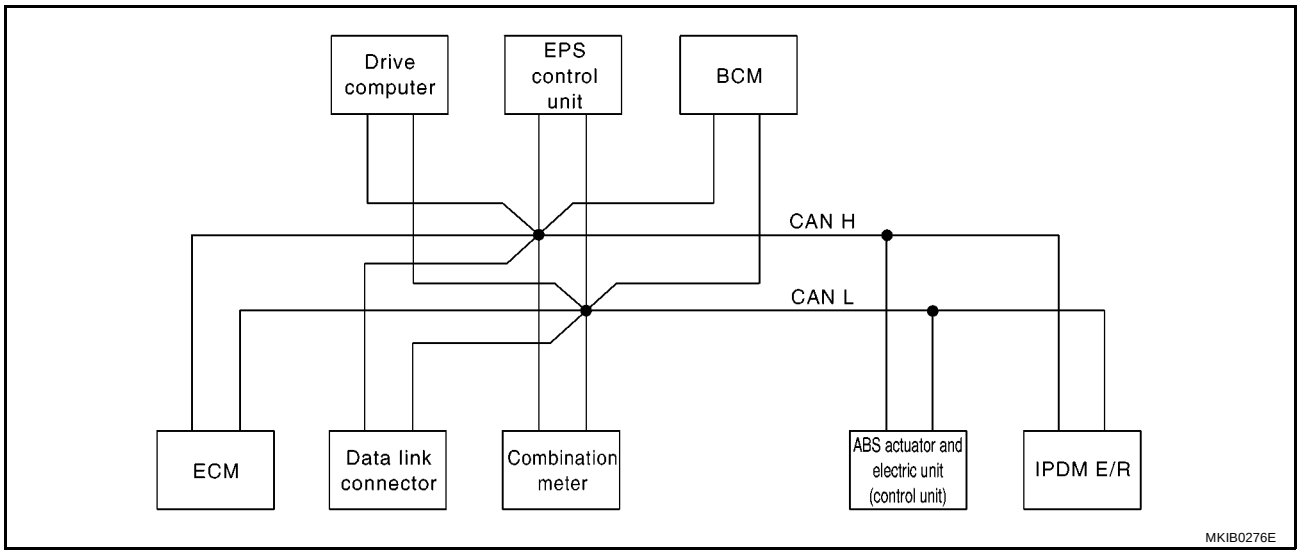
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

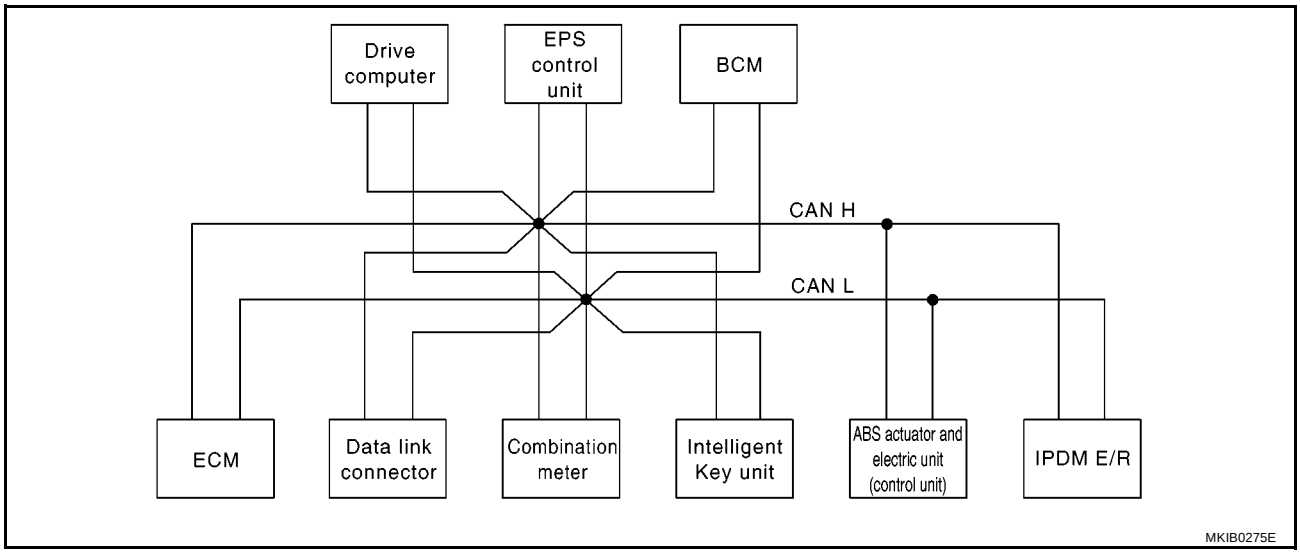
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

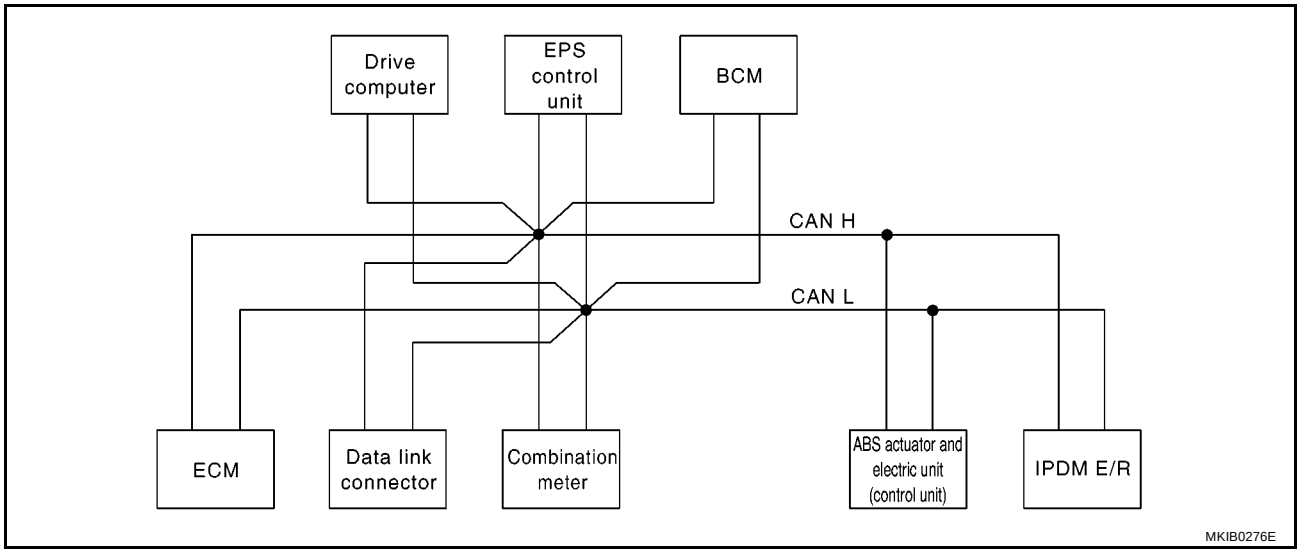
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

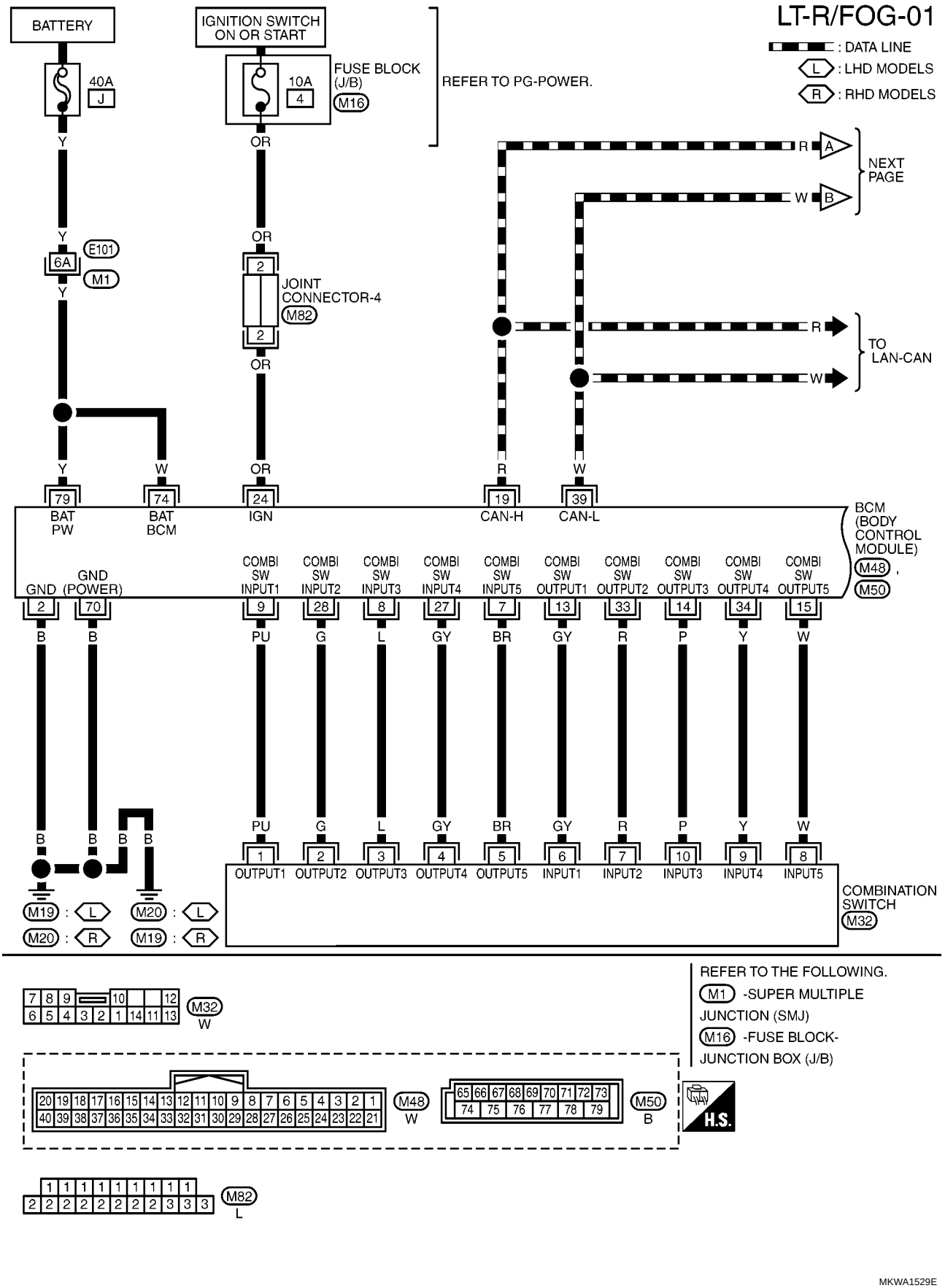
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

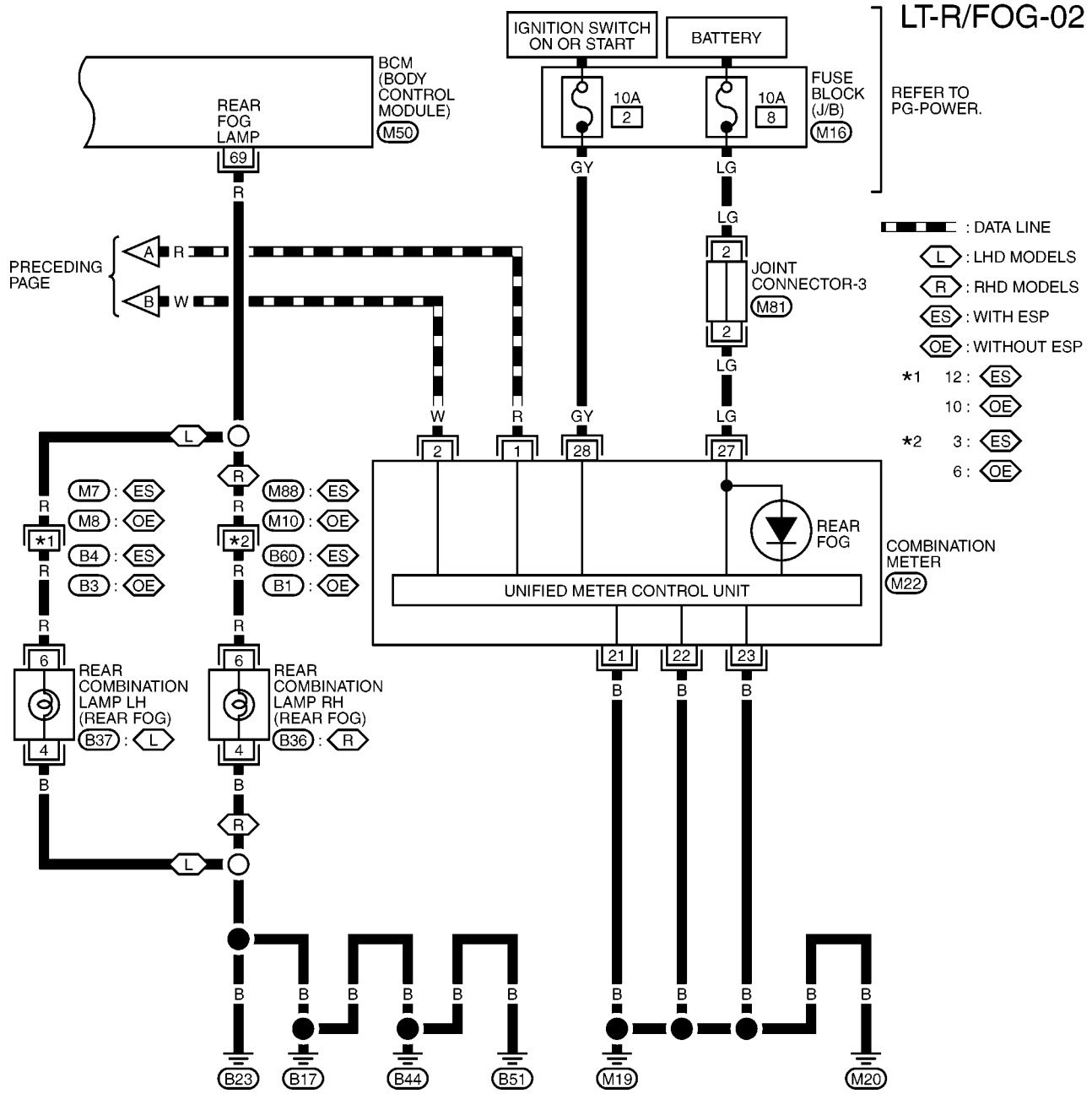
Wiring Diagram — R/FOG —

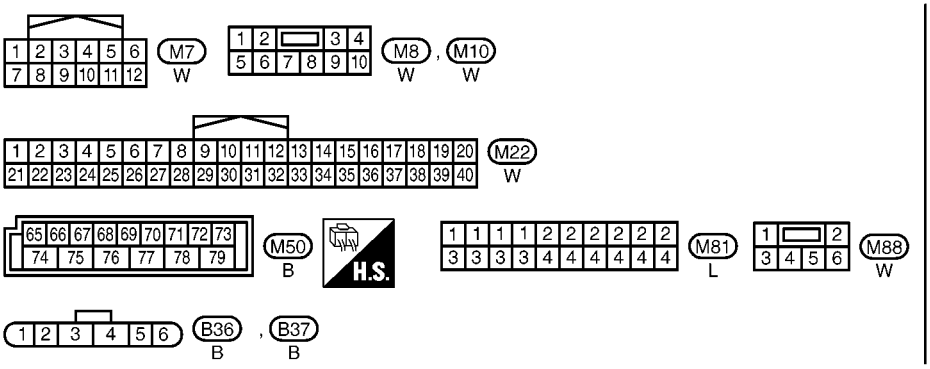
SMA for VIN >SJN**AK12U1309269

EKS00EMK



MKWA1529E



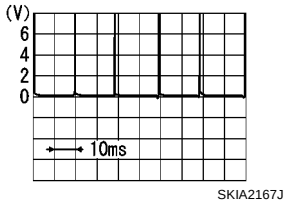
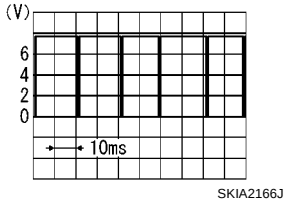
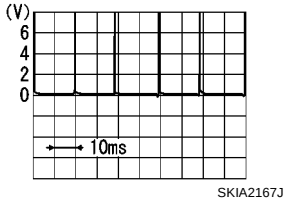


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1751E

Terminals and Reference Value for BCM

EKS00EML

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
69	R	Rear fog lamp signal	ON	Rear fog lamp switch: ON	Approx. 12
				Rear fog lamp switch: OFF	Approx. 0
70	B	Ground	ON	—	Approx. 0
74	W	BAttery power supply	—	—	Approx. 12
79	Y	Battery power supply	—	—	Approx. 12

How to Proceed With Trouble Diagnosis

EKS00EMM

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to rear fog lamp LT-100, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-118, "Preliminary Check"
4. Check symptom and repair or replace the cause of malfunction.
5. Does the rear fog lamp operate normally? Yes: GO TO 6. No: GO TO 4.
6. INSPECTOPN END.

Preliminary Check

EKS00EMN

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch (ON)	4

Refer to LT-115, "Wiring Diagram — R/FOG —" .

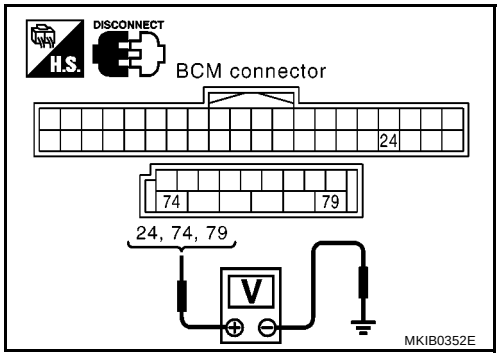
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	79 (Y)	Ground	Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage
M50	74 (W)		Battery voltage	Battery voltage	Battery voltage



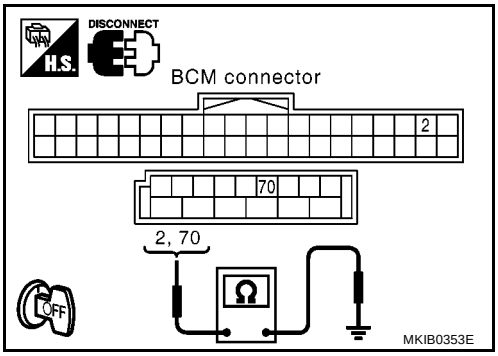
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse. If NG, repair or replace the harness or fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		



OK or NG

OK >> INSPECTION END.
NG >> Repair or replace the harness.

CONSULT-II Function (BCM)

EKS00EMO

Refer to LT-28, "CONSULT-II Functions (BCM)" .

Rear Fog Lamp Does Not Illuminate

EKS00EMP

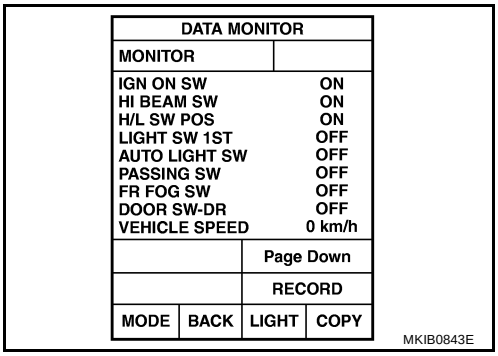
1. AHECK BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

Select BCM on CONSULT-II. Check lighting switch (“RR FOG SW”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 2nd position, fog lamp switch in ON position and rear fog lamp switch in ON position : RR FOG SW ON

When rear fog lamp switch is in OFF position : RR FOG SW OFF



Without CONSULT-II

Refer to LT-189, "COMBINATION SWITCH" .

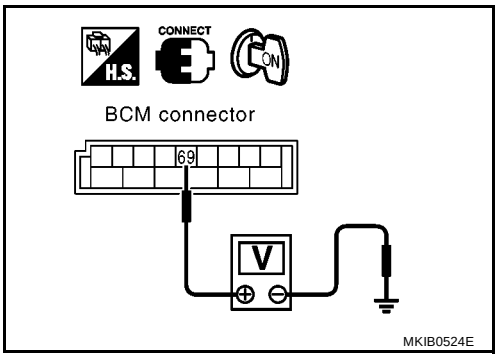
OK or NG

OK >> GO TO 2.
NG >> Refer to LT-189, "COMBINATION SWITCH" .

2. CHECK BCM OUTPUT SIGNAL

Check voltage between BCM terminal 69 (R) and ground.

Connector	Terminal (Wire color)	(–)	Condition	Voltage
M50	69 (R)	Ground	Rear fog switch ON	Battery voltage
			Rear fog switch OFF	Approx. 0



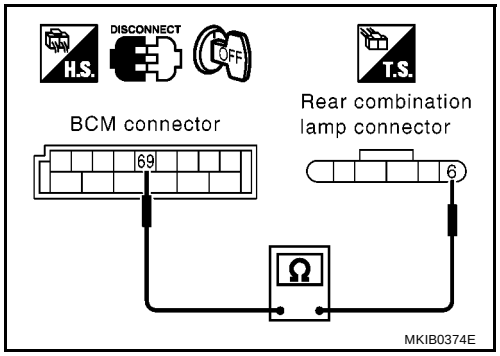
OK or NG

OK >> GO TO 3.
NG >> Replace BCM.

3. CHECK BETWEEN BCM AND REAR FOG LAMPS

1. Turn ignition switch OFF.
2. Disconnect BCM connector and rear combination lamp connector.
3. Check continuity between BCM and rear combination lamps.

Terminals					Continuity
Rear fog lamp (Rear combination lamp)			BCM		
Connector		Terminal (Wire color)	Connector	Terminal (Wire color)	
RHD models	B36	6 (R)	M50	69 (R)	Yes
LHD models	B37	6 (R)			



OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK BULB

Check rear fog lamp bulb.

OK or NG

OK >> GO TO 5.
NG >> Replace rear fog lamp bulb.

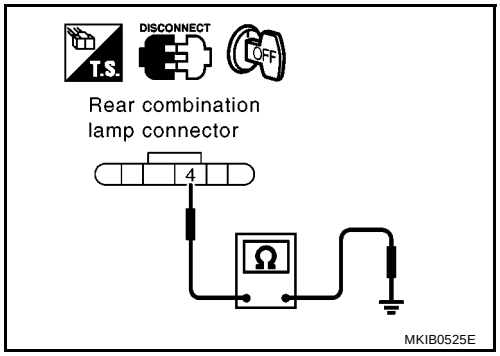
5. CHECK REAR FOG LAMP GROUND CIRCUIT

Check continuity between rear fog lamp harness connector B36 (RHD) or B37 (LHD) terminal 4(B) and ground.

Continuity should exist.

OK or NG

OK >> Replace rear fog lamp.
NG >> Repair or replace harness or connector.



Bulb Replacement

EKS00EMQ

Refer to LT-186, "Bulb Replacement" .

Removal and Installation

EKS00EMR

Refer to LT-186, "Removal and Installation" .

TURN SIGNAL AND HAZARD WARNING LAMPS

PFP:26120

System Description

EKS00EMS

TURN SIGNAL OPERATION

When the ignition switch is in the ON or START position, power is supplied

- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to BCM (body control module) terminal 24, and
- through 10A fuse [No. 2, located in the fuse block (J/B)]
- to combination meter terminal 28.

Ground is supplied

- to BCM terminals 2 and 70, and
- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20.

LH Turn

When the turn signal switch (combination switch) is moved to the LH position, the BCM read combination switch condition (Refer to LT-189, "System Description")power is supplied.

- through BCM terminal 65
- to front turn signal lamp LH terminal 1,
- to side turn signal lamp LH terminal 1 and
- to rear combination lamp LH (turn signal) terminal 5.

Ground is supplied to the front turn signal lamp LH terminal 2 and side turn signal lamp LH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40.
Ground is also supplied to rear combination lamp LH (turn signal) terminal 4 through body grounds B17, B23, B44, and B51.
BCM send turn indicator signal to combination meter with CAN communication line.Combination meter is flashed turn LH indicator lamp.
With power and ground supplied, the BCM controls the flashing of the LH turn signal lamps.

RH Turn

When the turn signal switch (combination switch) is moved to the RH position, the BCM read combination meter condition (Refer to LT-189, "System Description").Power is supplied.

- through BCM terminal 66
- to front turn signal lamp RH terminal 1,
- to side turn signal lamp RH terminal 1 and
- to rear combination lamp RH (turn signal) terminal 5.

Ground is supplied to the front turn signal lamp RH terminal 2 and side turn signal lamp RH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40.
Ground is supplied to rear combination lamp RH (turn signal) terminal 4 through body ground B17, B23, B44 and B51.
BCM send turn indicator signal to combination meter via CAN communication line.Combination meter is flashed turn RH indicator lamp.
With power and ground supplied, the BCM controls the flashing of the RH turn signal lamps.

HAZARD LAMP OPERATION

Power is supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box), and
- to combination meter terminal 27
- through 10A fuse [No. 8, located in the fuse block (J/B)].

Ground is supplied

- to hazard switch terminal 1,
- to BCM terminals 2 and 70 and
- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20.

When the hazard switch is ON position, ground is supplied

- to BCM terminal 26
- through hazard switch terminal 2.

Power is supplied

- through BCM terminal 65
- to front turn signal lamp LH terminal 1
- to side turn signal lamp LH terminal 1
- to rear combination lamp LH (turn signal) terminal 5
- through BCM terminal 66
- to front turn signal lamp RH terminal 1
- to side turn signal lamp RH terminal 1
- to rear combination lamp RH (turn signal) terminal 5.

Ground is supplied

- to the front turn signal lamp LH terminal 2 and side turn signal lamp LH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40
- to the front turn signal lamp RH terminal 2 and side turn signal lamp RH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40
- to rear combination lamp LH (turn signal) terminal 4 through body grounds B17, B23, B44 and B51
- to rear combination lamp RH (turn signal) terminal 4 through body grounds B17, B23, B44 and B51.

BCM send turn indicator signal to combination meter with CAN communication line.Combination meter is flashed turn LH and RH indicator lamps.
With power and ground supplied, the BCM controls the flashing of the hazard warning lamps.

MULTI-REMOTE CONTROL SYSTEM OPERATION

Power is supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box), and
- to combination meter terminal 27
- through 10A fuse [No. 8, located in the fuse block (J/B)].

Ground is supplied

- to BCM terminals 2 and 70
- through body grounds M19, M20, and
- to combination meter terminals 21, 22 and 23
- through body grounds M19 and M20.

When BCM receives LOCK or UNLOCK signal from remote controller, power is supplied.

- through BCM terminal 65
- to front turn signal lamp LH terminal 1
- to side turn signal lamp LH terminal 1
- to rear combination lamp LH (turn signal) terminal 5
- through BCM terminal 66
- to front turn signal lamp RH terminal 1
- to side turn signal lamp RH terminal 1
- to rear combination lamp RH (turn signal) terminal 5.

Ground is supplied

- to the front turn signal lamp LH terminal 2 and side turn signal lamp LH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40.
- to the front turn signal lamp RH terminal 2 and side turn signal lamp RH terminal 2 through body grounds E25(Gasoline engine models), E26 and E40.
- to rear combination lamp LH (turn signal) terminal 4 through body grounds B17, B23, B44 and B51.
- to rear combination lamp RH (turn signal) terminal 4 through body grounds B17, B23, B44 and B51.

BCM send turn indicator signal to combination meter via CAN communication line.Combination meter is flashed turn LH and RH indicator lamps.
With power and ground supplied, the BCM controls the flashing of the hazard warning lamps.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

CAN Communication

EKS00ERK

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LTB

Go to CAN system, when selecting your car model from the following table.

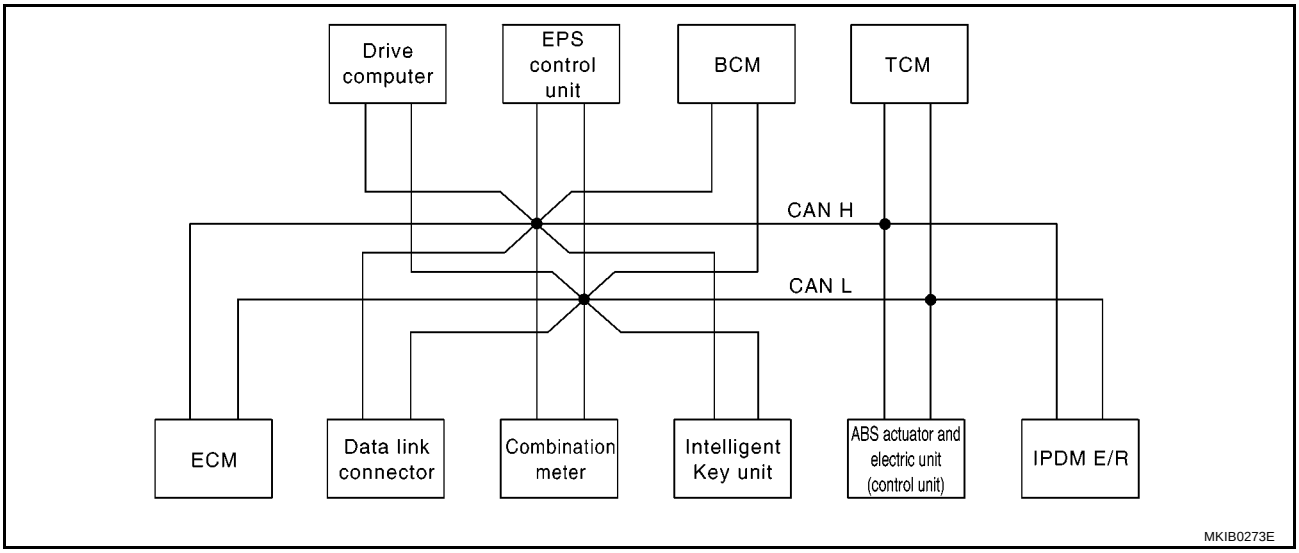
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-125, "TYPE 1/ TYPE 2"				LT-128, "TYPE 3/ TYPE 4"				LT-130, "TYPE 5/ TYPE 6"				LT-133, "TYPE 7/ TYPE 8"				LT-135, "TYPE 9/ TYPE 10"			

×: Applicable

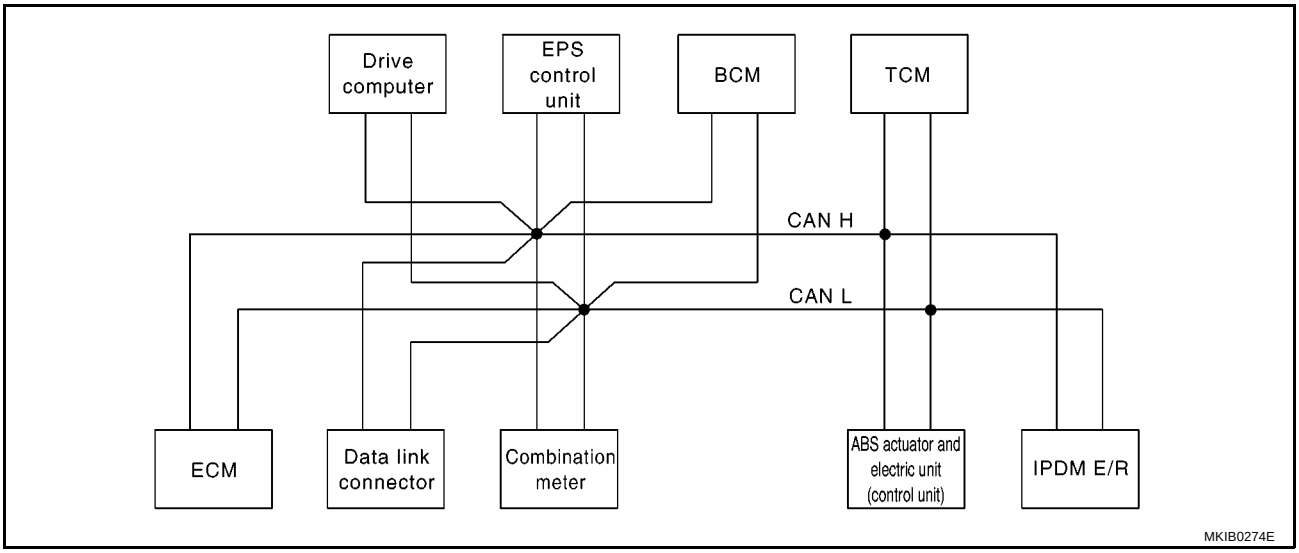
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

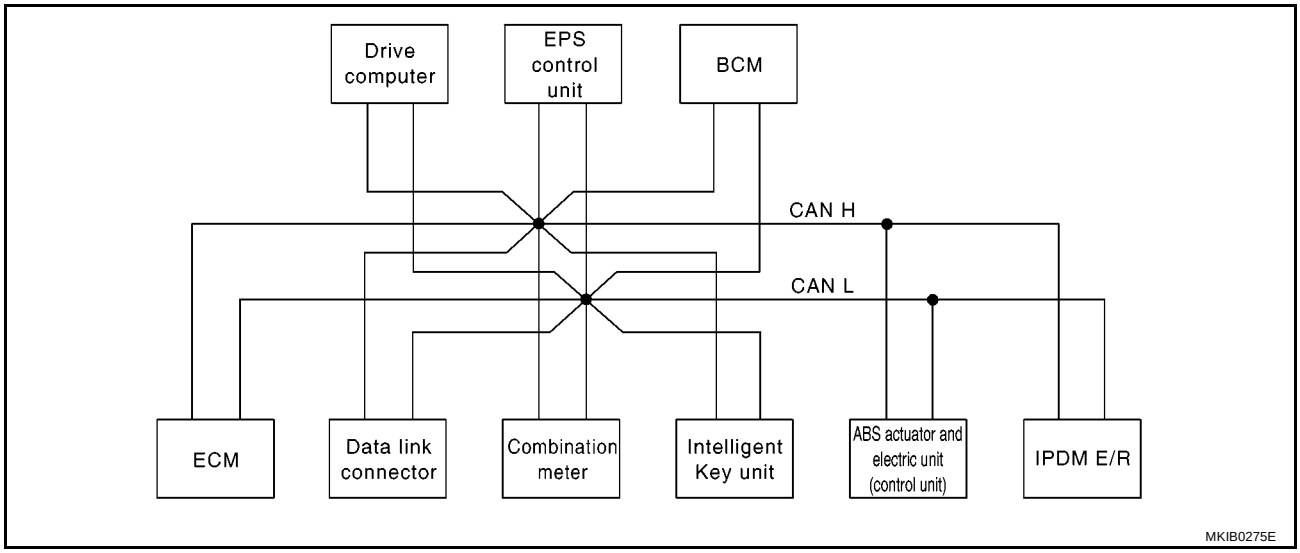
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

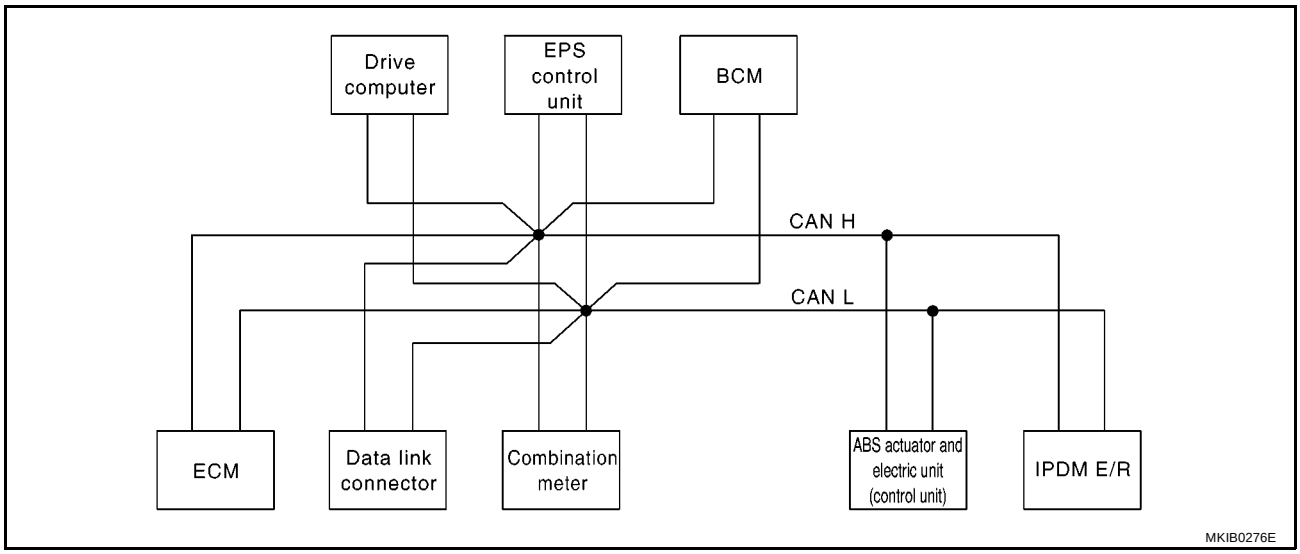
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

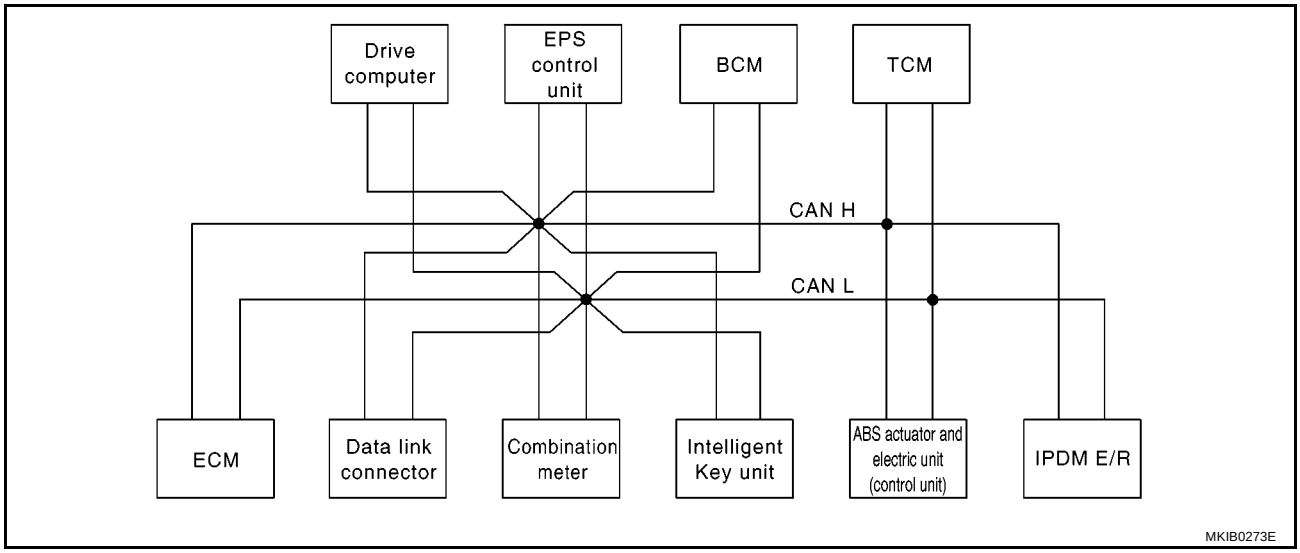
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

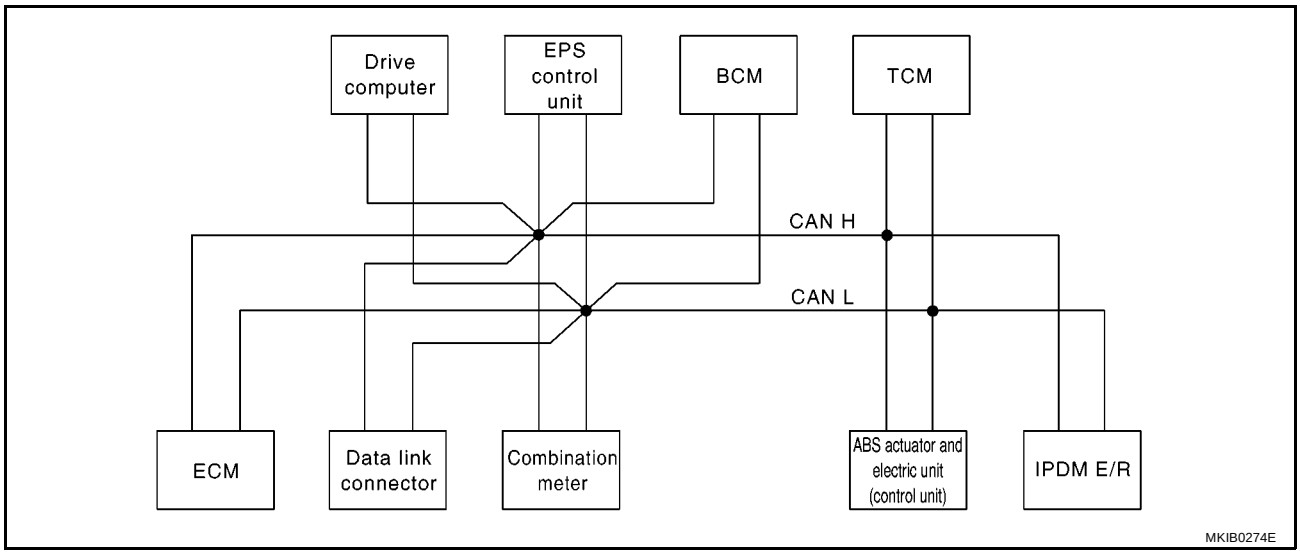
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

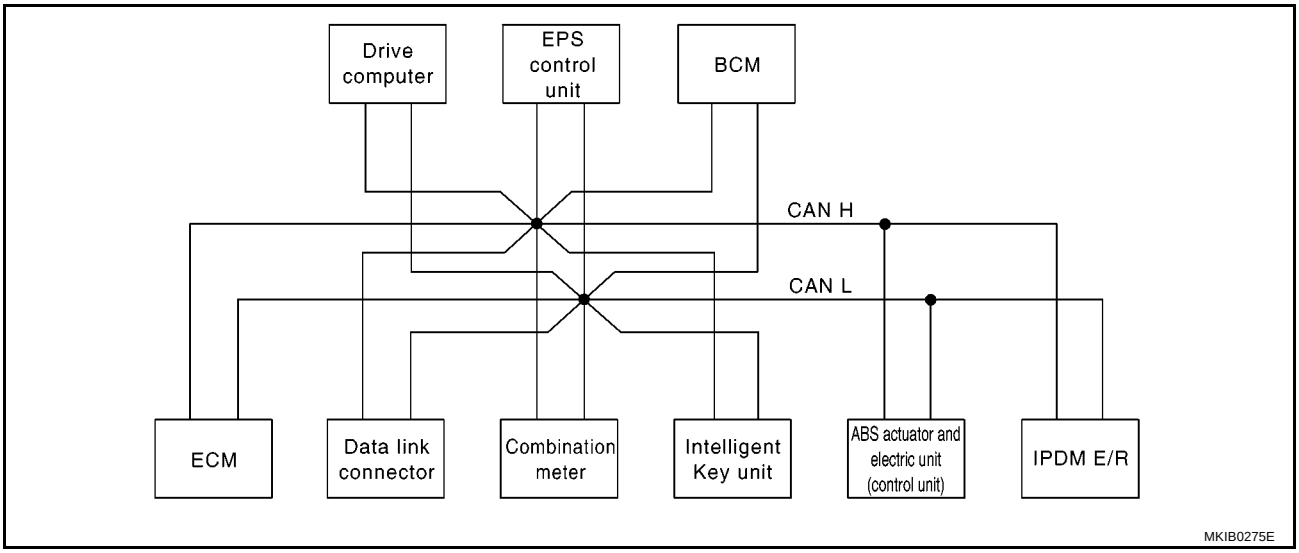
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

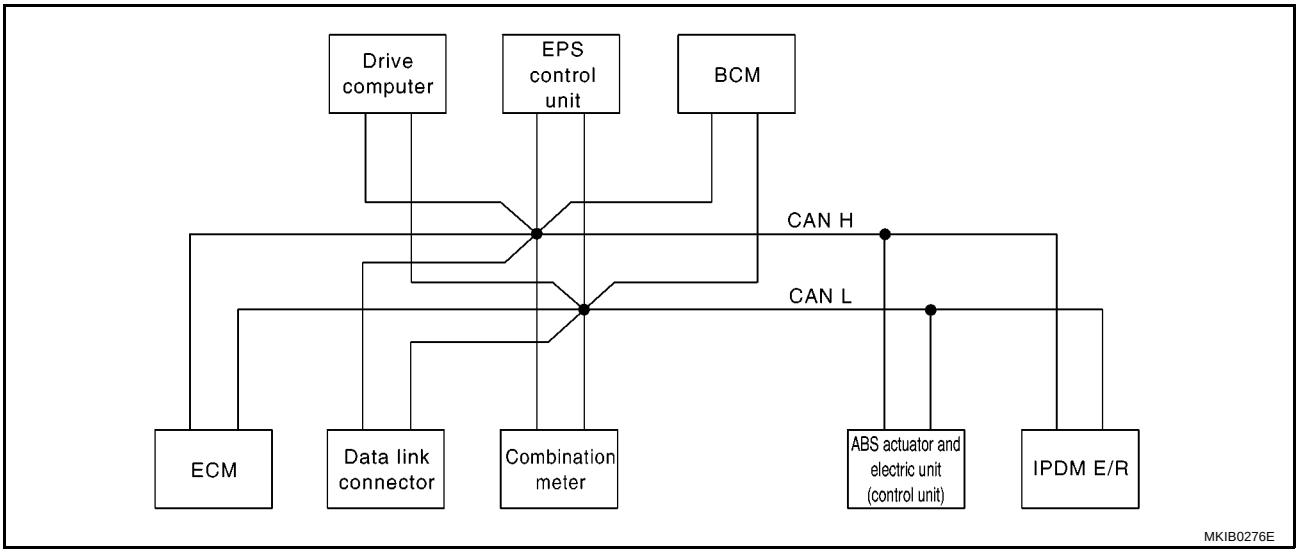
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

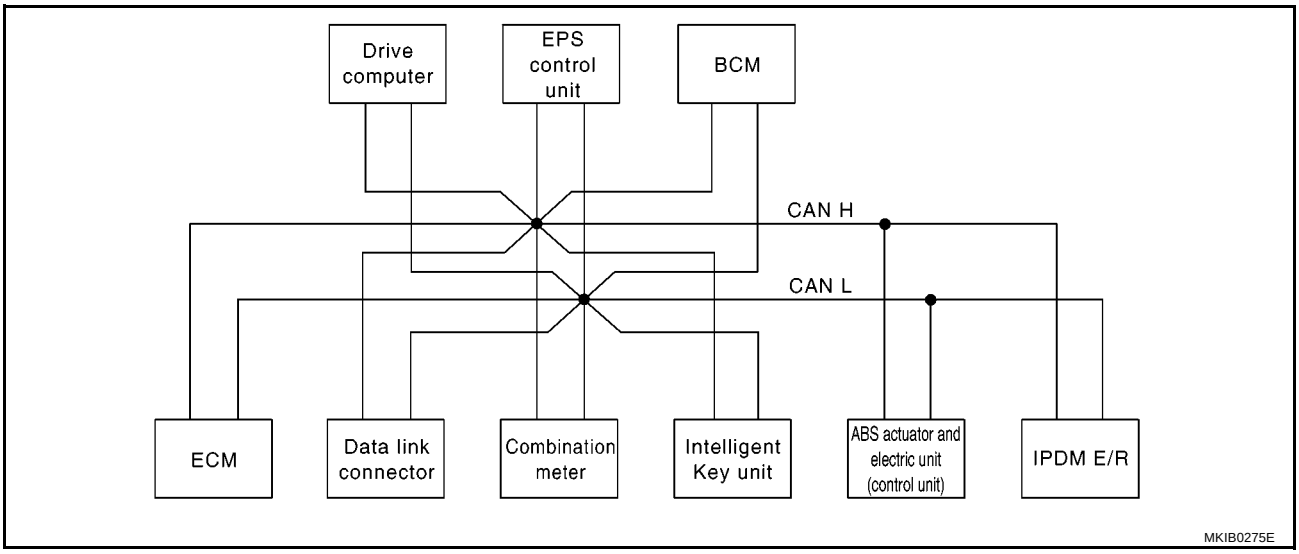
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

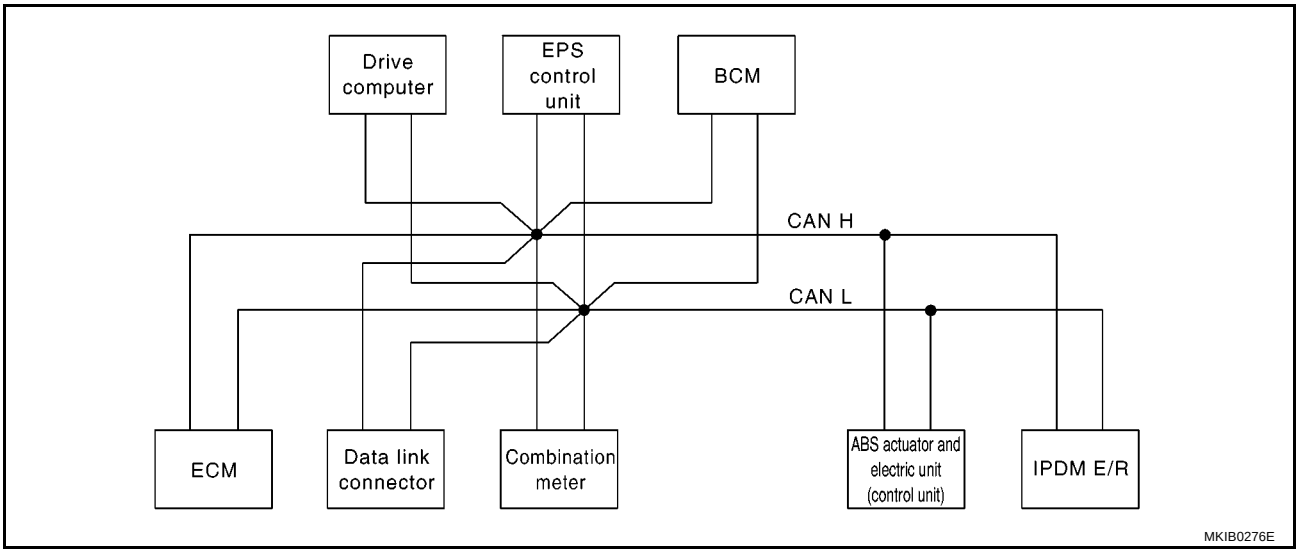
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

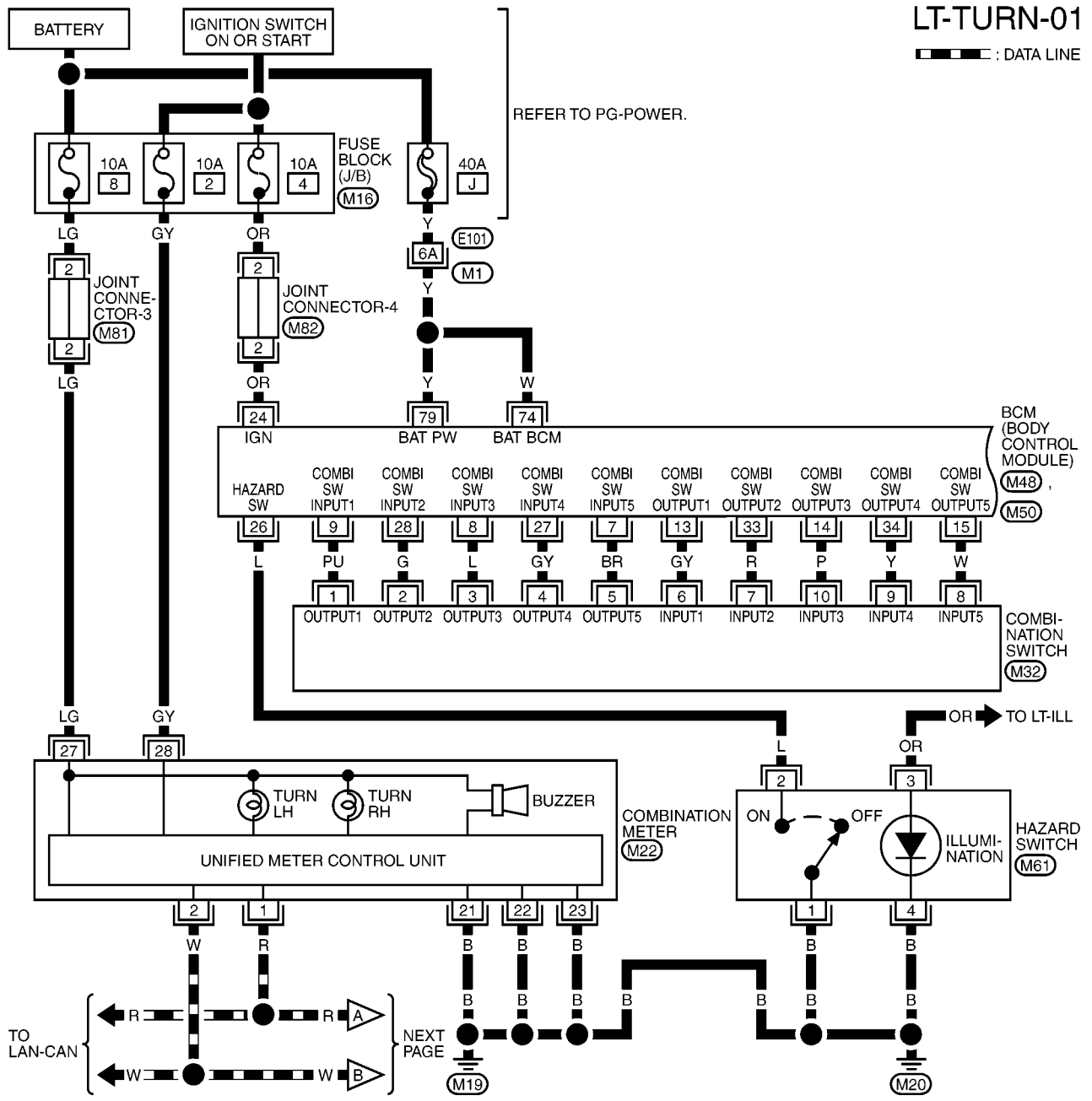
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

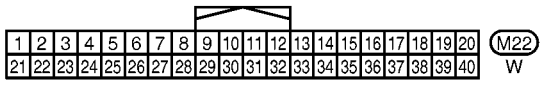
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

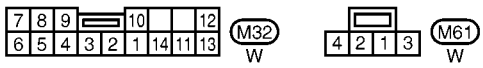
Wiring Diagram — TURN —

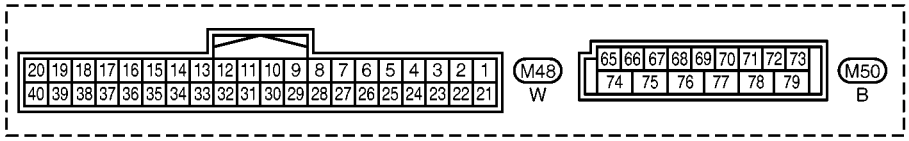
SMA for VIN >SJN**AK12U1309269

EKS00EMU



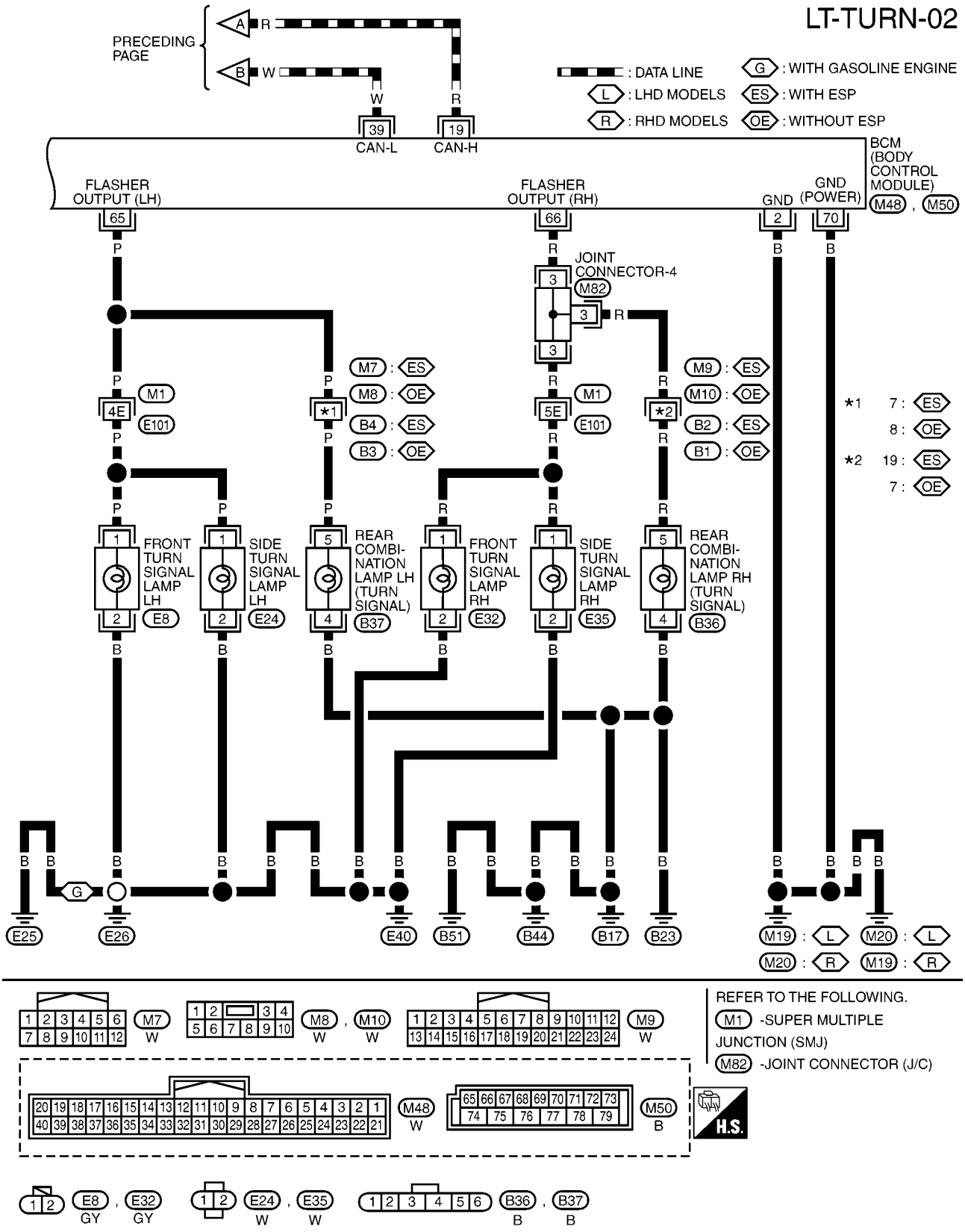






REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M81, M82 -JOINT CONNECTOR (J/C)

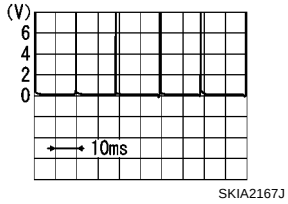
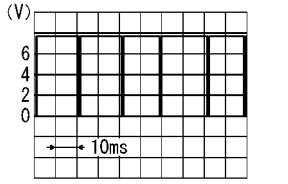
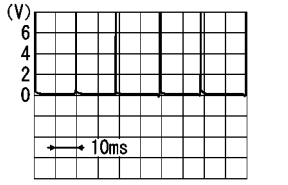
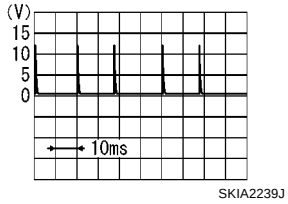
MKWA1444E

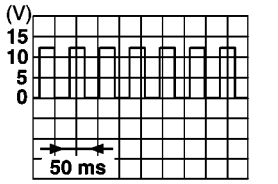
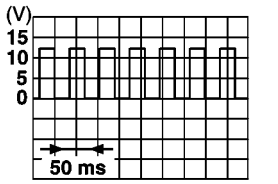

LT-TURN-02
PRECEDING PAGE
A R
B W
W
R
39
19
CAN-L
CAN-H
: DATA LINE
L : LHD MODELS
R : RHD MODELS
G : WITH GASOLINE ENGINE
ES : WITH ESP
OE : WITHOUT ESP
BCM (BODY CONTROL MODULE)
M48 , M50
FLASHER OUTPUT (LH)
FLASHER OUTPUT (RH)
GND
GND (POWER)
65
66
2
70
JOINT CONNECTOR-4
M82
M1
4E
E101
5E
M7 : ES
M8 : OE
B4 : ES
B3 : OE
M9 : ES
M10 : OE
B2 : ES
B1 : OE
*1 7 : ES
8 : OE
*2 19 : ES
7 : OE
FRONT TURN SIGNAL LAMP LH
E8
SIDE TURN SIGNAL LAMP LH
E24
REAR COMBI-NATION LAMP LH (TURN SIGNAL)
B37
FRONT TURN SIGNAL LAMP RH
E32
SIDE TURN SIGNAL LAMP RH
E35
REAR COMBI-NATION LAMP RH (TURN SIGNAL)
B36
E25
E26
E40
B51
B44
B17
B23
M19 : L
M20 : L
M20 : R
M19 : R
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M82 -JOINT CONNECTOR (J/C)
M7 W
M8 , M10 W W
M9 W
M48 W
M50 B
H.S.
E8 , E32 GY GY
E24 , E35 W W
B36 , B37 B B

MKWA1752E

Terminals and Reference Value for BCM

EKS00EMV

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
2	B	Ground	ON	—		Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF		 SKIA2167J
8	L	Combination switch input 3				
9	PU	Combination switch input 1				
27	GY	Combination switch input 4				
28	G	Combination switch input 2				
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)		 SKIA2166J
14	P	Combination switch output 3				
15	W	Combination switch output 5				
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)		 SKIA2167J
34	Y	Combination switch output 4				
19	R	CAN H	—	—		—
24	OR	Ignition power supply	ON	—		Approx. 12
26	L	Hazard	OFF	Hazard switch	ON	Approx. 0
					OFF	 SKIA2239J
39	W	CAN L	—	—		—

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
65	P	Turn signal (LH)	ON	Combination switch	Turn left ON	 SKIA1120J
66	R	Turn signal (RH)			Turn right ON	 SKIA1120J
70	B	Ground	ON	—		Approx. 0
74	W	Battery power supply	—	—		Approx. 12
79	Y	Battery power supply	—	—		Approx. 12

How to Proceed With Trouble Diagnosis

EKS00EMW

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Turn signal and hazard warning lamps LT-121, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-142, "Preliminary Check"
4. Check symptom and repair or replace the cause of malfunction.
5. Dose the turn signal and hazard warning lamps operate normally? Yes: GO TO 6. No: GO TO 4.
6. INSPECTION end.

Preliminary Check

EKS00EMX

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4

Refer to LT-138, "Wiring Diagram — TURN —" .

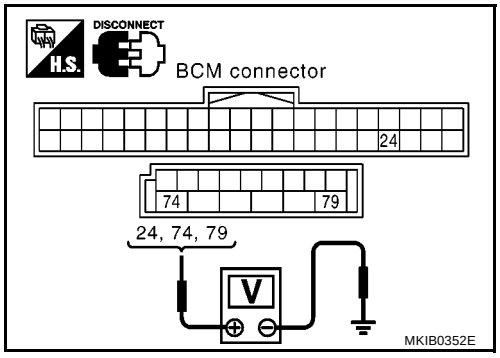
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. POWER SUPPLY CIRCUIT CHECK

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM connector and ground.

Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage



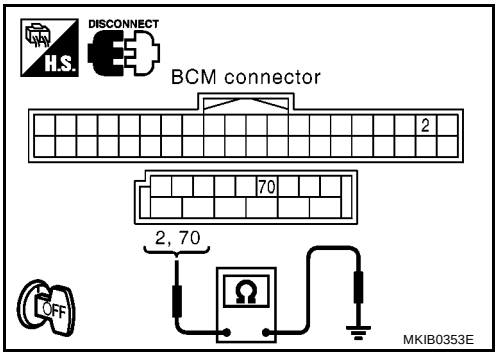
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse. If NG, repair or replace the harness or fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		



OK or NG

OK >> INSPECTION END
NG >> Repair or replace the harness (ground circuit).

CONSULT-II Functions (BCM)

EKS00EMY

CONSULT-II can display each diagnosis itemusing the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

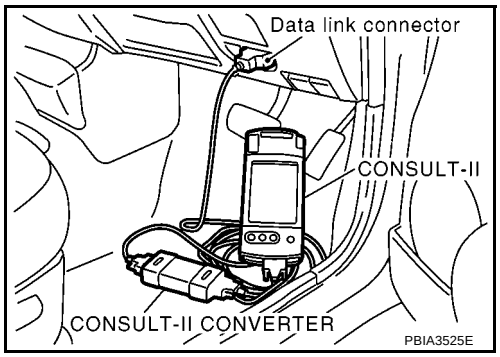
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Flasher	Work Support	Changes the setting for each function.
	Data monitor	Displays BCM input data in real time.
	Active Test	Sends a drive signal to electronic components to check their operation.

CONSULT-II BASIC OPERATION

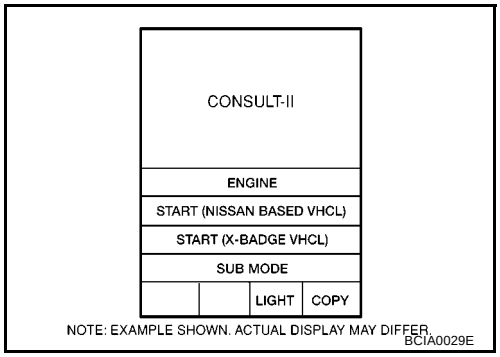
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

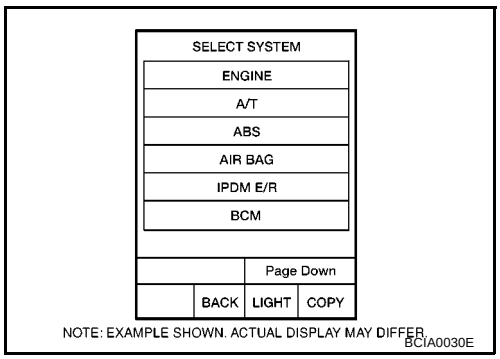
1. Turn ignition switch OFF.
2. Connect CONSULT-II and “CONSULT-II CONVERTER” to data link connector.



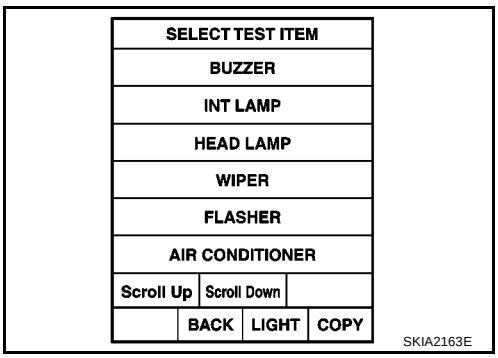
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



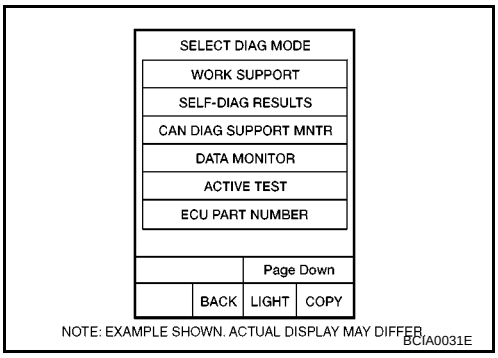
5. Touch “BCM” on “SELECT SYSTEM” screen.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “FLASHER” on “SELECT TEST ITEM” screen.



7. Touch "WORK SUPPORT", “DATA MONITOR” or "ACTIVE TEST" on “SELECT DIAG MODE” screen.



WORK SUPPORT

Supported Item	All items will be monitored.
HAZARD LAMP SET	hazard reminder function mode can be changed in this mode.

Hazard Lamp Set

	MODE1		MODE2		MODE3		MODE4	
Remote controller operation	Lock	Unlock	Lock	Unlock	Lock	Unlock	Lock	Unlock
Hazard warning lamp flash	-	-	-	Twice	Once	-	Once	Twice

DATA MONITOR

Operation Procedure

1. Touch “FLASHER” on “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.
3. Touch “ALL SIGNALS” or “SELETION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
SELECTION FROM MENU	Selects and monitors individual items.

4. Touch “START”.
5. When “SELECTION FROM MENU” is selected, touch items to be monitored. When “ALL SIGNALS” is selected, all the items will be monitored.
6. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

Display Item List

Monitor item “UNIT”		Display content
IGN ON SW	[ON/OFF]	Displays status (Ignition switch ON: ON/Others OFF, ACC: OFF) as judged from the ignition switch signal.
HAZARD SW	[ON/OFF]	Displays status (Hazard ON: ON/Hazard OFF: OFF) as judged from hazard switch signal.
TURN SIGNAL R	[ON/OFF]	Displays status (Turn right: ON/Others: OFF) as judged from lighting switch signal.

Monitor item “UNIT”		Display content
TURN SIGNAL L	[ON/OFF]	Displays status (Turn left: ON/Others: OFF) as judged from lighting switch signal.
TURN/L MNTR	[ON/OFF]	Displays status (One bulb blown: ON/Others: OFF) as judged from bulb signal.

ACTIVE TEST

Test Item	Description
FLASHER	This test is able to check left or right turn signal lamp operation. The turn signal lamp turned ON when "LH" or "RH" on CONSULT-II screen is touched.

Turn Signal Lamp Does Not Operate

EKS00EMZ

1. CHECK BULB

Check turn signal lamp bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace turn signal lamp bulb.

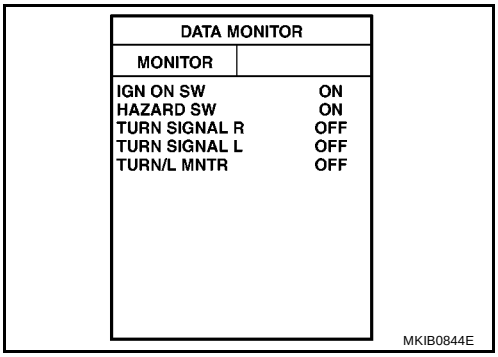
2. CHECK BCM INPUT SIGNAL

With CONSULT-II

Select BCM on CONSULT-II.Check turn signal (“TURN SIGNAL”) in “DATA MONITOR” mode with CONSULT-II.

When combination switch LH position : TURN SIGNAL L ON

When combination switch RH position : TURN SIGNAL R ON



Without CONSULT-II

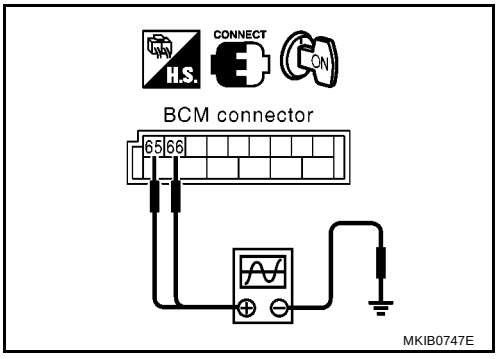
Refer to LT-196, "Check Combination Switch" .

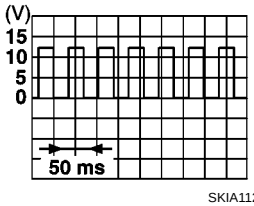
OK or NG

OK >> GO TO 3.
NG >> Refer to LT-196, "Check Combination Switch" .

3. CHECK BCM

1. Connect BCM connector and all turn signal lamp connectors.
2. Check voltage between BCM connector M50 terminals 65, 66 and ground.



Terminals				Condition		Voltage
(+)			(-)			
Connector		Terminal (Wire color)				
RH	M50	66 (R)	Ground	Combination switch	Turn right ON	
LH		65 (P)			Turn left ON	

OK or NG

OK >> Check harness for open between BCM and turn signal lamps, turn signal lamp ground circuit.
NG >>
- Replace BCM
- Check harness for short between BCM and turn signal lamps. If NG, repair or replace the harness.

Hazard Lamp Does Not Operate

EKS00EN0

1. CHECK BULB

Check turn signal lamp bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace turn signal lamp bulb.

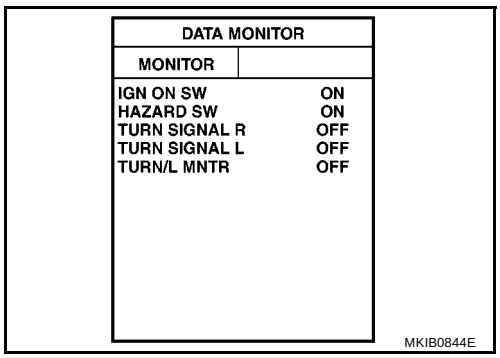
2. CHECK BCM INPUT SIGNAL

With CONSULT-II

Select BCM on CONSULT-II.Check turn signal (“HAZARD SW”) in “DATA MONITOR” mode with CONSULT-II.

When hazard switch ON : HAZARD SW ON

When hazard switch OFF : HAZARD SW OFF



Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

OK or NG

OK >> GO TO 3.
NG >> Refer to LT-196, "Check Combination Switch" .

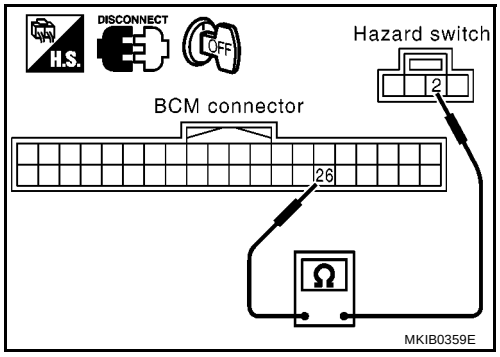
3. CHECK HAZARD SWITCH AND BCM

1. Turn ignition switch OFF.
2. Disconnect BCM connector and hazard switch connector.
3. Check continuity between harness connector M48 terminal 26 (L) of BCM and hazard switch harness connector M61 terminal 2 (L).

Continuity should exist.

4. Check continuity between harness connector M48 terminal 26 (L) of BCM and body ground.

Continuity should not exist.

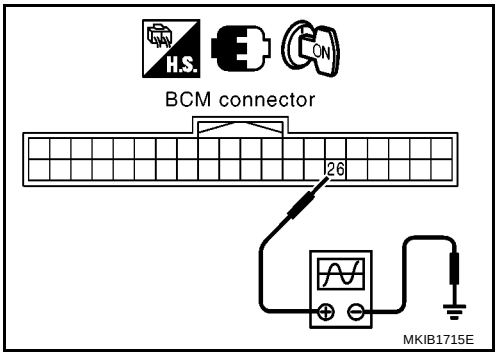


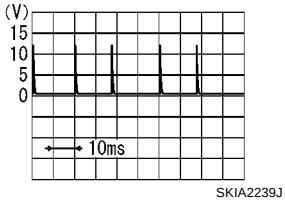
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

4. CHECK BCM AND GROUND

1. Connect BCM connector.
2. Check voltage between harness connector M48 terminal 26 (L) of BCM and ground with hazard switch in OFF position.



Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			IGN switch	Condition		
26	L	Hazard	OFF	Hazard switch	ON	Approx. 0
					OFF	

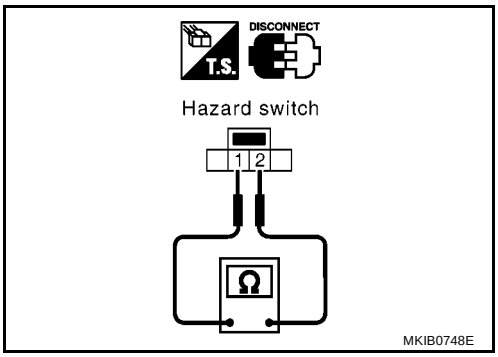
OK or NG

OK >> GO TO 5.
NG >> Replace BCM.

5. CHECK HAZARD SWITCH

Check continuity hazard switch connector M61.

Terminal		Condition	Continuity
2	1	Hazard switch is ON	Yes
		Hazard switch is OFF	No



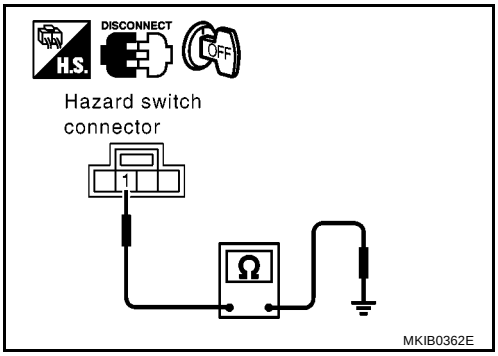
OK or NG

OK >> GO TO 6.
NG >> Replace hazard switch.

6. CHECK HAZARD SWITCH AND GROUND

Check continuity between harness connector M61 terminal 1 (B) of hazard switch and ground.

Continuity should exist.



OK or NG

OK >> INSPECTION END.
NG >> Repair or replace harness or connector.

Turn Signal Indicator Lamp Does Not Operate

EKS00EN1

1. CHECK BULB

Check indicator bulb.

OK or NG

OK >> Replace combination meter.
NG >> Replace indicator bulb.

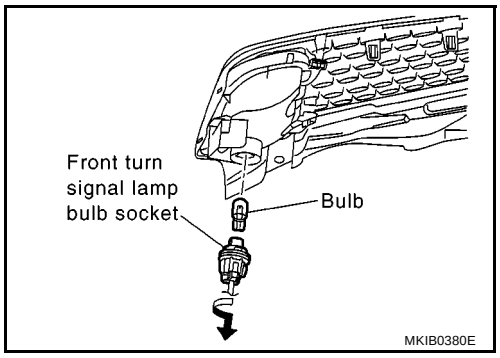
Bulb Replacement

EKS00EN2

FRONT TURN SIGNAL LAMP

1. Remove front grille. Refer to EI-8, "FRONT GRILLE" .
2. Turn bulb socket left to release lock and remove it.
3. Remove bulb.

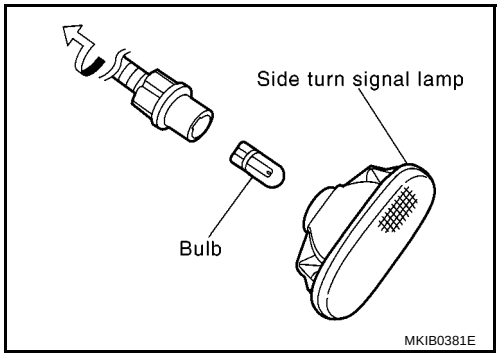
Front turn signal lamp : 12V-21W



SIDE TURN SIGNAL LAMP

1. Remove side turn signal lamp. Refer to LT-151, "SIDE TURN SIGNAL LAMP" .
2. Turn bulb socket left to release lock and remove it.
3. Remove bulb.

Side turn signal lamp : 12V-5W



REAR TURN SIGNAL LAMP

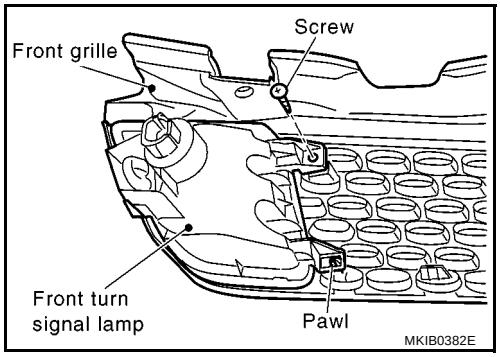
Refer to LT-186, "REAR COMBINATION LAMP" .

Removal and Installation

EKS00EN3

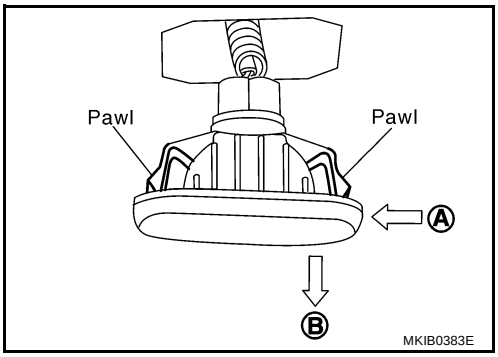
FRONT TURN SIGNAL LAMP

1. Remove front grille. Refer to EI-8, "FRONT GRILLE" .
2. Remove screw and tabs, and then remove front turn signal lamp from front grille.



SIDE TURN SIGNAL LAMP

1. Pull the side turn signal lamp in direction B while pushing it in direction A as shown by the arrow in the figure and remove from the vehicle.
2. Disconnect side turn signal lamp connector.
   When installing, face surface with rib upwards.



REAR TURN SIGNAL LAMP

Refer to LT-186, "REAR COMBINATION LAMP" .

PARKING, LICENSE PLATE AND TAIL LAMPS

PFP:26550

System Description

EKS00EN4

The parking, license plate and tail lamps operation is controlled by the lighting switch which built into the combination switch, BCM (body control module) and IPDM E/R (intelligent power distribution module engine room).Tail lamp relay is built into IPDM E/R.BCM read combination switch condition.Refer toLT-189, "System Description"

Power is supplied at all times

- to tail lamp relay, located in the IPDM E/R, and
- to IPDM E/R
- through 20A fusible link (No.52, located in the IPDM E/R).

Power is also supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box).

With the ignition switch in the ON or START position, power is supplied

- to BCM terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)].

Ground is supplied

- to BCM terminals 2 and 70
- through body grounds M19 and M20.
- to IPDM E/R terminals 3 and 54
- through body grounds E25(Gasoline engine models), E26 and E40.

OPERATION BY LIGHTING SWITCH

When the lighting switch is turned to 1ST position, BCM read combination switch condition (refer to LT-189, "System Description"). And BCM send parking, license plate and tail lamps request signal to IPDM E/R with CAN communication line. Then IPDM E/R is turned on tail lamp relay. Tail lamp relay is energized and then power is supplied.

- through terminal 49 of the IPDM E/R
- to parking lamp LH terminal 1
- through terminal 15 of the IPDM E/R
- to rear combination lamp LH terminal 3
- through terminal 45 of the IPDM E/R
- to parking lamp RH terminal 1
- through terminal 16 of the IPDM E/R
- to rear combination lamp RH terminal 3
- to license plate lamp terminal 2.

Ground is supplied at all times

- to each parking lamps terminal 2
- through body grounds E25(Gasoline engine models), E26 and E40
- to each rear combination lamps terminal 4
- to license plate lamp terminal 1
- through body grounds B17, B23, B44 and B51.

With power and ground supplied, the parking, license plate and tail lamps illuminate.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, parking, license plate and tail lamps illuminate when the ignition switch is turned from OFF to ON or ACC and parking, license plate and tail lamps are turned off when the ignition switch is turn from ON or ACC to OFF. If the fail-safe system is operating, parking, license plate and tail lamps does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control. (Refer to PG-19, "FAIL-SAFE FUNCTION")

CAN Communication

EKS00ERM

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LTC

Go to CAN system, when selecting your car model from the following table.

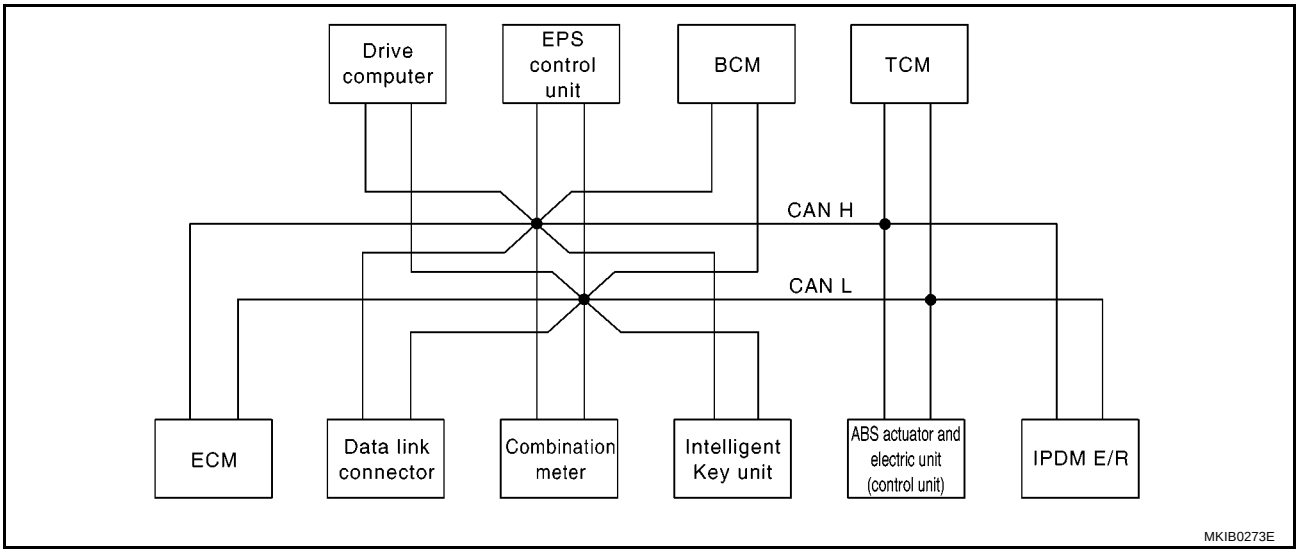
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-155, "TYPE 1/ TYPE 2"				LT-158, "TYPE 3/ TYPE 4"				LT-160, "TYPE 5/ TYPE 6"				LT-163, "TYPE 7/ TYPE 8"				LT-165, "TYPE 9/ TYPE 10"			

×: Applicable

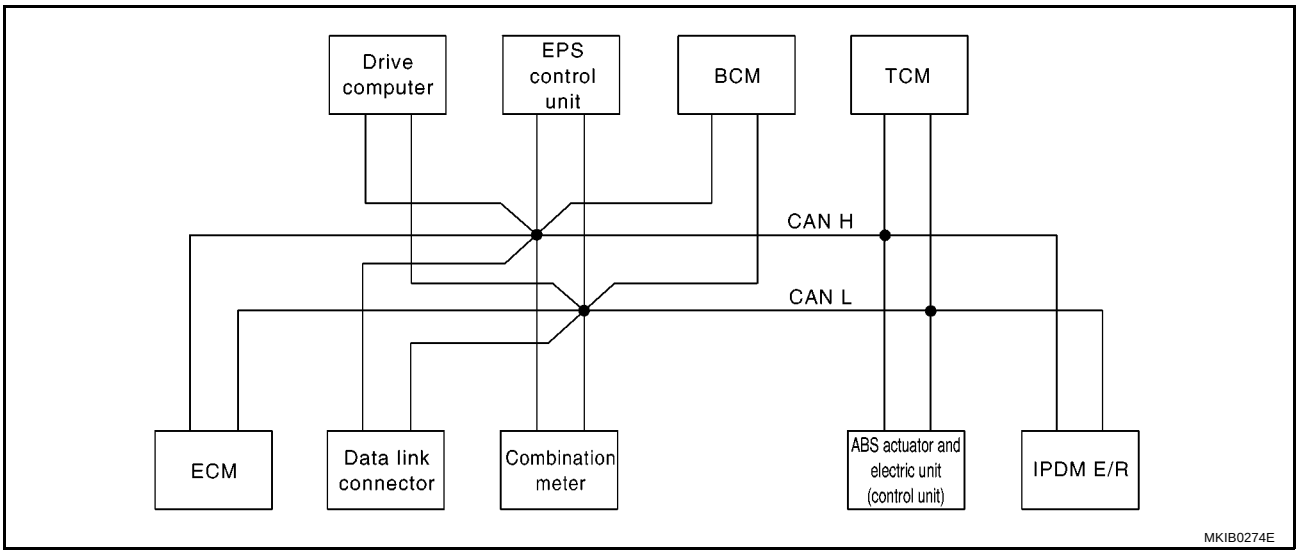
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

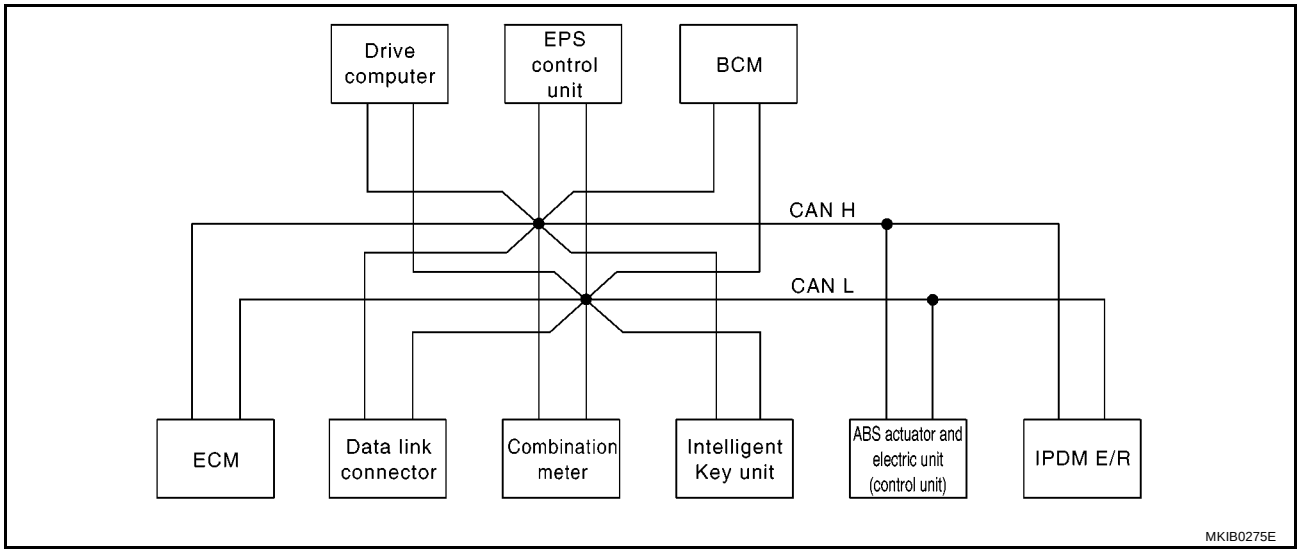
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

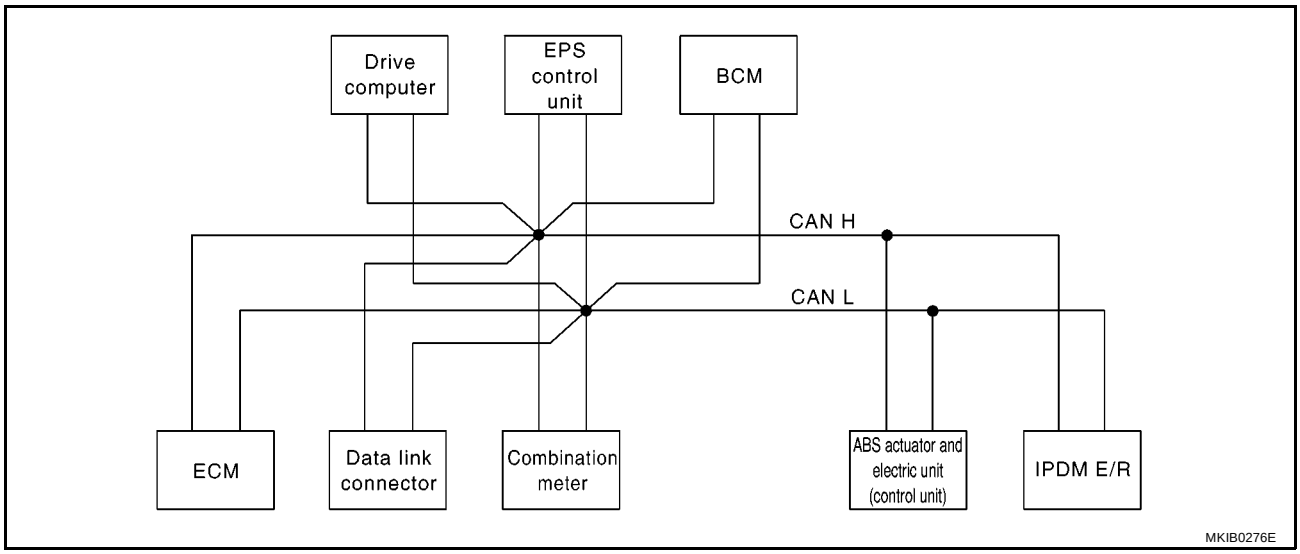
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

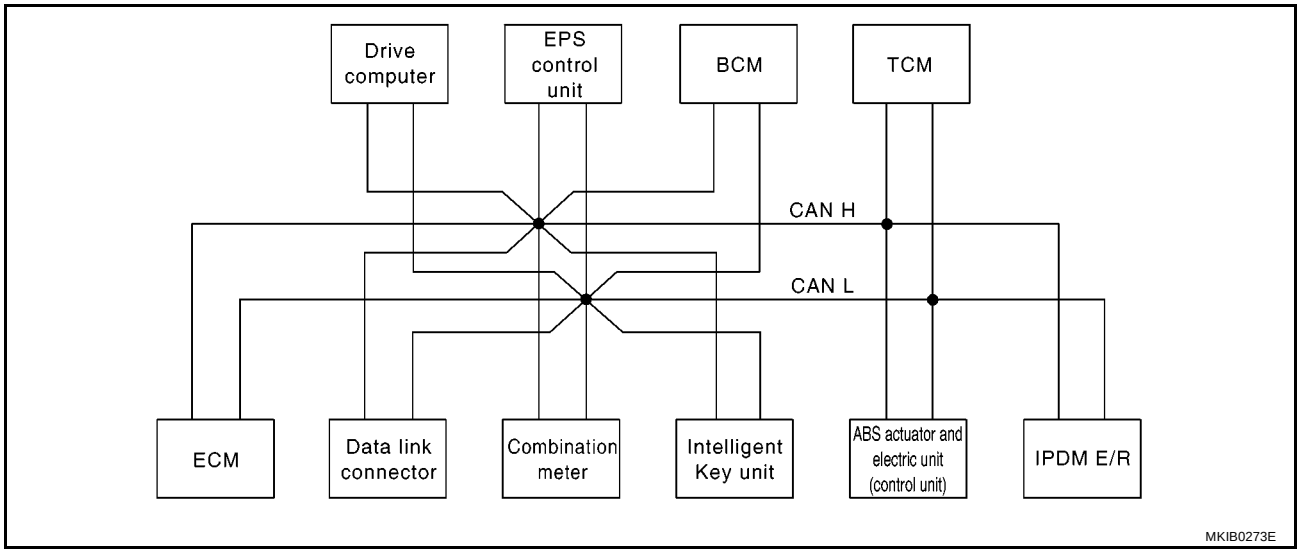
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

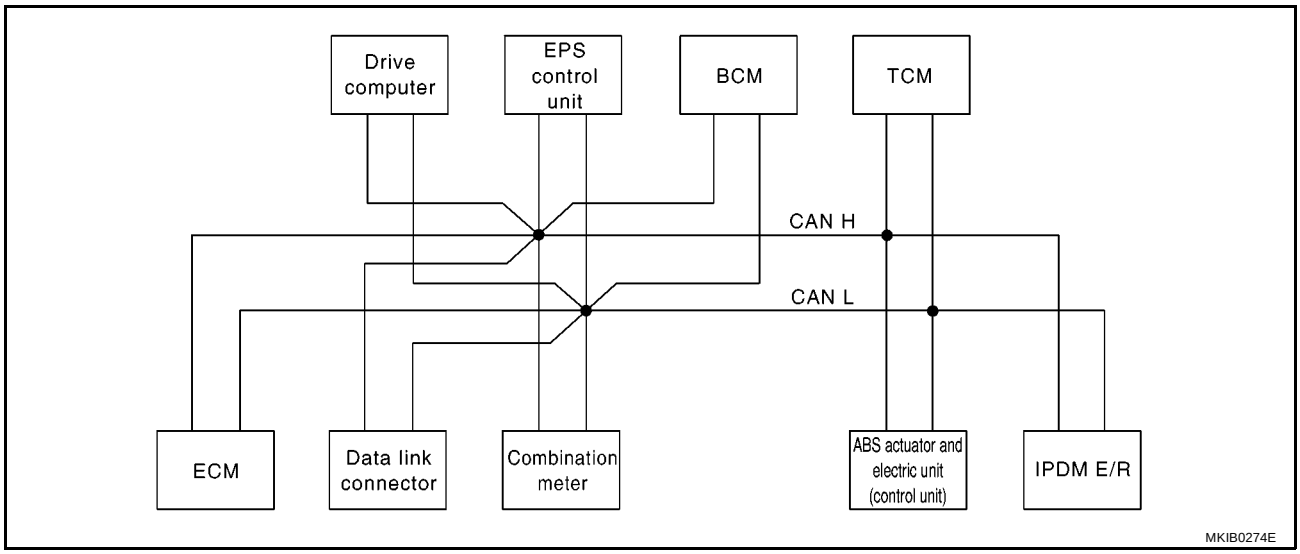
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

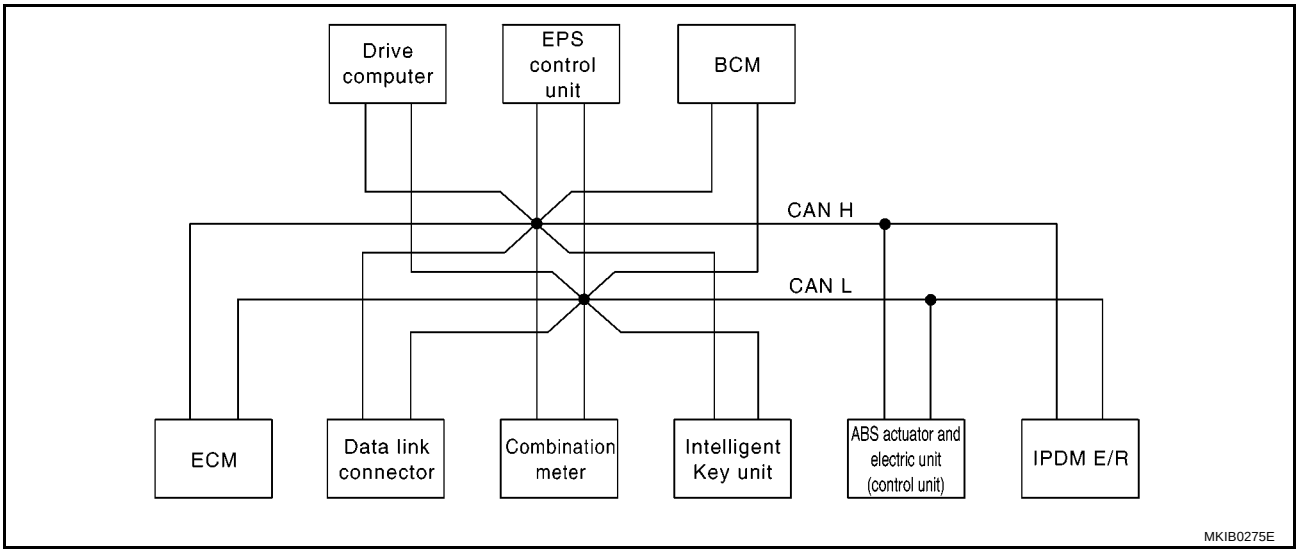
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

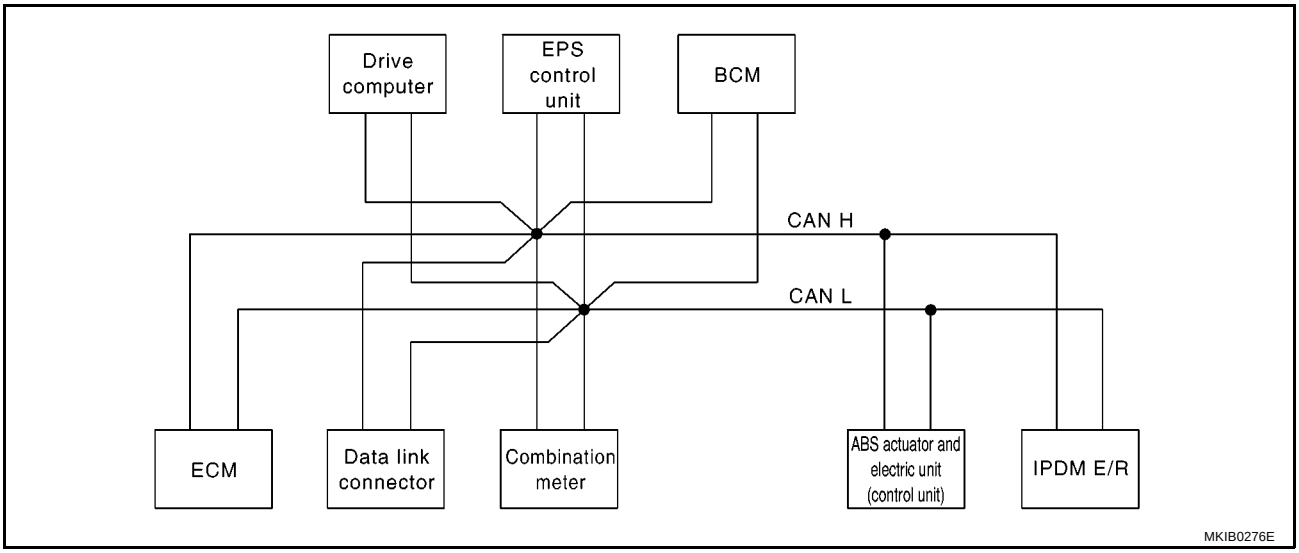
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

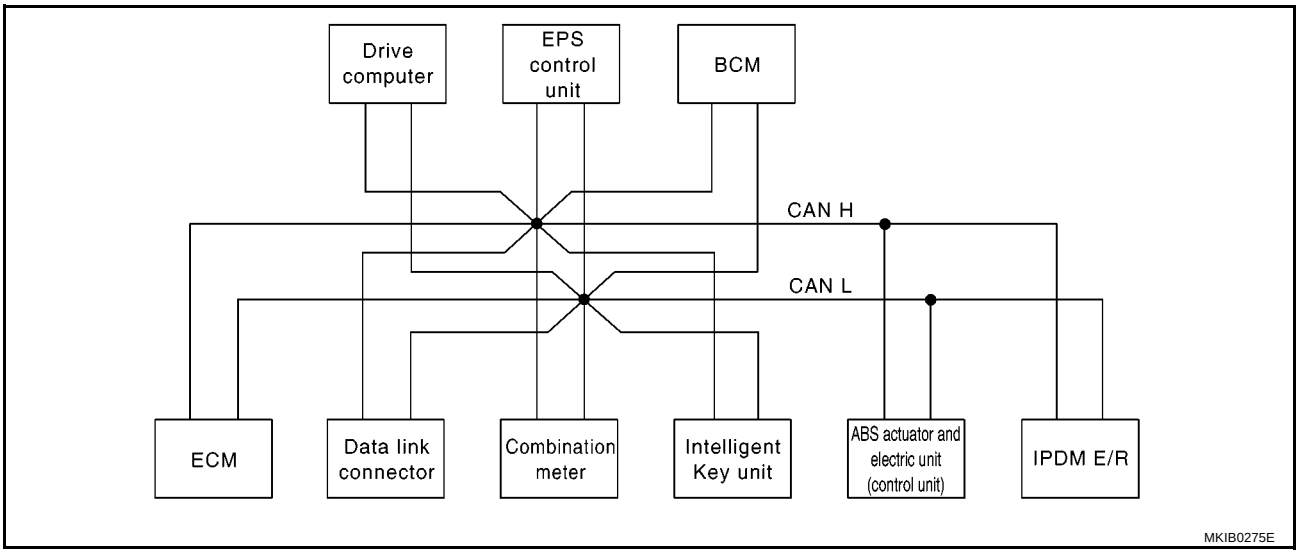
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

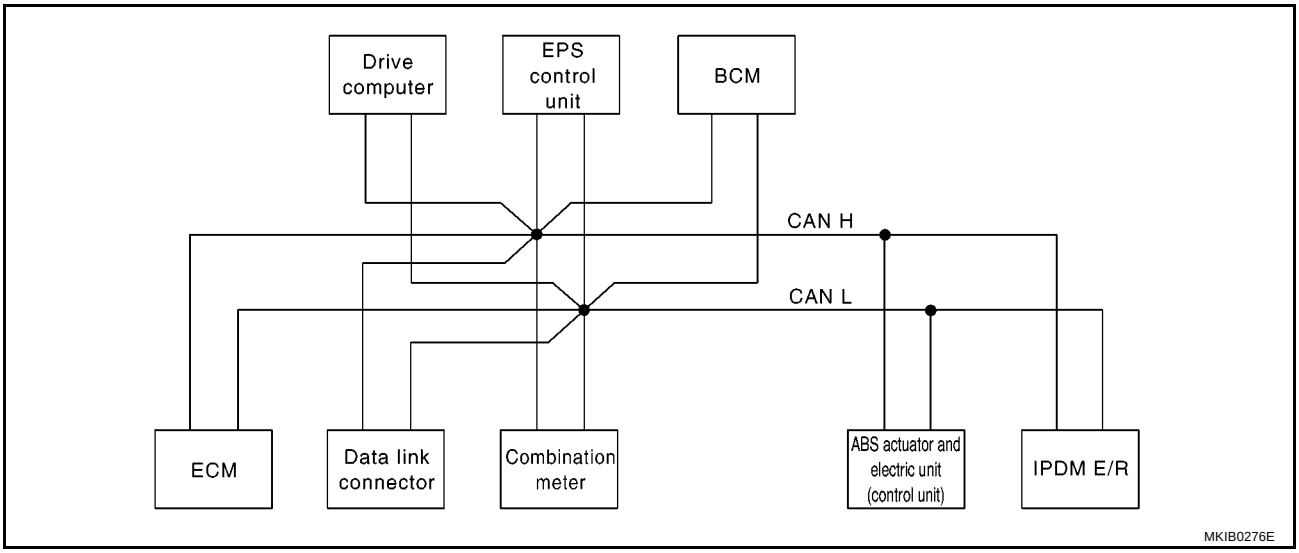
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

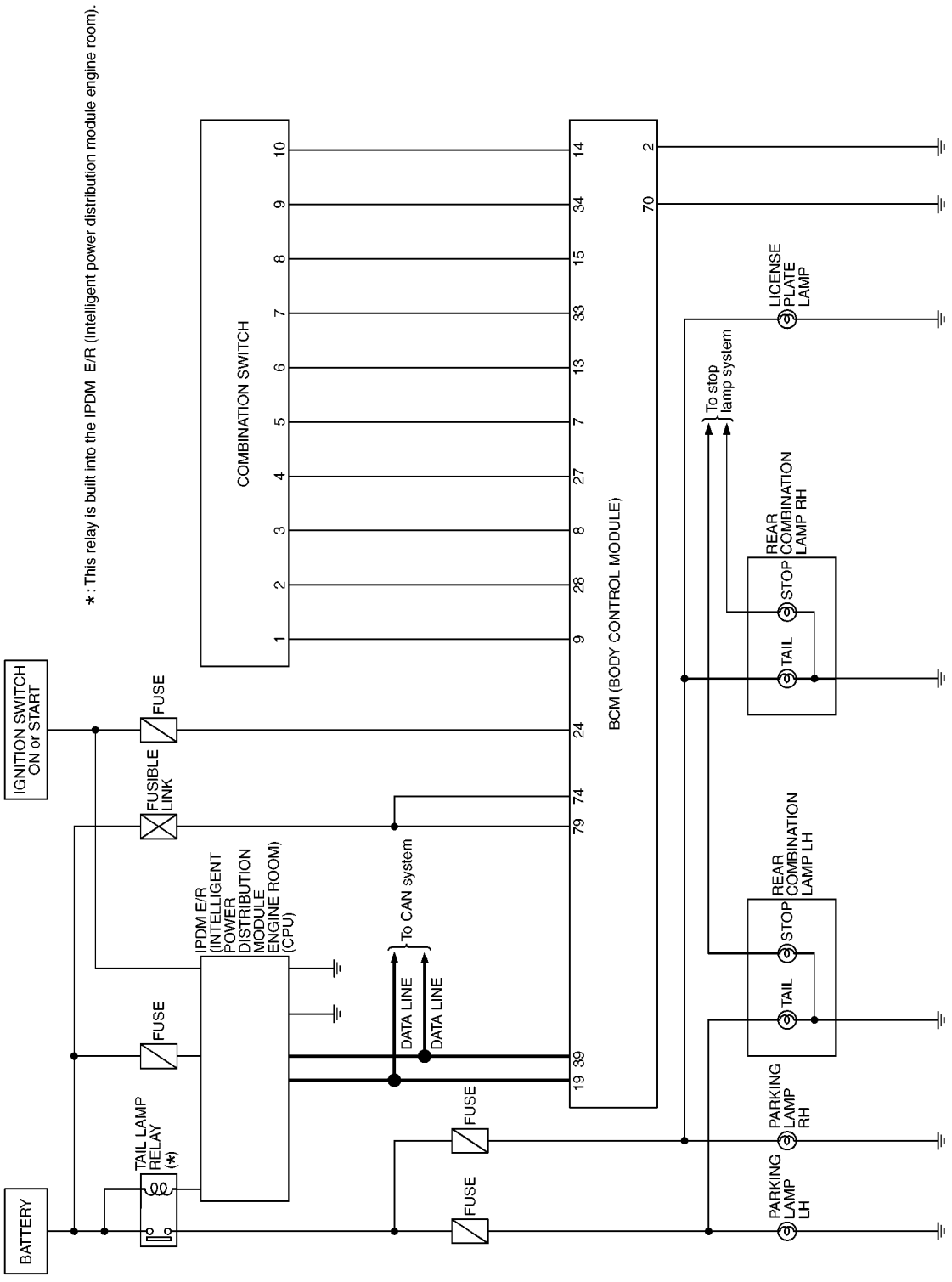
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic

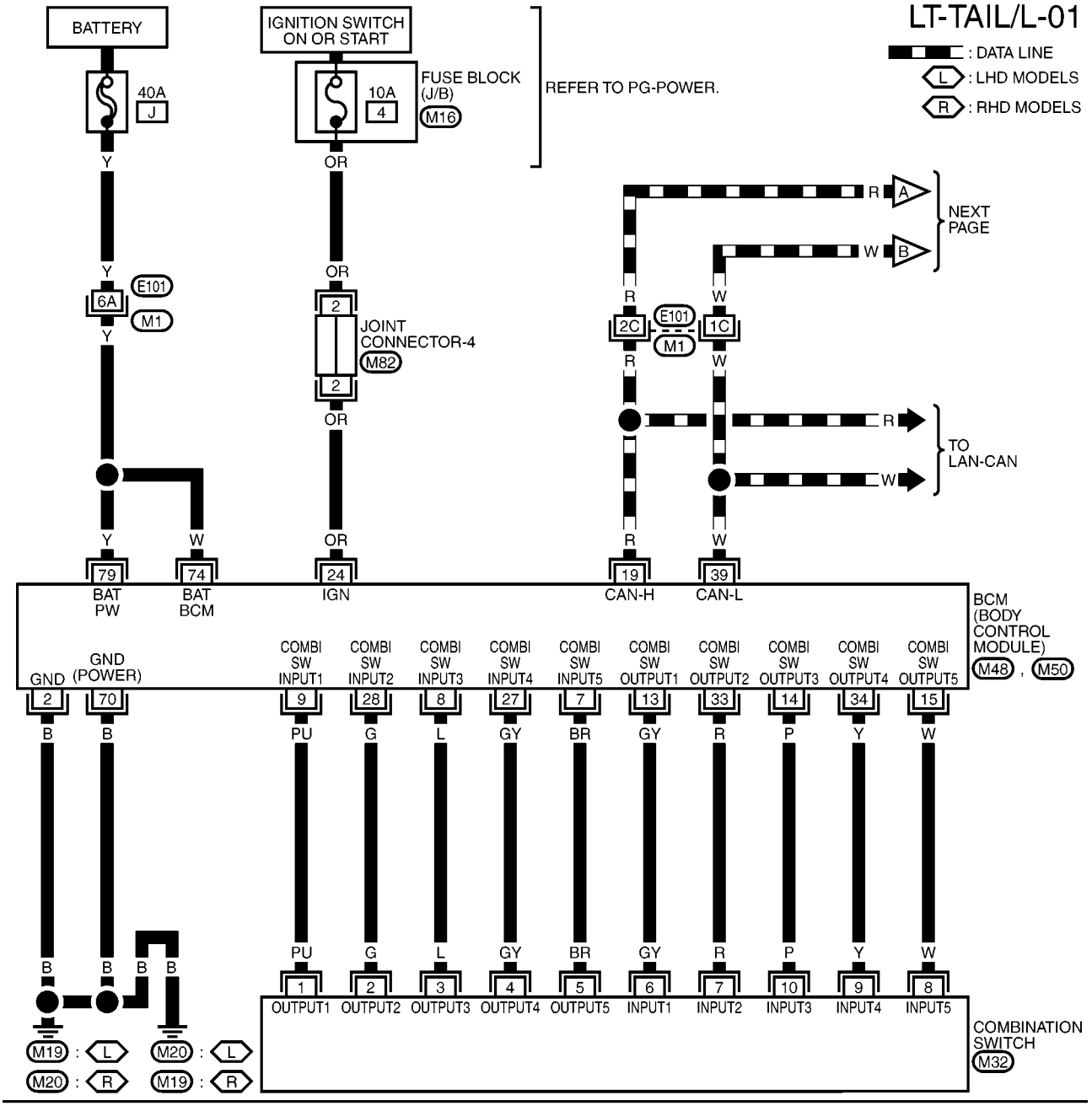
EKS00EN6



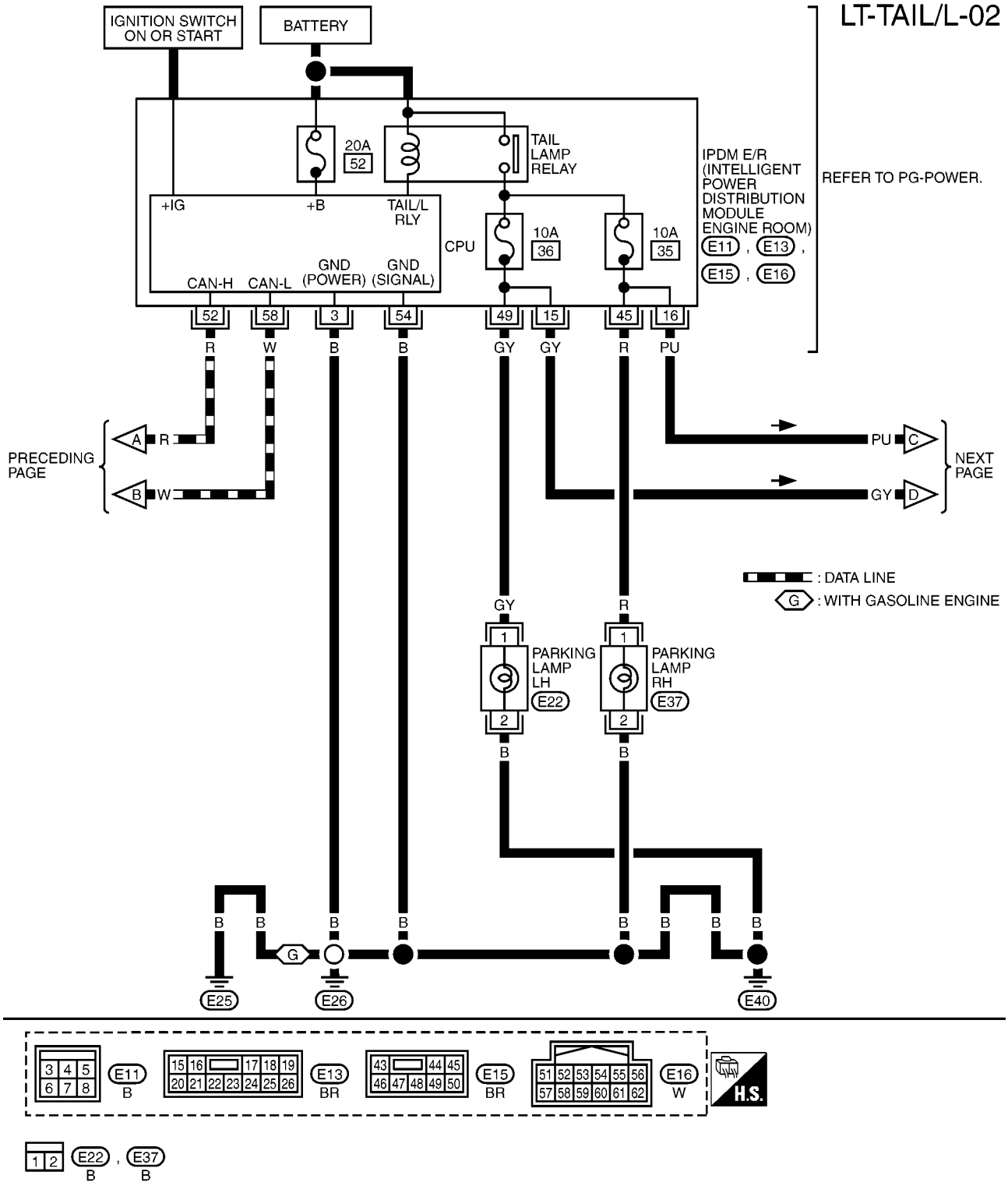
MKWA1440E

Wiring Diagram — TAIL/L —

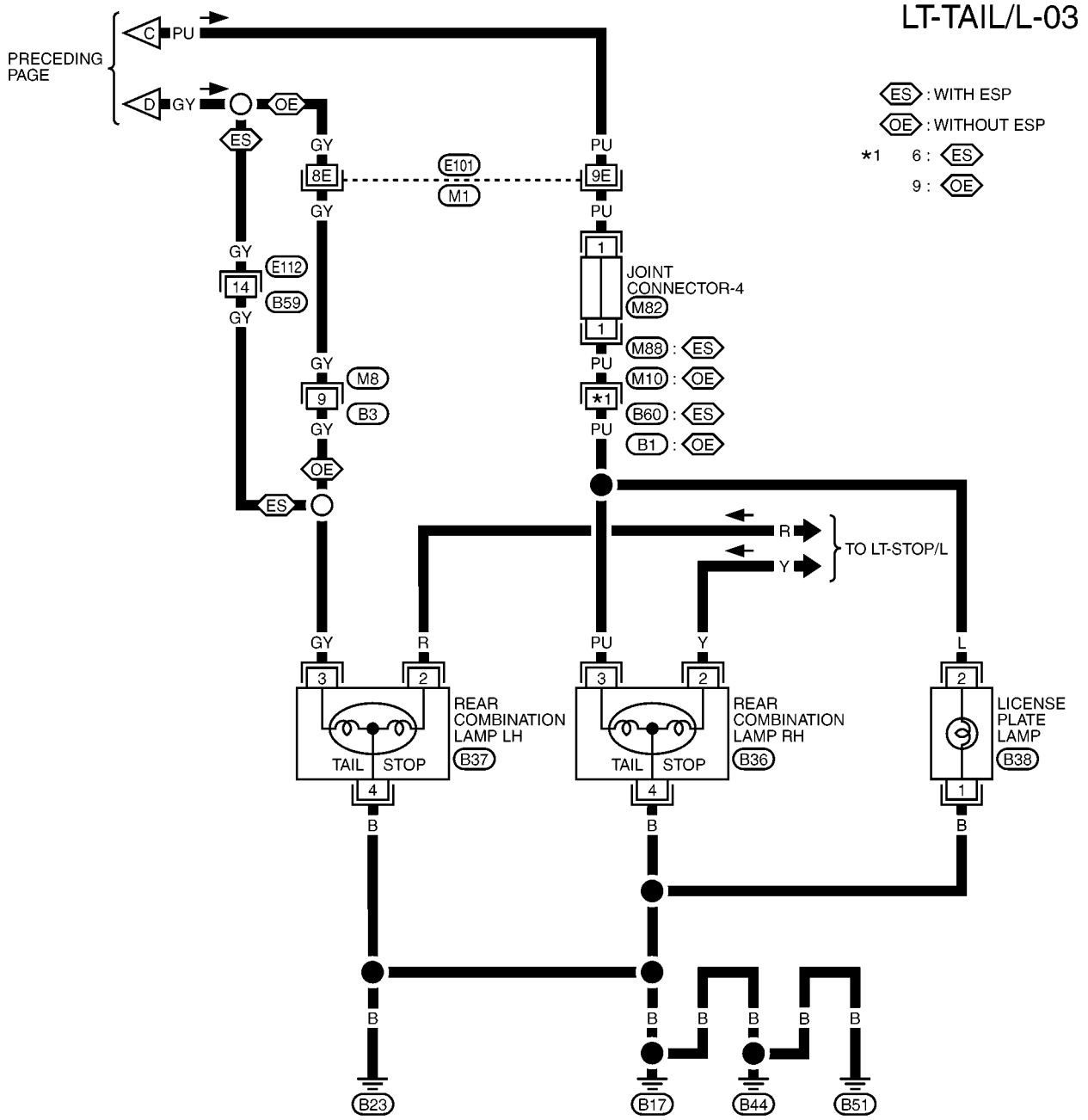
SMA for VIN >SJN**AK12U1309269 EKS00EN7

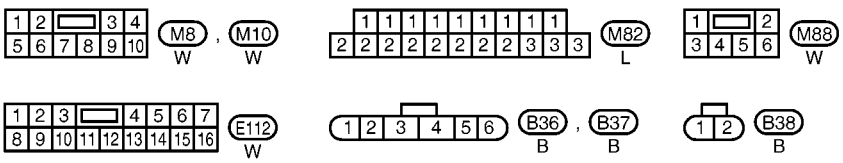


MKWA1525E


LT-TAIL/L-02
IGNITION SWITCH ON OR START
BATTERY
20A 52
TAIL LAMP RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11, E13, E15, E16
REFER TO PG-POWER.
+IG
+B
TAIL/L RLY
CPU
10A 36
10A 35
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
52 58 3 54 49 15 45 16
R W B B GY GY R PU
PRECEDING PAGE
A R
B W
PU C
GY D
NEXT PAGE
: DATA LINE
G : WITH GASOLINE ENGINE
GY R
1 1
PARKING LAMP LH E22
PARKING LAMP RH E37
2 2
B B
B B G B B B B B B
E25 E26 E40
3 4 5 6 7 8 E11 B
15 16 17 18 19 20 21 22 23 24 25 26 E13 BR
43 44 45 46 47 48 49 50 E15 BR
51 52 53 54 55 56 57 58 59 60 61 62 E16 W
H.S.
1 2 E22 B , E37 B

MKWA1441E



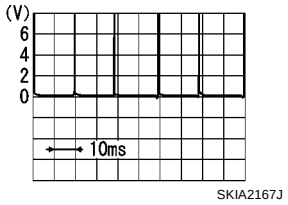
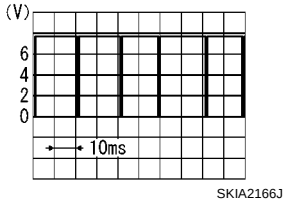
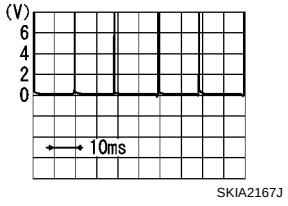


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1753E

Terminals and Reference Value for BCM

EKS00EN8

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	—	—	Approx. 12
79	Y	Battery power supply	—	—	Approx. 12

Terminals and Reference Value for IPDM E/R

EKS00EN9

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
15 16 45 49	GY PU R GY	Tail lamp (LH) Tail lamp (RH) Tail lamp (RH) Tail lamp (LH)	ON	Lighting switch	1st position	Approx. 12
					OFF	Approx. 0
52	R	CAN H	—	—		—
54	B	Ground	ON	—		Approx. 0
58	W	CAN L	—	—		—

How to Proceed With Trouble Diagnosis

EKS00ENA

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Parking, license plate and tail lamps LT-152, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-173, "Preliminary Check" .
4. Confirm parking, license plate and tail lamps does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION" .
5. Check symptom and repair or replace the cause of malfunction.
6. Dose the parking, license plate and tail lamps operate normally? Yes: GO TO 7. No: GO TO 5.
7. INSPECTION END.

Preliminary Check

EKS00ENB

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4

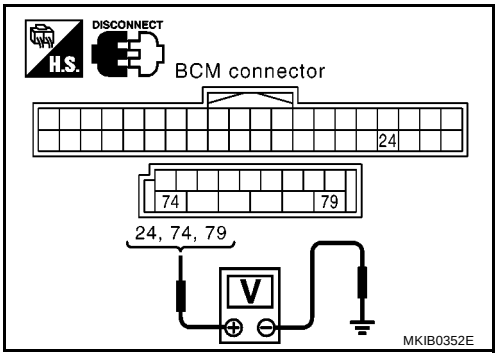
Refer to LT-169, "Wiring Diagram — TAIL/L —" .

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. POWER SUPPLY CIRCUIT CHECK

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM connector and ground.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

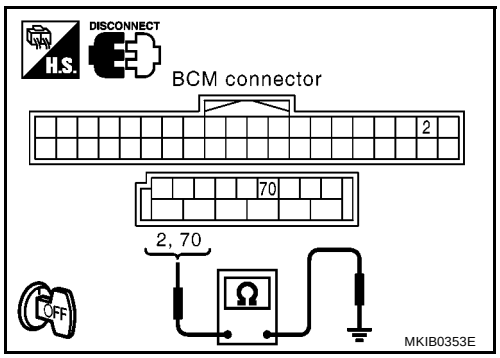
OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse. If NG, repair or replace the harness.

3. GROUND CIRCUIT CHECK

Check continuity between BCM and ground.

Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		



OK or NG

OK >> INSPECTION END.
NG >> Repair or replace the harness.

CONSULT-II Function (BCM)

EKS00ENC

Refer to LT-28, "CONSULT-II Functions (BCM)" .

CONSULT-II Function (IPDM E/R)

EKS00END

Refer to LT-31, "CONSULT-II Functions (IPDM E/R)" .

Parking, License Plate And Tail Lamps Does Not Illuminate

EKS00ENE

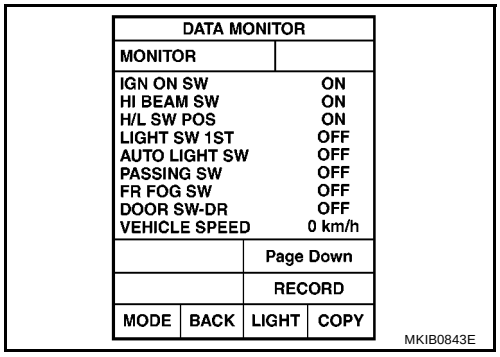
1. CHECK BETWEEN COMBINATION SWITCH AND BCM

With CONSULT-II

Select BCM on CONSULT-II.Check lighting switch (“LIGHT SW 1ST”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 1ST position : LIGHT SW 1ST ON

When lighting switch is in OFF position : LIGHT SW 1ST OFF



Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

OK or NG

OK >> GO TO 2.
NG >> Refer to LT-196, "Check Combination Switch" .

2. CHECK BETWEEN IPDM E/R TO PARKING LAMP

With CONSULT-II

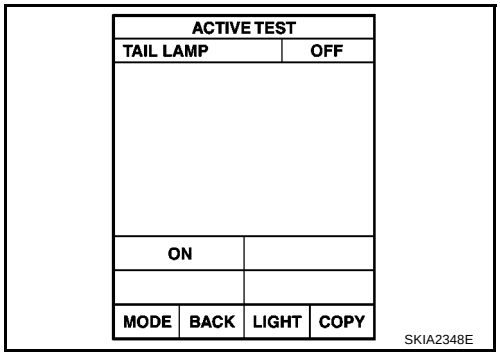
1. Select “IPDM E/R” by CONSULT-II, and select “Active test” on “Diagnosis System selection” screen.
2. Select “TAIL LAMP” on “Select Test Item” screen.
3. Make sure that parking lamps operate normally.

Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that parking lamps operate normally.

OK or NG

OK >> GO TO 3.
NG >> Replace IPDM E/R.

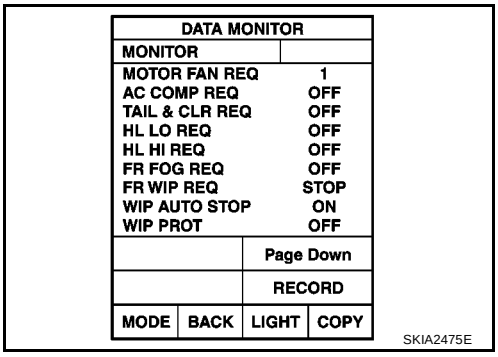


3. CHECK BETWEEN IPDM E/R AND BCM

Select IPDM E/R on CONSULT-II.Check lighting switch (“TAIL & CLR REQ”) in “DATA MONITOR” mode with CONSULT-II.

When lighting switch is in 1ST position : TAIL & CLR REQ ON

When lighting switch is in OFF position : TAIL & CLR REQ OFF



OK or NG

OK >> INSPECTION END
NG >> Replace BCM.

Parking Lamp Does Not Illuminate (One Side)

EKS00ENF

1. CHECK BULB

Check bulb of lamp which does not illuminate.

OK or NG

OK >> GO TO 2.
NG >> Replace parking lamp bulb.

2. CHECK FUSE

Check the following

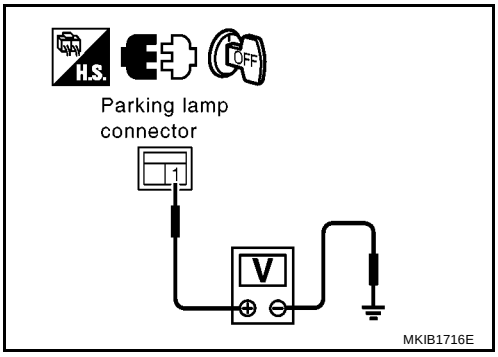
- 10A fuse (No. 35, located in the IPDM E/R).
- 10A fuse (No. 36, located in the IPDM E/R).

OK or NG

OK >> GO TO 3.
NG >> Replace fuse.

3. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect parking lamp connector.
3. Check voltage between parking lamp harness connector terminal 1 and ground.



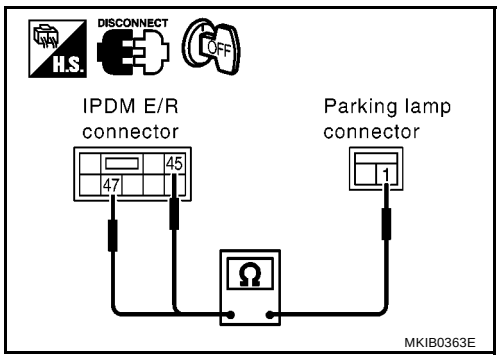
Terminals				Condition	Voltage [V]
(+)			(–)		
Connector		Terminal (Wire color)			
RH	E37	1 (R)	Ground	Lighting switch 1st position	Battery voltage
LH	E22	1 (GY)			

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK BETWEEN IPDM E/R AND PARKING LAMP

1. Disconnect IPDM E/R connector.
2. Check harness continuity between IPDM E/R connector and parking lamp connector.



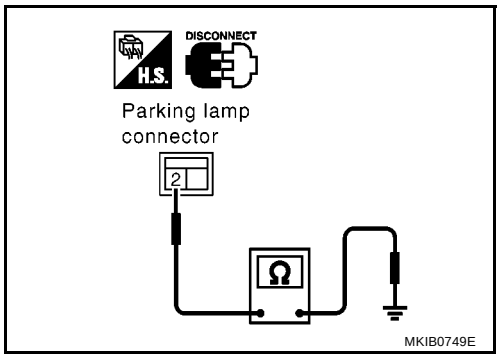
Terminals					Continuity
IPDM E/R		Parking lamp			
Connector	Terminal (Wire color)	Connector		Terminal (Wire color)	
E15	45 (R)	RH	E37	1 (R)	Yes
	49 (GY)	LH	E22	1 (GY)	

OK or NG

OK >> Replace IPDM E/R.
NG >> Repair or replace harness or connector.

5. CHECK GROUND CIRCUIT

Check continuity between parking lamp harness connector and ground.



Terminals				Continuity
Connector		Terminal (Wire color)		
RH	E37	2 (B)	Ground	Yes
LH	E22	2 (B)		

OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

Rear Combination Lamp (Tail lamp) Does Not Illuminate (One Side)

EKS00ENG

1. CHECK BULB

Check rear combination lamp (tail lamp) bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace rear combination lamp (tail lamp) bulb.

2. CHECK FUSE

Check the following

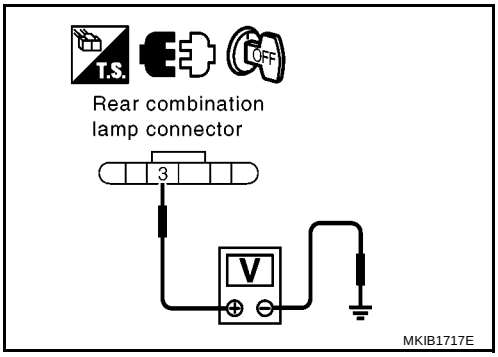
- 10A fuse (No. 35, located in the IPDM E/R).
- 10A fuse (No. 36, located in the IPDM E/R).

OK or NG

OK >> GO TO 3.
NG >> Replace fuse.

3. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear combination lamp (tail lamp) connector.
3. Check voltage between rear combination lamp (tail lamp) connector and ground.



Terminals				Condition	Voltage [V]
(+)			(–)		
Connector		Terminal (Wire color)			
RH	B36	3 (PU)	Ground	Lighting switch 1st position	Battery voltage
LH	B37	3 (PU)			

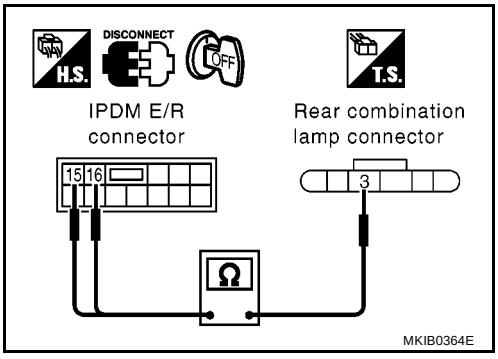
OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK BETWEEN IPDM E/R AND REAR COMBINATION LAMP (TAIL LAMP)

1. Disconnect IPDM E/R connector.
2. Check harness continuity between IPDM E/R connector and rear combination lamp (tail lamp) connector.

Terminals					Continuity
IPDM E/R		Rear combination lamp			
Connector	Terminal (Wire color)	Connector		Terminal (Wire color)	
E13	16 (PU)	RH	B36	3 (PU)	Yes
	15 (GY)	LH	B37	3 (GY)	



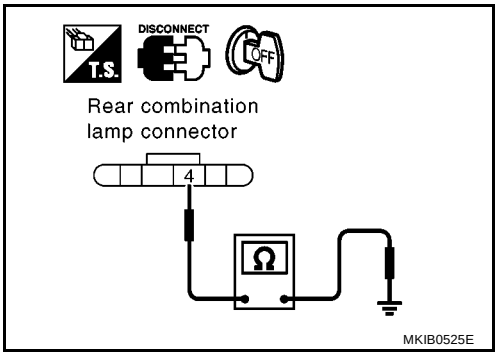
OK or NG

OK >> Replace IPDM E/R.
NG >> Repair or replace harness or connector.

5. CHECK GROUND CIRCUIT

Check continuity between tail lamp and ground.

Terminals				Continuity
(+)			(–)	
Connector		Terminal (Wire color)		
RH	B36	4 (B)	Ground	Yes
LH	B37	4 (B)		



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

License plate Lamp Does Not Illuminate

EKS00ENH

1. CHECK BULB

Check bulb of lamp which does not illuminate.

OK or NG

OK >> GO TO 2.
NG >> Replace license plate lamp bulb.

2. CHECK FUSE

Check the following

- 10A fuse (No. 35, located in the IPDM E/R).

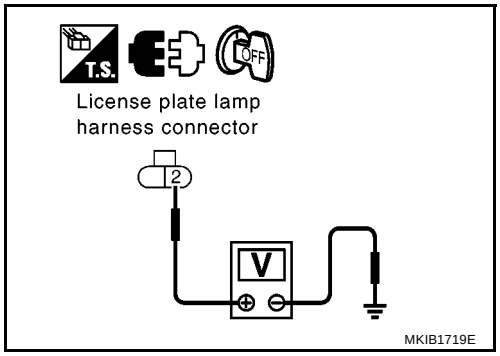
OK or NG

OK >> GO TO 3.
NG >> Replace fuse.

3. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect license plate lamp connector.
3. Check voltage between license plate lamp connector B38 terminal 2 (L) and ground.

Battery voltage.



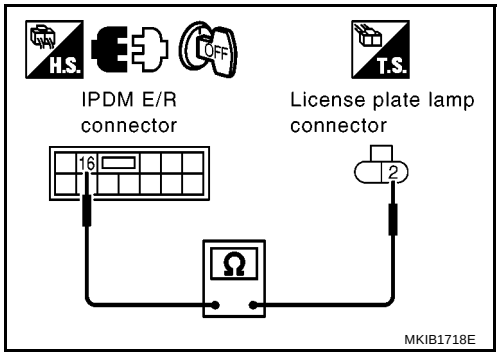
OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK BETWEEN IPDM E/R AND LICENSE PLATE LAMP

1. Disconnect IPDM E/R connector.
2. Check continuity between license plate lamp connector B38 terminal 2 (L) and IPDM E/R connector E13 terminal 16 (PU).

Continuity should exist.



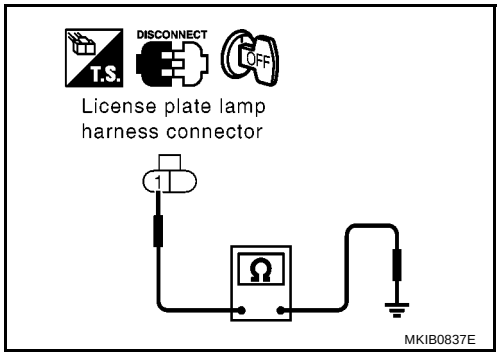
OK or NG

OK >> Replace IPDM E/R.
NG >> Repair or replace harness or connector.

5. CHECK GROUND CIRCUIT

Check continuity between license plate lamp connector B38 terminal 1 (B) and ground.

Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness.

Parking, License Plate and Tail Lamps Do Not Turn OFF (After Approx. 10 Minutes)

EKS00ENI

1. CHECK IPDM E/R

- Check whether symptom is caused by IPDM E/R fail-safe operation or by factors other than fail-safe operation.Refer to PG-19, "FAIL-SAFE FUNCTION" .

OK or NG

Fail-safe operation>>Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)" .
Other than fail-safe operation>>Refer to PG-51, "Diagnosis of IPDM E/R Integrated Relay"

Bulb Replacement

EKS00ENJ

PARKING LAMP

Refer to LT-41, "Bulb Replacement" .

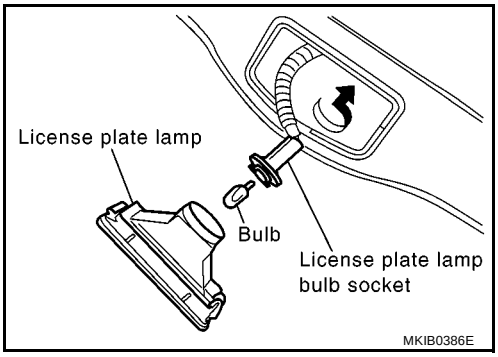
TAIL LAMP

Refer to LT-186, "REAR COMBINATION LAMP" .

LICENSE PLATE LAMP

1. Remove license plate lamp. Refer to LT-180, "LICENSE PLATE LAMP" .
2. Rotate license plate lamp bulb socket counterclockwise to release lock, then remove socket.
3. Remove bulb from license plate lamp bulb socket.

License plate lamp : 12V-10W



Removal and Installation of Parking Lamp, Tail Lamp and License Plate Lamp

EKS00ENK

PARKING LAMP

Refer to LT-41, "Removal and Installation" .

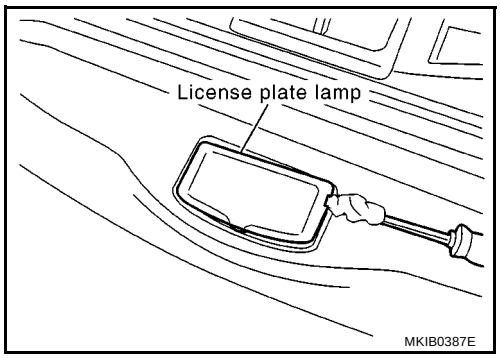
TAIL LAMP

Refer to LT-186, "REAR COMBINATION LAMP" .

LICENSE PLATE LAMP

Removal

1. Insert a screwdriver or the like wrapped in a cloth into the lens notch and remove license plate lamp from rear bumper.



Installation

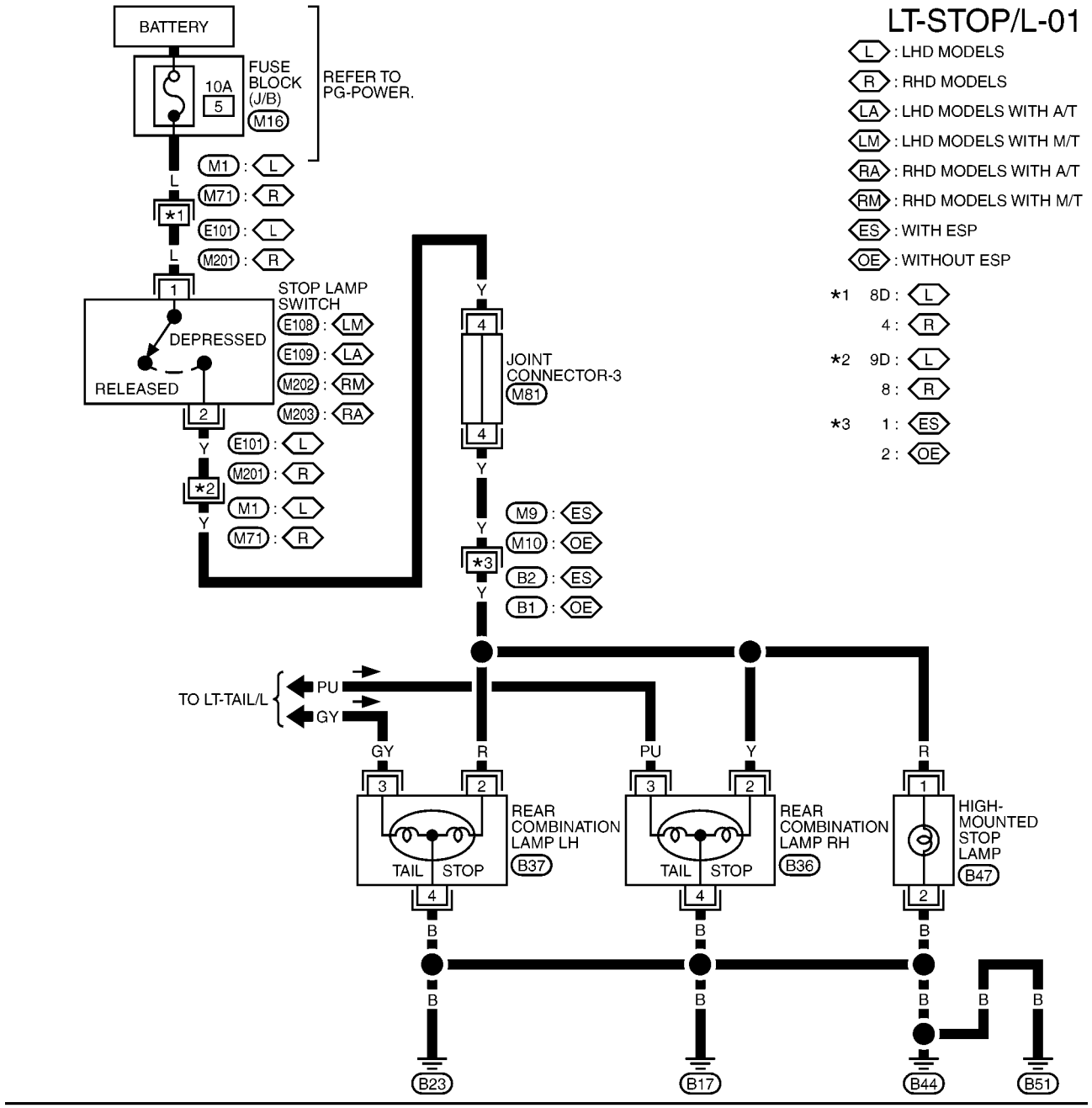
Install in the reverse order of removal.

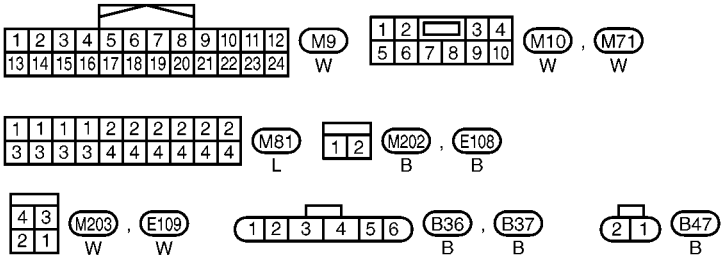
STOP LAMP

PFP:26554

Wiring Diagram— STOP/L —

SMA for VIN >SJN**AK12U1309269 EKS00ENL





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1754E

Bulb Replacement

EKS00ENM

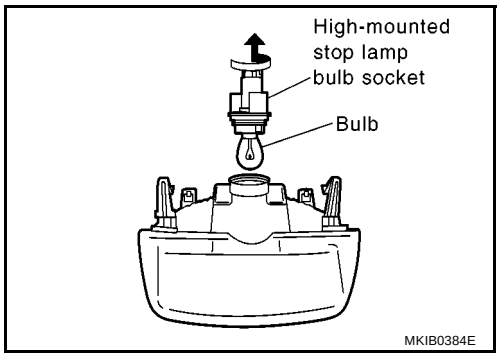
STOP LAMP

Refer to LT-186, "REAR COMBINATION LAMP" .

HIGH-MOUNTED STOP LAMP

1. Remove high-mounted stop lamp. Refer to LT-182, "HIGH-MOUNTED STOP LAMP" .
2. Turn bulb socket left to release lock and remove it.
3. Remove bulb.

High-mounted stop lamp : 12V-21W



Removal and Installation

EKS00ENN

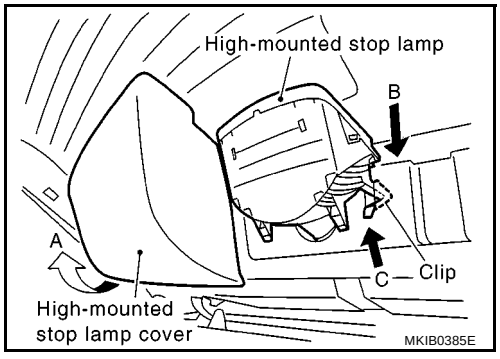
STOP LAMP

Refer to LT-186, "REAR COMBINATION LAMP" .

HIGH-MOUNTED STOP LAMP

Removal

1. Open back door and with both hands pull high-mounted stop lamp cover roof side horizontal edge in direction A to remove it.
2. Push high-mounted stop lamp clip shown in figure in direction B, release top hooks, then push in direction C to release it, then remove it from back door.



Installation

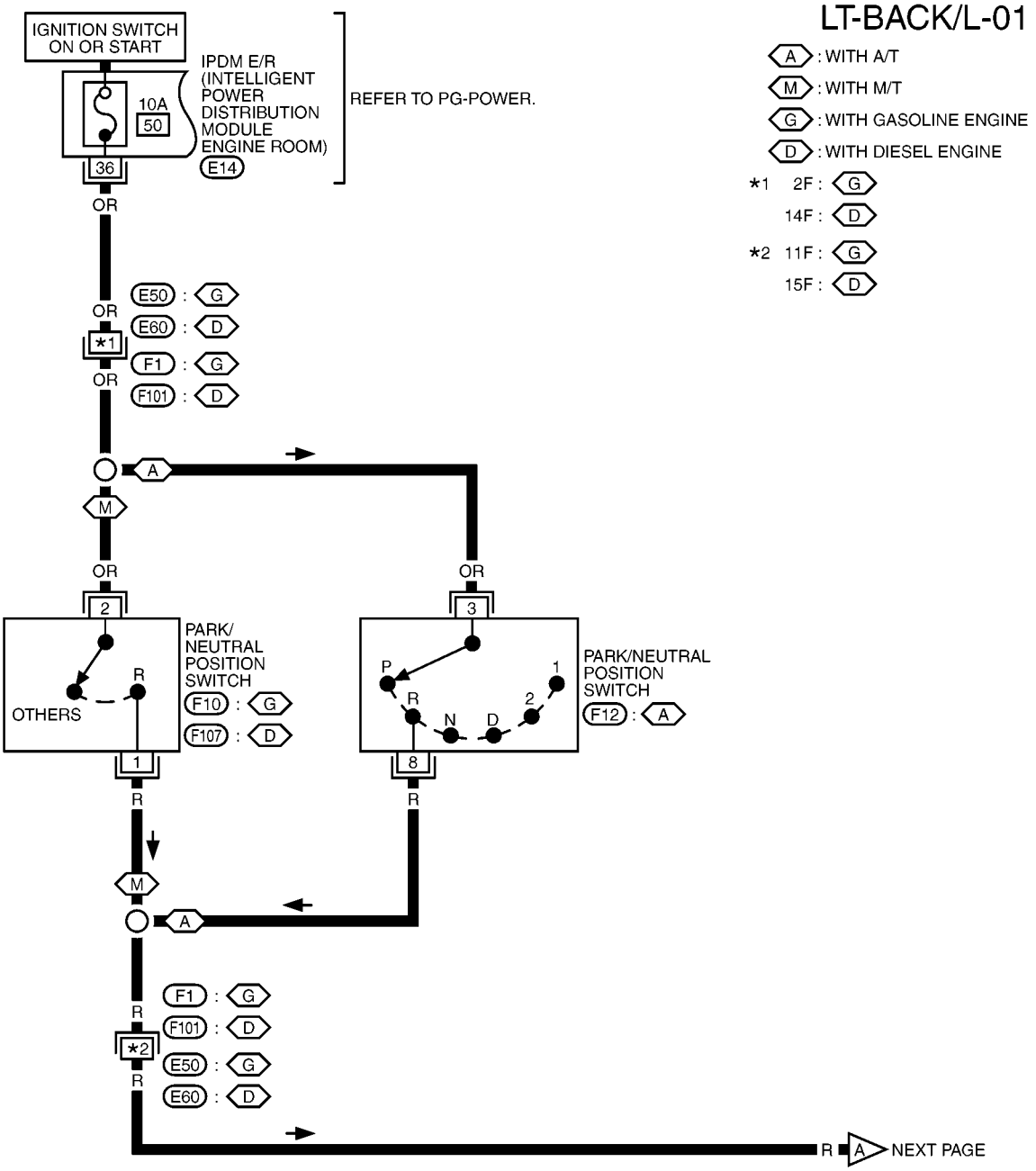
Install in the reverse order of removal.

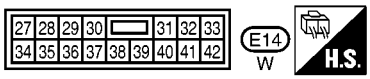
BACK-UP LAMP

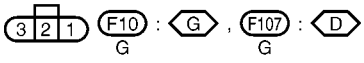
PFP:26550

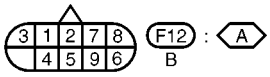
Wiring Diagram — BACK/L —

SMA for VIN >SJN**AK12U1309269 EKS00ENO



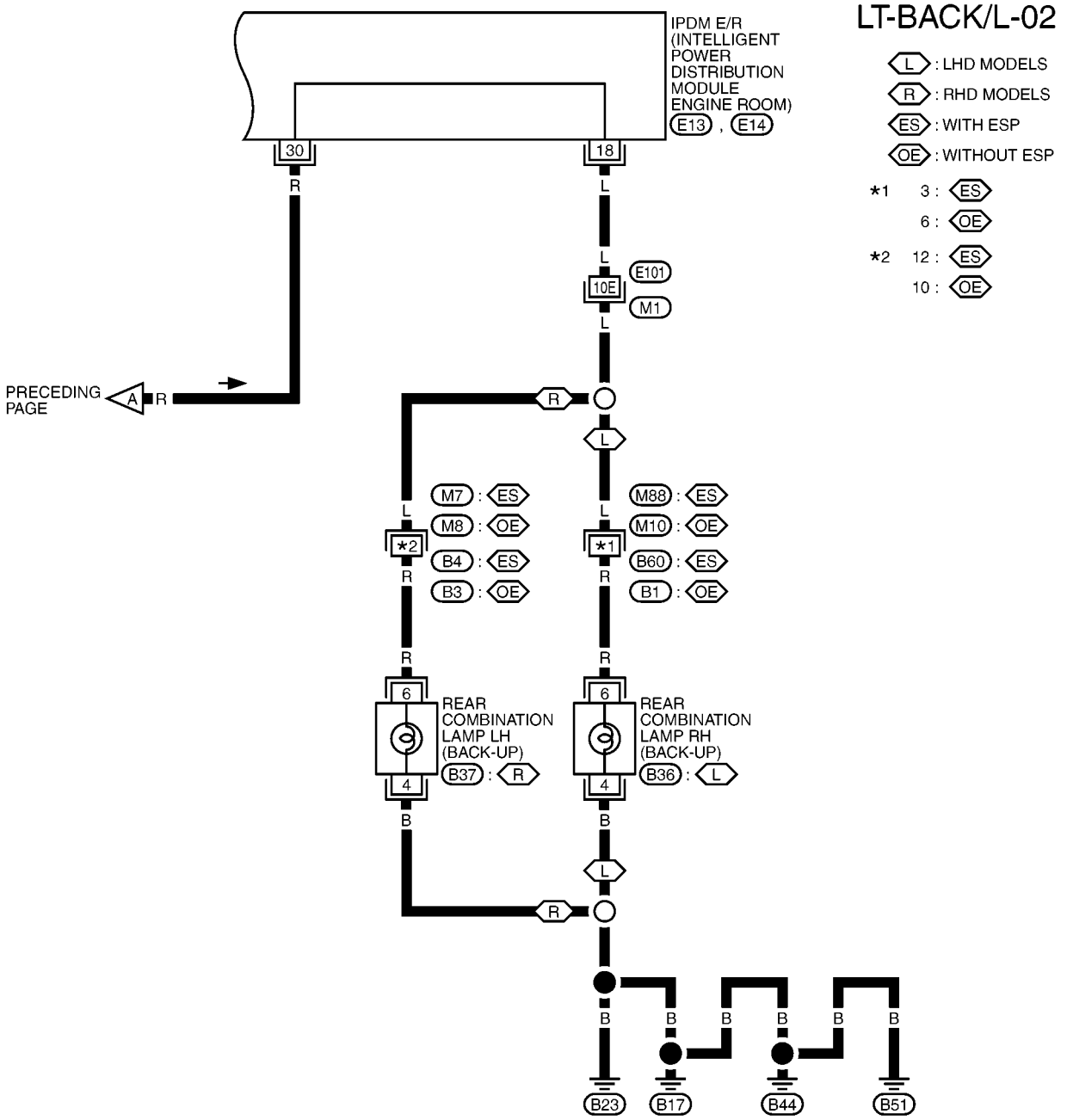


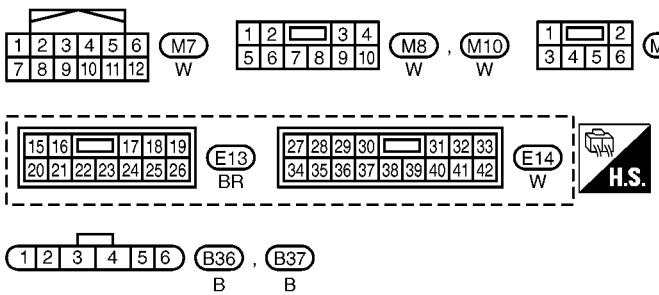




REFER TO THE FOLLOWING.
F1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1443E





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1755E

Bulb Replacement

EKS00ENP

Refer to LT-186, "REAR COMBINATION LAMP" .

Removal and Installation

EKS00ENQ

Refer to LT-186, "REAR COMBINATION LAMP" .

REAR COMBINATION LAMP

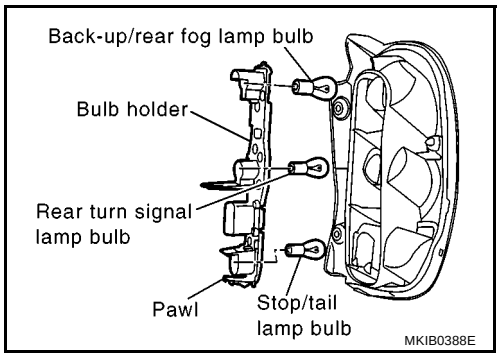
PFP:26554

Bulb Replacement

EKS00ENR

REAR TURN SIGNAL LAMP BULB, BACK-UP LAMP BULB, STOP/TAIL LAMP BULB,REAR FOG LAMP BULB

1. Open the back door, and remove rear combination lamp. Refer to LT-186, "Removal and Installation" .
2. Release holder assembly bottom hooks and remove from combination lamp housing.
3. Remove all bulbs.



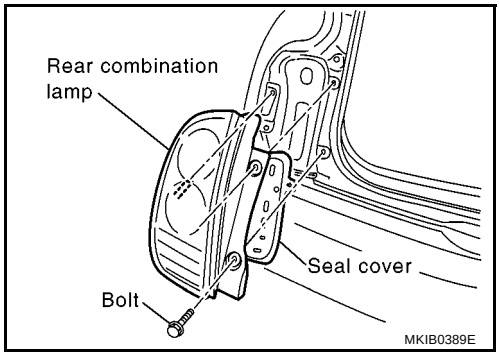
Stop/Tail lamp	**: 12V-21/5W**
Rear turn signal lamp	**: 12V-21W**
Back-up lamp	**: 12V-21W**
Rear fog lamp	**: 12V-21W**

Removal and Installation

EKS00ENS

REMOVAL

1. Open the back door, and remove rear combination lamp bolts.
2. Pull the rear combination lamp toward rear of the vehicle and remove from the vehicle.
3. Disconnect rear combination lamp connector.



INSTALLATION

Install in the reverse order of removal, paying attention to the following.

Rear combination lamp bolts

Tightening torque	**: 3.24 - 7.75 N·m (0.33 - 0.79 kg-m, 29 - 69 in-lb)**

LIGHTING AND TURN SIGNAL SWITCH

PFP:25540

Removal and Installation

EKS00ENT

Refer to LT-199, "Removal and Installation" .

HAZARD SWITCH

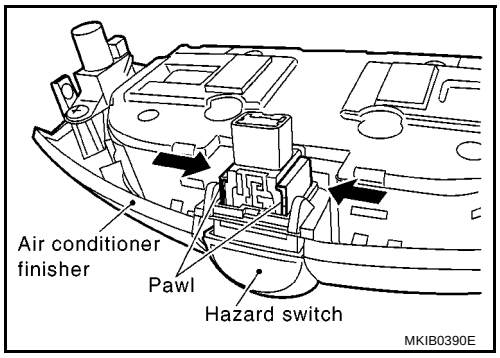
PFP:25290

Removal and Installation

EKS00ENU

REMOVAL

1. Remove air conditioner finisher. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove connector.
3. Press tab on reverse side and pull hazard switch towards you to remove.



INSTALLATION

Install in the reverse order of removal.

COMBINATION SWITCH

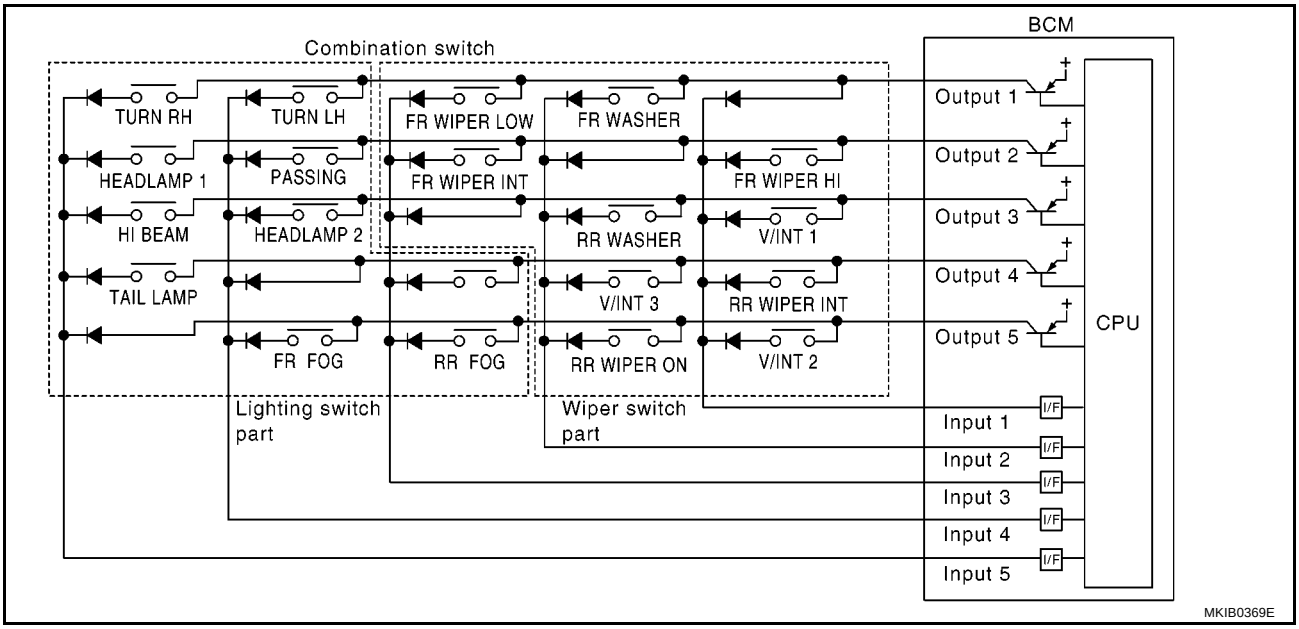
PFP:25567

System Description

EKS00ENV

COMBINATION SWITCH READING FUNCTION

1. Description
   - BCM reads combination switch (headlamp, wiper washer, turn signal) status, and controls various electrical components according to the results.
   - BCM reads information of 20 switches results by combining five output terminals (output 1 - 5) and five input terminals (input 1 - 5).
2. Operation description
   - BCM makes current flow through transistors in output terminals (output 1 - 5) at regular intervals in order.
   - When any of switches is turned ON, a circuit is established between output terminals (output 1 - 5) and input terminals (input 1 - 5).
   - At this time, transistors in output terminals (output 1 - 5) operate, and current flows, and then voltage of input terminals (input 1 - 5) corresponding to switch varies. Interface inside BCM detects status, and judges that the switch is ON.



3. BCM - Operation table of combination switches

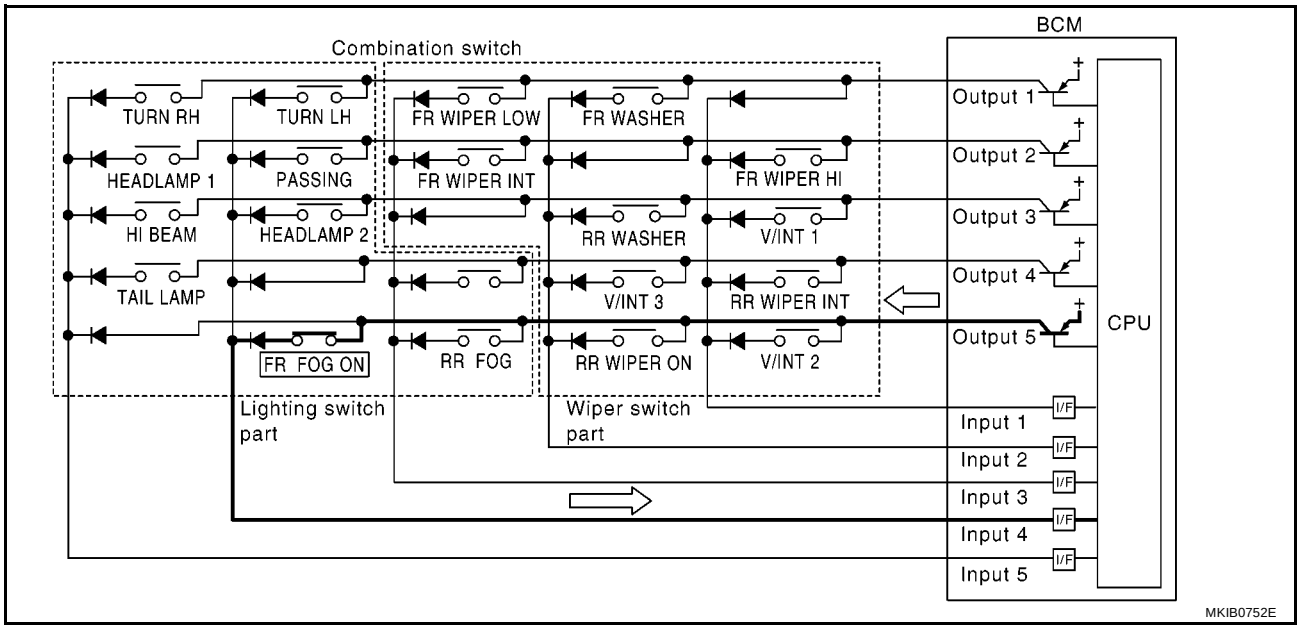
- BCM reads operation status of combination switches by the combination shown in the table.

	Combination SW INPUT 1		Combination SW INPUT 2		Combination SW INPUT 3		Combination SW INPUT 4		Combination SW INPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Combination SW OUTPUT 1	—	—	FR WIPER HI ON	FR WIPER HI OFF	V/INT 1 ON	V/INT 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	V/INT 2 ON	V/INT 2 OFF
Combination SW OUTPUT 2	FR WASHER ON	FR WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	V/INT 3 ON	V/INT 3 OFF	RR WIPER ON	RR WIPER OFF
Combination SW OUTPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	—	—	RR FOG ON	RR FOG OFF
Combination SW OUTPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEADLAMP 2 ON	HEADLAMP 2 OFF	—	—	FR FOG ON	FR FOG OFF
Combination SW OUTPUT 5	TURN RH ON	TURN RH OFF	HEADLAMP 1 ON	HEADLAMP 1 OFF	HI BEAM ON	HI BEAM OFF	TAIL LAMP ON	TAIL LAMP OFF	—	—

MKIB0370E

NOTE:
Dual switches are set for headlamps.

4. Example (When front fog lamp switch is turned ON)
   1. When front fog lamp switch is turned ON position, FR FOG ON contact inside combination switch becomes ON.
   2. Transistor in output 5 operates, and BCM detects that voltage at input 4 varies.
   3. When BCM detects voltage change at input 4 while transistor in output 5 is in ON status, BCM determines that front fog lamp switch is set to ON, and sends a front fog lamp request signal to IPDM E/R via CAN communication line.
   4. When BCM detects voltage change at input 4 when transistor in output 5 is operated again, it determines that front fog lamp ON operation continues.



MKIB0752E

NOTE:
Each output terminal transistor is activated at 20 ms intervals. Therefore, after a switch is turned ON, the electrical loads are activated with a time delay, but this time delay is too short to be noticed.

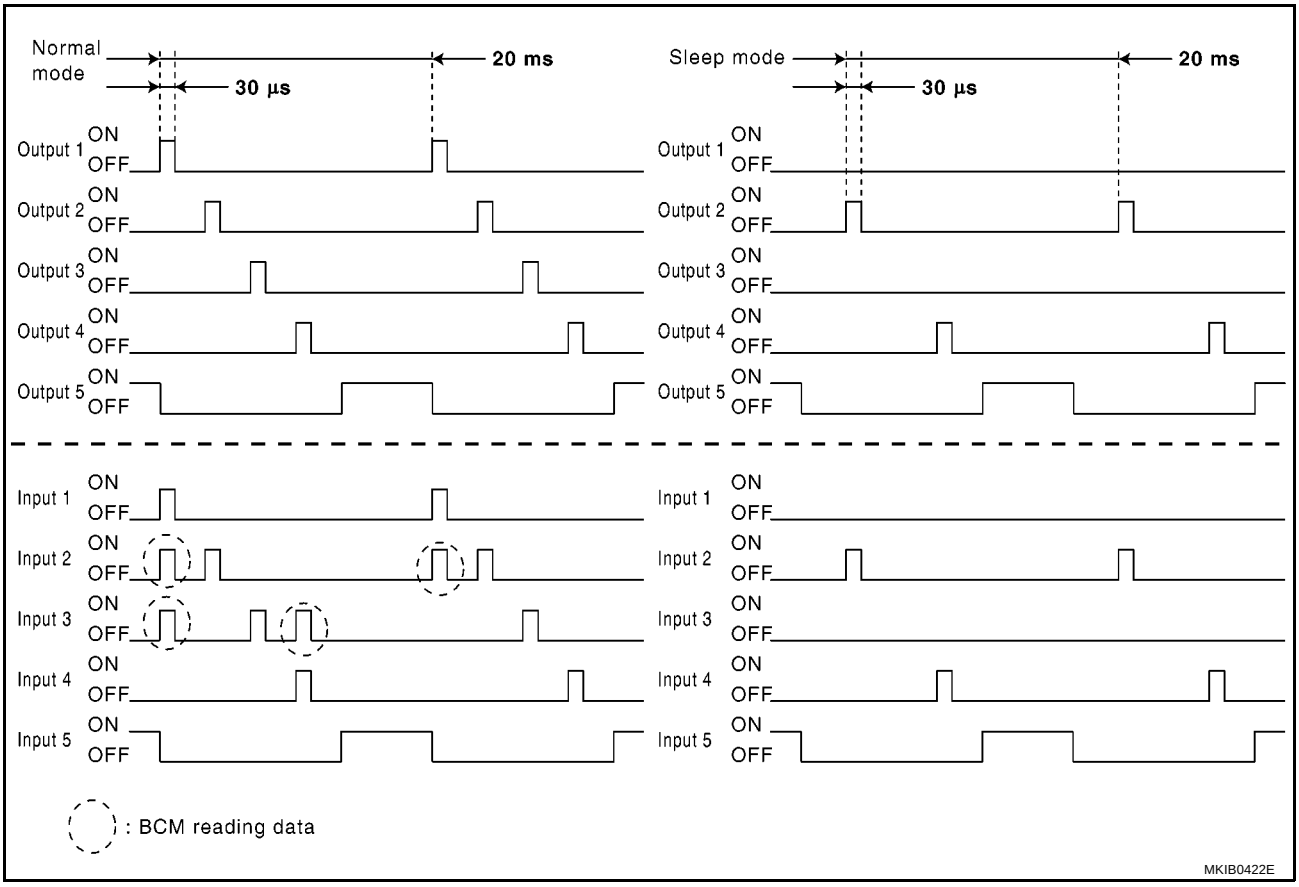
5. Operation mode
   - Combination switch reading function has operation modes shown below.

a. Normal mode

- When BCM is not in sleep mode, each output (1 - 5) terminal turns ON-OFF at 20 ms intervals.

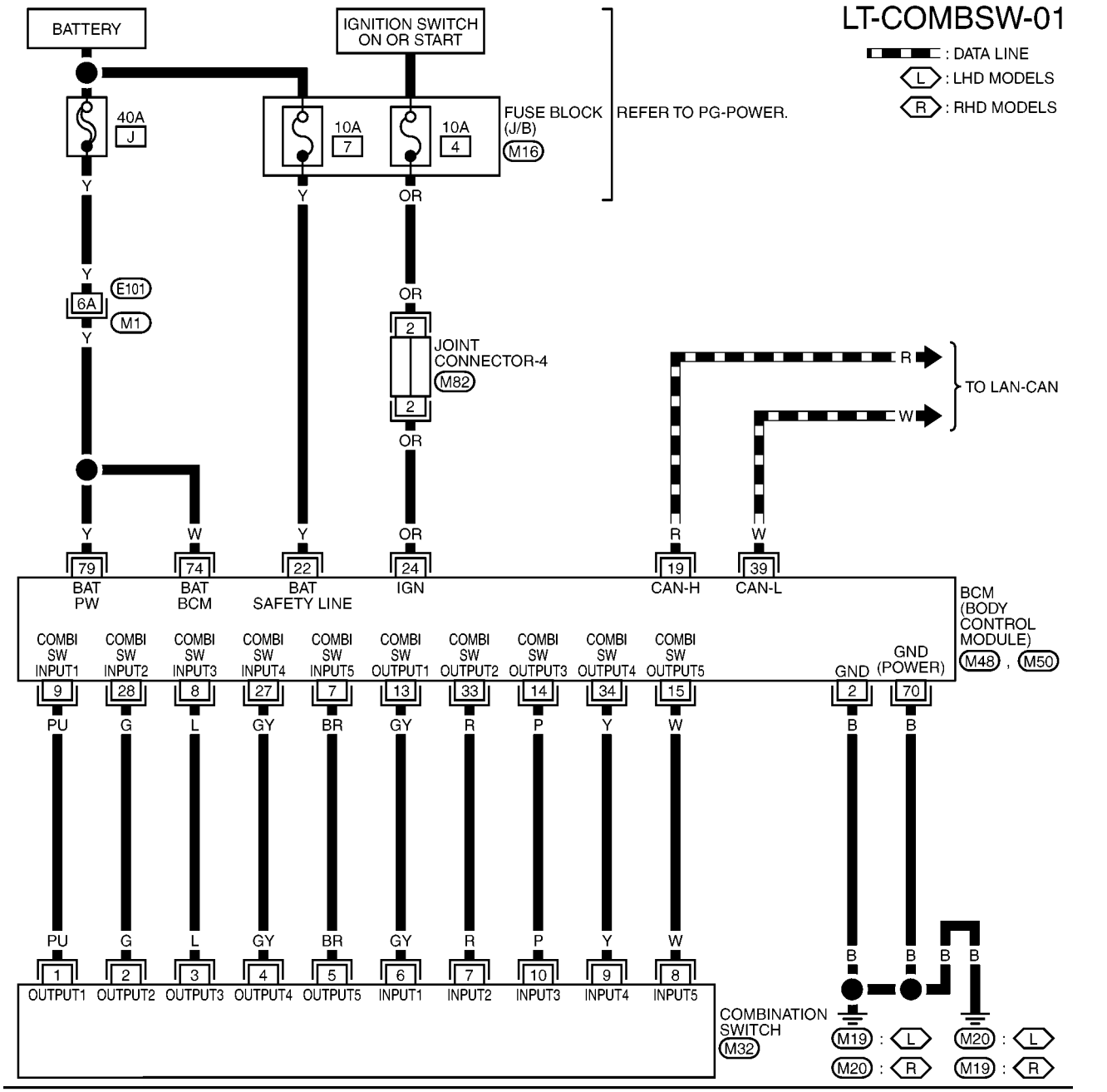
b. Sleep mode

- While BCM is in sleep status, transistors in output 1 and 3 stop their input, with BCM entering a power-saving mode. Input 2, 4 and 5 turn ON-OFF every 20 ms, and accept only output from lighting switch system.



Wiring Diagram — COMBSW —

EKS00ENW



MKWA1535E

CONSULT-II Functions (BCM)

EKS00ENX

CONSULT-II can display each diagnosis itemusing the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

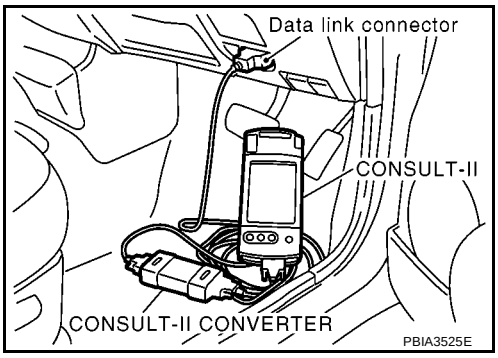
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Combination switch	Data monitor	Displays BCM input data in real time.

CONSULT-II BASIC OPERATION

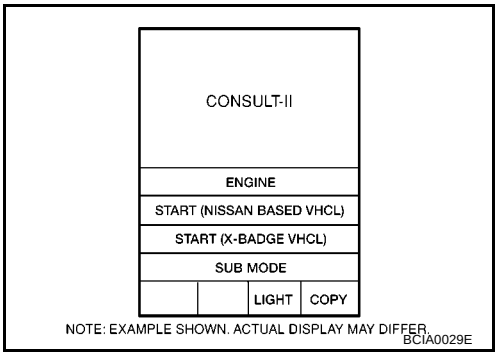
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

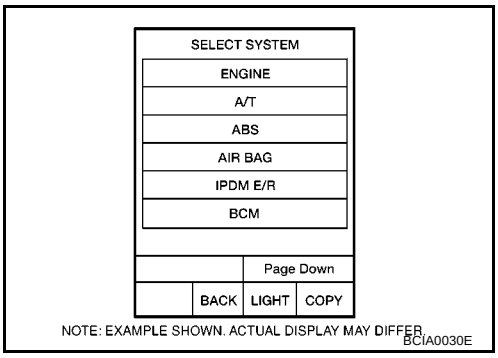
1. Turn ignition switch OFF.
2. Connect CONSULT-II and “CONSULT-II CONVERTER” to data link connector.



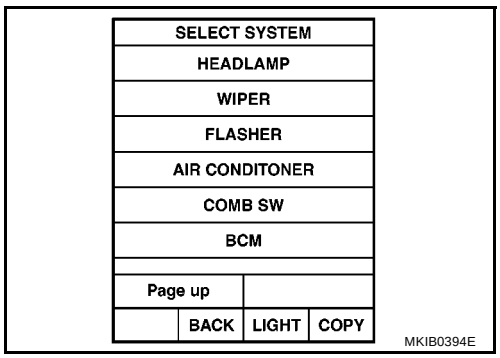
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “BCM CAN” on the “SELECT SYSTEM” screen.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “COMBINATION SWITCH” on “SELECT TEST ITEM” screen.
7. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.



DATA MONITOR

Operation Procedure

1. Touch “COMBINATION SWITCH” on “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.
3. Touch “ALL SIGNALS” or “SELETION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
SELECTION FROM MENU	Selects and monitors individual items.

4. Touch “START”.
5. When “SELECTION FROM MENU” is selected, touch items to be monitored. When “ALL SIGNALS” is selected, all the items will be monitored.
6. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

Display Item List

Monitor item “UNIT”		Display content
TURN SIGNAL R	[ON/OFF]	Displays status (Turn right: ON/Others: OFF) as judged from lighting switch signal.
TURN SIGNAL L	[ON/OFF]	Displays status (Turn left: ON/Others: OFF) as judged from lighting switch signal.
HI BEAM SW	[ON/OFF]	Displays status (High beam switch: ON/Others: OFF) as judged from lighting switch signal.
H/L SW POS	[ON/OFF]	Displays status (Headlamp switch 1: ON/Others: OFF) as judged from lighting switch signal.
LIGHT SW 1ST	[ON/OFF]	Displays status (Lighting switch 1st position: ON/Others: OFF) as judged from lighting switch signal.
PASSING SW	[ON/OFF]	Displays status (Flash-to-pass switch: ON/Others: OFF) as judged from lighting switch signal.
FR FOG SW	[ON/OFF]	Displays status (Front fog lamp switch: ON/Others: OFF) as judged from lighting switch signal. (ON is also displayed when rear fog lamp switch is on.)
RR FOG SW	[ON/OFF]	Displays status (Rear fog lamp switch: ON/Others: OFF) as judged from lighting switch signal.
FR WIPER HI	[ON/OFF]	Displays status (Front Wiper HI: ON/Others: OFF) as judged from wiper switch signal.
FR WIPER LOW	[ON/OFF]	Displays status (Front Wiper LOW: ON/Others: OFF) as judged from wiper switch signal.
FR WIPER INT	[ON/OFF]	Displays status (Front Wiper INT: ON/Others: OFF) as judged from wiper switch signal.
FR WASHER SW	[ON/OFF]	Displays status (Front Washer Switch: ON/Others: OFF) as judged from wiper switch signal.
INT VOLUME	[1 - 7]	Displays intermittent operation dial position setting (1 - 7) as judged from wiper switch signal.
RR WIPER ON	[ON/OFF]	Displays status (Rear Wiper ON: ON/Others: OFF) as judged from wiper switch signal.
RR WIPER INT	[ON/OFF]	Displays status (Rear Wiper INT: ON/Others: OFF) as judged from wiper switch signal.
RR WASHER SW	[ON/OFF]	Displays status (Rear Washer Switch: ON/Others: OFF) as judged from wiper switch signal.

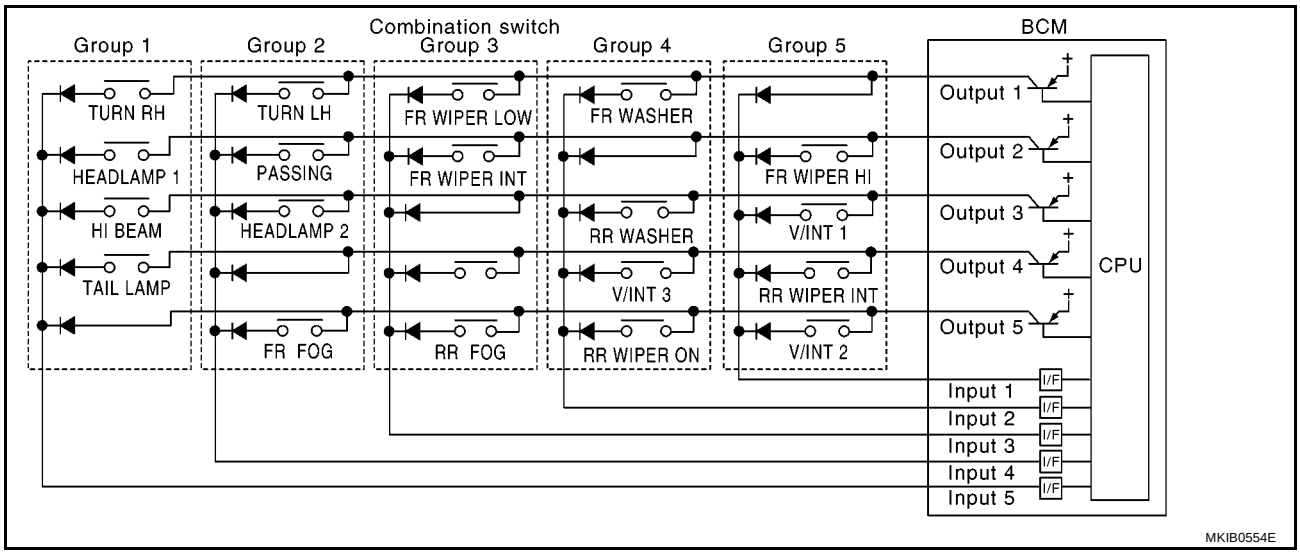
Check Combination Switch

EKS00ENY

1. CHECK COMBINATION SWITCH OPERATION

1. Check the malfunctioning operation which is controlled by combination switch, and check the group which including the malfunctioning operation.

Group 5	Group 4	Group 3	Group 2	Group 1
—	FR WASHER	FR WIPER LO	TURN LH	TURN RH
FR WIPER HI	—	FR WIPER INT	PASSING	HEAD LAMP1
V/INT 1	RR WASHER	—	HEAD LAMP2	HI BEAM
RR WIPER INT	V/INT 3	—	—	TAIL LAMP
V/INT 2	RR WIPER ON	RR FOG	FR FOG	—

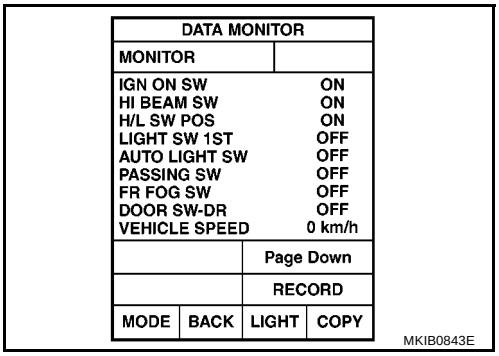


>> Confirm the group where malfunctioning operation is in and GO TO 2.

2. CHECK SYSTEM

With CONSULT-II

1. Select BCM on CONSULT-II.Check combination switch (“COMB SW”) in “DATA MONITOR” mode with CONSULT-II.
2. Select “START” and confirm all switch except the malfunctioning switch are operating normally.(Refer to LT-195, "Display Item List")
   Example: When there is RR fog lamp switch malfunction, confirm that “FR WIPER LOW” and “FR WIPER INT”, which are in the same group 3, turn ON/OFF normally.



Without CONSULT-II

Operate combination switch to Make sure other switches in the system with an error operate normally.
Example: When there is an error with RR fog lamp switch, make sure front wiper low operation and front wiper intermittent operation in the same group 3 operate normally.

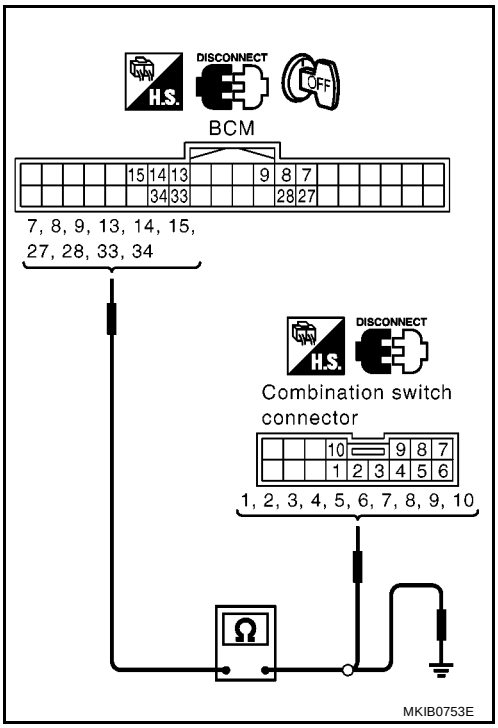
What is the inspection results?

Other switches in the group with an error operate normally.>>Replace combination switch.
Other switches in the group with an error do not operate normally.>>GO TO 3.

3. CHECK HARNESS

1. Turn ignition switch OFF.
2. Disconnect BCM and combination switch connectors.
3. Check continuity between BCM harness connector of the inoperative system and the corresponding combination switch connector terminals.
4. Check continuity between BCM harness connector of the suspect system and ground.

Group	Connector terminal			Continuity
	BCM		Combination switch	
1	output 1	13 (GY)	6 (GY)	Yes
	input 1	9 (PU)	1 (PU)	
2	output 2	33 (R)	7 (R)	
	input 2	28 (G)	2 (G)	
3	output 3	14 (P)	10 (P)	
	input 3	8 (L)	3 (L)	
4	output 4	34 (Y)	9 (Y)	
	input 4	27 (GY)	4 (GY)	
5	output 5	15 (W)	8 (W)	
	input 5	7 (BR)	5 (BR)	



Group	Connector terminal			Continuity
	BCM		—	
1	output 1	13 (GY)	Ground	No
	input 1	9 (PU)		
2	output 2	33 (R)		
	input 2	28 (G)		
3	output 3	14 (P)		
	input 3	8 (L)		
4	output 4	34 (Y)		
	input 4	27 (GY)		
5	output 5	15 (W)		
	input 5	7 (BR)		

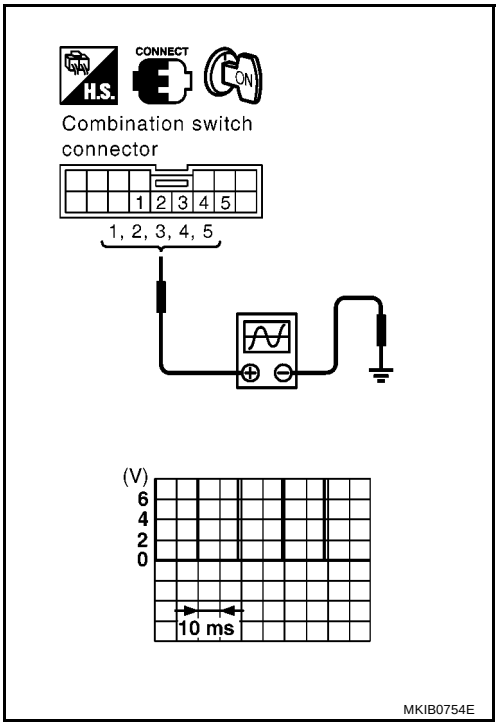
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness connector.

4. CHECK BCM OUTPUT SIGNAL

Connect BCM and combination switch connector, and check voltage waveform of malfunctioning system.

Group	Connector	terminal (wire color)	
		(+)	(-)
1	M32	1 (PU)	Ground
2		2 (G)	
3		3 (L)	
4		4 (GY)	
5		5 (BR)	



OK or NG

OK >> Repair combination switch.
NG >> Replace BCM.

Removal and Installation

EKS00ENZ

REMOVAL

1. Remove steering column cover. Refer to PS-7, "STEERING COLUMN" .
2. Remove driver air bag module. Refer to SRS-36, "DRIVER AIR BAG MODULE" .
3. Remove spiral cable. Refer to SRS-38, "SPIRAL CABLE" .
4. Remove screw and remove combination switch.

INSTALLATION

Install in the reverse order of removal, for details.

INTERIOR ROOM LAMP

PFP:26410

System Description

EKS00EO0

POWER SUPPLY AND GROUND

Power is supplied at all times:

- through 40A fusible link (letter **J** , located in the fuse and fusible link box)
- to BCM terminals 74 and 79.
- through 10A fuse [No. 6, located in the fuse block (J/B)]
- to luggage room lamp terminal 1
- to BCM terminal 72
- to key switch terminal 1 (without Intelligent Key system) or
- to key switch and ignition knob switch terminal 3 (Gasoline engine with Intelligent Key system)
- through 10A fuse [No. 17, located in the fuse block (J/B)]
- to key switch and ignition knob switch terminals 1 (Diesel engine models with Intelligent Key system)

When the key is removed from ignition key cylinder, power is interrupted:

- through key switch terminal 2 (without Intelligent Key system) or
- through key switch and ignition knob switch terminal 4 (Gasoline engine models with Intelligent Key system) or
- through key switch and ignition knob switch terminal 2 (Diesel engine models with Intelligent Key system)
- to BCM terminal 48.

When Intelligent Key unit receives unlock signal from Intelligent Key controller. BCM receives door lock/unlock signal from Intelligent Key unit via CAN communication line.
With the ignition key switch in the ON or START position, power is supplied:

- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to BCM terminal 24.

Ground is supplied:

- through body grounds M19 and M20
- to BCM terminals 2 and 70.

When any door is opened, ground is supplied:

- through case ground of front door switch (driver side)
- to front door switch (driver side) terminal 1
- to BCM terminal 29.
- through case ground of front door switch (passenger side)
- to front door switch (passenger side) terminal 1
- to BCM terminal 30.
- through case ground of rear door switch LH
- to rear door switch LH terminal 1
- to BCM terminal 59.
- through case ground of rear door switch RH
- to rear door switch RH terminal 1
- to BCM terminal 60.
- through body grounds B17, B23, B44 and B51
- to back door switch terminal 2
- to back door switch terminal 1
- to BCM terminal 10.

When a signal, or combination of signal is received by the BCM ground is supplied:

- through BCM terminal 21
- to interior room lamp terminal 1

With power and ground are supplied, the interior room lamp illuminates.

SWITCH OPERATION

Ground is supplied:

- through body grounds M19 and M20
- to interior room lamp terminal 3,

When interior room lamp switch is ON, power is supplied:

- to interior room lamp terminal 2
- through BCM terminal 73.

With power and ground are supplied, the interior room lamp illuminates.
When back door is opened, ground supplied:

- to luggage room lamp terminal 2
- through back door release actuator (back door switch) terminal 2 and 1
- through body grounds B17,B23,B44 and B51.

With power and ground are supplied, the luggage room lamp illuminates.

INTERIOR ROOM LAMP TIMER OPERATION

When interior room lamp switch is in the “DOOR” position, the BCM keeps the interior room lamp illuminated for about 30 seconds when:

- unlock signal is received from Intelligent Key controller, while all doors are closed and key is out of the ignition key cylinder (with Intelligent Key system).
- unlock signal is received from remote controller while all doors are closed and key is out of the ignition key cylinder (without Intelligent Key system).
- key is removed from ignition key cylinder while all doors are closed (without Intelligent Key system)
- any door is opened and then closed while key is out of the ignition key cylinder.

The timer is canceled when:

- ignition switch is turned ON.
- lock signal is received from Intelligent Key controller, while all doors are closed and key is out of the ignition key cylinder (with Intelligent Key system).
- lock signal is received from remote controller while all doors are closed and key is out of the ignition key cylinder (without Intelligent Key system).

ON-OFF CONTROL

When the driver side door, front passenger door, rear LH or RH door is opened, the interior room lamp turns on while the interior room lamp switch is in the “DOOR” position.

CAN Communication

EKS00ERO

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LTD

Go to CAN system, when selecting your car model from the following table.

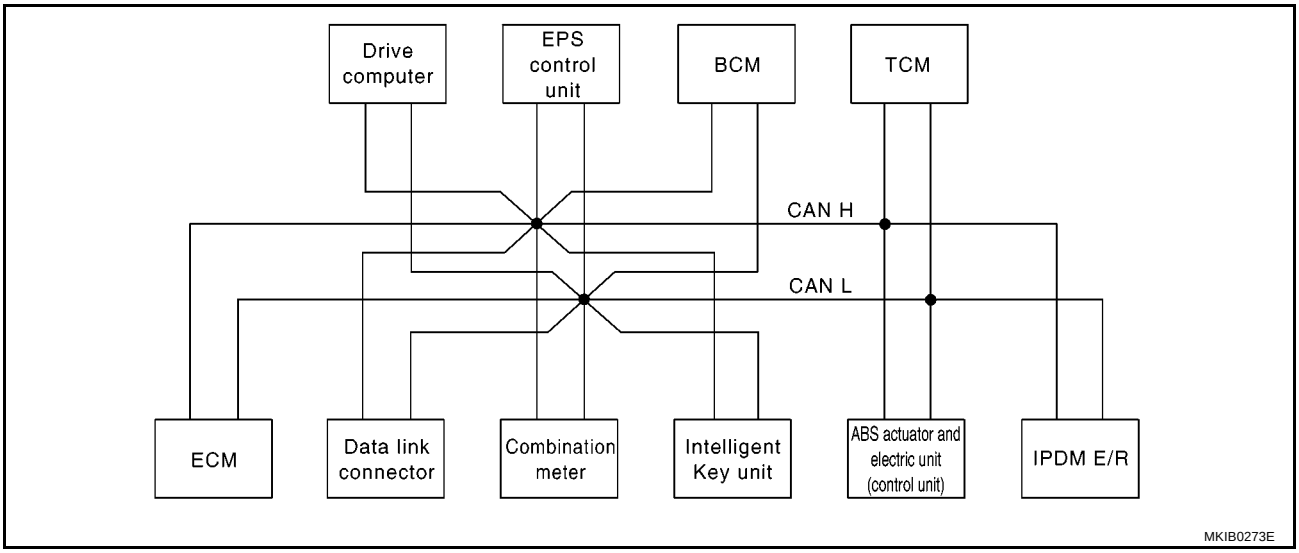
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-203, "TYPE 1/ TYPE 2"				LT-206, "TYPE 3/ TYPE 4"				LT-208, "TYPE 5/ TYPE 6"				LT-211, "TYPE 7/ TYPE 8"				LT-213, "TYPE 9/ TYPE 10"			

×: Applicable

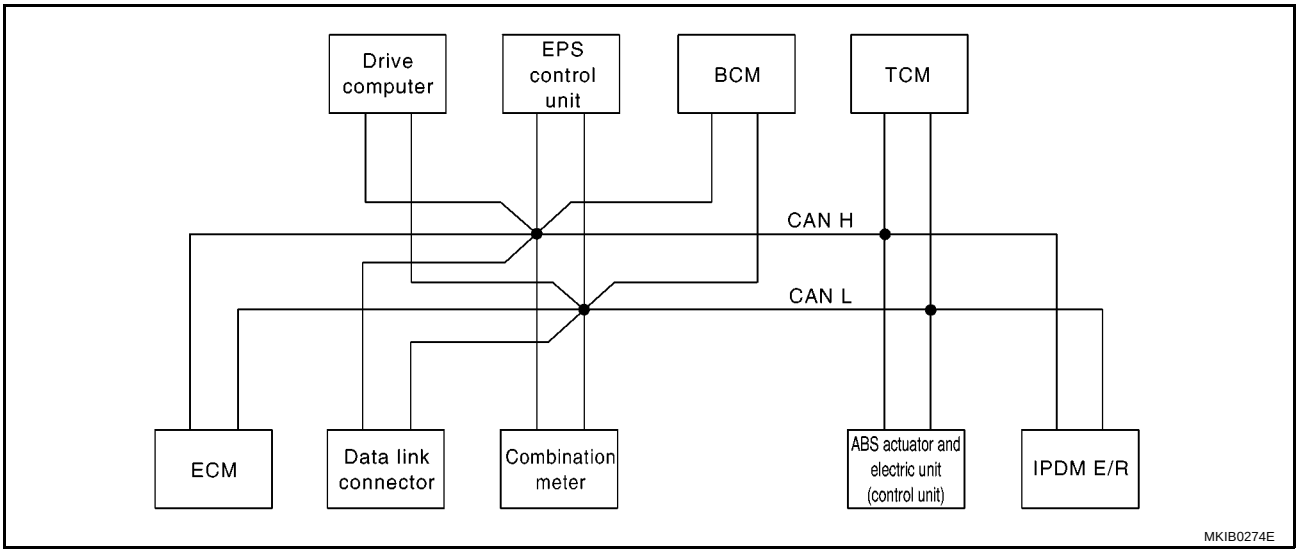
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

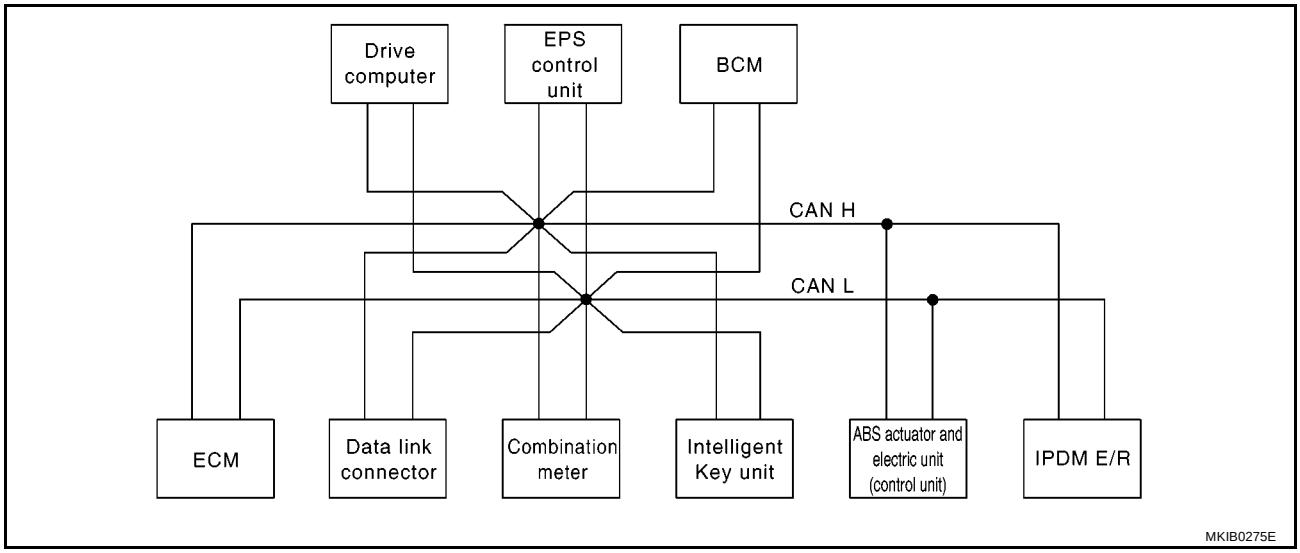
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

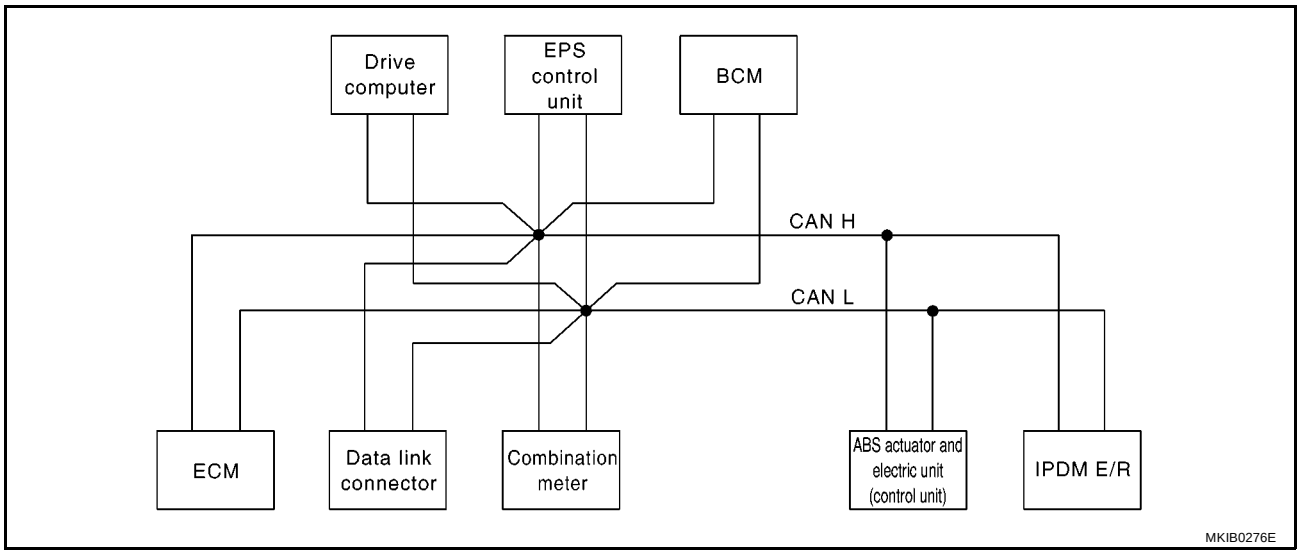
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

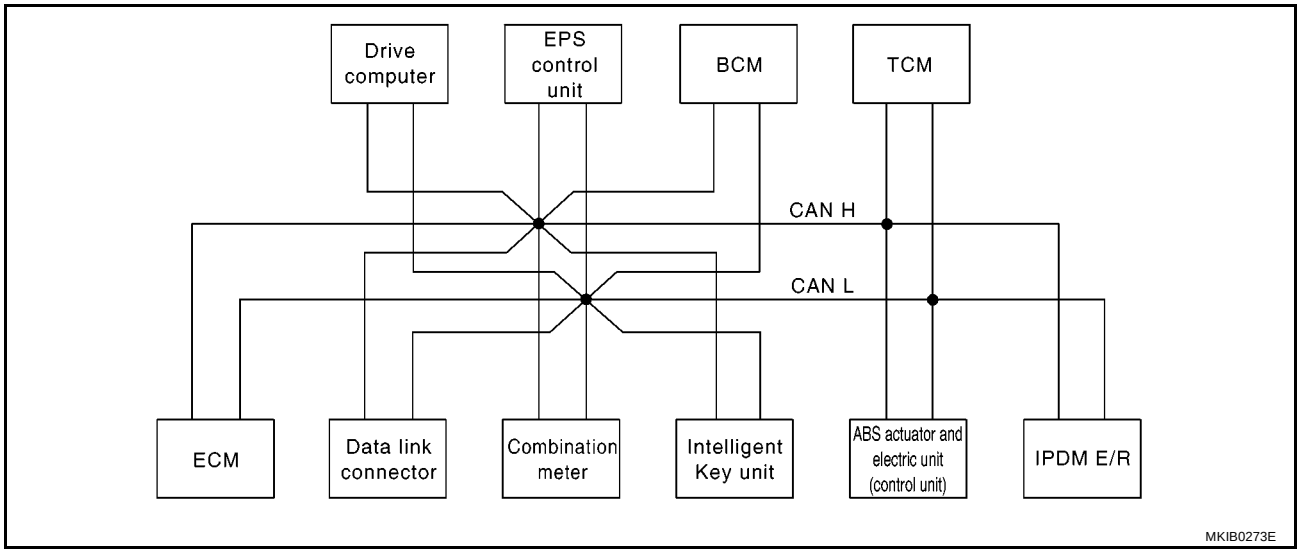
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

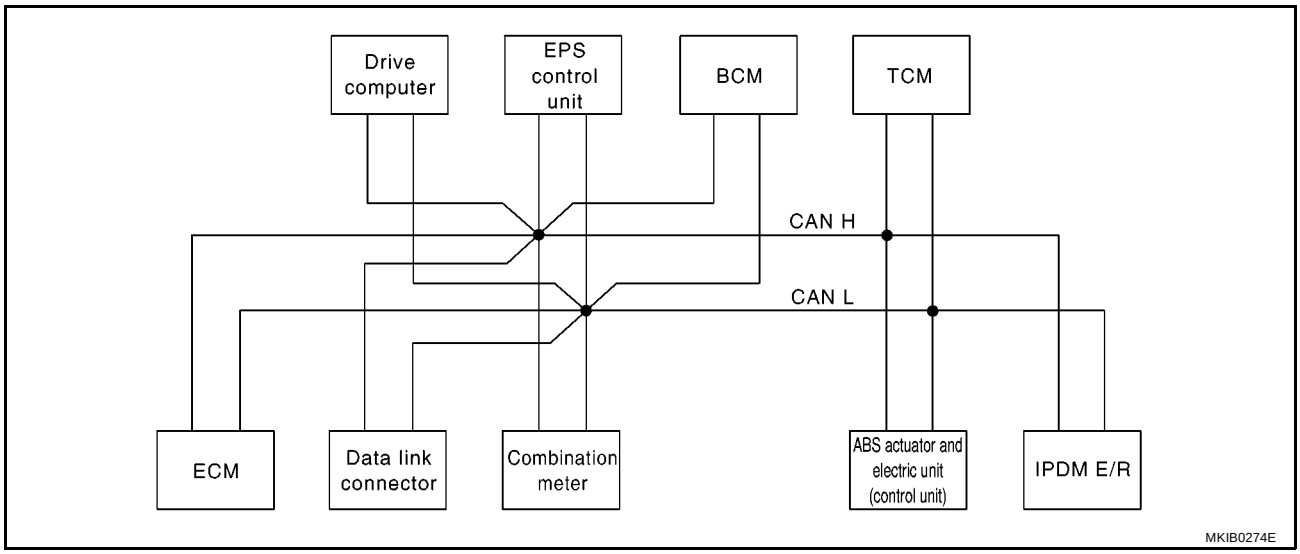
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

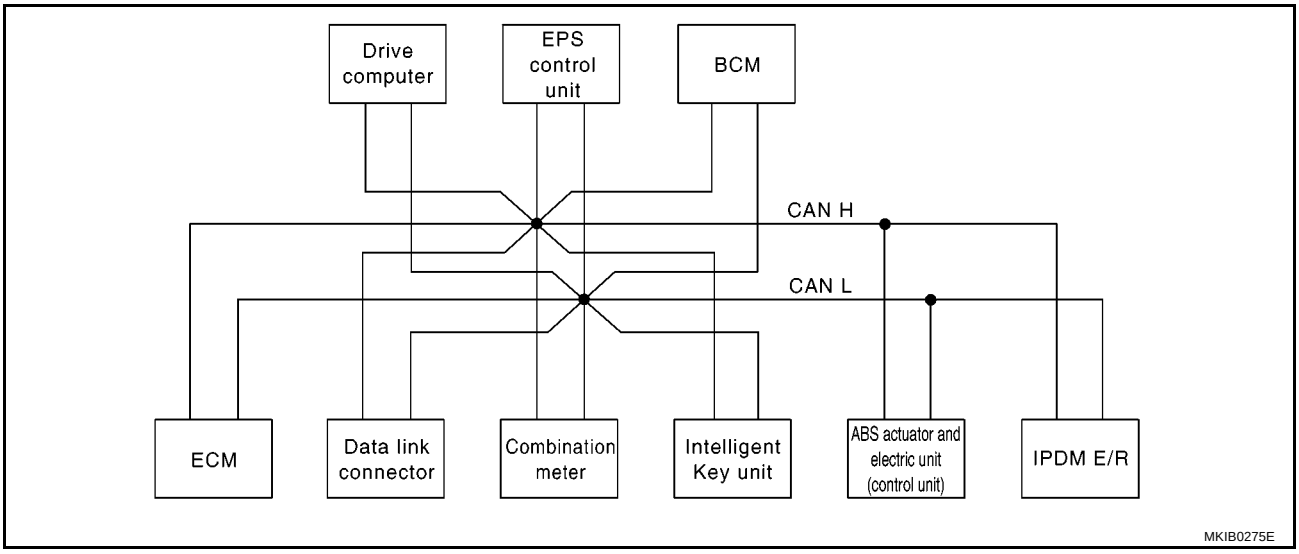
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

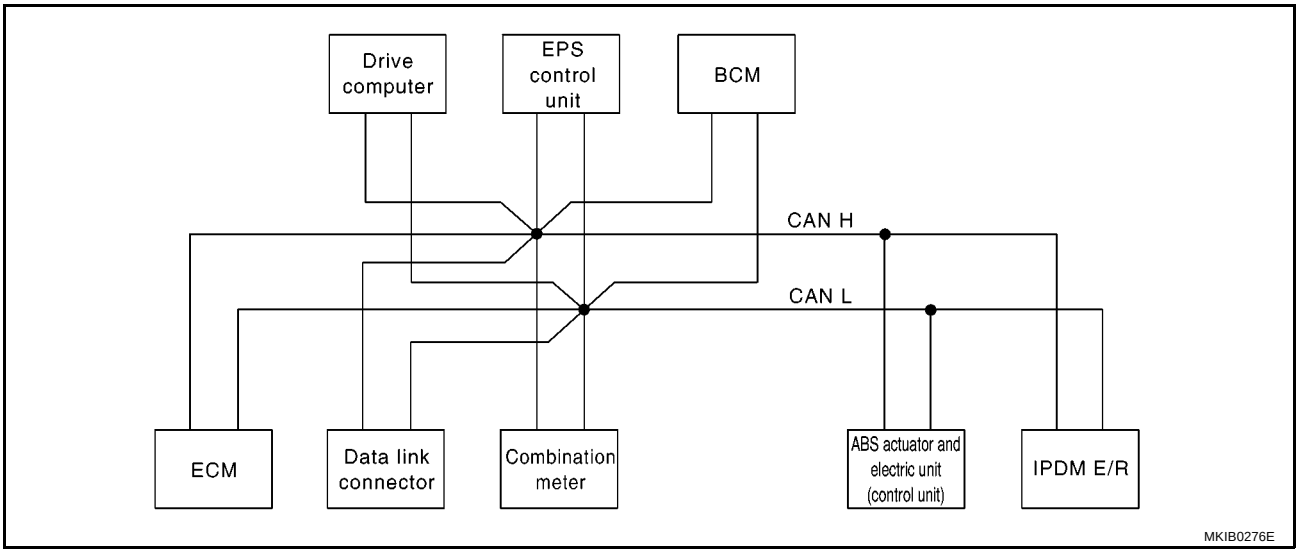
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

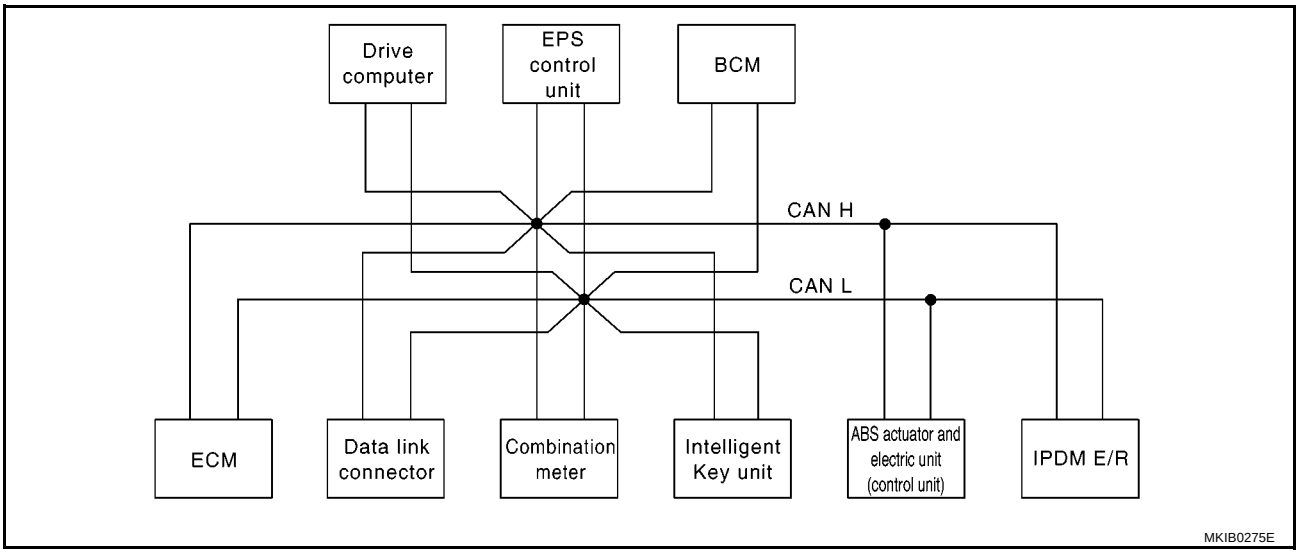
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

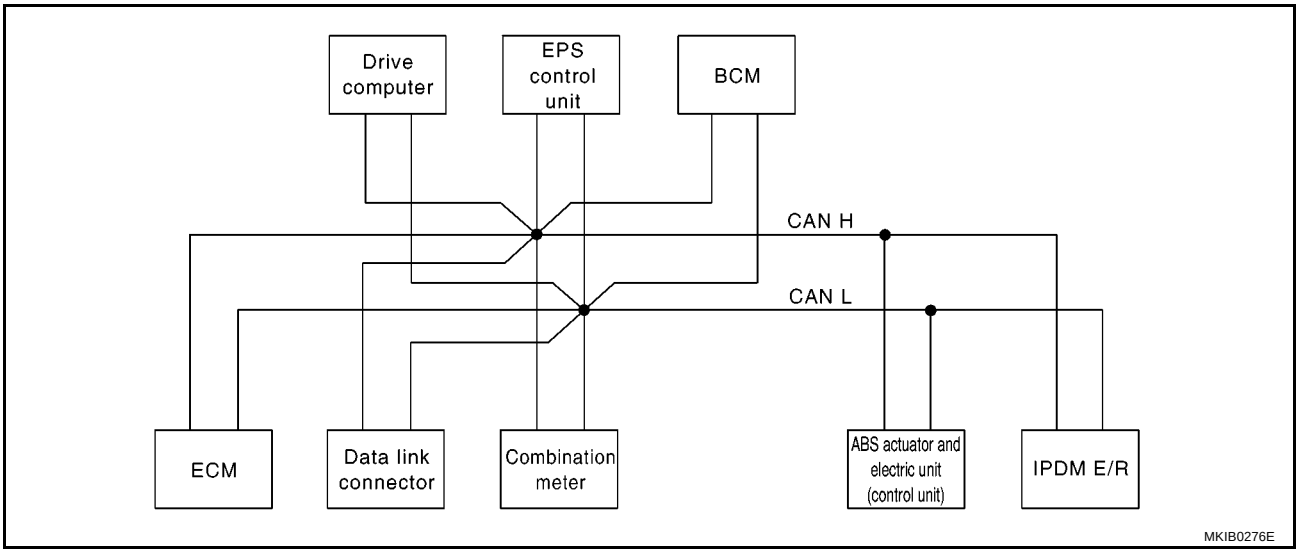
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

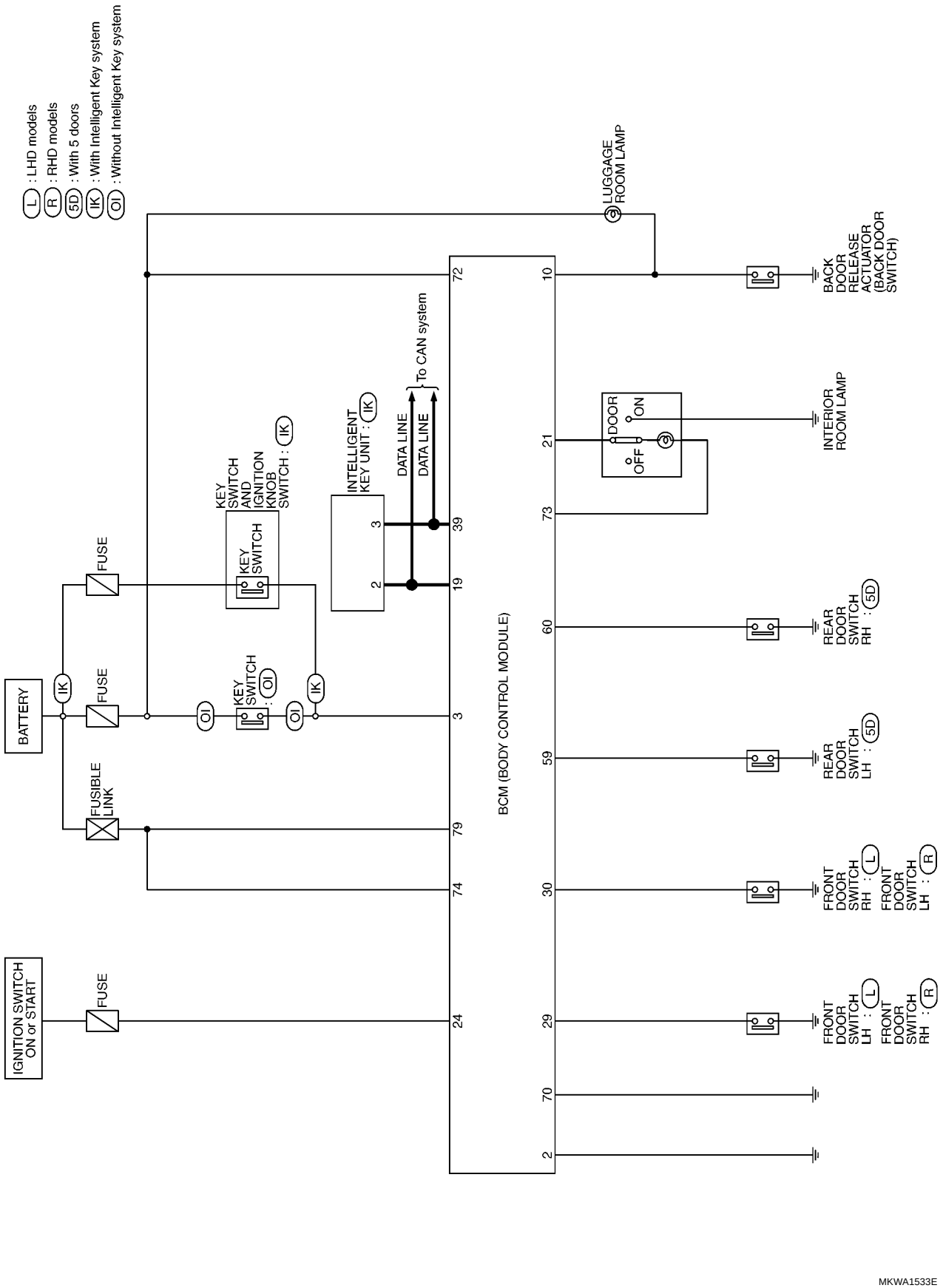
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic

EKS00EO2

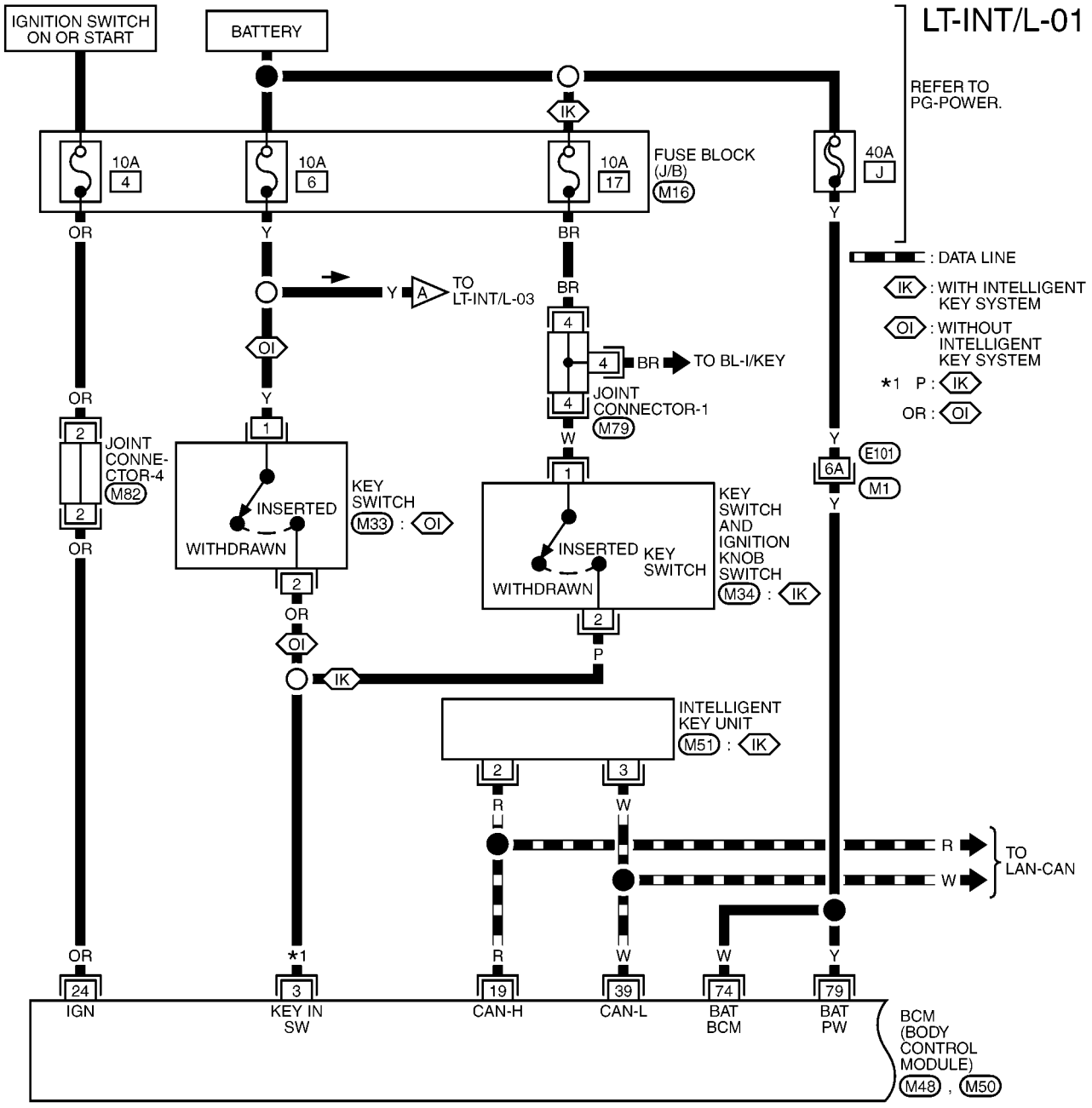


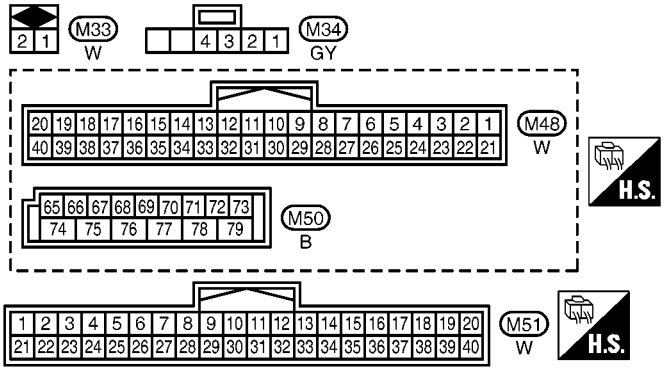
MKWA1533E

Wiring Diagram — INT/L —

SMA for VIN >SJN**AK12U1149635

EKS00EO3

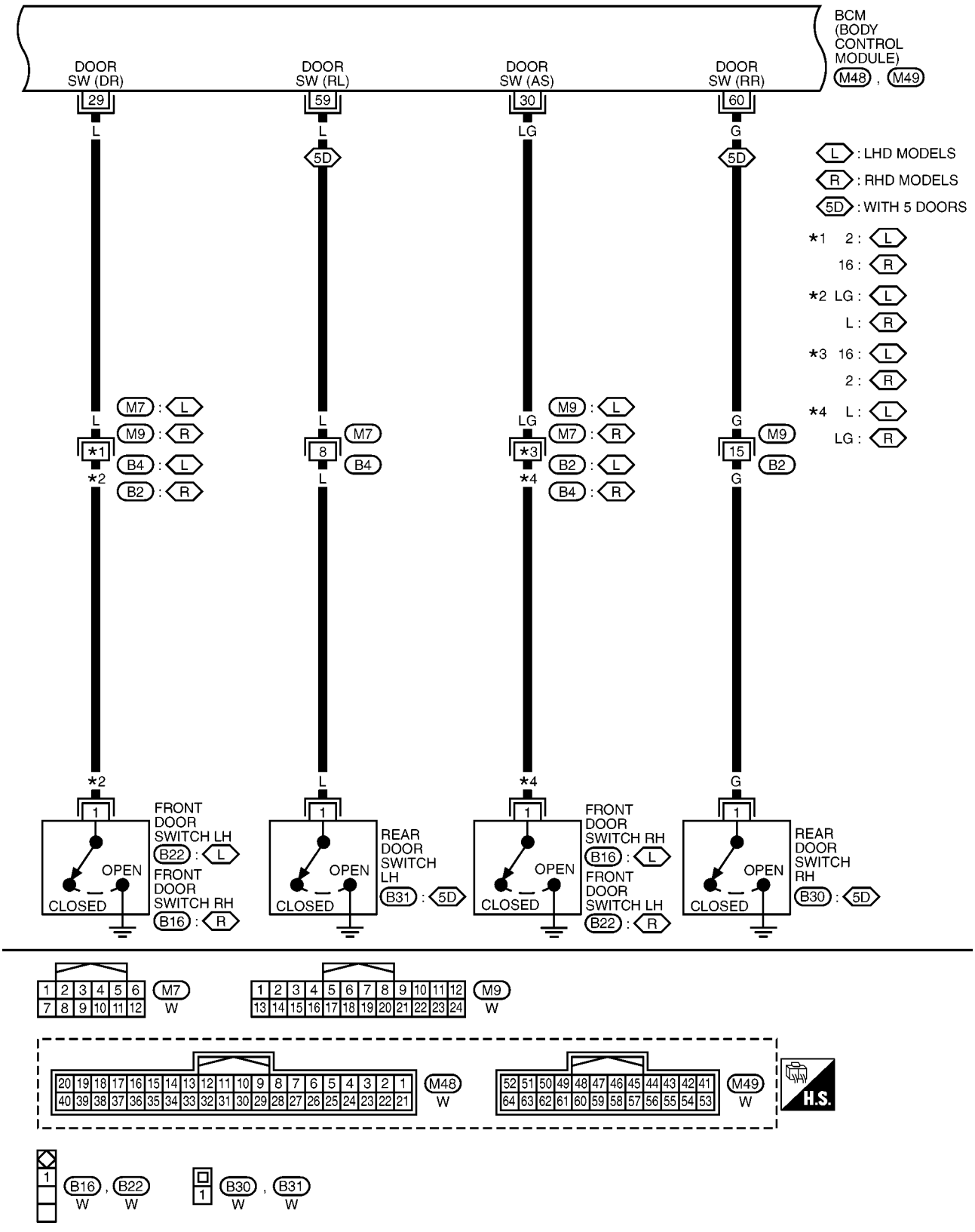




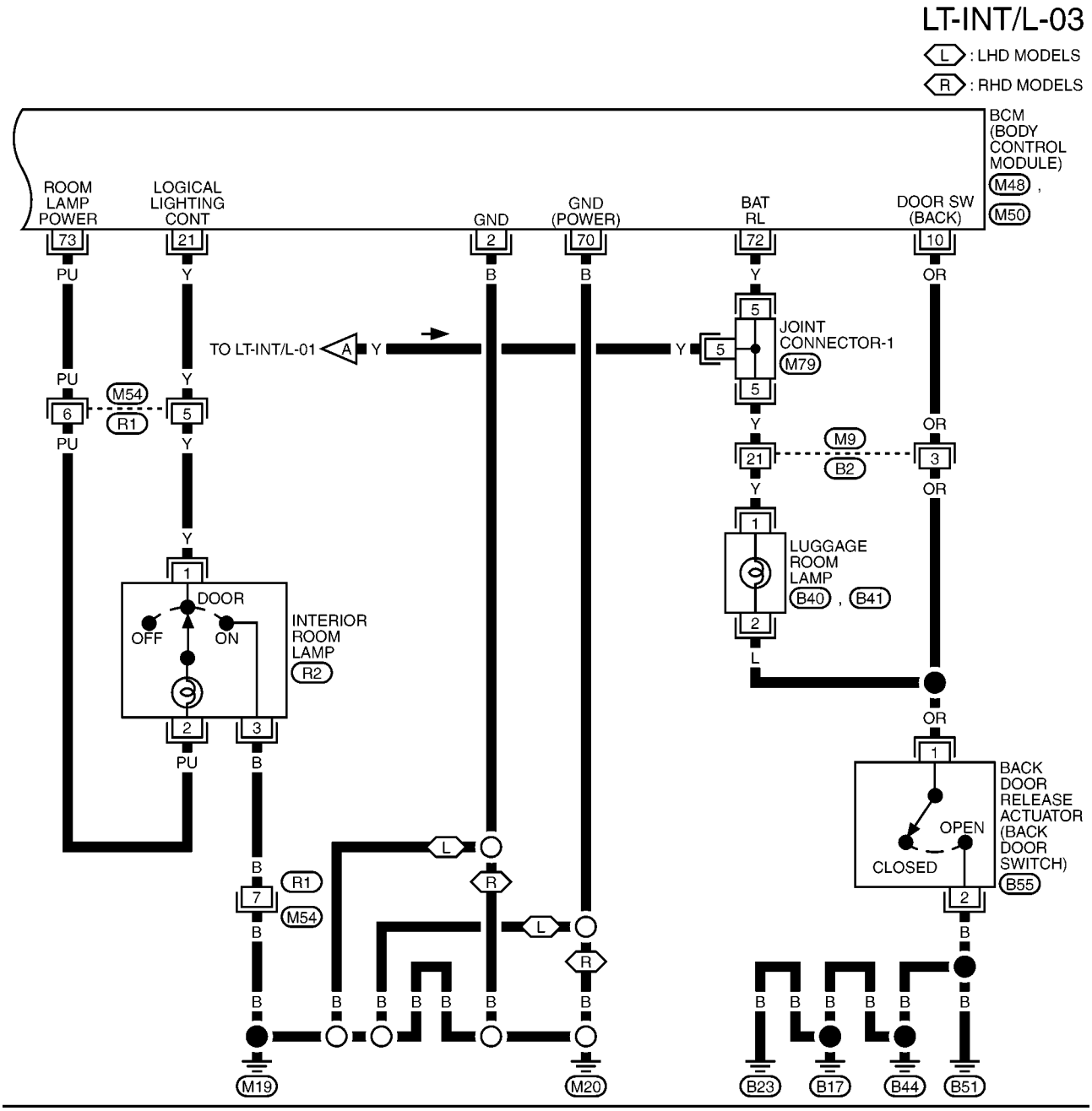
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M79 , M82 -JOINT CONNECTOR (J/C)

MKWA1450E

LT-INT/L-02



MKWA0832E


LT-INT/L-03
L : LHD MODELS
R : RHD MODELS
BCM (BODY CONTROL MODULE) M48, M50
ROOM LAMP POWER
LOGICAL LIGHTING CONT
GND
GND (POWER)
BAT RL
DOOR SW (BACK)
TO LT-INT/L-01
JOINT CONNECTOR-1 M79
LUGGAGE ROOM LAMP B40, B41
INTERIOR ROOM LAMP R2
DOOR
OFF
ON
BACK DOOR RELEASE ACTUATOR (BACK DOOR SWITCH) B55
OPEN
CLOSED
M54
R1
M9
B2
M19
M20
B23
B17
B44
B51
M9 W
M48 W
M50 B
H.S.
M54 W
M79 W
B40 B
B41 B
B55 W
R2 W

MKWA1534E

Terminals and Reference Value for BCM

EKS00EO4

Terminal No.	Wire color	Signal designation	Measuring condition						Reference value (V)
			Ignition switch	Operation or condition					
2	B	Ground	ON	—					Approx. 0
10	OR	Back door switch signal	OFF	Back door switch signal		ON (open)			Approx. 0
						OFF (close)			Approx. 12
21	Y	Logical lighting control	OFF	Room lamp switch: DOOR position	Key is inserted	Any door switch	ON (Open)		Approx. 0
							OFF (Close)		Approx. 12
					Close all doors	Key is removed from key cylincer			Approx. 0
						Turn igntion switch ON			Approx. 12
					Key is removed				Approx. 0
					Interior room lamp timer		OFF		Approx. 12
							ON		Approx. 0
24	OR	Ignition power supply	ON	—					Approx. 12
29	L	Driver door switch signal	OFF	Driver door switch signal		ON (open)			Approx. 0
						OFF (closed)			Approx. 12
30	LG	Passenger door switch signal	OFF	Passenger door switch signal		ON (open)			Approx. 0
						OFF (close)			Approx. 12
48	P*1	Key detection switch signal	OFF	Remove key.					Approx. 0
	OR*2			Key is inserted.					Approx. 12
59	L	Rear door switch LH signal	OFF	Rear door switch LH signal		ON (open)			Approx. 0
						OFF (close)			Approx. 12
60	G	Rear door switch RH signal	OFF	Rear door switch RH signal		ON (open)			Approx. 0
						OFF (close)			Approx. 12
70	B	Ground	ON	—					Approx. 0
73	PU	Room lamp signal	OFF	Room lamp switch: DOOR position	Key is inserted.	Any door switch	ON (open)		Approx. 0
							OFF (closed)		Approx. 12
			—		Close all doors.	Key is removed after being fully inserted.			Approx. 0
						Turn ignition switch ON.			Approx. 12
74	W	Battery power supply	OFF	—					Approx. 12
79	Y	Battery power supply	OFF	—					Approx. 12

*1: With Intelligent Key system
*2: Without Intelligent Key system

How to Proceed With Trouble Diagnosis

EKS00EO5

1. Confirm the symptom or customer complaints.
2. Understand operation description and function description.
   Refer to Interior room lamp LT-200, "System Description" .
3. Carry out the Preliminary Check. Refer to LT-221, "Preliminary Check"
4. Check symptom and repair or replace the cause of malfunction.
5. Dose the interior room lamp operate normally? Yes: GO TO 6. No: GO TO 4.
6. INSPECTION END.

Preliminary Check

EKS00EO6

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

Check BCM fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4

Refer to LT-217, "Wiring Diagram — INT/L —" .

OK or NG

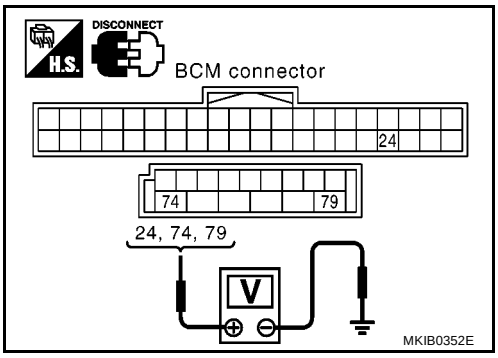
OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.

Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage



OK or NG

OK >> GO TO 3.

NG >> Repair harness for open or short between BCM and fuse. If NG, repair and replace the harness or fuse.

3. CHECK GROUND CIRCUIT

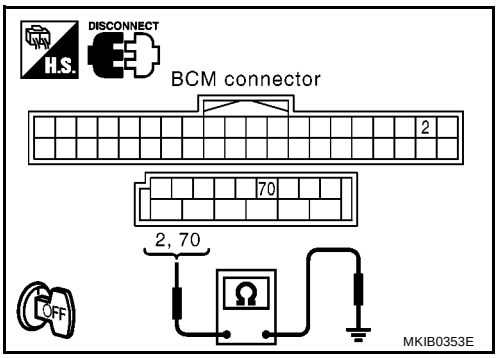
Check continuity between BCM harness connector and ground.

Terminals			Continuity
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70 (B)		

OK or NG

OK >> INSPECTION END

NG >> Repair or replace the harness.



CONSULT-II Functions (BCM)

EKS00EO7

CONSULT-II can display each diagnosis itemusing the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

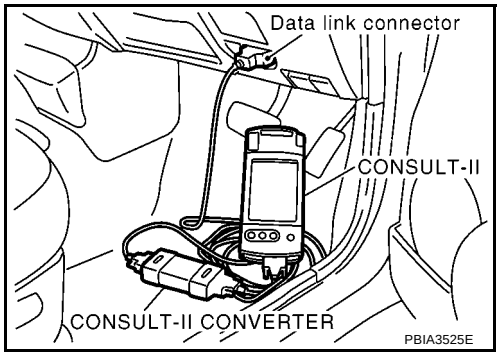
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Room lamp	Data monitor	Displays BCM input data in real time.
	Active test	BCM can sends a drive signal to electrical components to their opration.

CONSULT-II BASIC OPERATION

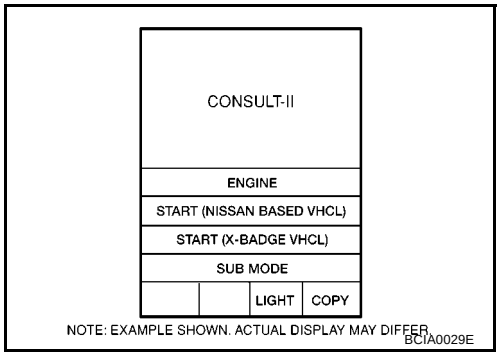
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

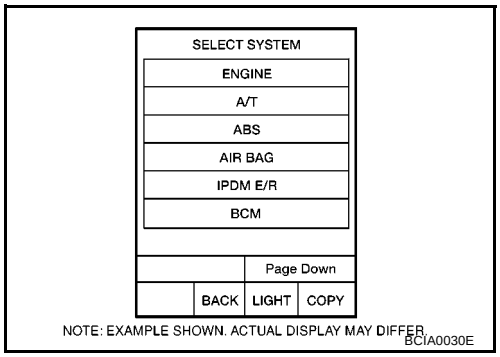
1. Turn ignition switch OFF.
2. Connect CONSULT-II and “CONSULT-II CONVERTER” to data link connector.



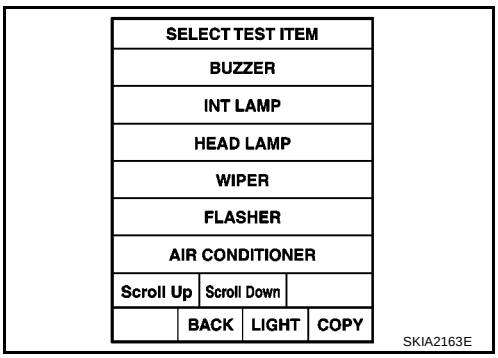
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



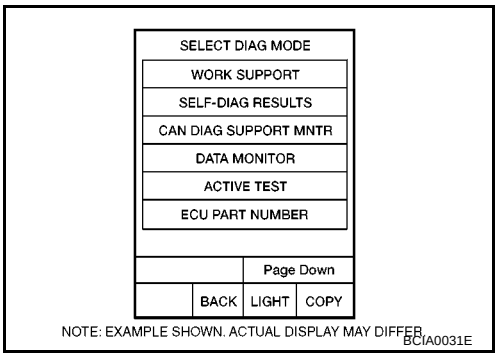
5. Touch “BCM” on the “SELECT SYSTEM” screen.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “INT LAMP” on “SELECT TEST ITEM” screen.



7. Touch “DATA MONITOR”, or “ACTIVE TEST” on the “SELECT DIAG MODE” screen.



DATA MONITOR

Operation Procedure

1. Touch “INT LAMP” on “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on the “SELECT DIAG MODE” screen.
3. Touch “ALL SIGNALS” or “SELETION FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
SELECTION FROM MENU	Selects and monitors individual items.

4. Touch “START”.
5. When “SELECTION FROM MENU” is selected, touch items to be monitored. When “ALL SIGNALS” is selected, all the items will be monitored.
6. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

Display Item List

Monitor item “UNIT”		Display content
IGN ON SW	[ON/OFF]	Displays status (Ignition switch ON: ON/Others OFF, ACC: OFF) as judged from the ignition switch signal.
PUSH SW (*1)	[ON/OFF]	Displays status (Ignition knob is pushed: ON/ released: OFF) as judged from the ignition knob switch signal.
KEY IN SW (*2)	[ON/OFF]	Displays status (Key inserted: ON/Key removed: OFF) as judged from the key switch signal.
DOOR SW-DR	[ON/OFF]	Displays status (Door open: ON/door closed: OFF) as judged from the front door switch RH signal.
DOOR SW-AS	[ON/OFF]	Displays status (Door open: ON/Door closed: OFF) as judged from the front door switch LH signal.
DOOR SW-RR	[ON/OFF]	Displays status (Door open: ON/door closed: OFF) as judged from the rear door switch RH signal.
DOOR SW-RL	[ON/OFF]	Displays status (Door open: ON/Door closed: OFF) as judged from the rear door switch LH signal.

Monitor item “UNIT”		Display content
BACK DOOR SW	[ON/OFF]	Displays status (Door open: ON/Door closed: OFF) as judged from the back door switch signal.
CDL LOCK SW	[ON/OFF]	Displays status (Locked: ON/Others: OFF) as judged from lock signal.
CDL UNLOCK SW	[ON/OFF]	Displays status (Unlocked: ON/Others: OFF) as judged from unlock signal.
KEYLESS LOCK (*2)	[ON/OFF]	Displays status (Locked: ON/Others: OFF) as judged from lock signal. (Locked by Multi-Remote control system)
KEYLESS UNLOCK(*2)	[ON/OFF]	Displays status (Unlocked: ON/Others: OFF) as judged from unlock signal. (Unlocked by Multi-Remote control system)
I-KEY LOCK (*1)	[ON/OFF]	Displays status (Locked: ON/Others: OFF) as judged from lock signal. (Locked by Intelligent Key system)
I-KEY UNLOCK (*1)	[ON/OFF]	Displays status (Unlocked: ON/Others: OFF) as judged from unlock signal. (Unlocked by Intelligent Key system)
I-KEY ALL UNL (*1)	[ON/OFF]	Displays status (Unlocked: ON/Others: OFF) as judged from unlock signal. (Unlocked by Intelligent Key system)

*1: Displayed for models with Intelligent Key system.
*2: Displayed for models without Intelligent Key system.

ACTIVE TEST

Test Item	Description
INT LAMP	This test is able to check interior lamp operation. The interior lamp turned ON when "ON" on CONSULT-II display is touched.

Room Lamp Does Not Operate

EKS00EO8

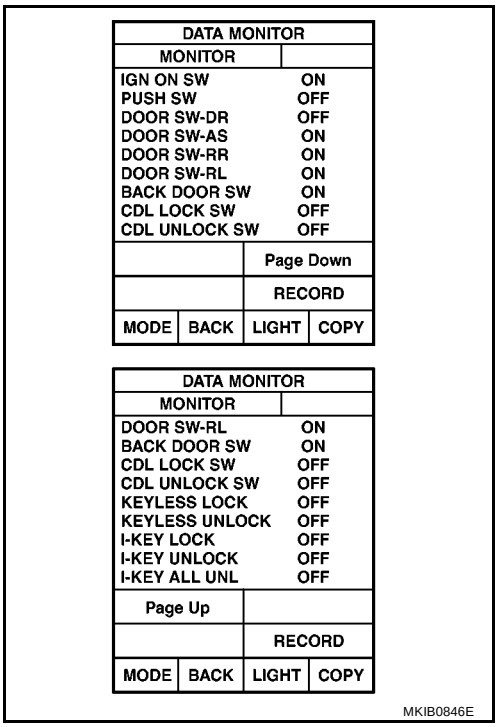
1. CHECK SWITCH SIGNAL

SMA for VIN >SJN**AK12U1149635

Select BCM on CONSULT-II.Check following item in “DATA MONITOR” mode with CONSULT-II.

Monitor item	Condition	
IGN ON SW	Ignition switch is in ON position	ON
	Ignition switch is in other position	OFF
PUSH SW	Ignition knob is pushed	ON
	Ignition knob is released	OFF
KEY IN SW	Key is inserted	ON
	Key is removed	OFF
DOOR SW-DR	Front RH door is opened	ON
	Front RH door is closed	OFF
DOOR SW-AS	Front LH door is opened	ON
	Front LH door is closed	OFF
DOOR SW-RR	Rear RH door is opened	ON
	Rear RH door is closed	OFF
DOOR SW-RL	Rear LH door is opened	ON
	Rear LH door is closed	OFF
BACK DOOR SW	Back door is opened	ON
	Back door is closed	OFF
CDL LOCK SW	Lock/unlock switch lock position	ON
	Lock/unlock switch unlock position	OFF
CDL UNLOCK SW	Lock/unlock switch unlock position	ON
	Lock/unlock switch lock position	OFF
KEYLESS LOCK (*2)	Keyless lock/unlock switch lock position	ON
	Keyless lock/unlock switch unlock position	OFF
KEYLESS UNLOCK (*2)	Keyless lock/unlock switch unlock position	ON
	Keyless lock/unlock switch lock position	OFF
I-KEY LOCK (*1)	Intelligent Key lock/unlock switch lock position	ON
	Intelligent Key lock/unlock switch unlock position	OFF
I-KET UNLOCK (*1)	Intelligent Key lock/unlock switch unlock position	ON
	Intelligent Key lock/unlock switch lock position	OFF
I-KEY ALL UNL (*1)	Intelligent Key all door unlock switch unlock position	ON
	Intelligent Key all door unlock switch lock position	OFF

*1: Display for models with Intelligent Key system
*2: Displayed for models without Intelligent Key system



OK or NG

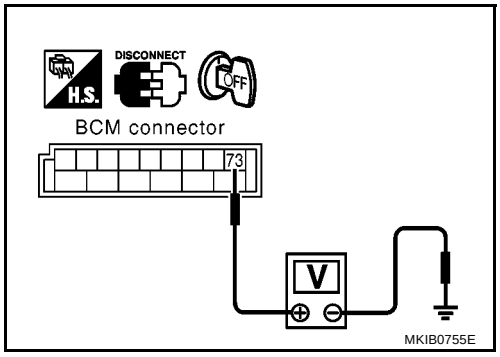
OK >> GO TO 2.

NG >>
- IGN ON SW: Refer to DI-110, "Ignition ON Signal Check" .
- PUSH SW (with Intelligent Key system): Refer to DI-107, "Key Switch Signal Check/With Intelligent Key System"
- KEY IN SW (without Intelligent Key system): Refer to DI-105, "Key Switch Signal Check/Without Intelligent Key System"
- DOOR SW-DR: Refer to BL-58, "DRIVER SIDE"
- DOOR SW-AS: Refer to BL-60, "PASSENGER SIDE"

- DOOR SW-RR: Refer to BL-64, "REAR RH SIDE"
- DOOR SW-RL: Refer to BL-62, "REAR LH SIDE"
- BACK DOOR SW: Refer to BL-66, "Check External Back Door Release Switch"
- CDL LOCK/UNLOCK SW: Refer to BL-50, "Check Door Lock / Unlock Switch"
- KEYLESS LOCK/UNLOCK: Refer to BL-143, "Remote controller Check"
- I-KEY LOCK/UNLOCK: Refer to BL-194, "Check Door Request Switch"
- I-KEY ALL UNL: Refer to BL-194, "Check Door Request Switch"

2. CHECK BCM OUTPUT SIGNAL

1. Interior room lamp switch is in DOOR position.
2. Check voltage between BCM and ground.



Terminal			Condition				Voltage (V)
(+)		(-)					
Con-nector	Termi-nal (Wire color)						
M50	73 (PU)	Ground	Ignition switch OFF	Key is inserted	Any door switch	ON (open)	Approx. 0
						OFF (closed)	Approx. 12
			—	Close all doors.	Key is removed after being fully inserted.		Approx. 0
					Turn ignition switch ON.		Approx. 12

OK or NG

OK >> GO TO 3.
NG >> Replace BCM.

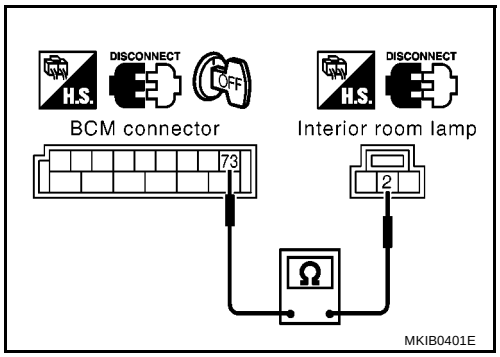
3. CHECK INTERIOR ROOM LAMP INPUT SIGNAL CIRCUIT

1. Turn igntion switch OFF.
2. Disconnect BCM connector and room lamp connector.
3. Check continuity between BCM harness connector M50 terminal 73(PU) and interior room lamp harness connector R2 terminal 2(PU).

Continuity should exist.

4. Check continuity between BCM connector M50 terminal 73 (PU) and ground.

Continuity should not exist.



OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connector.

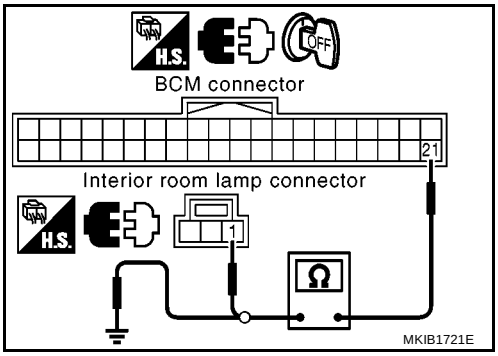
4. CHECK INTERIOR ROOM LAMP GROUND CIRCUIT

1. Check continuity between BCM connector M48 terminal 21(Y) and interior room lamp connector R2 terminal 1 (Y).

   Continuity should exist.

2. Check continuity between BCM connector M48 terminal 21 (Y) and ground.

   Continuity should not exist.

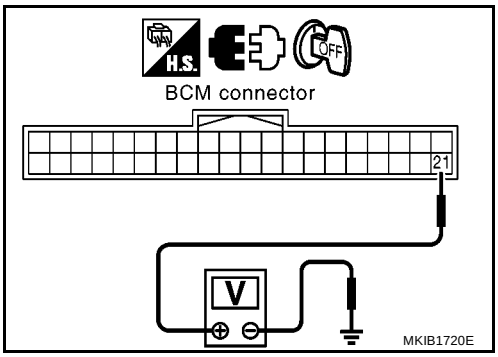


OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connector.

5. CHECK BCM OUTPUT SIGNAL

1. Interior room lamp switch is in DOOR position.
2. Connect BCM connector
3. Check voltage between BCM connector terminal and ground.



Terminal No.	Wire color	Signal designation	Measuring condition					Reference value (V)
			Ignition switch	Operation or condition				
21	Y	Logical lighting control	OFF	Room lamp switch: DOOR position	Key is inserted	Any door switch	ON (Open)	Approx. 0
							OFF (Close)	Approx. 12
					Close all doors	Key is removed from key cylincer		Approx. 0
						Turn igntion switch ON		Approx. 12
					Key is removed			Approx. 0
					Interior room lamp timer		OFF	Approx. 12
							ON	Approx. 0

OK or NG

OK >> Check condition of the harness and connector.
NG >> Replace BCM.

Luggage Room Lamp Does Not Illuminate

EKS00EO9

1. CHECK BULB

Check luggage room lamp bulb.

OK or NG

OK >> GO TO 2.
NG >> Replace luggage room lamp bulb.

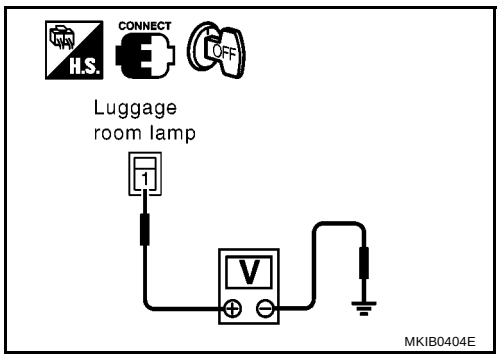
2. CHECK LUGGAGE ROOM LAMP INPUT SIGNAL

Check voltage between luggage room lamp harness connector B40 terminal 1(Y) and ground.

Battery voltage should exist.

OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between luggage room lamp and fuse. If NG, repair or replace the harness or fuse.



3. CHECK BACK DOOR SWITCH CIRCUIT

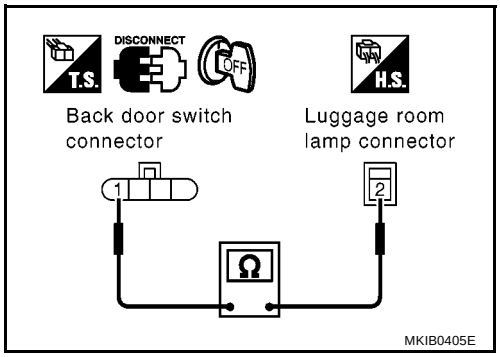
1. Turn ignition switch OFF.
2. Disconnect back door release actuator connector and luggage room lamp connector.
3. Check continuity between back door release actuator harness connector B55 terminal 1(OR) and luggage room lamp harness connector B41 terminal 2(L).

Continuity should exist.

4. Check continuity between

OK or NG

OK >> GO TO 4.
NG >> Repair or replace the harness.



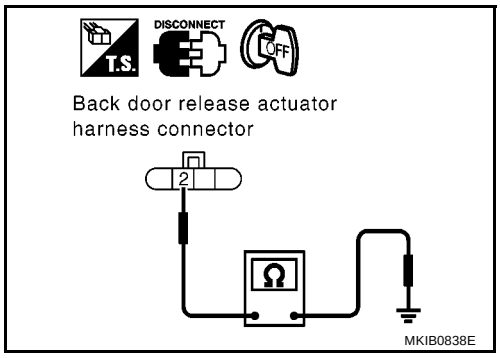
4. CHECK BACK DOOR SWITCH GROUND CIRCUIT

Check continuity between back door release actuator harness connector B55 terminal 2(B) and ground.

Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or harness connector.



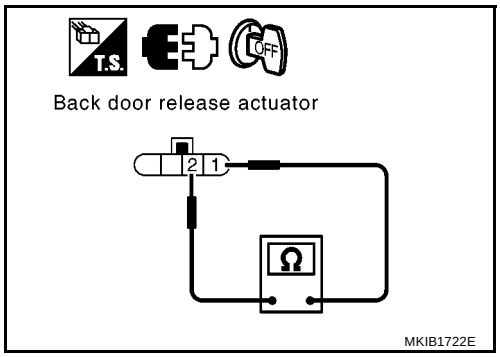
5. CHECK BACK DOOR SWITCH

Check continuity back door switch terminals.

Terminals		Condition	Continuity
1	2	Back door : OPEN	Yes
		Back door : CLOSED	No

OK or NG

OK >> Check condition of the harness and connector.
NG >> Replace theback door release actuator.



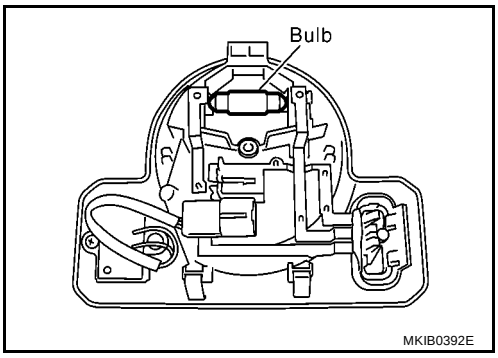
Bulb Replacement

SMA for VIN >SJN**AK12U1149635

EKS00EOA

1. Remove interior room lamp. Refer to LT-229, "Removal and Installation" .
2. Remove bulb.

Interior room lamp : 12V - 10W

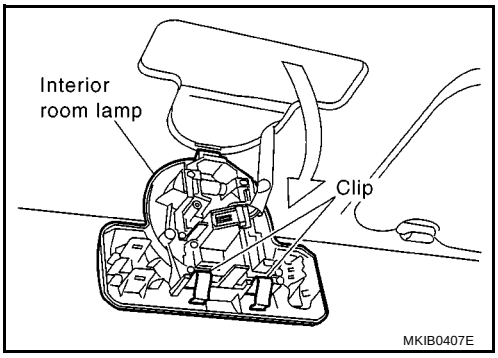


Removal and Installation

EKS00EOB

REMOVAL

1. Without damaging the headliner, insert a clip driver in the interior room lamp back edge to disengage metal clips.
2. Disconnect connector and remove interior room lamp.



INSTALLATION

Install in the reverse order of removal.

ILLUMINATION

PFP:27545

System Description

SMA for VIN >SJN**AK12U1309269 EKS00EOC

The illumination lamps operation is controlled by the lighting switch which built into the combination switch, BCM and IPDM E/R.Tail lamp relay is built into IPDM E/R.BCM read combination switch condition.Refer toLT-189, "System Description"

Power is supplied at all times

- to tail lamp relay (located in the IPDM E/R).

Power is also supplied at all times

- to BCM terminals 74 and 79
- through 40A fusible link (letter **J** , located in the fuse and fusible link box).

With the ignition switch in the ON or START position, power is supplied

- to BCM terminal 24
- through 10A fuse [No. 4, located in the fuse block (J/B)].
- to power window main switch terminal 5
- to front power window switch (passenger side) terminal 1
- through BCM terminal 78

Ground is supplied

- to BCM terminals 2 and 70
- through grounds M19, and M20.

ILLUMINATION OPERATION BY LIGHTING SWITCH

When the lighting switch is turned to 1ST position, BCM read combination switch condition (refer to LT-189, "System Description"). And BCM send illumination lamp request signal to IPDM E/R via CAN communication line. Then IPDM E/R is turned on tail lamp relay. Tail lamp relay is energized and then power is supplied:

- through terminal 15 of the IPDM E/R
- to heated seat switch driver side (illumination) terminal 5
- to heated seat switch passenger side (illumination) terminal 5
- to door lock/unlock switch terminal 2
- through terminal 16 of the IPDM E/R
- to audio unit terminal 36
- to audio and navi control unit terminal 36
- to heater control panel terminal 15
- to A/C auto amplifier terminal 11
- to headlamp aiming switch terminal 3
- to headlamp washer switch terminal 3
- to hazard switch terminal 3
- to ashtray illumination terminal 1 and
- to A/T device terminal 5
- to ESP OFF switch terminal 3

Ground is supplied at all times

- to door lock/unlock switch terminal 4
- to heated seat switch driver side terminal 6
- to heated seat switch passenger side terminal 6
- through body grounds B17, B23, B44 and B51
- to heater control panel terminal 7
- to A/C auto amplifier terminal 12
- to headlamp aiming switch terminal 4
- to headlamp washer switch terminal 4
- to hazard switch terminal 4
- to ashtray illumination terminal 2

- to A/T device terminal 4
- to power window main switch terminal 7
- to front power window switch (passenger side) terminal 7
- to ESP OFF switch terminal 4
- through body grounds M19 and M20
- to audio unit terminal 36
- to audio and navi control unit terminal 36
- through body ground M60

With power and ground supplied, illumination lamps illuminate.

COMBINATION SWITCH READING FUNCTION

Refer to LT-189, "System Description"

CAN Communication

EKS00ERQ

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00LTE

Go to CAN system, when selecting your car model from the following table.

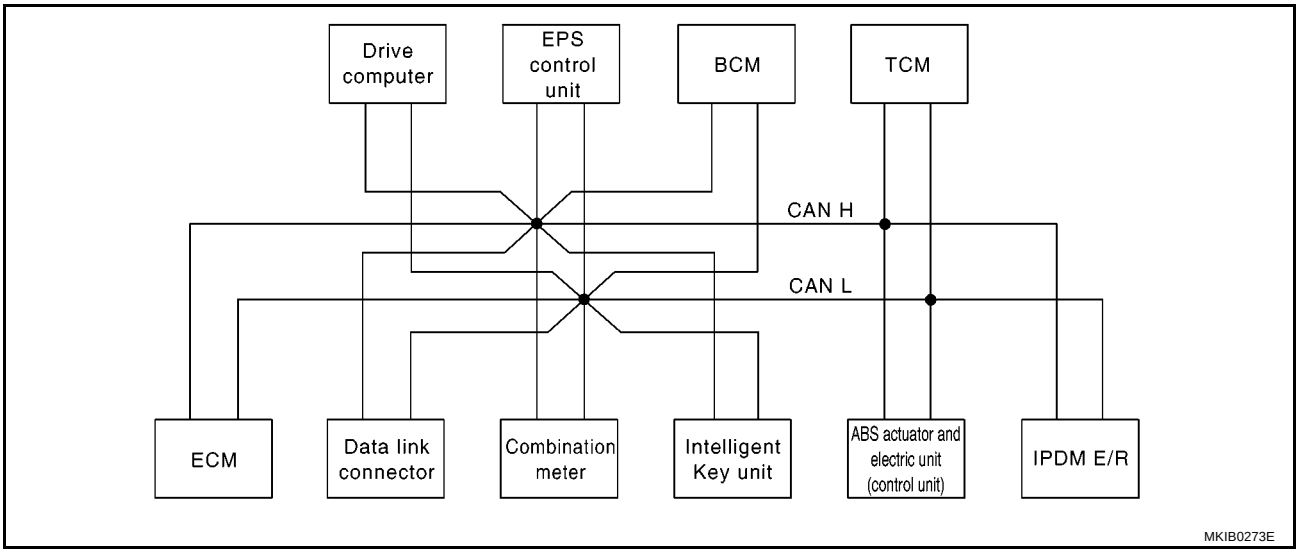
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	LT-233, "TYPE 1/ TYPE 2"				LT-236, "TYPE 3/ TYPE 4"				LT-238, "TYPE 5/ TYPE 6"				LT-241, "TYPE 7/ TYPE 8"				LT-243, "TYPE 9/ TYPE 10"			

×: Applicable

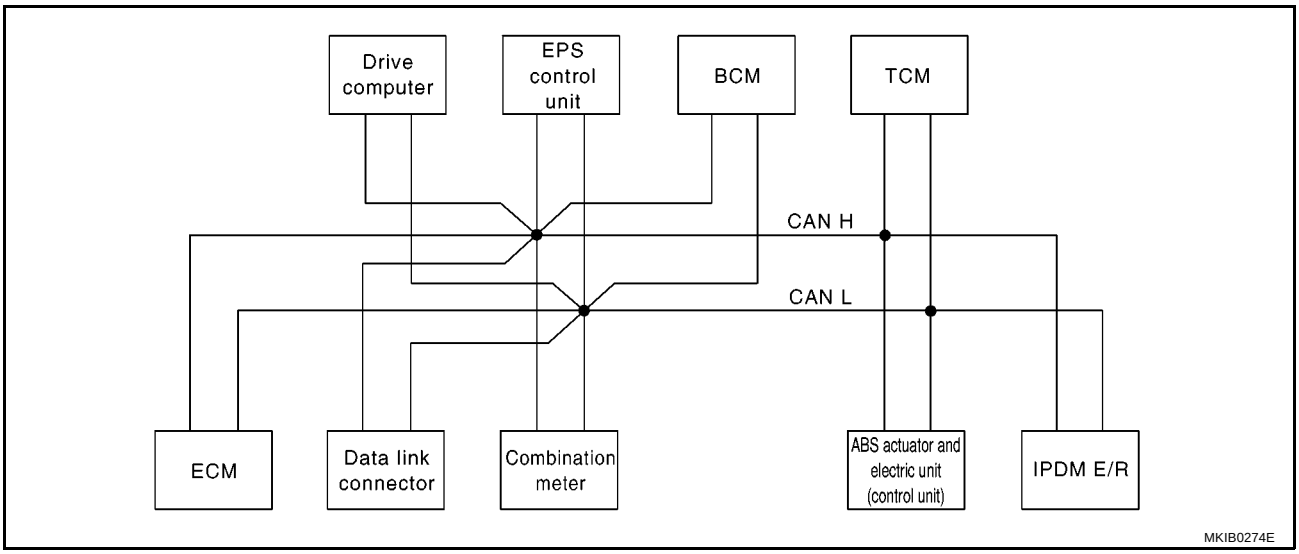
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

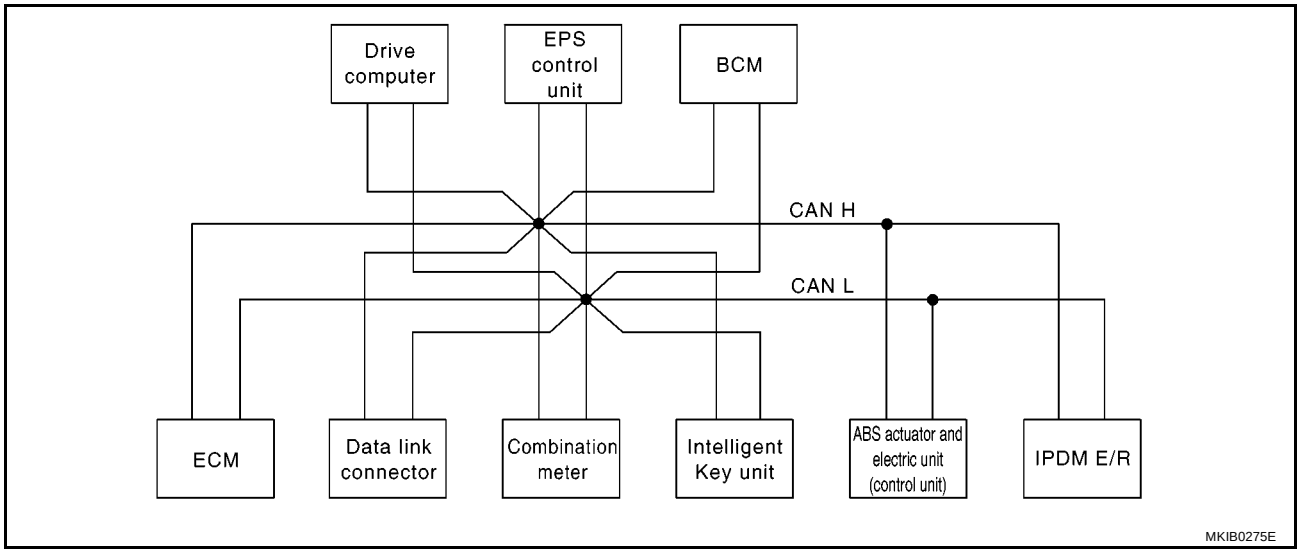
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

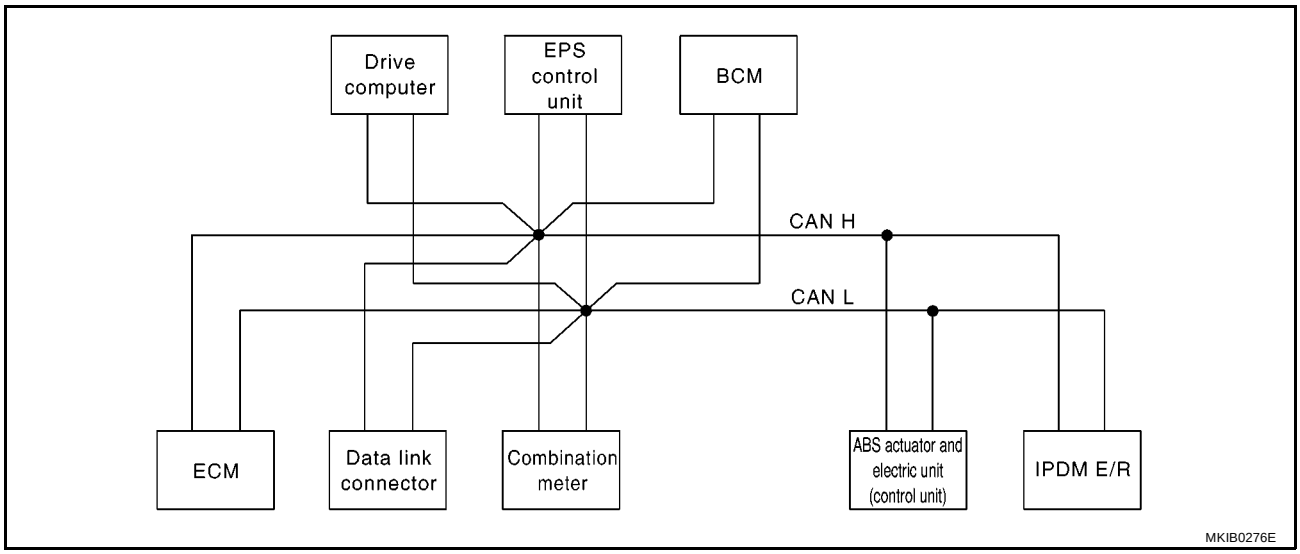
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

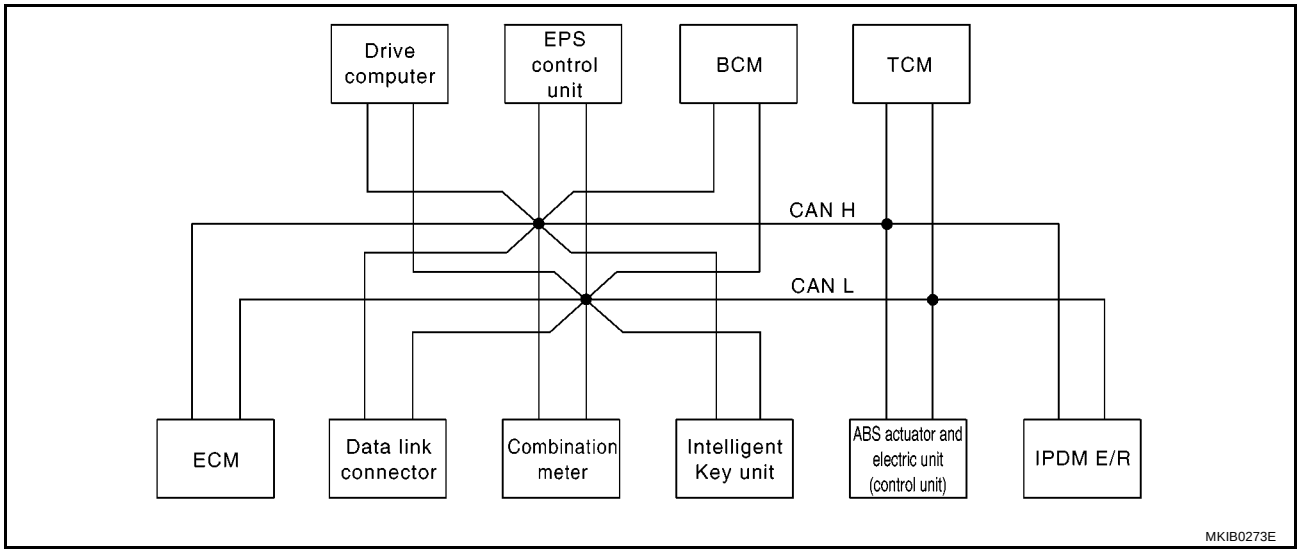
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

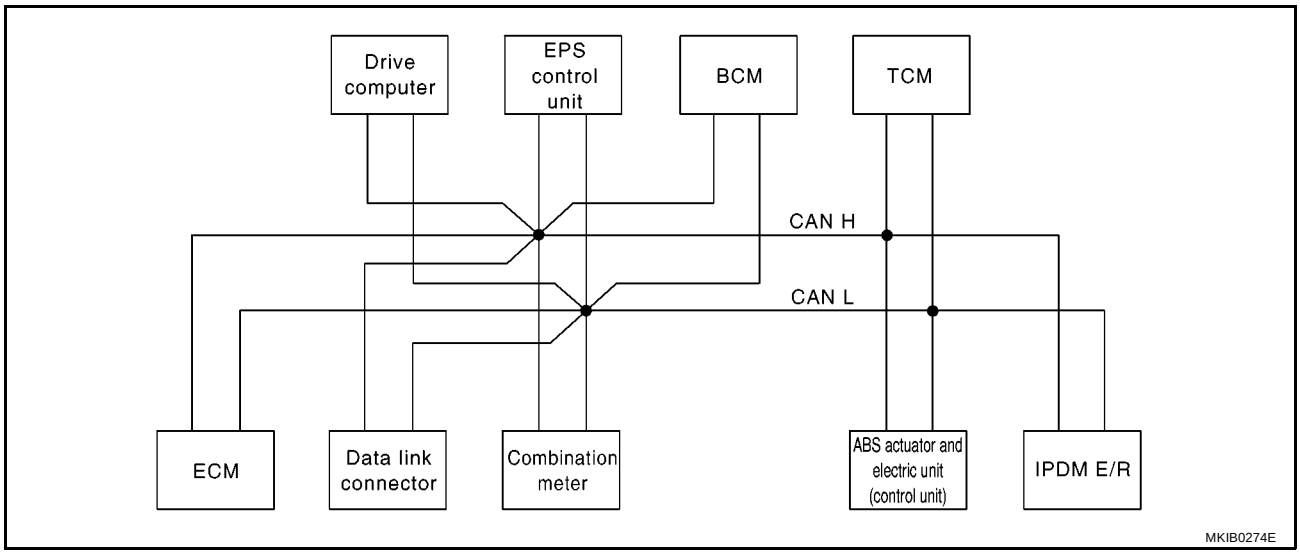
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

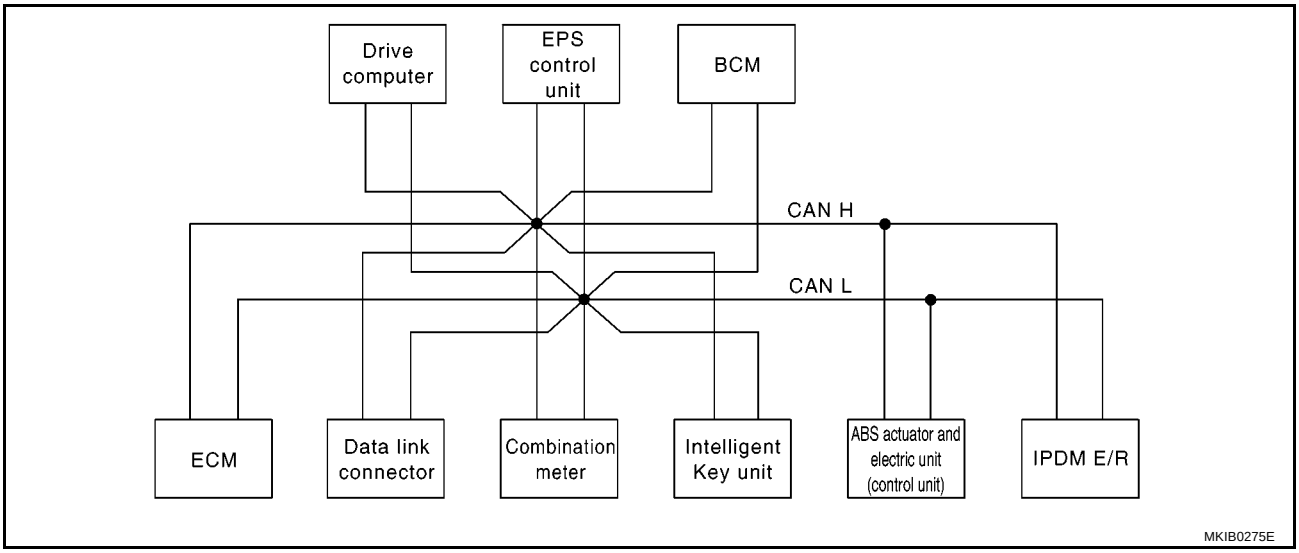
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

TYPE 7/TYPE 8

System diagram

- Type 7



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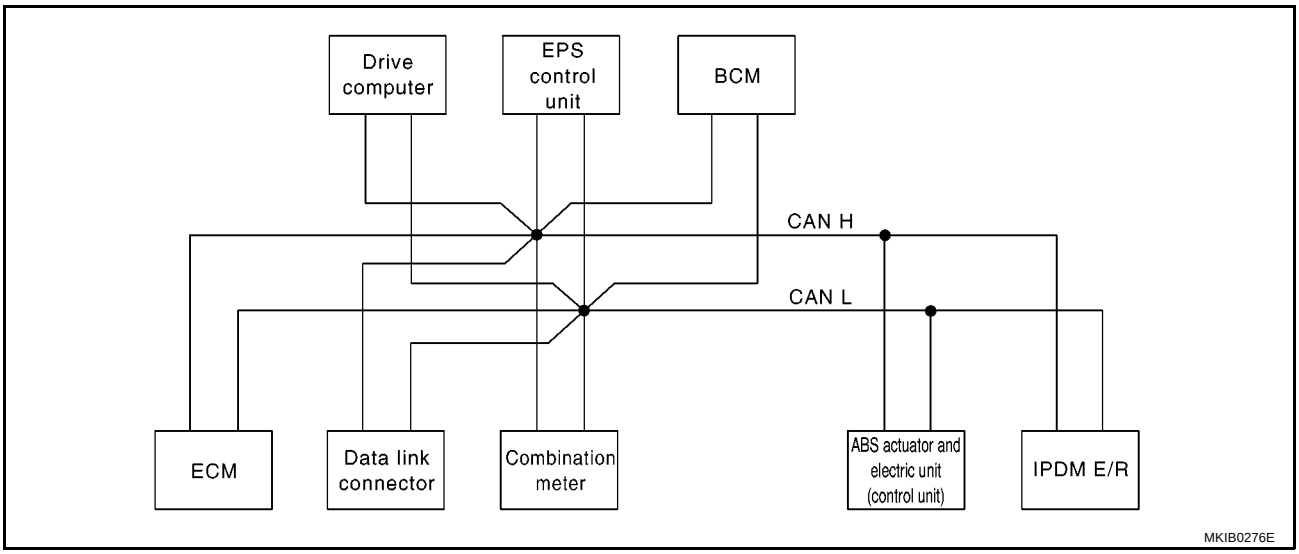


Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

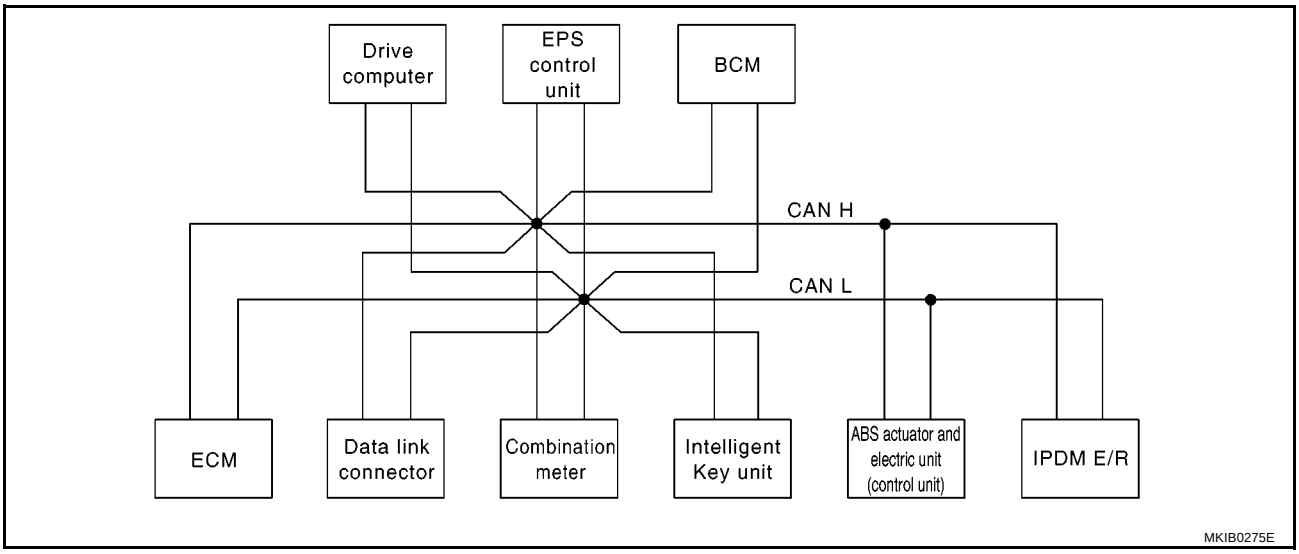
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

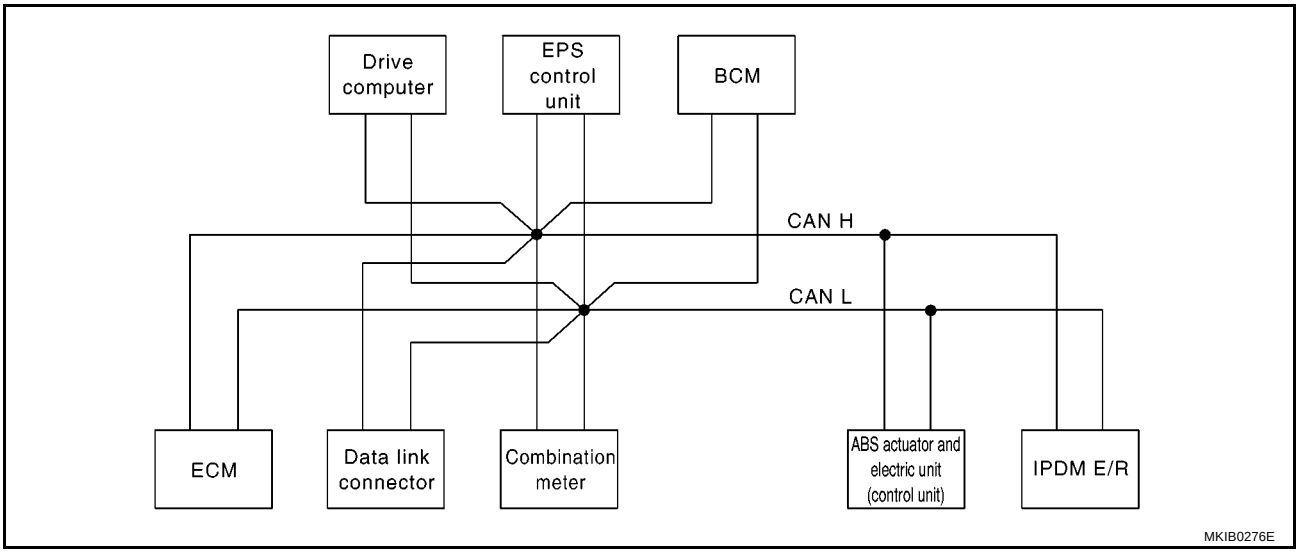
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

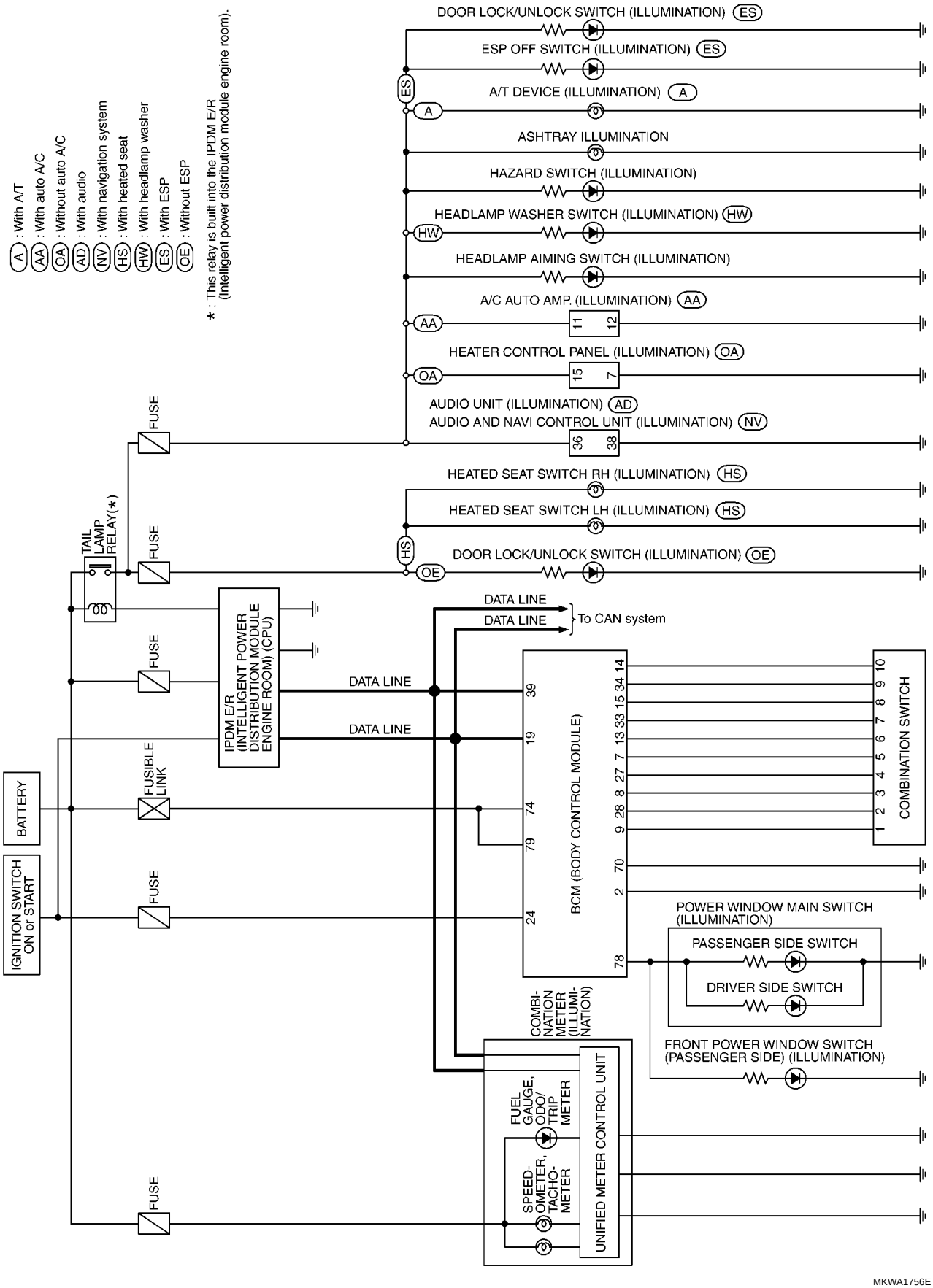
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic

SMA for VIN >SJN**AK12U1309269

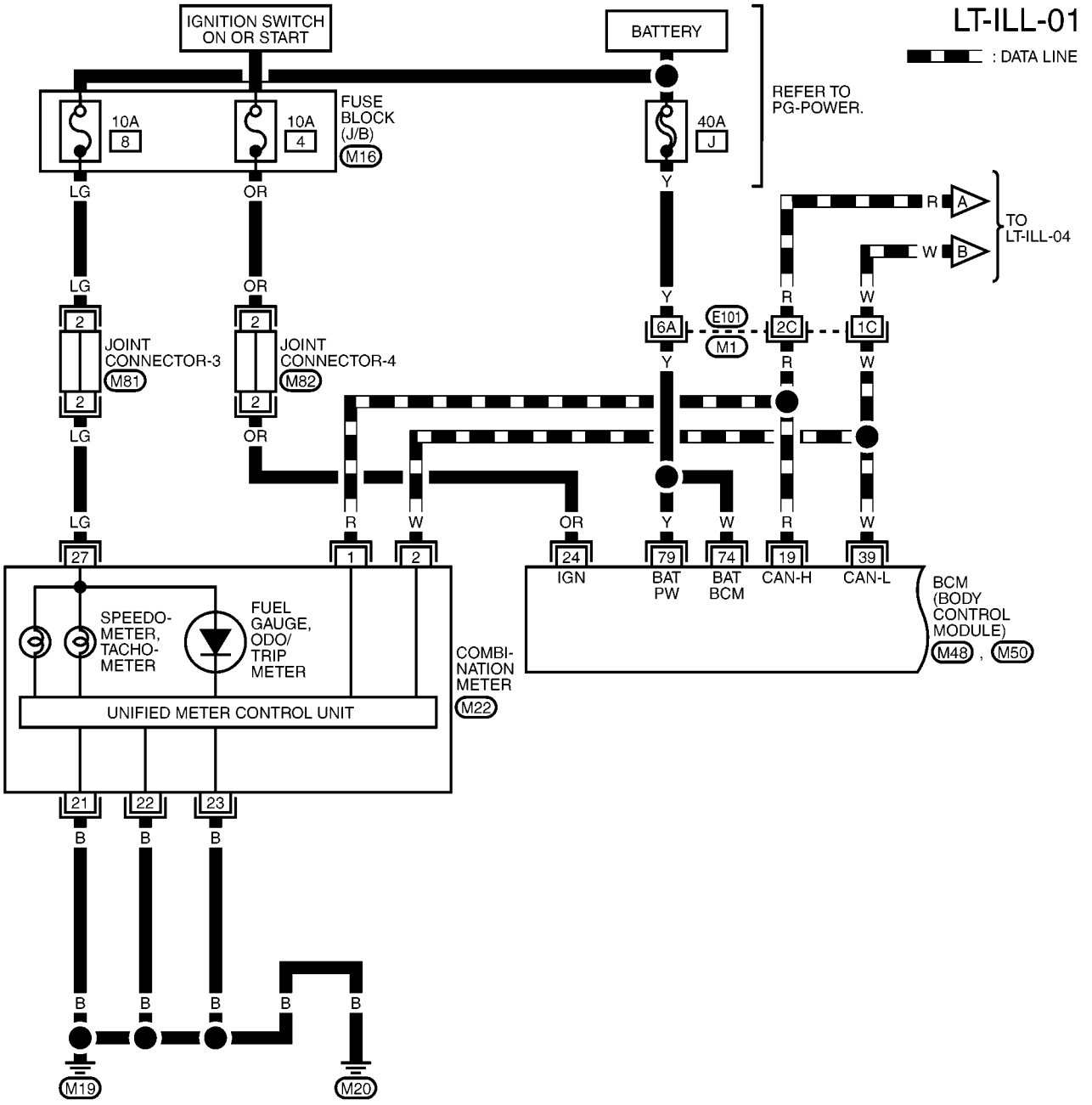
EKS00EOE

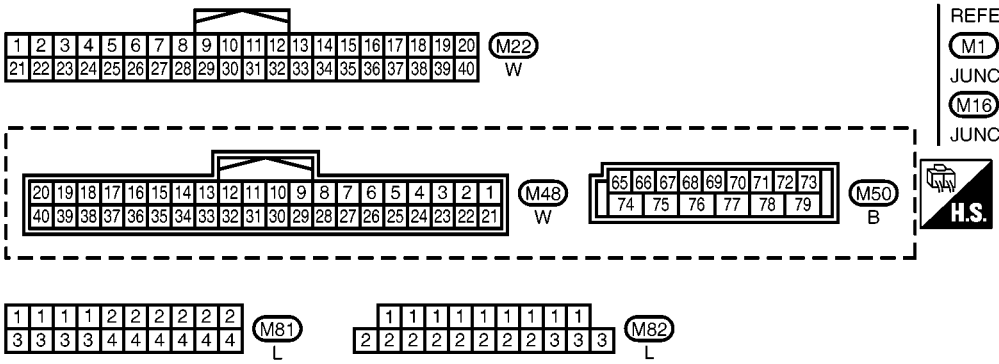


Wiring Diagram — ILL —

SMA for VIN >SJN**AK12U1309269

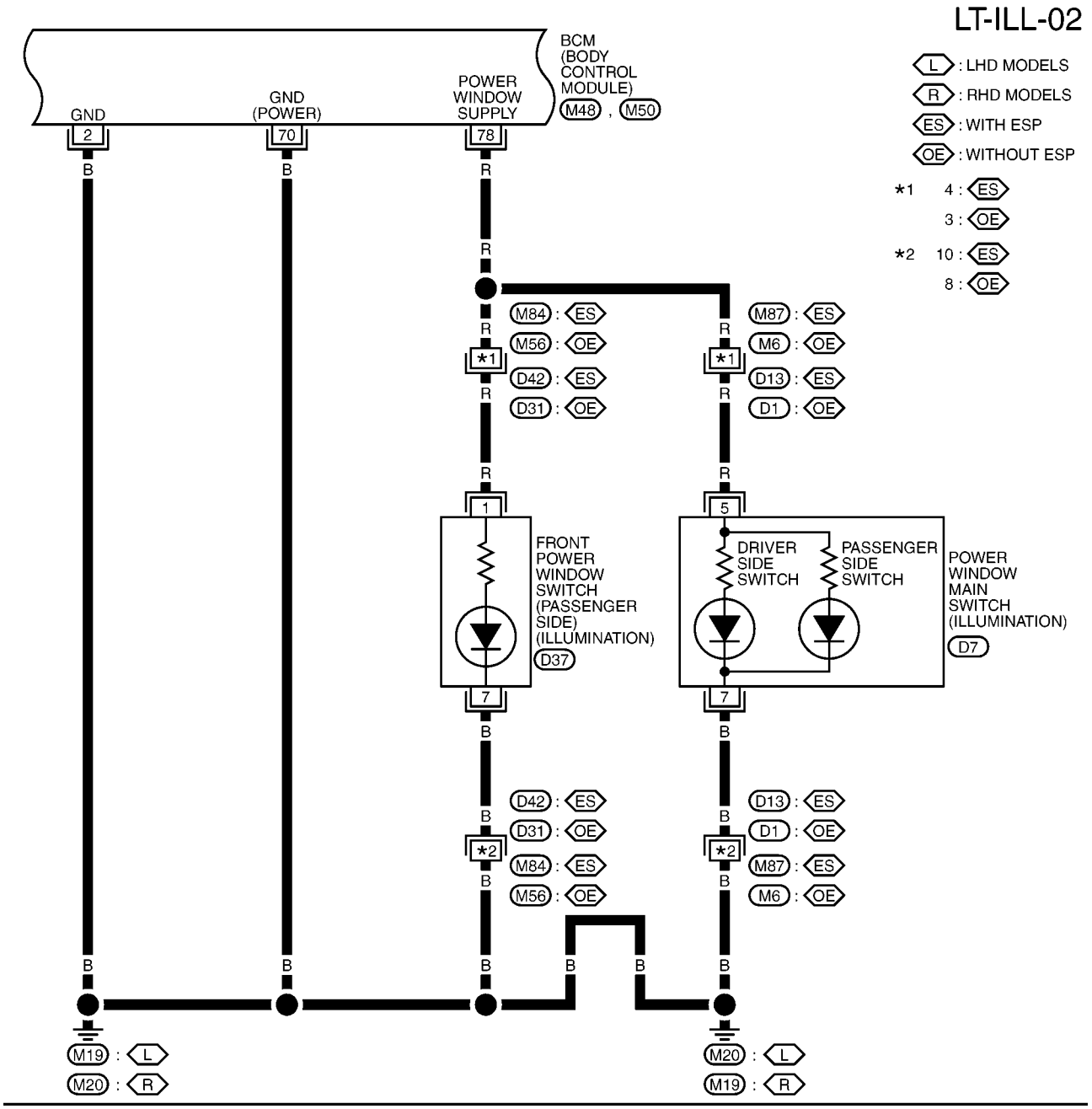
EKS00EOF

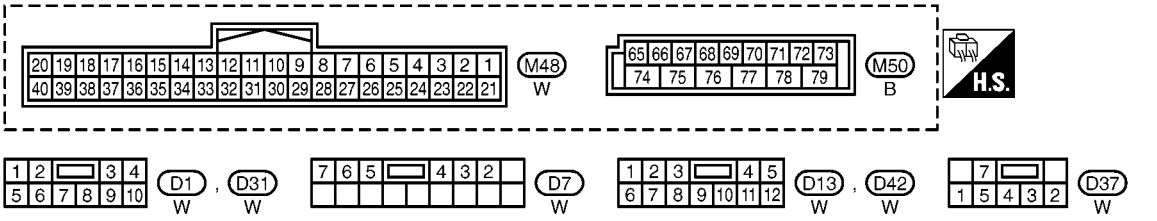




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

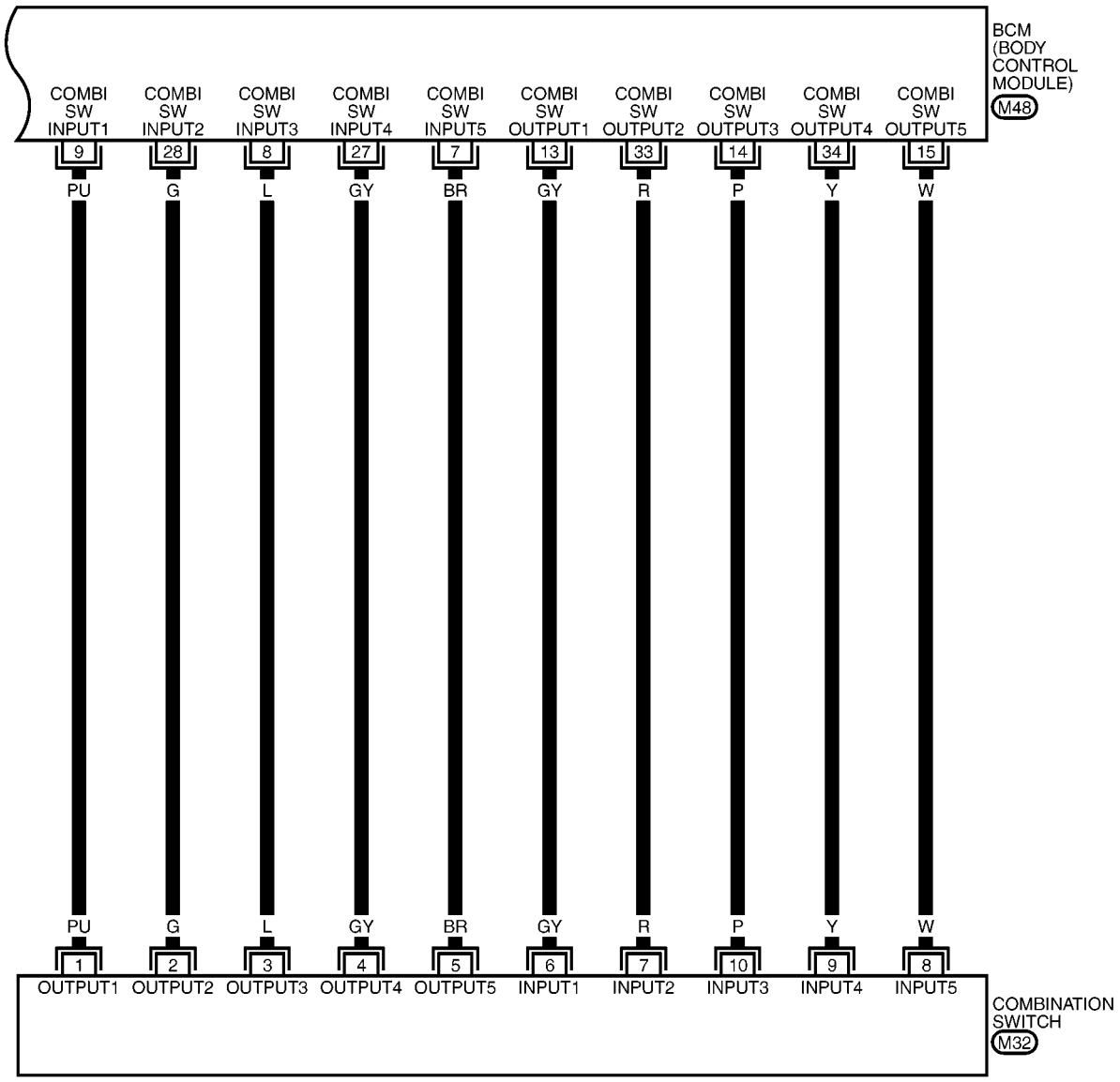
MKWA1530E

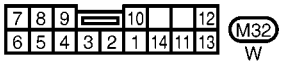

LT-ILL-02
L : LHD MODELS
R : RHD MODELS
ES : WITH ESP
OE : WITHOUT ESP
*1 4 : ES
3 : OE
*2 10 : ES
8 : OE
BCM (BODY CONTROL MODULE)
M48 , M50
GND
2
GND (POWER)
70
POWER WINDOW SUPPLY
78
M84 : ES
M56 : OE
D42 : ES
D31 : OE
M87 : ES
M6 : OE
D13 : ES
D1 : OE
FRONT POWER WINDOW SWITCH (PASSENGER SIDE) (ILLUMINATION)
D37
DRIVER SIDE SWITCH
PASSENGER SIDE SWITCH
POWER WINDOW MAIN SWITCH (ILLUMINATION)
D7
M19 : L
M20 : R
M20 : L
M19 : R

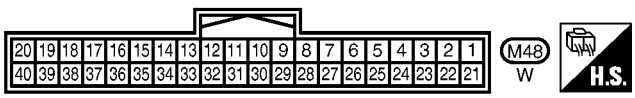

M48
W
M50
B
H.S.
D1 , D31
W W
D7
W
D13 , D42
W W
D37
W

MKWA1757E

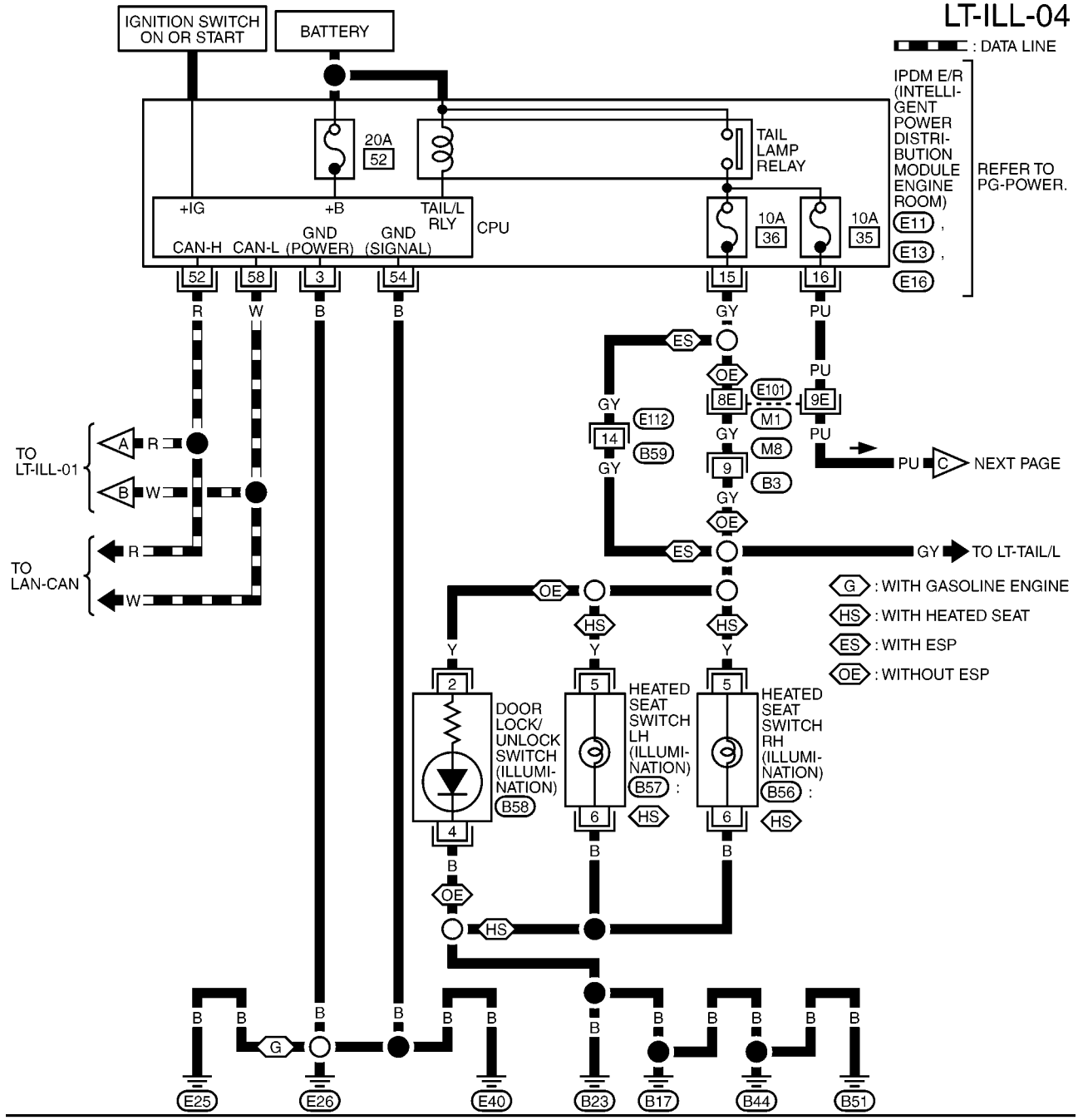
LT-ILL-03

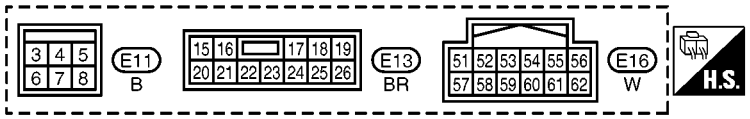


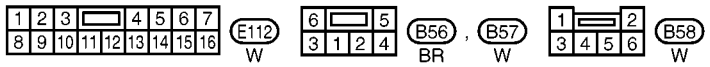




MKWA1748E

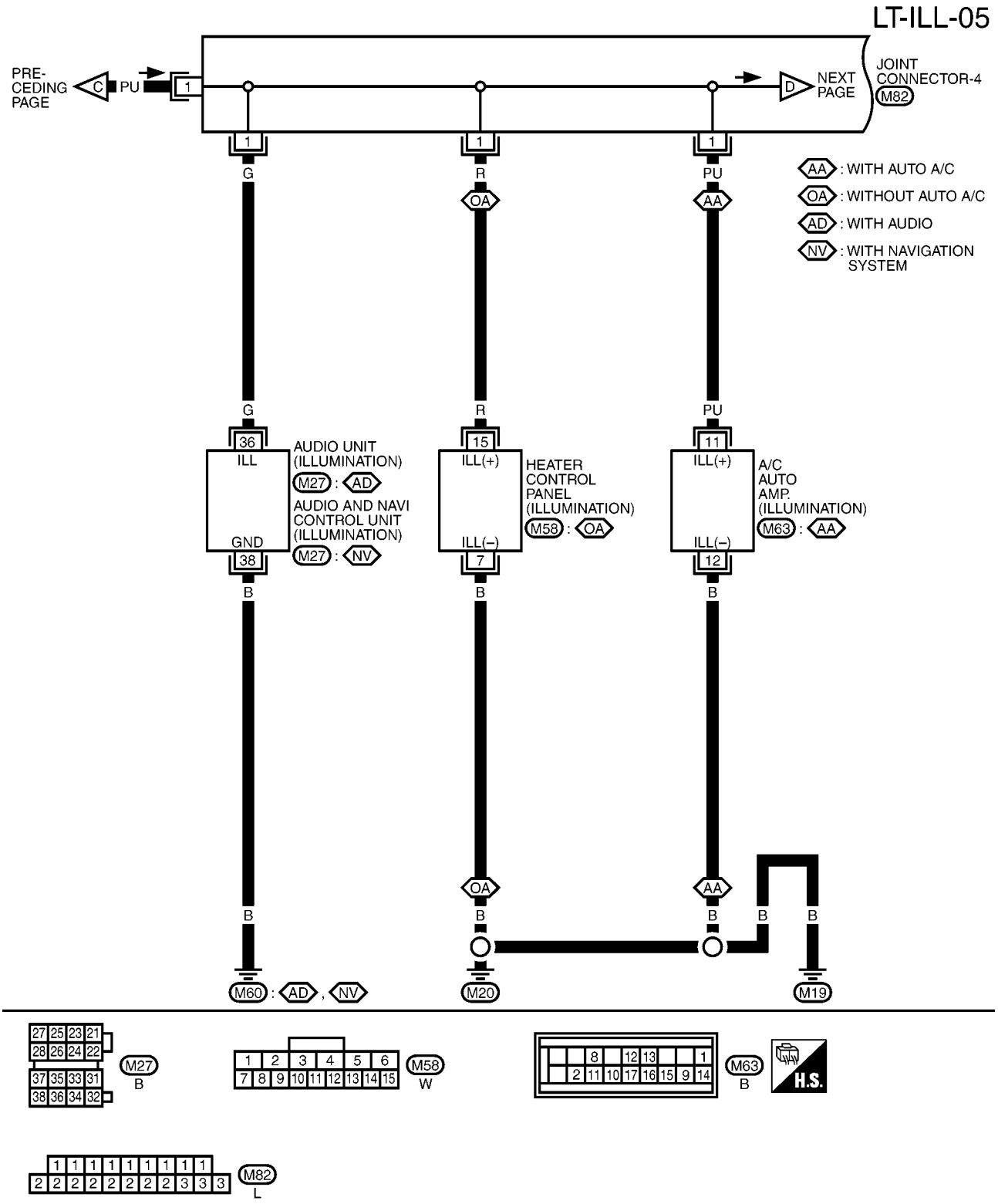






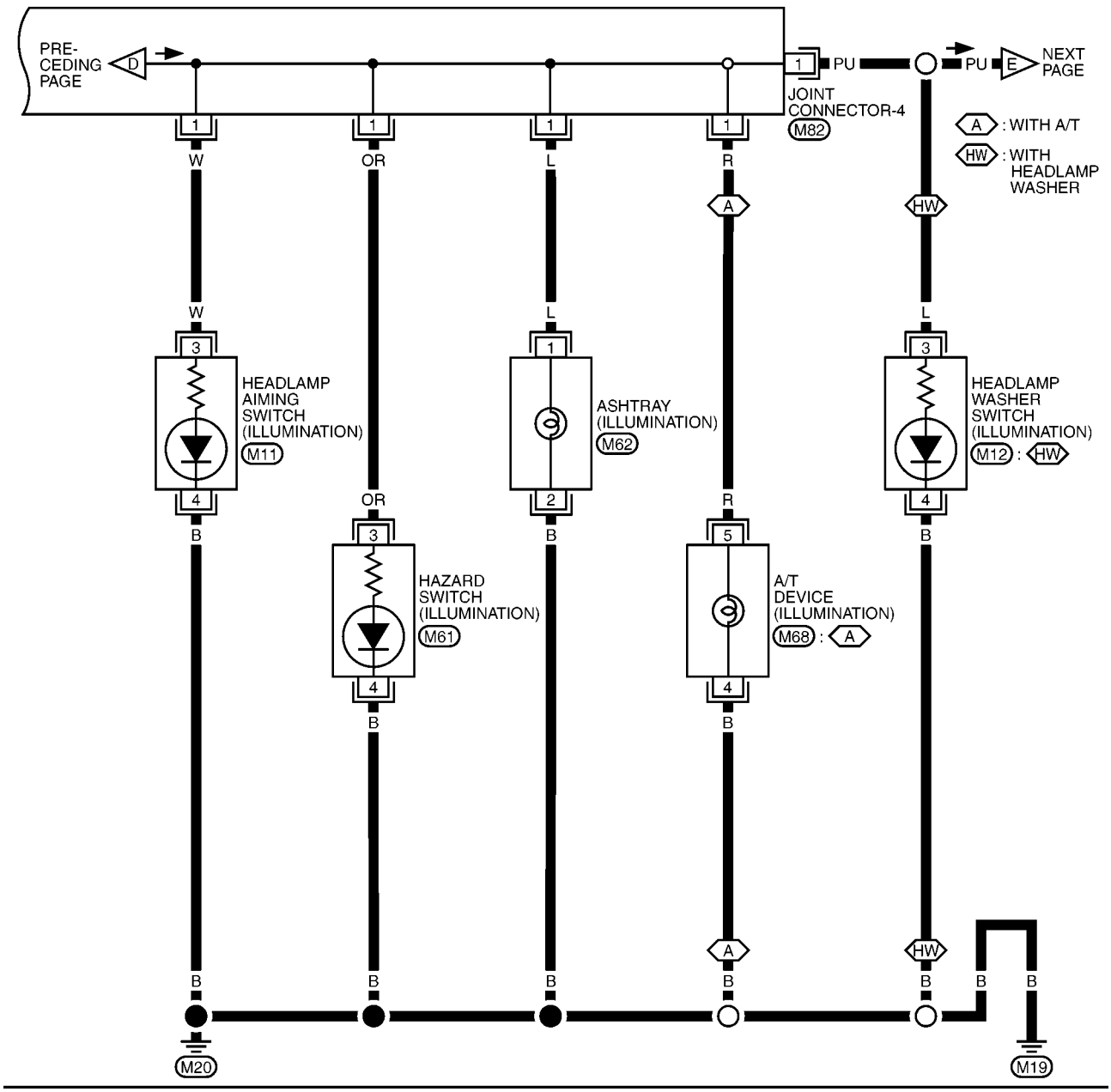
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

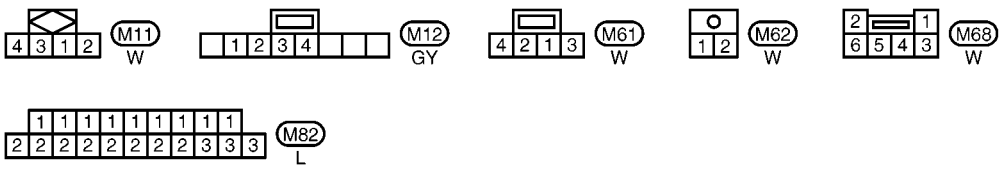
MKWA1758E


LT-ILL-05
PRE-CEDING PAGE
C
PU
1
D
NEXT PAGE
JOINT CONNECTOR-4
M82
AA : WITH AUTO A/C
OA : WITHOUT AUTO A/C
AD : WITH AUDIO
NV : WITH NAVIGATION SYSTEM
G
R
PU
36
ILL
GND
38
AUDIO UNIT (ILLUMINATION)
M27 : AD
AUDIO AND NAVI CONTROL UNIT (ILLUMINATION)
M27 : NV
15
ILL(+)
ILL(–)
7
HEATER CONTROL PANEL (ILLUMINATION)
M58 : OA
11
ILL(+)
ILL(–)
12
A/C AUTO AMP. (ILLUMINATION)
M63 : AA
B
M60 : AD , NV
M20
M19
M27
B
M58
W
M63
B
H.S.
M82
L

MKWA1531E

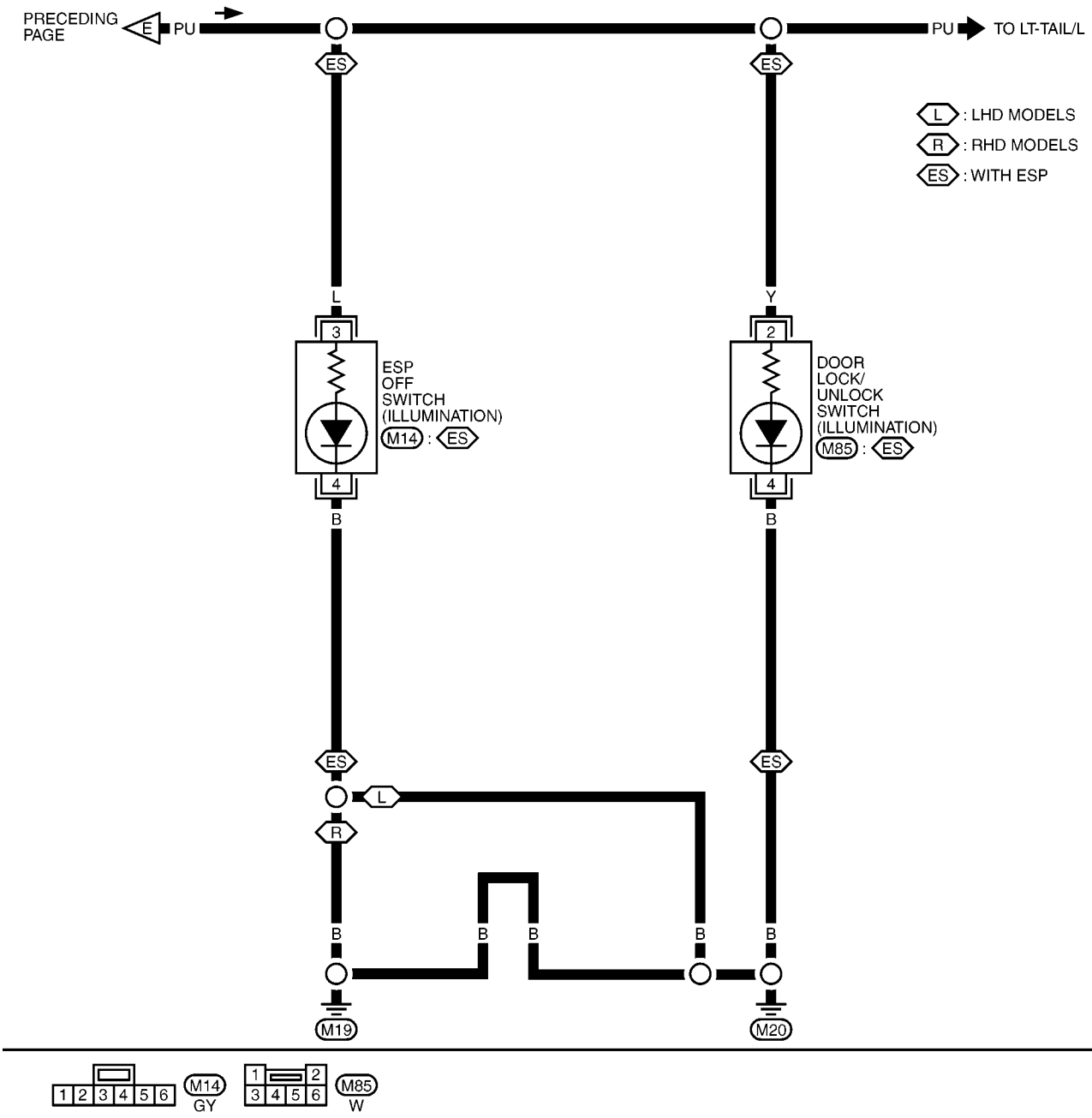
LT-ILL-06





MKWA1759E

LT-ILL-07



MKWA1760E

Removal and Installation

EKS00EOG

GLOVE BOX LAMP

Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .

BULB SPECIFICATIONS

SMA for VIN >SJN**AK12U1149635 PFP:26297

Headlamp

EKS00EOH

Item		Wattage (W)
High/Low	Halogen	60/55 (H4)

Exterior Lamp

EKS00EOI

Item		Wattage (W)
Clearance lamp		5
Front turn signal lamp		21 (amber)
Side turn signal lamp		5
Front fog lamp		55 (H11)
Rear combination lamp	Rear fog lamp	21
	Stop/Tail lamp	21/5
	Turn signal lamp	21
	Back-up lamp	21
License plate lamp		10
High-mounted stop lamp		21

Interior Lamp/Illumination

EKS00EOJ

Item	Wattage (W)
Interior room lamp	10
Luggage room lamp	10

SECTION LU

ENGINE LUBRICATION SYSTEM

CONTENTS

CR

PREPARATION 2
Special Service Tools 2
LUBRICATION SYSTEM 3
Lubrication Circuit 3
ENGINE OIL 4
Inspection 4
OIL LEVEL AND CONTAMINATION 4
OIL LEAK 4
OIL PRESSURE CHECK 4
Changing Engine Oil 5
OIL FILTER 6
Removal and Installation 6
REMOVAL 6
INSTALLATION 6
INSPECTION AFTER INSTALLATION 6
OIL PUMP 7
Removal and Installation 7
REMOVAL 7
INSTALLATION 7
Disassembly and Assembly 7
DISASSEMBLY 7
INSPECTION AFTER DISASSEMBLY 7
ASSEMBLY 8
SERVICE DATA AND SPECIFICATIONS (SDS) 9
Standard and Limit 9
OIL PRESSURE 9
OIL PUMP 9
OIL CAPACITY 9
TIGHTENING TORQUE 9

K9K

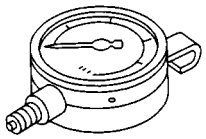
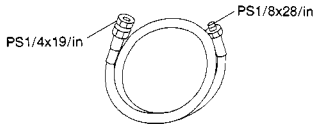
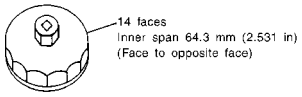
PRECAUTIONS 10
Precautions For Liquid Gasket 10
REMOVAL OF LIQUID GASKET 10
LIQUID GASKET APPLICATION PROCEDURE.. 10
PREPARATION 11
Special Service Tools 11
ENGINE OIL 12
Inspection 12
OIL LEVEL AND MUDDINESS 12
OIL LEAKAGE 12
OIL PRESSURE CHECK 12
Changing Engine Oil 13
OIL FILTER 14
Removal and Installation 14
REMOVAL 14
INSTALLATION 14
OIL PUMP 15
Removal and Installation 15
REMOVAL 15
INSTALLATION 15
OIL COOLER 16
Removal and Installation 16
REMOVAL 16
INSPECTION 16
INSTALLATION 16

PREPARATION

PFP:00002

Special Service Tools

EBS00OIH

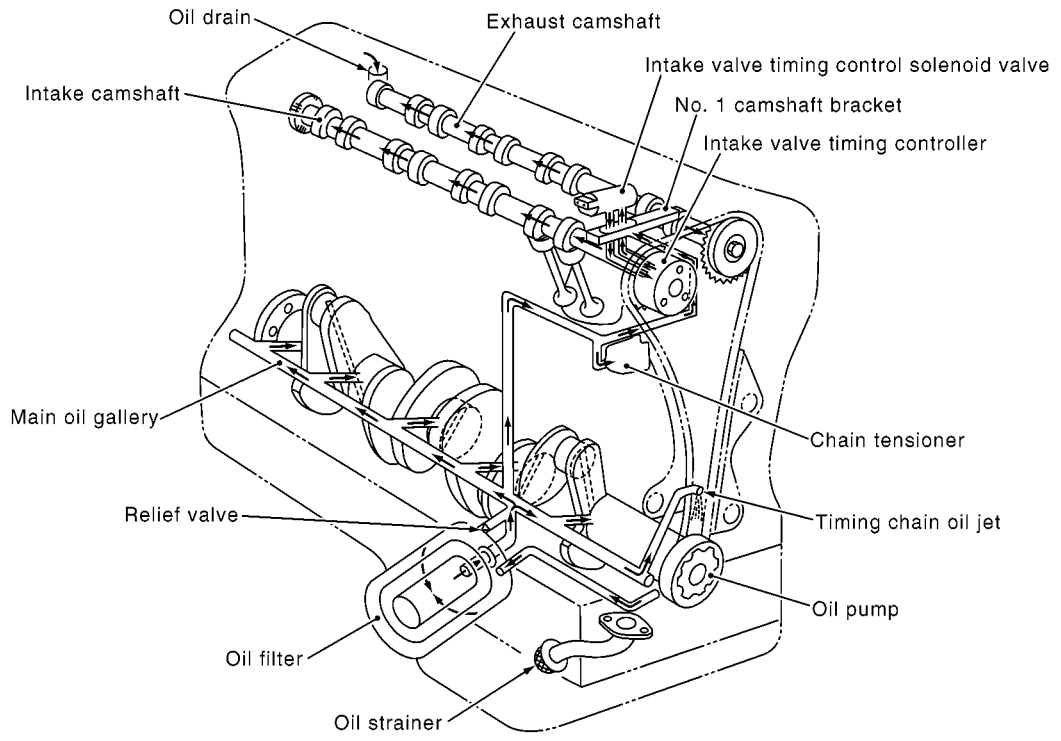
Tool number Tool name	Description
ST25051001 Oil pressure gauge  S-NT050	Measuring oil pressure **Maximum measuring range:** **2,452 kPa (24.5 bar, 25 kg/cm^2 , 356 psi)**
ST25052000 Hose  S-NT559	Adapting oil pressure gauge to cylinder block
KV10115801 Oil filter wrench  S-NT772	Removing oil filter

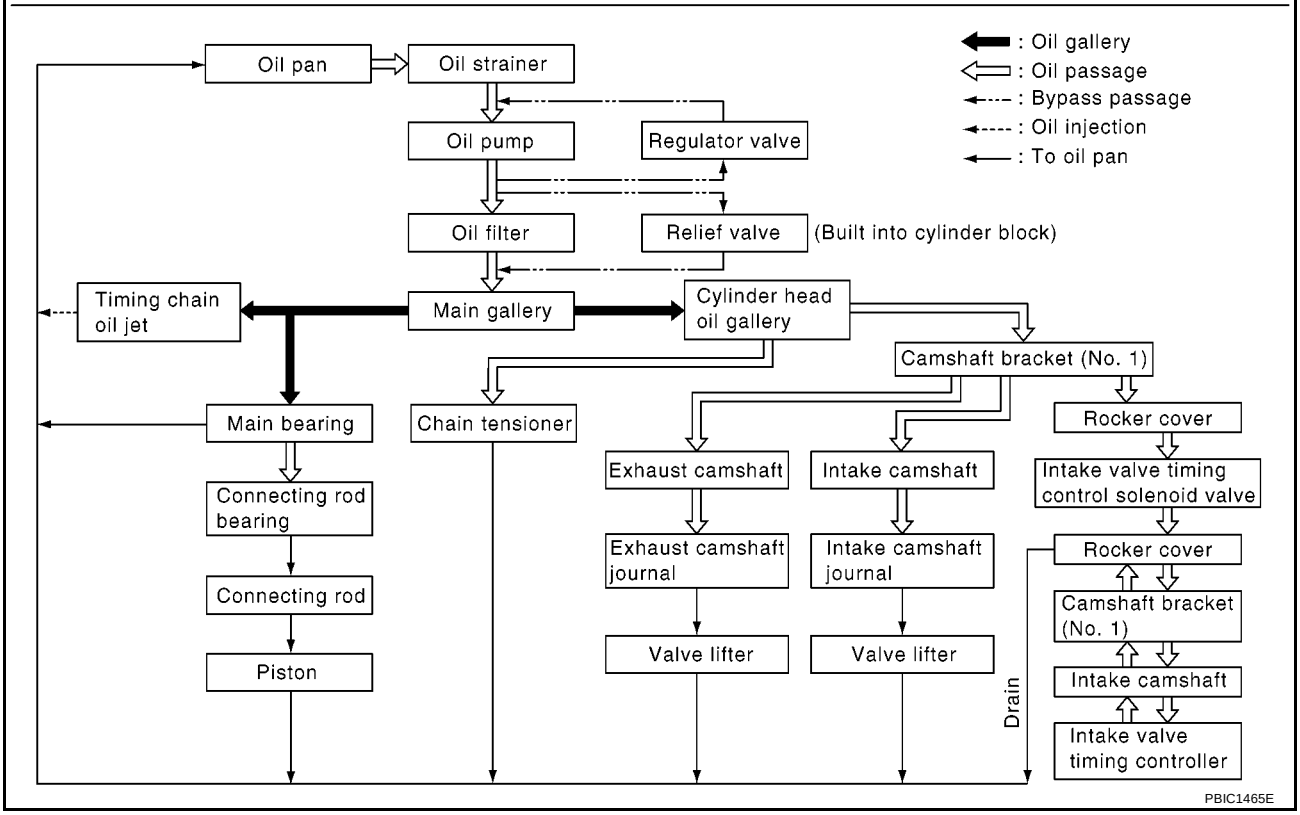
LUBRICATION SYSTEM

PFP:15010

Lubrication Circuit

EBS00OII





ENGINE OIL

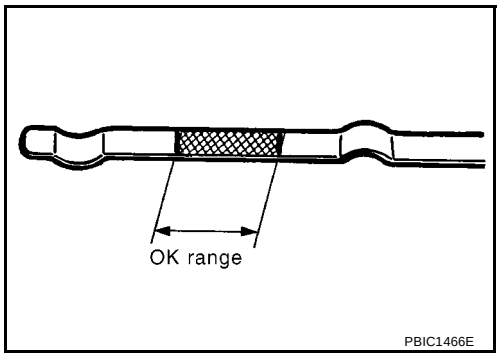
PFP:KLA92

Inspection

EBS00OIJ

OIL LEVEL AND CONTAMINATION

- Before starting the engine, put vehicle horizontally and check the oil level. If the engine is already started, stop it and allow 10 minutes before checking.
- Check that the oil level is within the range shown in the figure.
- If oil level is outside the range, adjust level.
- Check the oil for white turbidity or remarkable contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Find the cause and repair.
- When oil level gauge is inserted in guide, apply engine oil to rubber seal of grip.



OIL LEAK

Check the following parts for engine oil leaks.

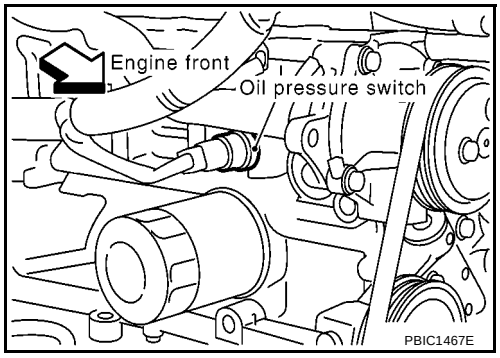
- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- Front cover
- Cylinder head front cover
- Mating surfaces of cylinder block and cylinder head
- Mating surfaces of cylinder head and rocker cover

OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Oil pressure check should be done in “Parking” or “Neutral” position.**

1. Check the engine oil level.
2. Remove oil filter. Refer to LU-6, "OIL FILTER" .
3. Remove oil pressure switch and connect an oil pressure gauge.



4. Install oil filter. Refer to LU-6, "OIL FILTER" .
5. After warming up the engine, check that oil pressure corresponding to the engine speed is produced.

   NOTE:
   Low oil temperature creates high pressure.

Engine oil pressure [When oil temperature is 80 °C (176 °F)]

Engine speed (rpm)	Idle speed	2,000	6,000
Engine oil pressure kPa (bar, kg/cm^2 , psi)	Approx. 44.1 (0.441, 0.45, 6.4) or more	Approx. 265 (2.65, 2.7, 38) or more	Approx. 373 (3.73, 3.8, 54) or more

6. After checking the oil pressure, install oil pressure switch as follows:

a. Remove old sealant on the switch and engine.

b. Apply thread sealant and tighten.
Use Genuine Liquid Gasket or equivalent.

: 18.7 - 20.5 N·m (1.9 - 2.0 kg-m, 14 - 15 ft-lb)

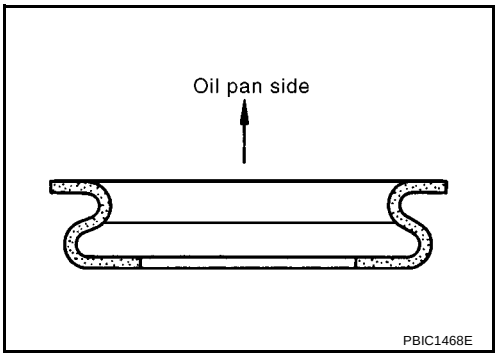
CAUTION:
Be careful not to get burned when engine or engine oil is heated.

Changing Engine Oil

EBS00OIK

WARNING:
- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up engine, and check for oil leakage from engine components.
2. Stop engine and wait for 10 minutes.
3. Remove oil filler cap, and remove drain plug.
4. Drain engine oil.
5. Install drain plug. Refill with new engine oil.
   - Install drain plug washer in the direction shown in figure.
   - **Oil specification and viscosity:**
     Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS".



Oil capacity (Approximate):

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	3.0 (2-5/8)
	Without oil filter change	2.8 (2-1/2)
Dry engine (engine overhaul)		3.5 (3-1/8)

CAUTION:
- **Be sure to clean drain plug and install with new washer.**

Oil pan drain plug:

: 29.4 - 39.2 N·m (3.0 - 3.9 kg-m, 22 - 28 ft-lb)

- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to determine when the proper amount of oil is in the engine.

6. Warm up engine and check area around drain plug and oil filter for oil leakage.
7. Stop engine and wait for 10 minutes.
8. Check oil level. Refer to LU-4, "Inspection" .

OIL FILTER

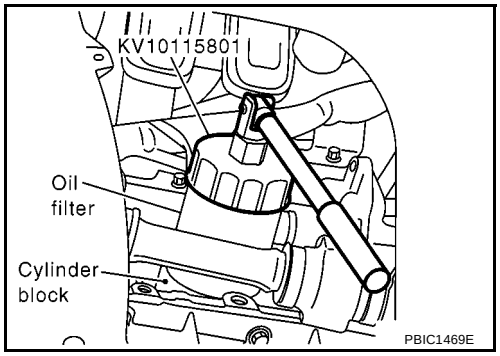
PFP:15208

Removal and Installation

EBS00OIL

REMOVAL

- Using an oil filter wrench (special service tool), remove oil filter.

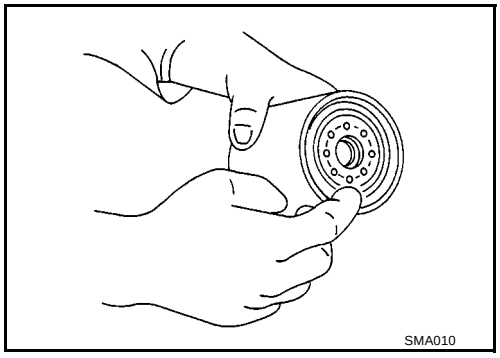


CAUTION:

- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Do not allow engine oil to adhere to the drive belts.**
- **Completely wipe off any oil that adheres to the engine and the vehicle.**

INSTALLATION

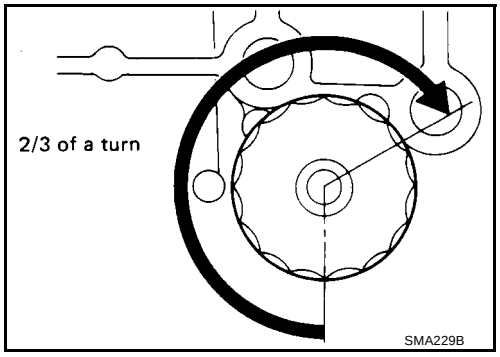
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply engine oil to the oil seal circumference of the new oil filter.



CAUTION:

- **Use genuine NISSAN oil filter or the equivalent.**

3. Screw the oil filter manually until it touches the installation surface, then tighten it by 2/3 turn.



Oil filter:

:11 - 14 N·m (1.2 - 1.4 kg-m, 9 - 10 ft-lb)

INSPECTION AFTER INSTALLATION

1. Check oil level and add engine oil. Refer to LU-4, "ENGINE OIL" .
2. After warming up the engine, check for engine oil leakage.

OIL PUMP

PFP:15010

Removal and Installation

EBS00OIM

REMOVAL

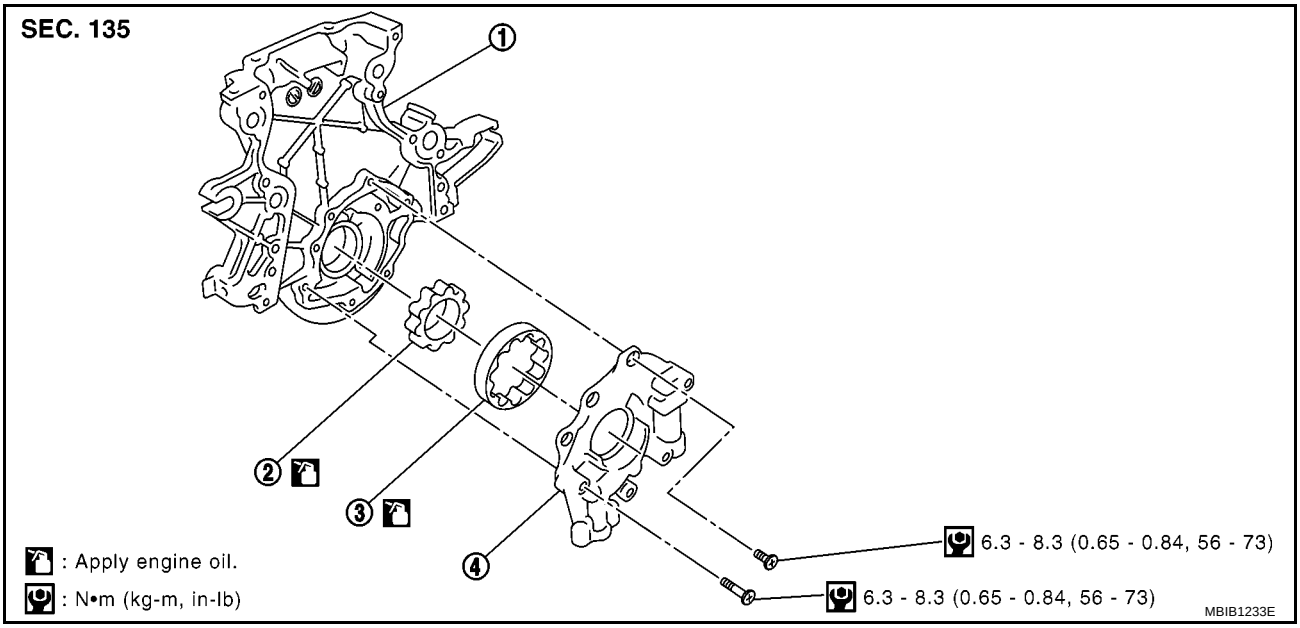
- Remove front cover. Refer to EM-48, "TIMING CHAIN" .

INSTALLATION

- Install in the reverse order of removal.

Disassembly and Assembly

EBS00OIN



1. Front cover
2. Inner rotor
3. Outer rotor
4. Oil pump cover

CAUTION:

Prior to installation, apply new engine oil to the parts marked in figure.

DISASSEMBLY

1. Remove oil pump cover.
2. Remove outer rotor and inner rotor from front cover.

INSPECTION AFTER DISASSEMBLY

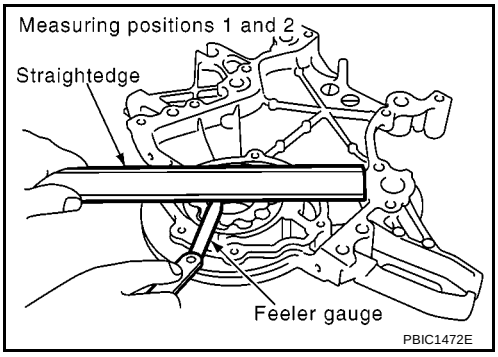
Clearances of Oil Pump Parts

- Measure clearance with feeler gauge and straightedge.
  Side clearance between inner rotor and front cover (position 1).

  Standard : 0.025 - 0.075 mm (0.0010 - 0.0030 in)

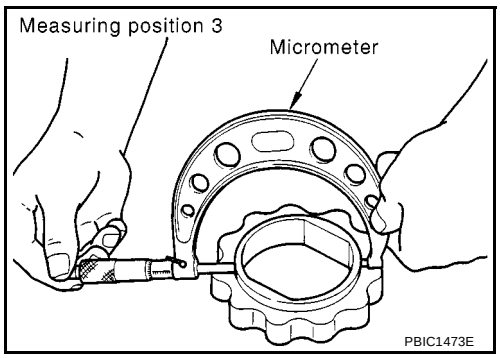
  Side clearance between outer rotor and front cover (position 2).

  Standard : 0.025 - 0.075 mm (0.0010 - 0.0030 in)



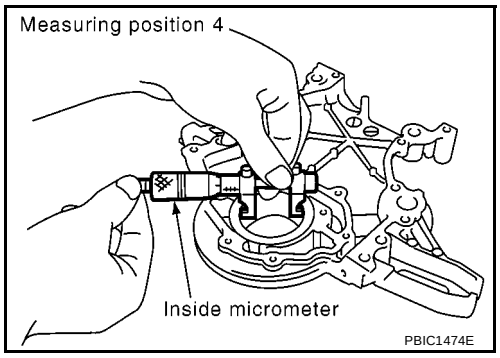
- Calculate the clearance from inner rotor to front cover socket with the following procedures.

1. Using a micrometer, measure the outer diameter of inner rotor protrusion (Position 3).



2. Using an inside micrometer, measure the inner diameter of front cover. (Position 4)
(Clearance) = (Inner diameter of front cover) - (outer diameter of inner rotor protrusion)

Standard : 0.045 - 0.095 mm (0.0011 - 0.0037 in)



ASSEMBLY

Install in the reverse order of disassembly.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

EBS00OIO

OIL PRESSURE

Engine speed rpm	Approximate discharge pressure kPa (bar, kg/cm^2 , psi)
Idle speed	Approx. 44.1 (0.441, 0.45, 6.4) or more
2,000	Approx. 265 (2.65, 2.7, 38) or more
6,000	Approx. 373 (3.73, 3.8, 54) or more

OIL PUMP

Unit: mm (in)

Body to inner rotor axial clearance	0.025 - 0.075 (0.0010 - 0.0030)
Body to outer rotor axial clearance	0.025 - 0.075 (0.0010 - 0.0030)
Inner rotor to brazed portion of housing clearance	0.045 - 0.095 (0.0018 - 0.0037)

OIL CAPACITY

Unit: ℓ (Imp qt)

With oil filter change	Approximately 3.0 (2-5/8)
Without oil filter change	Approximately 2.8 (2-1/2)
Dry engine (engine overhaul)	Approximately 3.5 (3-1/8)

TIGHTENING TORQUE

Unit: N·m (kg-m, ft-lb)
Unit: N·m (kg-m, in-lb)*

Oil pressure switch	18.7 - 20.5 (1.9 - 2.0, 14 - 15)
Oil pan drain plug	29.4 - 39.2 (3.0 - 3.9, 22 - 28)
Oil filter	11 - 14 (1.2 - 1.4, 9 - 10)
Oil pump cover	6.3 - 8.3 (0.65 - 0.84, 56 - 73)*

PRECAUTIONS

PFP:00001

Precautions For Liquid Gasket

EBS01C7G

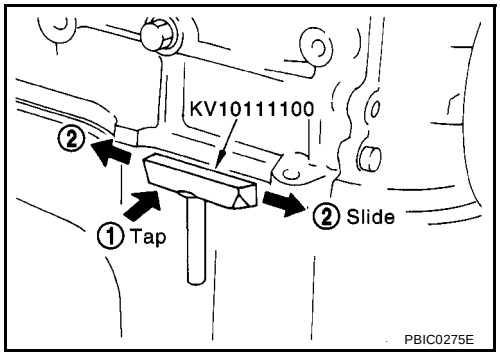
REMOVAL OF LIQUID GASKET

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

  CAUTION:
  Be careful not to damage the mating surfaces.

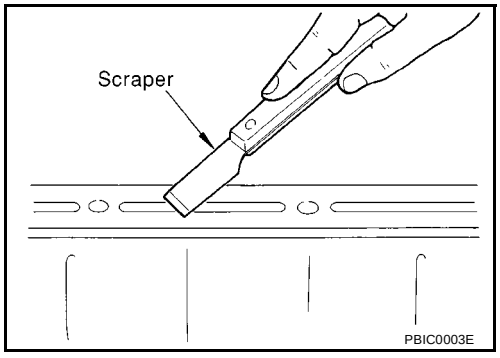
- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.

  CAUTION:
  If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.

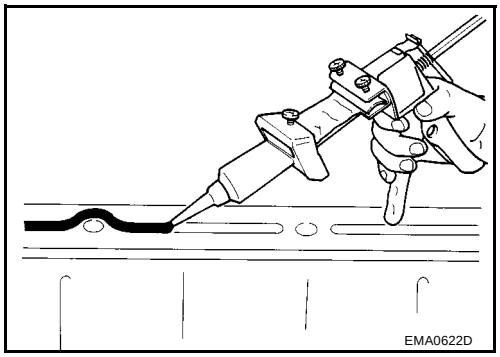


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
2. Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket to the tube presser.
   Use Genuine Liquid Gasket or equivalent.

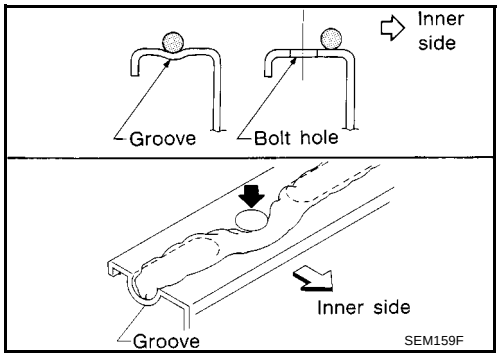


4. Apply the gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the gasket to the groove.



   - As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
   - Within five minutes of gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten after the installation.
   - After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

   CAUTION:
   If there are instructions in this manual, observe them.

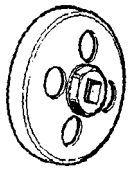
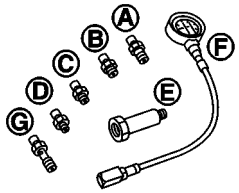
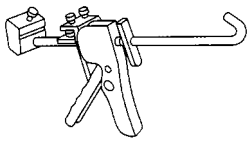


PREPARATION

PFP:00002

Special Service Tools

EBS01C7H

NISSAN tool number (RENAULT tool number) Tool name	Description
KV113C0010 (Mot.1329) Oil filter wrench  MBIB0369E	Removing and installing oil filter
KV113E0020 (Mot.836-05) Oil pressure gauge set  MBIB0663E	Measuring oil pressure Use C, E, F.
WS39930000 (—) Tube presser  S-NT052	Pressing the tube of liquid gasket

ENGINE OIL

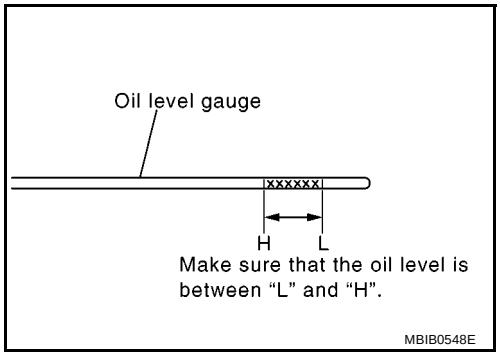
PFP:KLA92

Inspection

EBS01C7I

OIL LEVEL AND MUDDINESS

- Before starting the engine, check the oil level placing vehicle horizontally. If the engine is already started, stop it and allow 10 minutes before checking.
- Make sure the oil level is within the range shown in the figure.
- If it is out of range, adjust it.
- Check the oil for white turbidity or remarkable contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Find the cause and repair.



OIL LEAKAGE

Check for oil leakage around the following area.

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter bracket
- Vacuum pump
- Oil pump housing
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Oil cooler
- Crankshaft oil seals

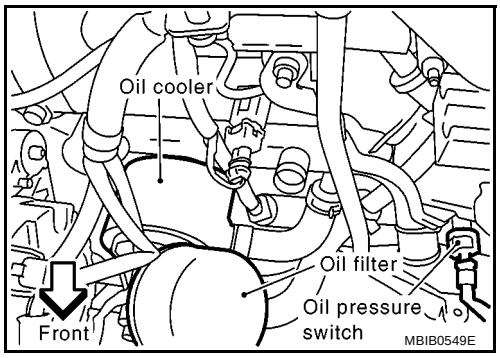
OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Oil pressure check should be done in Neutral “N” position.**

1. Check the oil level. Refer to LU-12, "OIL LEVEL AND MUDDINESS" .
2. Remove engine undercover.
3. Remove the oil pressure switch to connect the oil pressure gauge (special service tool).
4. After warming up the engine, make sure oil pressure corresponding to the engine speed is produced.

Idle speed	**: Approx. 120 kPa (1.2 bar, 1.22 kg/cm^2 , 17.4 psi)**
3000 rpm	**: Approx. 350 kPa (3.5 bar, 3.57 kg/cm^2 , 50.8 psi)**



5. After checking, install the oil pressure switch as follows.

a. Remove old sealant adhering to the switch and engine.

b. Apply thread sealant.
Use Genuine Liquid Gasket or equivalent.

Oil pressure switch:

: 25 N·m (2.55 kg-m, 18.4 ft-lb)

6. Start engine and check for oil leakage.

Changing Engine Oil

EBS01C7J

WARNING:

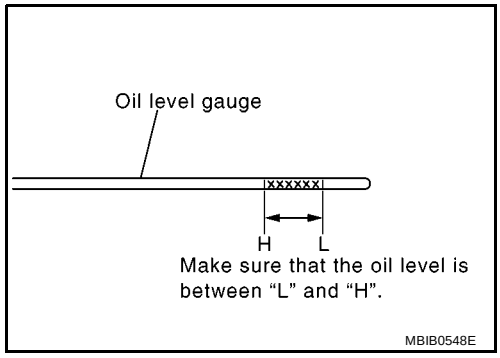
- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Put vehicle horizontally.
2. Warm up engine, and check for oil leakage from engine components.
3. Stop engine and wait for 10 minutes.
4. Remove drain plug and oil filler cap.
5. Drain oil and refill with new engine oil.

- Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Oil capacity (Approximate):

Drain and refill	With oil filter change	4.55 ℓ (4 Imp qt)
	Without oil filter change	4.39 ℓ (3-7/8 Imp qt)
Dry engine (overhaul)		4.71 ℓ (4-1/8 Imp qt)



- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

CAUTION:

- **Be sure to clean drain plug and install with new washer.**
- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

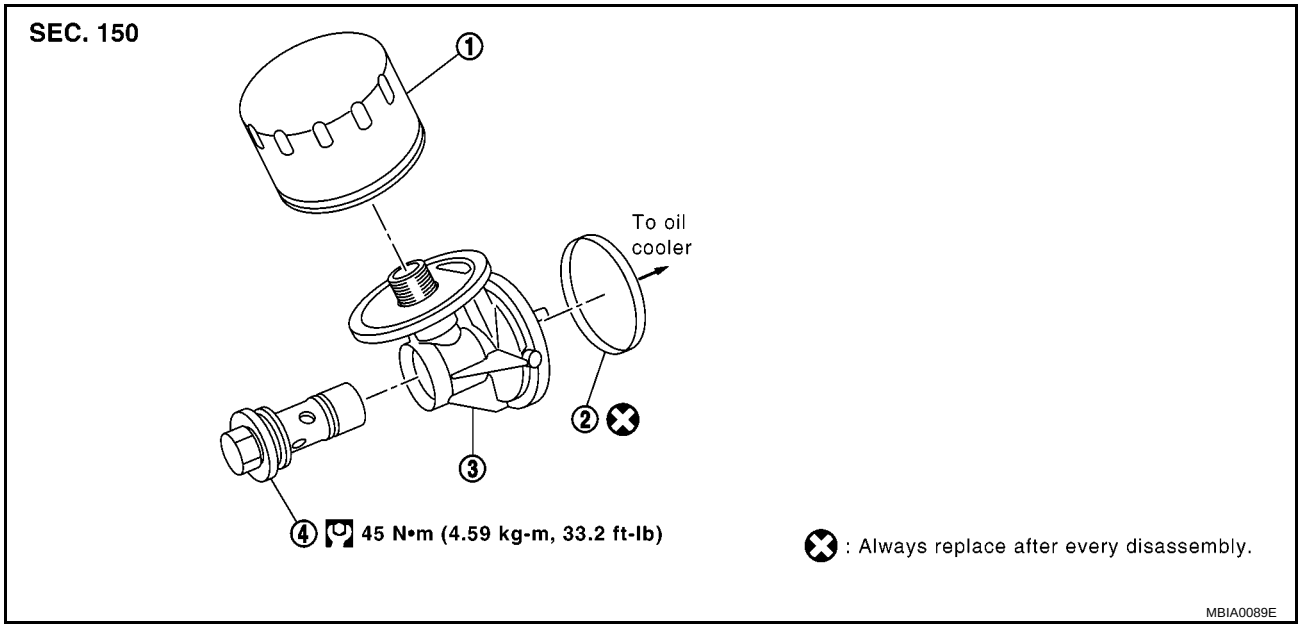
6. Warm up engine and check area around drain plug and oil filter for oil leakage.
7. Stop engine and wait for 10 minutes.
8. Check oil level.

OIL FILTER

PFP:15208

Removal and Installation

EBS01C7K



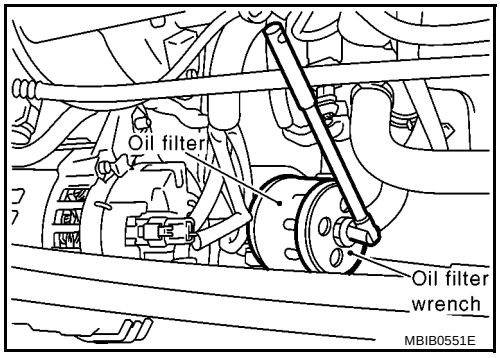
1. Oil filter
2. O-ring
3. Oil filter bracket
4. Connecting bolt

REMOVAL

1. Using an oil filter wrench (special service tool), remove oil filter.

CAUTION:

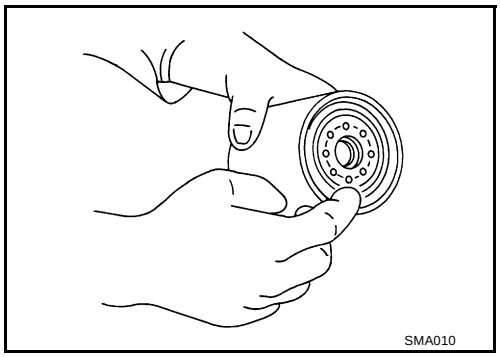
- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Do not allow engine oil to adhere to the drive belts.**
- **Completely wipe off any oil that adhere to the engine and the vehicle.**



INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Install oil filter bracket to oil cooler.

   CAUTION:
   Install oil filter bracket, positioning lug in the hole of oil cooler.
3. Apply engine oil to the oil seal contact surface of the new oil filter.
4. Install the oil filter until it comes into contact with the oil seal on the engine bracket.
5. Tighten the oil filter three-quarters of a turn by hand.
6. After warming up the engine, check for engine oil leakage.
7. Check oil level and add engine oil. Refer to LU-12, "ENGINE OIL" .

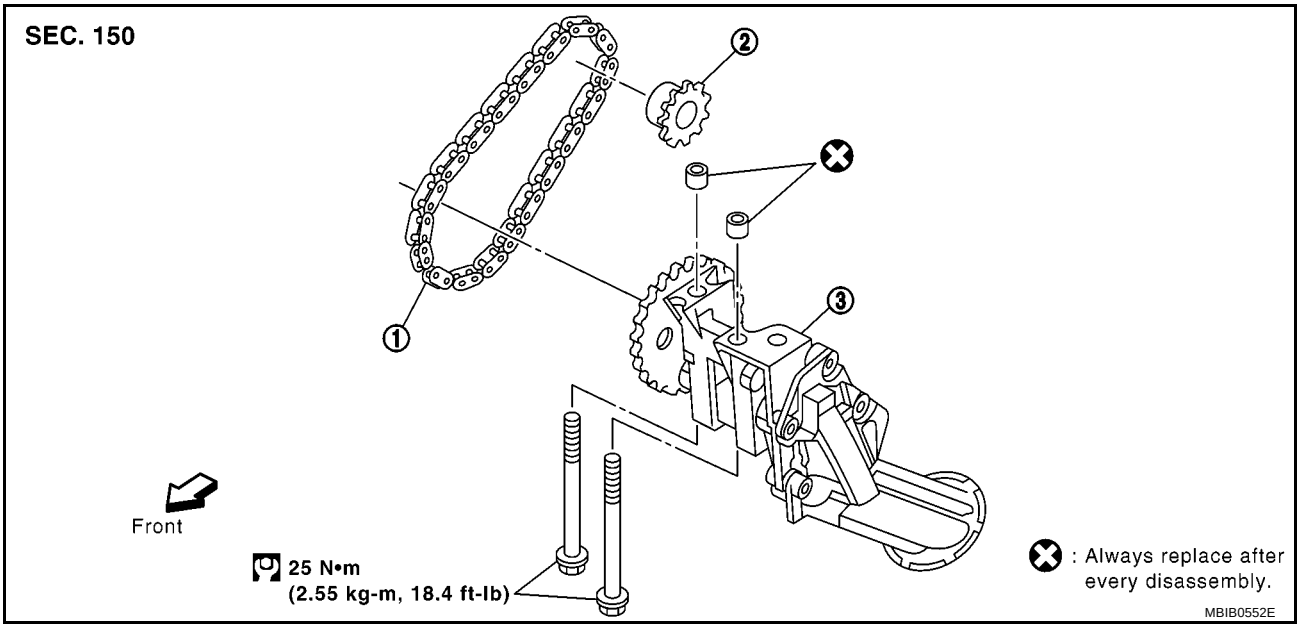


OIL PUMP

PFP:15010

Removal and Installation

EBS01C7L



1. Oil pump drive chain
2. Crankshaft sprocket
3. Oil pump assembly

REMOVAL

1. Remove the following parts.
   - Battery ground cable
   - Undercover
   - RH front wheel
2. Remove right side splash cover.
3. Remove drive belt. Refer to EM-121, "DRIVE BELTS" .
4. Remove oil pan. Refer to EM-133, "OIL PAN" .
5. Remove rear oil seal retainer. Refer to EM-140, "TIMING BELT" .
6. Remove oil pump drive chain. Refer to EM-167, "Disassembly of The Bottom Engine" .
7. Remove oil pump assembly.

INSTALLATION

Install in the reverse order of removal paying attention to the following.

Rear Oil Seal Retainer and Oil Pump

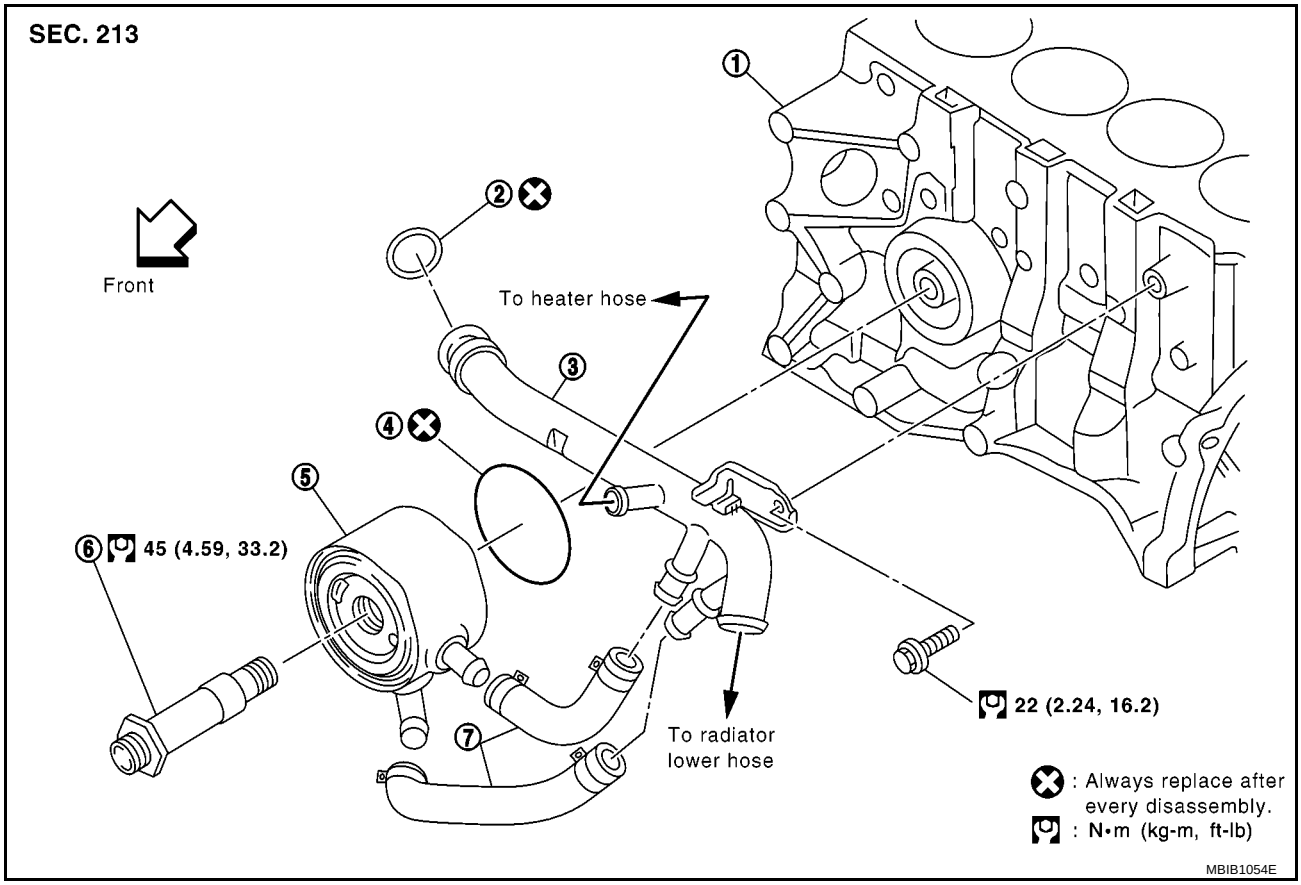
- Refer to EM-179, "INSTALLATION OF REAR OIL SEAL RETAINER AND OIL PUMP" .

OIL COOLER

PFP:21305

Removal and Installation

EBS01C7M



1. Cylinder block
2. O-ring
3. Water pipe
4. O-ring
5. Oil cooler
6. Connecting bolt
7. Water hose

CAUTION:

- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Completely wipe off any oil that abhere to the engine and the vehicle.**

REMOVAL

1. Drain engine coolant. Refer to CO-32, "DRAINING ENGINE COOLANT" .

   CAUTION:
   Perform when engine is cold.
2. Remove oil filter and oil filter bracket. Refer to LU-14, "OIL FILTER" .
3. Remove water hoses from oil cooler.
4. Remove oil cooler.

INSPECTION

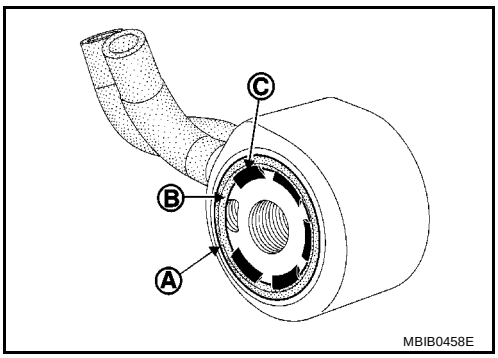
Oil Cooler

Check oil cooler for cracks and clogging by blowing through coolant inlet. If necessary, replace oil cooler assembly.

INSTALLATION

Installation is in reverse order of removal.

- Replace the O-ring (A) of the oil cooler, positioning the lip (B) of the seal behind the lug (C) of the oil cooler.



- Confirm that no foreign objects are adhering to the installation planes of the oil cooler and block.

SECTION MA
MAINTENANCE

CONTENTS

PREPARATION 3
Special Service Tools 3
Commercial Service Tool 3
DESCRIPTION 4
Pre-delivery Inspection Items 4
GENERAL MAINTENANCE 6
General Maintenance 6
PERIODIC MAINTENANCE 7
Periodic Maintenance 7
ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR EUROPE) 7
CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR EUROPE) 8
ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE) 8
CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE) 9
MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR EUROPE) 10
ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR EUROPE) 11
CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR EUROPE) 12
ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE) 12
CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE) 13
MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR EUROPE) 14
ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR SOUTH AFRICA) 15
CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR SOUTH AFRICA) 16
MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR SOUTH AFRICA) 16
RECOMMENDED FLUIDS AND LUBRICANTS 18
Fluids and Lubricants 18
SAE Viscosity Number 19
GASOLINE ENGINE 19
DIESEL ENGINE 19
Engine Coolant Mixture Ratio 20
ENGINE MAINTENANCE (CR) 21
Checking drive Belts 21
Tension Adjustment 21
ALTERNATOR AND A/C COMPRESSOR BELT (WITH A/C MODELS) 22
ALTERNATOR BELT (WITHOUT A/C MODELS) 22
WATER PUMP BELT 23
Changing Engine coolant 23
DRAINING ENGINE COOLANT 23
REFILLING ENGINE COOLANT 23
FLUSHING COOLING SYSTEM 24
Checking Cooling System 25
CHECKING COOLING SYSTEM HOSES 25
CHECKING RADIATOR 25
CHECKING RADIATOR CAP 25
CHECKING COOLING SYSTEM FOR LEAKS 26
Checking Fuel Lines 26
Changing Air Cleaner Filter 26
REMOVAL 26
INSTALLATION 26
Changing Engine Oil 27
Changing Oil Filter 27
Changing Spark Plugs 28
REMOVAL 28
INSPECTION AFTER REMOVAL 28
INSTALLATION 29
Checking EVAP Vapor Lines 29
ENGINE MAINTENANCE (K9K) 30
Checking Drive Belts 30
TENTION ADJUSTMENT 30
Changing Engine coolant 30
DRAINING ENGINE COOLANT 30
REFILLING ENGINE COOLANT 31
FLUSHING COOLING SYSTEM 31
Checking Cooling System 32
CHECKING COOLING SYSTEM HOSES 32
CHECKING RADIATOR 32
Checking Reservoir Tank Cap 32

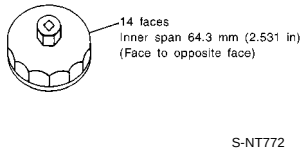
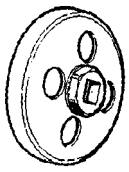
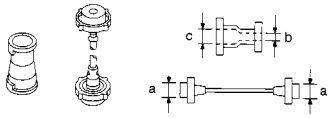
Checking Radiator 33
Checking Fuel Lines 33
Changing Air Cleaner Filter 33
REMOVAL 33
INSTALLATION 34
Changing Engine Oil 34
Changing Oil Filter 35
REMOVAL 35
INSTALLATION 35
CHASSIS AND BODY MAINTENANCE 36
Checking Exhaust System 36
Checking Clutch Fluid Level and Leaks 36
Checking Clutch System 36
Checking M/T Oil 36
Changing M/T Oil 37
Checking A/T Fluid 37
Changing A/T Fluid 37
Rotation 38
Checking Brake Fluid Level and Leaks 38
Checking Brake Lines and Cables 38
Changing Brake Fluid 39
Checking Disc Brake 39
ROTOR 39
CALIPER 39
PAD 39
Checking Drum Brake 39
WHEEL CYLINDER 39
DRUM 40
LINING 40
Checking Steering Gear and Linkage 40
STEERING GEAR 40
STEERING LINKAGE 40
Axle and Suspension Parts 40
Drive Shaft 41
Lubricating Locks, Hinges and Hood Latches 41
Checking Seat Belts, Buckles, Retractors, Anchors and Adjusters 41
Checking Body Corrosion 41
HEMMED PANELS 42
PANEL JOINT 42
PANEL EDGE 42
PARTS CONTACT 42
PROTECTORS 42
ANTI-CORROSION MATERIALS 42
DRAIN HOLES 42
SERVICE DATA AND SPECIFICATIONS (SDS) 43
Standard and Limit 43
BELT DEFLECTION AND TENSION 43
ENGINE COOLANT CAPACITY 43
ENGINE OIL CAPACITY 44
SPARK PLUG 44

PREPARATION

PFP:00002

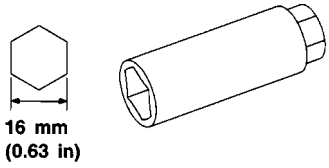
Special Service Tools

ELS000L4

NISSAN tool number (RENAULT tool number) Tool name	Description
KV10115801 Oil filter wrench (For CR engine)  S-NT772	Removing and installing oil filter
KV10115801 (Mot. 1329) Oil filter wrench (For K9K engine)  MBIB0369E	Removing and installing oil filter
EG17650301 Radiator cap tester adapter  S-NT564	Adapter radiator cap tester to radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)

Commercial Service Tool

ELS000L5

Tool name	Description
Spark plug wrench  NT047	Removing and installing spark plug

DESCRIPTION

PFP:00000

Pre-delivery Inspection Items

ELS000L6

Shown below are Pre-delivery Inspection Items required for the new vehicle. It is recommended that necessary items other than those listed here be added, paying due regard to the conditions in each country.

Perform applicable items on each model. Consult text of this section for specifications.

☐ Install vehicle protection kit

☐ Fit all accessories ordered (if applicable) (e.g. towbar, audio, navigation, air conditioner, styling kit)

UNDER HOOD — engine off

☐ Check coolant level and cooling system for leaks

☐ Charge battery and check terminals for condition

☐ Check drive belts tension

☐ Check fuel filter for water or dust (diesel only) and fuel system for leaks

☐ Check engine oil level and for oil leaks

☐ Check brake and clutch fluid levels and fluid lines for leaks

☐ Check and top up washer reservoirs

☐ Check power steering fluid level and fluid lines for leaks (if applicable)

☐ Check air conditioning system for gas leaks (if applicable)

ON INSIDE AND OUTSIDE

☐ Install transit fuse if removed for vehicle storage

☐ Check instruments, gauges, lamps, horn and accessories for operation

☐ Check wipers and washers for operation and adjustment

☐ Check interior and door mirrors and sun visors for operation

☐ Set radio code and set clock

☐ Check parking brake adjustment

☐ Check clutch pedal adjustment

☐ Check steering lock operation

☐ Check seat adjusters and seat belts for operation

☐ Check all windows for operation and alignment

☐ Check mouldings, trim and fittings for fit and alignment

☐ Check weatherstrips for fit and adhesion

☐ Check hood, trunk lid, door panels and fuel lid for fit and alignment

☐ Check latches, keys, remote key, door locks and remote trunk lid and fuel lid release for operation

☐ Check wheel nut torques

☐ Check tyre pressure (incl. spare tyre)

☐ Check tool kit and jack for operation

☐ Check automatic transmission/transaxle starter inhibitor (if applicable)

☐ Check sunroof for operation and alignment (if applicable)

UNDER BODY

☐ Check manual transmission/transaxle, differential and transfer box for oil level and oil leaks

☐ Tighten bolts and nuts steering linkage and gear box, axle/suspension parts, propeller and exhaust system

☐ Check brake and clutch lines, and oil/fluid reservoirs for leaks

☐ Remove front suspension spacer blocks (if applicable)

☐ Check body mounting torque (if applicable)

ROAD TEST

- ☐ Check clutch operation
- ☐ Check foot brake operation
- ☐ Check parking brake operation
- ☐ Check steering operation, self-centering and steering wheel alignment
- ☐ Check engine performance
- ☐ Check for squeeks, rattles and noise from interior, suspension and brakes
- ☐ Check heating, ventilation and air conditioning operation
- ☐ Check radio, cassette and CD player operation
- ☐ Check odometer and trip meter operation and cancelling
- ☐ Check instruments for operation
- ☐ Check automatic transmission/transaxle shift pattern and kickdown operation (if applicable)
- ☐ Check cruise control and navigation system operation (if applicable)

ENGINE OPERATING AND HOT

- ☐ Check idle speed
- ☐ Check automatic transmission/transaxle oil level (if applicable)

FINAL INSPECTION

- ☐ Remove vehicle protection kit
- ☐ Fit interior mats and wheel covers
- ☐ Check for interior and exterior metal and paint damage
- ☐ Wash, clean interior and exterior

GENERAL MAINTENANCE

PFP:00000

General Maintenance

ELS000L7

General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform the checks and inspections themselves or they can have their NISSAN dealers do them for a nominal charge.

OUTSIDE THE VEHICLE

The maintenance items listed here should be performed from time to time, unless otherwise specified.

Item		Reference page
Tires	Check the pressure with a gauge periodically when at a service station, including the spare, and adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	—
Windshield wiper blades	Check for cracks or wear if not functioning correctly.	—
Doors and engine hood	Check that all doors and the engine hood operate smoothly as well as the back door and glass hatch. Also ensure that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released. When driving in areas using road salt or other corrosive materials, check for lubrication frequently.	BL-7, BL-204
Tire rotation	Tires should be rotated every 10,000 km (6,000 miles).	MA-38

INSIDE THE VEHICLE

The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.

Item		Reference page
Lamps	Make sure that the headlamps, stop lamps, tail lamps, turn signal lamps, and other lamps are all operating properly and installed securely. Also check headlamp aim.	—
Warning lamps and chimes	Make sure that all warning lamps and buzzers/chimes are operating properly.	—
Steering wheel	Check that it has the specified play. Check for changes in the steering conditions, such as excessive free play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	—
Seat belts	Check that all parts of the seat belt system (e.g. buckles, anchors, adjusters and retractors) operate properly and smoothly, and are installed securely. Check the belt webbing for cuts, fraying, wear or damage.	SB-3

UNDER THE HOOD AND VEHICLE

The maintenance items listed here should be checked periodically. e.g. each time you check the engine oil or refuel.

Item		Reference page
Windshield washer fluid	Check that there is adequate fluid in the tank.	—
Engine coolant level	Check the coolant level when the engine is cold.	CO-8
Engine oil level	Check the level after parking the vehicle (on level ground) and turning off the engine.	LU-4
Brake and clutch fluid levels	Make sure that the brake and clutch fluid levels are between the “MAX” and “MIN” lines on the reservoir.	MA-38, MA-36
Battery	Check the fluid level in each cell. It should be between the “MAX” and “MIN” lines.	—

PERIODIC MAINTENANCE

PFP:00026

Periodic Maintenance

ELS000L8

The following tables show the normal maintenance schedule. Depending upon weather and atmospheric conditions, varying road surfaces, individual driving habits and vehicle usage, additional or more frequent maintenance may be required.

Periodic maintenance beyond the last period shown on the tables requires similar maintenance.

ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR EUROPE)

(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace,.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform on a kilometer basis, but on an annual basis when driving less than 15,000 km (9,000 miles) per year	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Engine compartment and under vehicle										
Intake and exhaust valve clearance	See NOTE (1)									EM-45
Drive belts	See NOTE (2)									EM-12
Engine oil (Use recommended oil.)★		R	R	R	R	R	R	R	R	LU-4
Engine oil filter (Use NISSAN genuine part or equivalent)★		R	R	R	R	R	R	R	R	LU-6
Engine anti-freeze coolant (Use genuine NISSAN Anti-Freeze Coolant (L250) or equivalent.)	See NOTE (3)			I			R		I	CO-8
Cooling system		I	I	I	I	I	I	I	I	CO-8
Fuel lines			I		I		I		I	FL-3
Air cleaner filter★					R				R	EM-16
Fuel filter (In-tank type)	See NOTE (4)									FL-4
Spark plugs [Platinum-Tipped Type]					R				R	MA-28
EVAP vapor lines (With carbon canister)			I		I		I		I	EC-464 or EC-840
Heated oxygen sensor 1	See NOTE (5)									EC-173 or EC-595

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belts if found damaged or if the auto belt tensioner reading reaches the maximum limit.**
- **(3) First replace at 90,000 Km (54,000 miles)/60 months, then every 60,000 km (36,000 miles)/48 months. Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL-4 .**
- **(5) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR EUROPE)

(Annual Mileage <30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform either at number of kilometers (miles) or months, whichever comes first.	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Underhood and under vehicle										
Headlamp aiming		I	I	I	I	I	I	I	I	LT-40
Brake & clutch, systems and fluid (For level & leaks)		I	I	I	I	I	I	I	I	MA-38, MA-36
Brake fluid★			R		R		R		R	MA-39
Brake booster vacuum hoses, connections & check valve			I		I		I		I	BR-17
Manual transaxle gear oil (For level & leaks)		I	I	I	I	I	I	I	I	MA-36
Automatic transaxle fluid (For level & leaks)★		I	I	I	I	I	I	I	I	MA-37
Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system★		I	I	I	I	I	I	I	I	MA-40,MA-40 , MA-41 , MA-36
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	I	I	I	I	FSU-15
Brake pads, rotors & other brake components★		I	I	I	I	I	I	I	I	MA-39, MA-39 , MA-39
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	I	I	I	I	BR-6, PB-3 , CL-5
Air conditioner filter★			R		R		R		R	MTC-52
Body corrosion	See NOTE (1)									MA-41

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage <30,000 Km/year)

Abbreviations: R = Replace I = Inspect: Correct or replace if necessary D= Check filter and drain water.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform on a kilometer basis, however when driving less than 15,000 km (9,000 miles) per year, perform every 24 months.	km x 1,000 (Miles x 1,000) Months	30 (18) 24	60 (36) 48	90 (54) 72	120 (72) 96	
Engine compartment and under vehicle						
Engine oil (Use recommended oil.)★		R	R	R	R	LU-12
Engine oil filter (Use recommended oil filter)★		R	R	R	R	LU-14
Timing belt★	See NOTE (1)	Replace every 120,000 km/60 months				EM-140
Drive belt	See NOTE (2)	I	I	I	I	EM-121
Cooling system		I	I	I	I	CO-31
Engine anti-freeze coolant (Use genuine NISSAN Anti-freeze Coolant (L250) or equivalent)	See NOTE (3)	I	I		I	CO-31
Air cleaner filter★			R		R	EM-123

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform on a kilometer basis, however when driving less than 15,000 km (9,000 miles) per year, perform every 24 months.	km x 1,000 (Miles x 1,000) Months	30 (18) 24	60 (36) 48	90 (54) 72	120 (72) 96	
Intake & exhaust valve clearance	See NOTE (4)	Inspect every 100,00 km				EM-161
Fuel lines		I	I	I	I	FL-13
Fuel filter★		D	R	D	R	FL-14

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) The replacement interval for the timing belt is the maximum lifespan which should not be exceeded. Replace the timing belt if it comes into contact with fuel. The frequency of replacement should be adapted depending on vehicle usage. See "Maintenance Under Sever Driving Conditions".**
- **(2) Replace every 120,000 km/maximum 60 months. Replace drive belt if it comes into contact with fuel or damage is found during inspection.**
- **(3) First replace at 90,000 Km (54,000 miles)/60 months, then every 60,000 km (36,000 miles)/48 months. After first replacement, perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) If valve noise increases, check valve clearance.**

CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage <30,000 Km/year)

Abbreviations: R = Replace I = Inspect: Correct or replace if necessary

MAINTENANCE OPERATION		MAINTENANCE INTERVAL				Reference page
Perform on a kilometer basis, however when driving less than 15,000 km (9,000 miles) per year, perform every 24 months.	km x 1,000 (Miles x 1,000) Months	30 (18) 24	60 (36) 48	90 (54) 72	120 (72) 96	
Underhood and under vehicle						
Headlamp aiming		I	I	I	I	LT-70
Wheel alignment (if necessary, balance & rotate wheels)		I	I	I	I	FSU-6
Brake pads, rotor & other brake components★		I	I	I	I	BR-21
Brake linings, drums & other brake components★		I	I	I	I	BR-27
Brake booster vacuum hoses, connections & check valve		I	I	I	I	BR-17
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	BR-6, PB-3 , CL-5
Brake & clutch, systems and fluid (for level and leaks)		I	I	I	I	MA-38, MA-36
Brake fluid★		R	R	R	R	MA-38
Air conditioner filter★		R	R	R	R	ATC-75, MTC-52
Manual transaxle gear oil (check for leakage. Use genuine Nissan gear oil or exact equivalent)		I	I	I	I	MA-36
Steering gear & linkage, axle & suspension parts, drive shafts, exhaust system★		I	I	I	I	MA-40, MA-40 , MA-41 , MA-36
Body corrosion	See NOTE (1)					MA-41

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR EUROPE)

(Annual Mileage <30,000 Km/year)

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

Severe driving conditions

A — Driving in dusty conditions
B — Repeatedly driving short distances
C — Towing a trailer or caravan
D — Extensive idling
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity or mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas
J — Frequent off road use or driving in water
K —Sustained high speed driving
L — For models without Euro-OBD system (For CR petrol engine models)
L — Repeated short journeys, cold engine at low temperature (For K9K diesel engine models)

Maintenance operation: Check = Check and correct or replace as necessary.

Driving condition												Maintenance item		Maintenance operation	Maintenance interval	Reference page
A	.	.	.	.	.	.	.	.	.	.	.	Air cleaner filter	Petrol models	Replace	Every 30,000 km (18,000 miles) or 24 months	MA-26
													Diesel models	Replace	Every 30,000 km (18,000 miles) or 24 months	MA-33
A	B	C	D	.	.	.	.	.	.	.	.	Engine oil & engine oil filter	Petrol models	Replace	Every 7,500 km (4,500 miles) or 6 months	MA-27, LU-6
													Diesel models	Replace	Every 15,000 km (9,000 miles) or 12 months	MA-34, MA-35
.	.	.	.	.	.	.	.	.	.	.	L	Heated oxygen sensor 1	Petrol models	Inspect	Every 30,000 km (18,000 miles) or 24 months	EC-169, EC-591 , EC-780
A	B	.	D	.	.	.	H	.	.	.	L	Timing belt	Diesel models	Replace	More frequently	EM-140
.	.	.	.	.	F	.	.	.	.	.	.	Brake fluid	All models	Replace	Every 15,000 km (9,000 miles) or 12 months	MA-39
.	.	C	.	.	.	.	H	.	.	.	.	Automatic transaxle fluid	Petrol models	Replace	Every 30,000 km (18,000 miles) or 24 months	MA-37
.	.	C	.	.	.	.	H	.	.	.	.	Fuel filter	Diesel models	Check filter & drain water	Every 15,000 km (9,000 miles) or 12 months	FL-14
														Replace	Every 30,000 km (18,000 miles) or 24 months	

Driving condition												Maintenance item		Maintenance operation	Maintenance interval	Reference page
.	.	.	.	.	.	G	H	.	.	.	.	Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system	Petrol models	Inspect	Every 7,500 km (4,500 miles) or 6 months	MA-40, MA-40 , MA-41 , MA-36
													Diesel models	Inspect	Every 15,000 km (9,000 miles) or 12 months	MA-40, MA-40 , MA-41 , MA-36
A	.	C	.	.	.	G	H	I	.	.	.	Brake pads, rotors & other brake components	Petrol models	Inspect	Every 7,500 km (4,500 miles) or 6 months	MA-39, MA-39 , MA-39
													Diesel models	Inspect	Every 15,000 km (9,000 miles) or 12 months	MA-39, MA-39
A	.	.	.	.	.	.	.	.	.	.	.	Air conditioner filter	All models	Replace	Every 15,000 km (9,000 miles) or 12 months	ATC-75

ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR EUROPE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace,.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform either at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Engine compartment and under vehicle										
Intake and exhaust valve clearance	See NOTE (1)									EM-45
Drive belts	See NOTE (2)	I	I	I	I	I	I	I	I	EM-12
Engine oil (Use recommended oil.)★		R	R	R	R	R	R	R	R	MA-27
Engine oil filter (Use NISSAN genuine part or equivalent)★		R	R	R	R	R	R	R	R	LU-6
Engine anti-freeze coolant (Use genuine NISSAN Anti-Freeze Coolant (L250) or equivalent.)	See NOTE (3)			I			R		I	CO-8
Cooling system			I		I		I		I	CO-8
Fuel lines					I				I	FL-3
Air cleaner filter★					R				R	EM-16
Fuel filter (In-tank type)	See NOTE (4)									FL-4
Spark plugs [Platinum-Tipped Type]					R				R	MA-28
EVAP vapor lines (With carbon canister)					I				I	EC-464 or EC-840
Heated oxygen sensor 1	See NOTE (5)									EC-169, or EC-780

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Replace the drive belts if found damaged or if the auto belt tensioner reading reaches the maximum limit.**
- **(3) First replace at 90,000 Km (54,000 miles), then every 60,000 km (36,000 miles). Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) Fuel filter is maintenance-free. For service procedures, refer to FL section.**
- **(5) Perform only according to "Maintenance Under Severe Driving conditions" for models without Euro-OBD system. For models with Euro-OBD system, periodic maintenance is not required.**

CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR EUROPE)

(Annual Mileage >30,000 Km/year)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform either at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Underhood and under vehicle										
Headlamp aiming			I		I		I		I	LT-40
Brake & clutch, systems and fluid (For level & leaks)			I		I		I		I	MA-38, MA-36
Brake fluid★					R				R	MA-39
Brake booster vacuum hoses, connections & check valve					I				I	BR-17
Manual transaxle gear oil (For level & leaks)			I		I		I		I	MA-36
Automatic transaxle fluid (For level & leaks)★			I		I		I		I	MA-37
Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system★			I		I		I		I	MA-40,MA-40 , MA-41 , MA-36
Wheel alignment (If necessary, rotate & balance wheels)			I		I		I		I	FSU-6
Brake pads, rotors & other brake components★			I		I		I		I	MA-39, MA-39 , MA-39
Foot brake, parking brake & clutch (For free play, stroke & operation)			I		I		I		I	BR-6, PB-3 , CL-5
Air conditioner filter★			R		R		R		R	ATC-75
Body corrosion	See NOTE (1)									MA-41

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

ENGINE AND EMISSION CONTROL MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: R = Replace I = Inspect and correct or replace as necessary D= Check filter and drain water.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform on a kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Engine compartment and under vehicle										
Engine oil (Use recommended oil.)★			R		R		R		R	LU-12
Engine oil filter (Use recommended oil filter)★			R		R		R		R	LU-14
Timing belt★	See NOTE (1)	Replace every 120,000 km								EM-140
Drive belt	See NOTE (2)		I		I		I		R	EM-121
Cooling system			I		I		I		I	CO-31
Engine anti-freeze coolant (Use genuine NISSAN Anti-freeze Coolant (L250) or equivalent.)	See NOTE (3)		I		I		R		I	CO-31
Air cleaner filter★					R				R	EM-123

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform on a kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Intake & exhaust valve clearance	See NOTE (4)	Inspect every 100,000 km								EM-161
Fuel lines					I				I	FL-13
Fuel filter★			D		R		D		R	FL-14

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) The replacement interval for the timing belt is the maximum lifespan which should not be exceeded. Replace the timing belt if it comes into contact with fuel. The frequency of replacement should be adapted depending on vehicle usage. See "Maintenance Under Sever Driving Conditions".**
- **(2) Replace every 120,000 km. Replace drive belt if it comes into contact with fuel or damage is found during inspection.**
- **(3) First replace at 90,000 Km (54,000 miles), then every 60,000 km (36,000 miles). After first replacement, Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**
- **(4) If valve noise increases, check valve clearance.**

CHASSIS AND BODY MAINTENANCE (K9K DIESEL ENGINE)

(Annual Mileage >30,000 Km/year)

Abbreviations: R = Replace I = Inspect: Correct or replace if necessary

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform either at number of kilometers (miles) basis only.	km x 1,000 (Miles x 1,000)	15 (9)	30 (18)	45 (27)	60 (36)	75 (45)	90 (54)	105 (63)	120 (72)	
Underhood and under vehicle										
Headlamp aiming			I		I		I		I	LT-70
Wheel alignment (if necessary, balance & rotate wheels)			I		I		I		I	FSU-6
Brake pads, rotor & other brake components★			I		I		I		I	BR-21
Brake linings, drums & other brake components★			I		I		I		I	BR-27
Foot brake, parking brake & clutch (For free play, stroke & operation)			I		I		I		I	BR-6, PB-3, CL-5
Brake booster vacuum hoses, connections & check valve					I				I	BR-17
Brake & clutch, systems and fluid (for level and leaks)			I		I		I		I	MA-38, MA-36
Brake fluid★					R				R	MA-38
Air conditioner filter★			R		R		R		R	ATC-75, MTC-52
Manual transaxle gear oil (check for leakage. Use genuine Nissan gear oil or exact equivalent)			I		I		I		I	MA-36
Steering gear & linkage, axle & suspension parts, drive shafts, exhaust system★					I				I	MA-40, MA-40, MA-41, MA-36
Body corrosion	See NOTE (1)									MA-41

NOTE:

- **(1) Inspect once per year.**
- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR EUROPE)

(Annual Mileage >30,000 Km/year)

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

Severe driving conditions

A — Driving in dusty conditions
B — Repeatedly driving short distances
C — Towing a trailer or caravan
D — Extensive idling
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity or mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas
J — Frequent off road use or driving in water
K —Sustained high speed driving
L — For models without Euro-OBD system (For CR petrol engine models)
L — Repeated short journeys, cold engine at low temperature (For K9K diesel engine models)

Maintenance operation: Check = Check and correct or replace as necessary.

Driving condition												Maintenance item		Maintenance operation	Maintenance interval	Reference page
A	.	.	.	.	.	.	.	.	.	.	.	Air cleaner filter	Petrol models	Replace	Every 30,000 km (18,000 miles)	MA-26
													Diesel models	Replace	Every 30,000 km (18,000 miles)	MA-33
A	B	C	D	.	.	.	.	.	.	.	.	Engine oil & engine oil filter	Petrol models	Replace	Every 7,500 km (4,500 miles)	MA-27, LU-6
													Diesel models	Replace	Every 15,000 km (9,000 miles)	MA-34, MA-35
.	.	.	.	.	.	.	.	.	.	.	L	Heated oxygen sensor 1	Petrol models	Inspect	Every 60,000 km (36,000 miles)	EC-169, EC-591 , EC-780
A	B	.	D	.	.	.	H	.	.	.	L	Timing belt	Diesel models	Replace	More frequently	EM-140
.	.	.	.	.	F	.	.	.	.	.	.	Brake fluid	All models	Replace	Every 30,000 km (18,000 miles)	MA-39
.	.	C	.	.	.	.	H	.	.	.	.	Automatic transaxle fluid	Petrol models	Replace	Every 60,000 km (36,000 miles)	MA-37
.	.	C	.	.	.	.	H	.	.	.	.	Fuel filter	Diesel models	Check filter & drain water	Every 15,000 km (9,000 miles)	FL-14
														Replace	Every 30,000 km (18,000 miles)	
.	.	.	.	.	.	G	H	.	.	.	.	Steering gear & linkage, axle & suspension parts, drive shafts & exhaust system	All models	Inspect	Every 30,000 km (18,000 miles)	MA-40, MA-40 , MA-41 , MA-36
A	.	C	.	.	.	G	H	I	.	.	.	Brake pads, rotors & other brake components	All models	Inspect	Every 15,000 km (9,000 miles)	MA-39, MA-39 , MA-39
A	.	.	.	.	.	.	.	.	.	.	.	Air conditioner filter	All models	Replace	Every 15,000 km (9,000 miles)	MTC-52

ENGINE AND EMISSION CONTROL MAINTENANCE (CR PETROL ENGINE FOR SOUTH AFRICA)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace,.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Refer-ence page
Perform on a kilometer basis, but on an annual basis when driving less than 15,000 km (9,000 miles) per year	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Engine compartment and under vehicle										
Intake and exhaust valve clearance	See NOTE (1)									EM-45
Drive belts		I	I	I	I	I	I	I	I	EM-12
Engine oil (Use recommended oil.)★		R	R	R	R	R	R	R	R	LU-4
Engine oil filter (Use NISSAN genuine part or equivalent)★		R	R	R	R	R	R	R	R	LU-6
Fuel filter (In-tank type)	See NOTE (2)									FL-4
Positive crankcase ventilation (PCV) valve		I		I		I		I		EC-844
Engine anti-freeze coolant (Use genuine NISSAN Anti-Freeze Coolant (L250) or equivalent.)	See NOTE (3)		I		I	R		I		CO-8
Cooling system		I	I	I	I	I	I	I	I	CO-8
Fuel lines			I		I		I		I	FL-3
Air cleaner filter★			R		R		R		R	EM-16
Spark plugs [Platinum-Tipped Type]							[R]			MA-28
EVAP vapor lines (With carbon canister)			I		I		I		I	EC-464 or EC-840
Heated oxygen sensor 1			I		I		I		I	EC-173 or EC-595

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**
- **(1) Periodic maintenance is not required. However, if valve noise increases, check valve clearance.**
- **(2) Fuel filter is maintenance-free. For service procedures, refer to FL-4 .**
- **(3) Use NISSAN Genuine engine coolant, or equivalent in its quality, in order to avoid possible aluminium corrosion within the engine cooling system caused by the use of non-genuine engine coolant. After first replacement, replace every 40,000 km (24,000 miles) or 24 months. Perform "I" (Checking the mixture ratio and correcting the mixture ratio if necessary) at the middle of replacement interval.**

CHASSIS AND BODY MAINTENANCE (CR PETROL ENGINE FOR SOUTH AFRICA)

Abbreviations: I = Inspect and correct or replace as necessary, R = Replace, L = Lubricate.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform either at number of kilometers (miles) or months, whichever comes first.	km x 1,000 (Miles x 1,000) Months	15 (9) 12	30 (18) 24	45 (27) 36	60 (36) 48	75 (45) 60	90 (54) 72	105 (63) 84	120 (72) 96	
Underhood and under vehicle										
Brake & clutch fluid (For level & leaks)★		I	I	I	I	I	I	I	I	MA-38, MA-36
Brake fluid★			R		R		R		R	MA-39
Brake booster vacuum hoses, connections & check valve			I		I		I		I	BR-17
Brake, clutch & exhaust system		I	I	I	I	I	I	I	I	MA-38, MA-36 , MA-36
Manual transaxle gear oil (For level & leaks)		I	I	I	I	I	I	I	I	MA-36
Steering gear & linkage, axle & suspension parts, front drive shafts★			I		I		I		I	MA-40,MA-40 , MA-41
Outside and inside										
Wheel alignment (If necessary, rotate & balance wheels)		I	I	I	I	I	I	I	I	FSU-15
Brake pads, rotors, linings, drums & other brake components★		I	I	I	I	I	I	I	I	MA-39, MA-39 , MA-39
Locks, hinges & hood latch★		L	L	L	L	L	L	L	L	MA-41
Seat belts, buckles, reactors, anchors & adjuster		I	I	I	I	I	I	I	I	MA-41
Foot brake, parking brake & clutch (For free play, stroke & operation)		I	I	I	I	I	I	I	I	BR-6, PB-3 , CL-5
Air conditioner filter★			I		I		I		I	ATC-75

NOTE:

- **★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".**

MAINTENANCE UNDER SEVERE DRIVING CONDITIONS (FOR SOUTH AFRICA)

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

Severe driving conditions

A — Driving in dusty conditions
B — Repeatedly driving short distances
C — Towing a trailer or caravan
D — Extensive idling
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity or mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas
J — Frequent off road use or driving in water
K —Sustained high speed driving

Maintenance operation: Check = Check and correct or replace as necessary.

Driving condition											Maintenance item		Maintenance operation	Maintenance interval	Reference page
A	.	.	.	.	.	.	.	.	.	.	Air cleaner filter	Petrol models	Replace	More frequently	MA-26
A	B	C	D	.	.	.	.	.	.	K	Engine oil & engine oil filter	Petrol models	Replace	Every 7,500 km (4,500 miles) or 6 months	MA-27, LU-6
.	.	.	.	.	F	.	.	.	.	.	Brake fluid	Petrol models	Replace	Every 15,000 km (9,000 miles) or 12 months	MA-39
.	.	.	.	.	.	G	H	.	.	.	Steering gear & linkage, axle & suspension parts, front drive shafts & exhaust system	Petrol models	Inspect	Every 15,000 km (9,000 miles) or 12 months	MA-40, MA-40 , MA-41 , MA-36
A	.	C	.	.	.	G	H	I	.	.	Brake pads, rotors, linings, drums & other brake components	Petrol models	Inspect	Every 7,500 km (4,500 miles) or 6 months	MA-39, MA-39 , MA-39
.	.	.	.	.	.	G	.	.	.	.	Lock, hinges & hood latch	Petrol models	Lubricate	Every 5,000 km (3,000 miles) or 3 months	MA-41
A	.	.	.	.	.	.	.	.	.	.	Air conditioner filter	Petrol models	Replace	More frequently	ATC-75

RECOMMENDED FLUIDS AND LUBRICANTS

PFP:00000

Fluids and Lubricants

ELS000L9

			Capacity (Approximate)		Recommended Fluids/Lubricants
			Liter	Imp measure	
Engine oil Drain and refill	With oil filter change	CR engine	3.0	2-5/8 qt	● Gasoline engine API SG, SH or SJ*1 ILSAC grade GF-I or GF-II*1 ACEA A2 ● Diesel engine ACEA B3, B4*1
		K9K engine	4.55	4 qt	
	Without oil filter change	CR engine	2.8	2-1/2 qt	
		K9K engine	4.39	3-7/8 qt	
Dry engine (engine overhaul)		CR engine	3.5	3-1/8 qt	
		K9K engine	4.71	4-1/8 qt	
Cooling system (with reservoir)	CR engine	M/T models with A/C	5.3	4-5/8 qt	● Genuine Nissan Anti-freeze Coolant (L250) or equivalent in its quality*3
		Except M/T models with A/C	4.9	4-3/8 qt	
	K9K engine		6.5	5-3/4 qt	
Reservoir tank	CR engine	M/T models with A/C	1.2	1-1/8 qt	
		Except M/T models with A/C	0.7	5/8 qt	
	K9K engine		1.2	1-1/8 qt	
Manual transaxle gear oil		JH3	2.6	4-5/8 pt	● Genuine Nissan gear oil or API GL-4, Viscosity SAE 75W-80, 75W-85
		JR5	2.5	4-3/8 pt	
Automatic transaxle fluid			7.7	6-3/4 qt	Genuine Nissan ATF or equivalent*4
Brake and clutch fluid			—	—	● DOT 3 or DOT 4 (US FMVSS No. 116)*5
Multi-purpose grease			—	—	NLGI No. 2 (Lithium soap base)

*1: For further details, see “SAE Viscosity Number”.

*2: Never use API CG-4.

*3: Use Genuine Nissan Anti-freeze Coolant (L250)] or equivalent in its quality, in order to avoid possible aluminum corrosion within the engine cooling system caused by the use of non-genuine engine coolant.

Note that any repairs for the incidents within the engine cooling system while using non-genuine engine coolant may not be covered by the warranty even if such incidents occurred during the warranty period.

*4: Contact a Nissan dealership for more information regarding suitable fluids, including recommended brand(s) of Dexron™ III/Mercon™ Automatic Transmission Fluid.

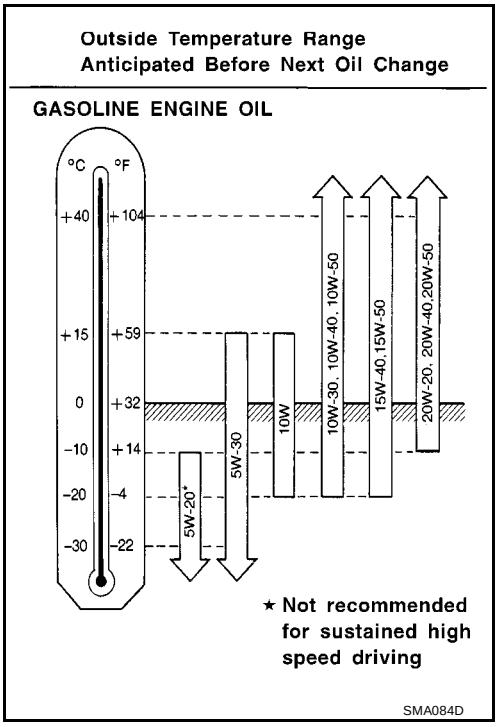
*5: Never mix different types of fluids (DOT 3 and DOT 4).

SAE Viscosity Number

ELS000LA

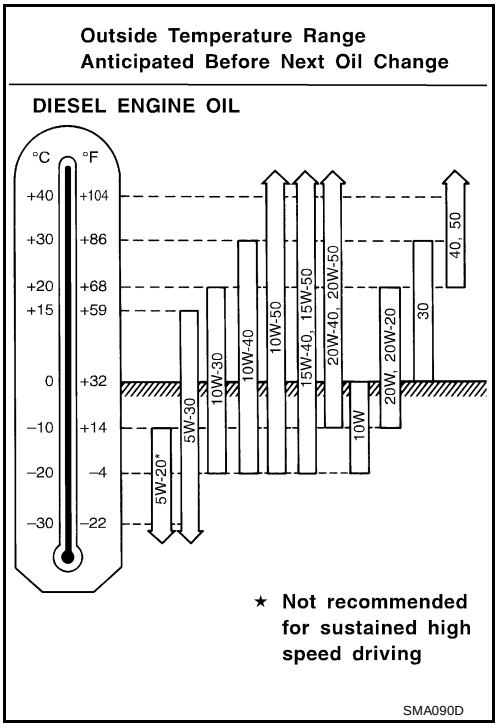
GASOLINE ENGINE

- For warm and cold areas: 10W-30 is preferable for ambient temperature above –20°C (–4°F).
- 5W-30 will positively improve fuel economy.
- For hot areas: 20W-40 and 20W-50 are suitable.



DIESEL ENGINE

- For cold and warm areas: 5W-40, 10W-40 and 15W-40 are suitable.
- 5W-40 and 10W-40 are preferable for ambient temperature below –15°C (5°F).
- 15W-40 is preferable for ambient temperature above –10°C (4°F).



Engine Coolant Mixture Ratio

ELS000LB

The engine cooling system is filled at the factory with a high-quality, year-round and extended life engine coolant. The high quality engine coolant contains the specific solutions effective for the anti-corrosion and the anti-freeze function. Therefore, additional cooling system additives are not necessary.

Outside temperature down to		Composition	
°C	°F	Engine coolant (Concentrated)	Demineralized water or distilled water
–15	5	30%	70%
–35	–30	50%	50%

SMA089D

CAUTION:

- **When adding or replacing coolant, be sure to use only Genuine NISSAN Anti-freeze Coolant (L250) or equivalent. Because L250 is premixed type coolant.**

The use of other types of engine coolant may damage your cooling system.

- When checking the engine coolant mixture ratio by the coolant hydrometer, use the chart below to correct your hydrometer reading (specific gravity) according to coolant temperature.

Mixed coolant specific gravity

Unit: specific gravity

Engine coolant mixture ratio	Coolant temperature °C (°F)			
	15 (59)	25 (77)	35 (95)	45 (113)
30%	1.046 - 1.050	1.042 - 1.046	1.038 - 1.042	1.033 - 1.038
50%	1.076 - 1.080	1.070 - 1.076	1.065 - 1.071	1.059 - 1.065

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator. Wait until the engine and radiator cool down.

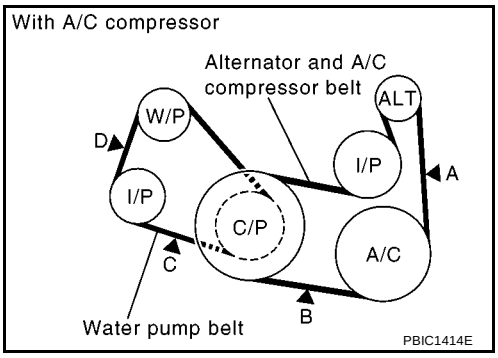
ENGINE MAINTENANCE (CR)

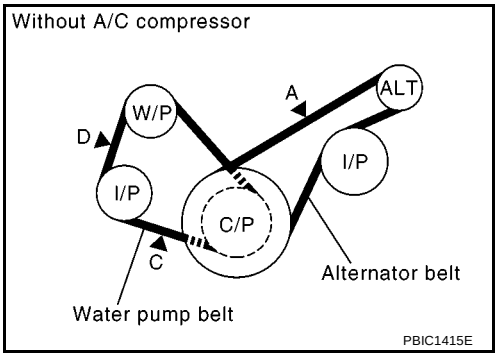
PFP:00000

Checking drive Belts

ELS000MI

- Inspection should be done only when engine is cold or over 30 minutes after the engine is stopped.
- Turn the clamp pulleys two times clockwise, and make sure tension on all pulleys is equal before doing the test.
- Visually check the belts for wear, damage, and cracks on inside and edges.
- When measuring deflection, apply 98,1 N (10 kg, 22lb) at the ▼ marked point.





CAUTION:

When measuring belt tension immediately after the belt is installed, first set the tension to the standard, rotate the crankshaft for more than two turns in order to eliminate variance in the tension between pulleys, then measure and adjust tension to the standard again.

Location	Tension [N (kg, lb)]			Deflection [mm (in)] [When pressed by force of 98.1N (10 kg, 22lb)]			
	New	At adjustment	Limit	Measuring point	New belt	At adjustment	Limit
Alternator and A/C compressor belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	6.6 - 7.8 (0.260 - 0.307)	7.3 - 8.5 (0.287 - 0.335)	13.8 (0.543)
				B	5.6 - 6.6 (0.220 - 0.260)	7.1 - 8.3 (0.280 - 0.327)	11.9 (0.469)
Alternator belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	3.1 - 4.1 (0.122 - 0.161)	9.8 - 10.6 (0.386 - 0.417)	13.8 (0.543)
Water pump belt	446 - 534 (45.5 - 54.5, 100.3 - 120.0)	348 - 436 (35.5 - 44.5, 78.2 - 98.0)	137 (14, 30.9)	C	6.7 - 7.3 (0.264 - 0.287)	7.6 - 8.6 (0.299 - 0.339)	12.4 (0.448)
				D	4.7 - 5.6 (0.185 - 0.220)	7.0 - 7.7 (0.276 - 0.303)	8.6 (0.339)

Tension Adjustment

ELS000MJ

Location	Location of adjuster and tightening method
Alternator and A/C compressor drive belt	Adjusting bolt on idler pulley
Water pump belt	Adjusting bolt on idler pulley

CAUTION:

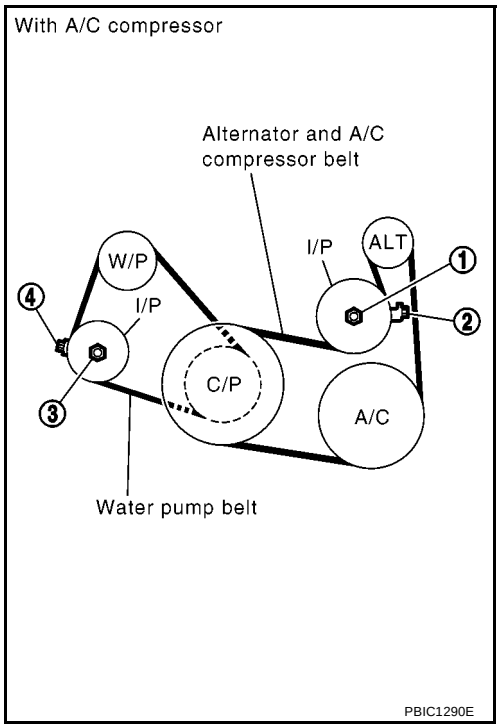
- **When the belt is replaced with new one, adjust the belt tension to the value for “New belt”, because new belt will not fully seat in the pulley groove.**
- **When tension of the belt being used exceeds “Limit”, adjust it to the value for “At adjustment”.**
- **When installing a belt, make sure that it is correctly engaged with the pulley groove.**
- **Do not allow oil or engine coolant to get on the belt.**
- **Do not twist or bend the belt strongly.**

ALTERNATOR AND A/C COMPRESSOR BELT (WITH A/C MODELS)

1. Remove RH front fender protector.
2. Loosen lock nut (1).
3. Tighten lock nut (1) with fingers.
4. Loosen lock nut (1) half a turn counter-clockwise.
5. Adjust the belt tension by turning the adjuster bolt (2).
   For the specified belt tension, refer to MA-21, "Checking drive Belts" .
6. Tighten lock nut (1).

   Nut (1) :

   : 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)
7. Turn the crankshaft pulley two times clockwise.
8. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .

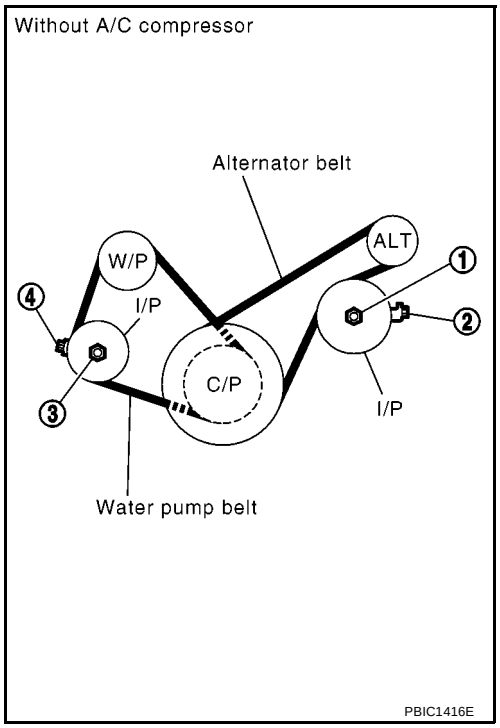


ALTERNATOR BELT (WITHOUT A/C MODELS)

1. Remove RH front fender protector.
2. Loosen lock nut (1).
3. Tighten lock nut (1) with fingers.
4. Loosen lock nut (1) half a turn counter-clockwise.
5. Adjust the belt tension by turning the adjuster bolt (2).
   For the specified belt tension, refer to MA-21, "Checking drive Belts" .
6. Tighten lock nut (1).

   Nut (1) :

   : 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)
7. Turn the crankshaft pulley two times clockwise.
8. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .



WATER PUMP BELT

1. Remove RH front fender protector.
2. Loosen lock nut (3).
3. Tighten lock nut (3) with fingers.
4. Adjust the belt tension by turning the adjuster bolt (4).
   For the specified belt tension, refer to MA-21, "Checking drive Belts" .
5. Tighten lock nut (3).

Nut (3) :

: 24.5 - 31.4 N·m (2.5 - 3.2 kg-m, 18 - 23 ft-lb)

6. Turn the crankshaft pulley two times clockwise.
7. Check that the belt tension is within the standard. Refer to MA-21, "Checking drive Belts" .

Changing Engine coolant

ELS000MK

WARNING:

- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

DRAINING ENGINE COOLANT

1. Disconnect radiator lower hose and radiator cap.

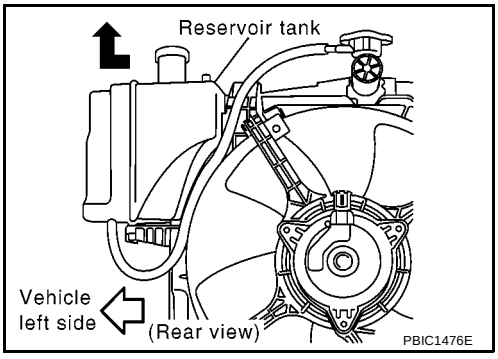
   CAUTION:
   - **Make sure to drain when the engine coolant temperature is cold.**
   - **Be careful not to allow coolant to contact drive belts.**

2. Remove reservoir tank and drain the engine coolant in the following procedures.

a. Move relay case.

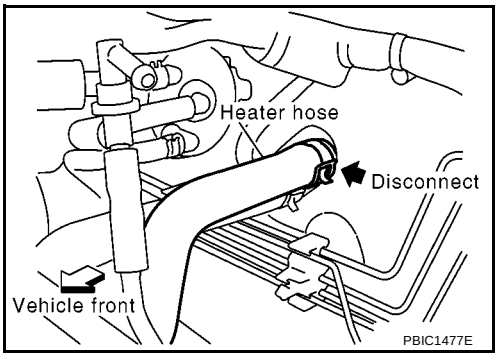
b. Disconnect the reservoir tank from fan shroud to remove. With force applied in the left direction of vehicle, pull up reservoir tank.

3. Check drain coolant for contaminants such as rust, corrosion or discoloration.
   If contaminated, flush engine cooling system. Refer to MA-24, "FLUSHING COOLING SYSTEM" .

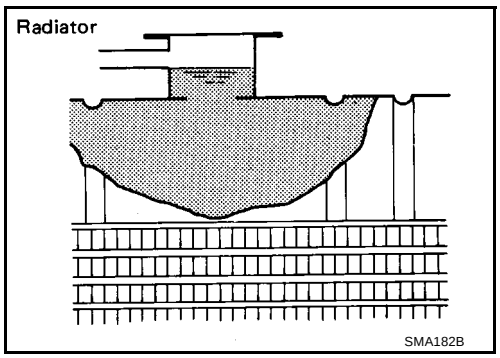


REFILLING ENGINE COOLANT

1. Install reservoir tank.
2. Connect radiator lower hose.
3. Disconnect heater hose (at heater hose outlet side: upper side) as shown in figure. Keep hose end at the same height as that of before removal.



4. Fill radiator and reservoir tank to specified level.
   - **Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**
   - **When coolant from heater hose starts to drain, connect heater hose and continue to fill.**
   - **Use Genuine Nissan Anti-freeze Coolant or equivalent mixed with water (distilled or demineralized).**
     Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS".



Engine coolant capacity (With reservoir tank):

M/T models with A/C

: Approx. 5.3 ℓ (4-5/8 Imp qt)

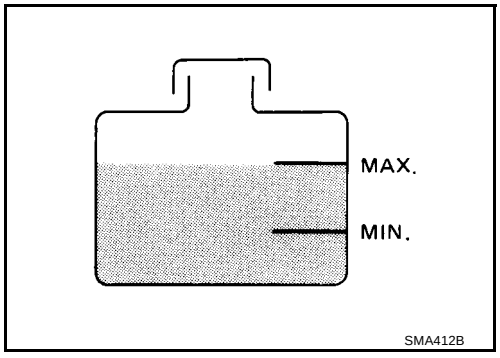
Except M/T models with A/C

: Approx. 4.9 ℓ (4-3/8 Imp qt)

Reservoir tank:

M/T models with A/C : 1.2 ℓ (1-1/8 Imp qt)

Except M/T models with A/C : 0.7 ℓ (5/8 Imp qt)



5. Warm up engine to normal operating temperature with radiator cap installed.
6. Warm up until thermostat opens. Keep warming at 3,000 rpm for approximately 10 minutes as guide.
   - For thermostat opening, touch radiator upper hose by hand to insure that water flow is hot.

   CAUTION:
   Be careful not to overheat.
7. Stop the engine.
8. After cooling engine [approximately 50°C (122 °F) or lower], remove radiator cap and check coolant level. If the level is low, fill up to the radiator neck again and repeat from step 5.
9. When the coolant level stabilizes, fill reservoir tank up to the “MAX” line.
10. Check cooling system for leaks with engine running.
11. Allow the engine to cool [approximately 50°C (122°F) or lower].
12. Start the engine. Perform the following cycle 3 times. Keep an engine speed of 1,000 rpm for approximately 30 seconds. Then increase it gradually to 3,000 rpm.
13. During the above step 12, make sure water flow sound is not heard from heater core.

- Sound may be noticeable at heater unit.

14. If water flow sound is heard, repeat from step 4 to 13.

- **Clean excess coolant from engine.**

FLUSHING COOLING SYSTEM

1. Fill radiator with water until water spills from the air relief hole, then close air relief plug. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.
6. Repeat steps 1 through 5 until clear water begins to drain from radiator.

Checking Cooling System

ELS000ML

WARNING:

Never remove the radiator cap when the engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around the cap and carefully remove it by turning it a quarter turn to allow built-up pressure to escape and then turn the cap all the way off.

CHECKING COOLING SYSTEM HOSES

Check hoses for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

CHECKING RADIATOR

Check radiator for mud or clogging. If necessary, clean radiator as follows.

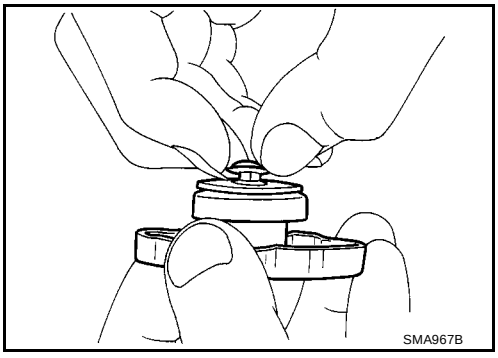
- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2 , 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

CHECKING RADIATOR CAP

1. Pull the negative-pressure valve to open it and check that it close completely when released.

- Check that there is no dirt or damage on the valve seat of the radiator cap negative-pressure valve.
- Check that there are no unusual conditions in the opening and closing conditions of the negative-pressure valve.



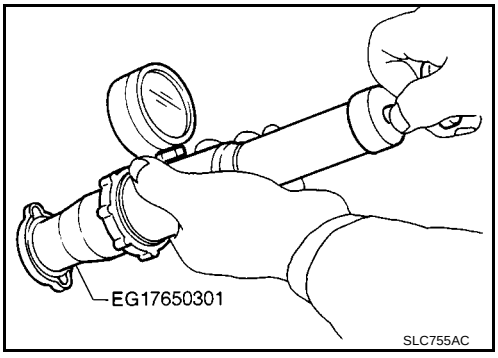
2. Check radiator cap relief pressure.

   Standard:

   78 - 98 kPa (0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2 , 11 - 14 psi)

   Limit:

   59 kPa (0.59 bar, 0.6 kg/cm^2 , 9 psi)



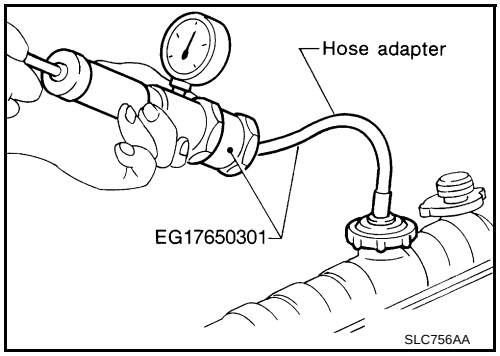
- When connecting the radiator cap to the tester, apply engine coolant to the cap seal part.
- Replace the radiator cap if there is an unusual conditions in the negative-pressure valve, or if the open-valve pressure is outside of the standard values.

CHECKING COOLING SYSTEM FOR LEAKS

- To check for leakage, apply pressure to the cooling system with a tester.

Testing pressure:

157 kPa (1.57 bar, 1.6 kg/cm^2 , 23 psi)



WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could occur from high pressure coolant escaping from the radiator.

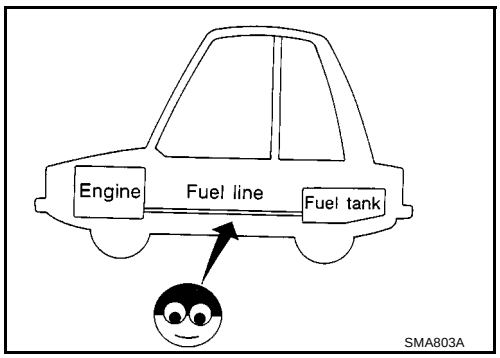
CAUTION:

Higher pressure than specified may cause radiator damage.

Checking Fuel Lines

ELS000MM

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration. If necessary, repair or replace malfunctioning parts.



CAUTION:

Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.
Tightening torque specifications are the same for all rubber hose clamps.
Ensure that screw does not contact adjacent parts.

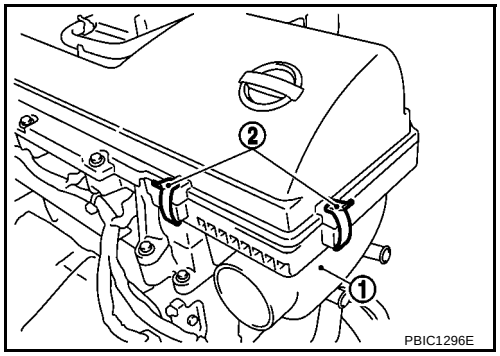
Changing Air Cleaner Filter

ELS000MN

REMOVAL

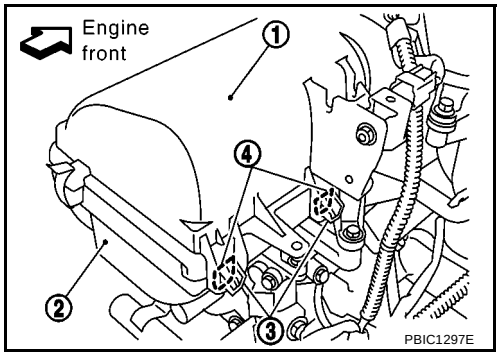
1. Remove air duct. Refer to EM-16, "REMOVAL" .
2. Remove clips (2) of air cleaner body (1).
3. After moving the air cleaner body downward, remove it by pulling it forward.
   - While pressing down the radiator upper hose, remove air cleaner body.
4. Remove air cleaner filter from the air cleaner body.

   NOTE:
   In some cases the air cleaner filter might remain in the air cleaner case (upper).



INSTALLATION

1. Set the air cleaner filter on the air cleaner case (upper) (1).
2. Insert the two projections (3) on the air cleaner body (2) into the two notch holes (4) on the rear of the air cleaner case (upper) (1), then lift up and fasten with the clip.
3. Attach air duct.



Changing Engine Oil

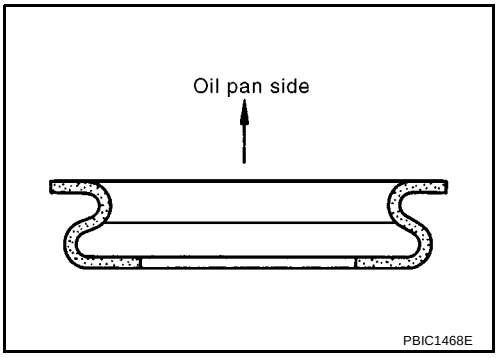
ELS000MO

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up engine put vehicle horizontally, and check for oil leakage from engine components.
2. Stop engine and wait for 10 minutes.
3. Remove oil filler cap, and remove drain plug.
4. Drain engine oil.
5. Install drain plug. Refill with new engine oil.
   - Install drain plug washer in the direction shown in figure.

   Oil specification and viscosity:
   Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS".



Oil capacity (Approximate):

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	3.0 (2-5/8)
	Without oil filter change	2.8 (2-1/2)
Dry engine (engine overhaul)		3.5 (3-1/8)

CAUTION:

- **Be sure to clean drain plug and install with new washer.**

  Oil pan drain plug:

  : 29.4 - 39.2 N·m (3.0 - 3.9 kg-m, 22 - 28 ft-lb)

- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to determine when the proper amount of oil is in the engine.

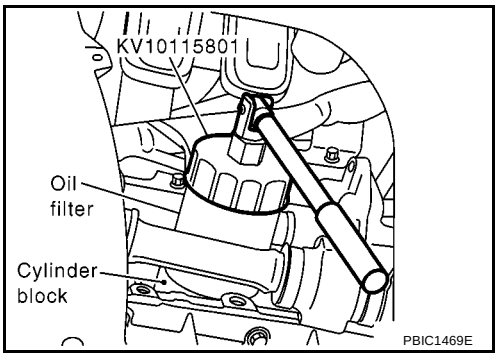
6. Warm up engine and check area around drain plug and oil filter for oil leakage.
7. Check oil level. Refer to LU-4, "Inspection" .
8. Stop engine and wait for 10 minutes.

Changing Oil Filter

ELS000MP

1. Using an oil filter wrench (special service tool), remove oil filter.

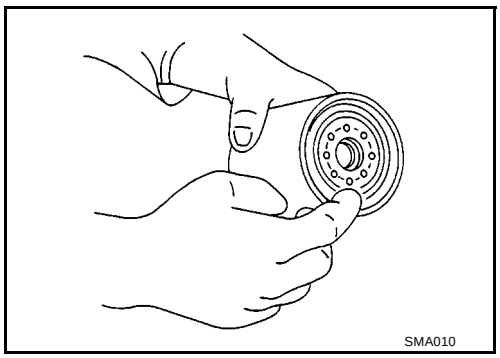
   CAUTION:
   - **Be careful not to get burned when the engine and engine oil are hot.**
   - **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
   - **Do not allow engine oil to adhere to the drive belts.**
   - **Completely wipe off any oil that adheres to the engine and the vehicle.**
2. Remove foreign materials adhering to the oil filter installation surface.



3. Apply engine oil to the oil seal circumference of the new oil filter.

CAUTION:

- **Use genuine NISSAN oil filter or the equivalent.**

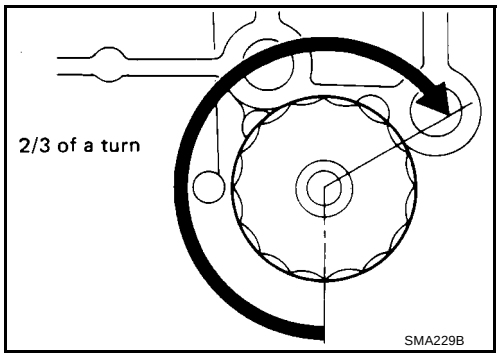


4. Screw the oil filter manually until it touches the installation surface, then tighten it by 2/3 turn.

Oil filter:

:14.7 - 20.5 N·m (1.5 - 2.1 kg-m, 11 - 15 ft-lb)

5. After warming up the engine, check for engine oil leakage.
6. Check oil level and add engine oil. Refer to LU-4, "ENGINE OIL" .



Changing Spark Plugs

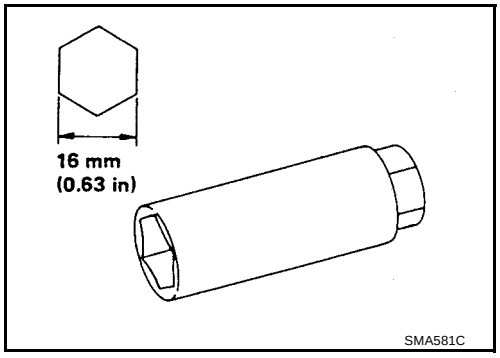
ELS000MQ

REMOVAL

1. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
2. Remove spark plugs with a spark plug wrench.

CAUTION:

Handle spark plug with care. Avoid impacts.



INSPECTION AFTER REMOVAL

- Use standard type spark plug for normal condition.
- The hot type spark plug is suitable when fouling occurs with the standard type spark plug under conditions such as:
  - Frequent engine starts
  - Low ambient temperatures
- The cold type spark plug is suitable when spark plug knock occurs with the standard type spark plug under conditions such as:
  - Extended highway driving
  - Frequent high engine revolution

Make	NGK	Champion
Standard type	LFR5AP-11	REC10PYC4
Hot type	LFR4AP-11	—
Cold type	LFR6AP-11	—

Gap (Nominal) : 1.1 mm (0.043 in)

CAUTION:

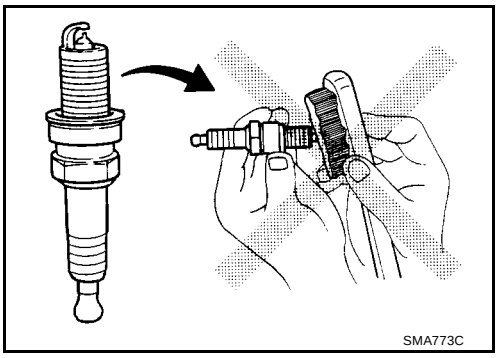
- **Do not use a wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

Cleaner air pressure:

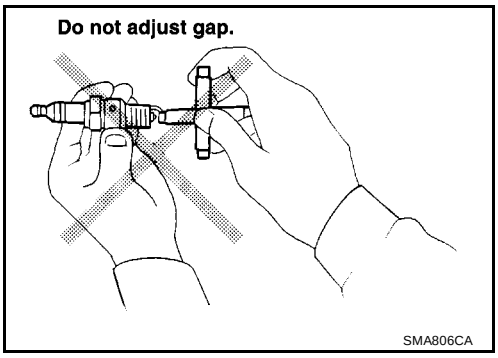
Less than 588 kPa (6 kg/cm^2 , 85 psi)

Cleaning time:

Less than 20 seconds



- **Checking and adjusting plug gap is not required between change intervals.**



INSTALLATION

Install in the reverse order of removal.

Spark plug

: 19.6 - 29.4 N·m (2.0 - 3.0 kg-m, 15 - 21 ft-lb)

Checking EVAP Vapor Lines

ELS000MR

1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.

Refer to EC-464, "EVAPORATIVE EMISSION SYSTEM" (CR engine models with E-OBD), EC-840, "EVAPORATIVE EMISSION SYSTEM" (CR engine models without E-OBD).

ENGINE MAINTENANCE (K9K)

PFP:00000

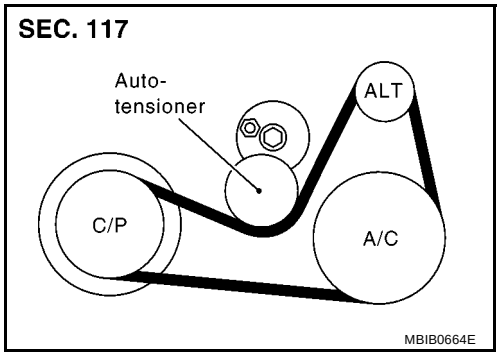
Checking Drive Belts

ELS0016D

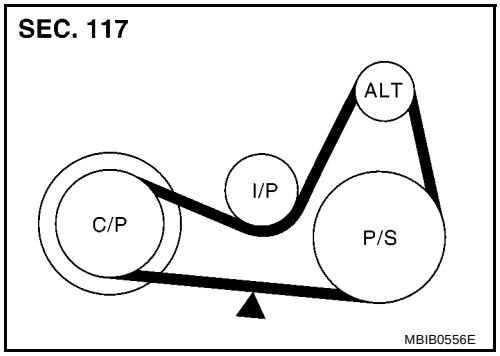
WARNING:

Be sure to perform when the engine is stopped.

1. Inspect belts for cracks, fraying, wear and oil. If necessary, replace.
2. Tighten auto-tensioner lock nut (models with A/C compressor) or idler pulley lock nut (models without A/C compressor) by hand and measure deflection or tension without looseness.



3. When measuring deflection, apply 98 N (10 kg, 22 lb) at the ▼ marked point as shown (models without A/C compressor).



TENTION ADJUSTMENT

Models With A/C Compressor

Belt tensioning is not necessary, as it is automatically adjusted by auto-tensioner.

Models Without A/C Compressor

Belt tightening method for adjustment	Adjusting bolt on idler pulley

- The tension value is 234±10 Hz.

NOTE:

The engine must be turned through two revolutions in order to position the belt correctly.

CAUTION:

- **When checking belt tension immediately after installation, first adjust it to the specified value. Then, after turning the crankshaft two turns or more, re-adjust to the specified value to avoid variation in deflection between pulleys.**
- **When installing belt, make sure that it is correctly engaged with pulley groove.**
- **Keep oil and water away from belt.**
- **Do not twist or bend belt excessively.**

Changing Engine coolant

ELS0016E

WARNING:

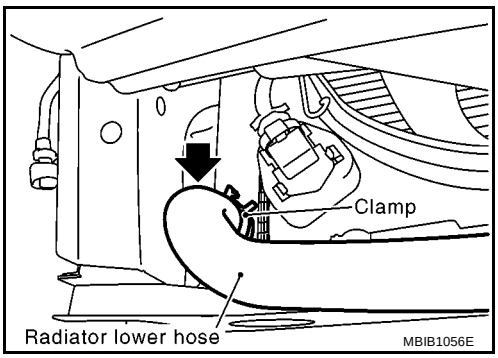
- **To avoid being scalded, never change the coolant when the engine is hot.**
- **Wrap a thick cloth around cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**

DRAINING ENGINE COOLANT

1. Remove engine undercover.

2. Disconnect lower radiator hose, and remove radiator cap.
3. Remove reservoir tank, drain coolant, then clean reservoir tank.
4. Check drained coolant for contaminants such as rust, corrosion or discoloration.

If contaminated, flush engine cooling system. Refer to CO-33, "FLUSHING COOLING SYSTEM" .



REFILLING ENGINE COOLANT

1. Install reservoir tank, radiator lower hose and air relief plug.
2. Fill reservoir tank slowly with coolant until coolant spills from radiator cap holes.

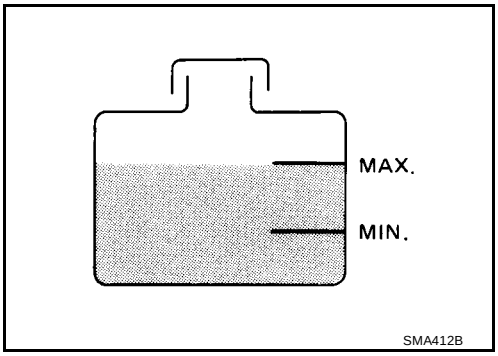
CAUTION:
If the filling rate is too fast, this could lead to air being mixed in the coolant. Be sure to fill the coolant slowly according to the rate indicated above.

- **Use genuine Nissan anti-freeze coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS".**

Engine coolant capacity (With reservoir tank):

6.5 ℓ (5-3/4 Imp qt)

Reservoir tank : 1.2 ℓ (1-1/8 Imp qt)



- **Pour coolant through coolant filler neck slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.**
3. Fill reservoir tank to specified level.
4. Warm up engine to normal operating temperature without radiator cap installed.
- **If coolant overflows radiator filler hole, install filler cap.**
5. Run engine at 3,000 rpm for 10 seconds and return to idle speed with radiator cap installed.
- Repeat two or three times.

Watch coolant temperature gauge so as not to overheat the engine.

6. Stop engine and cool down to less than approximately 50°C (122°F).
- Cool down using a fan to reduce the time.
- If necessary, refill radiator up to filler neck with coolant.
7. Refill reservoir tank to MAX level line with coolant.
8. Repeat steps 5 through 7 two or more times with radiator cap installed until coolant level no longer drops.
9. Check cooling system for leaks with engine running.
10. Warm up engine, and check for sound of coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between COOL and WARM.
- Sound may be noticeable at heater unit.
11. If sound is heard, bleed air from cooling system by repeating steps 5 through 7 until coolant level no longer drops.
- **Clean excess coolant from engine.**

FLUSHING COOLING SYSTEM

1. Fill radiator with water until water spills from the air relief hole, then close air relief plug. Fill radiator and reservoir tank with water and reinstall radiator cap.
2. Run engine and warm it up to normal operating temperature.
3. Rev engine two or three times under no-load.
4. Stop engine and wait until it cools down.
5. Drain water.

6. Repeat steps 1 through 5 until clear water begins to drain from radiator.
7. Blow compressed air into cooling circuit through the reservoir tank valve hole to drain all the water.

Checking Cooling System

ELS0016F

WARNING:
Never remove the radiator cap when the engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.
Wrap a thick cloth around the cap and carefully remove it by turning it a quarter turn to allow built-up pressure to escape and then turn the cap all the way off.

CHECKING COOLING SYSTEM HOSES

Check hoses for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

CHECKING RADIATOR

Check radiator for mud or clogging. If necessary, clean radiator as follows.

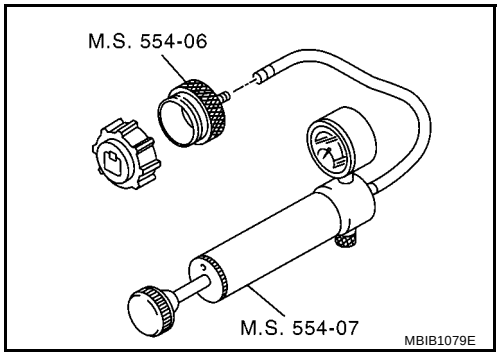
- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2 , 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

Checking Reservoir Tank Cap

ELS0016G

- Fit the adapter to the tester as shown.
- When connecting the reservoir tank cap to the tester, apply water or LLC to the cap seal part.
- Check reservoir tank cap relief operation.
- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.



Checking Radiator

ELS0016H

Check radiator for mud or clogging. If necessary, clean radiator as follows.

- Be careful not to bend or damage the radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as radiator fan, radiator shroud and horns. Then tape the harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downwards.
2. Apply water again to all radiator core surface once per minute.
3. Stop washing if any stains no longer flow out from the radiator.
4. Blow air into the back side of radiator core vertically downwards.

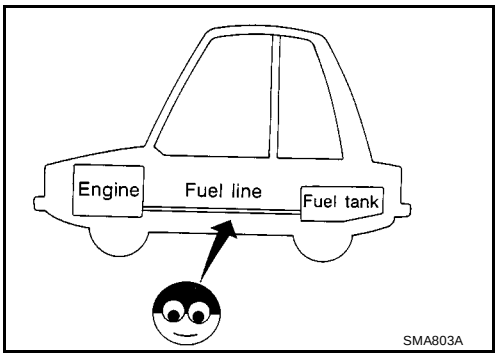
- Use compressed air lower than 490 kPa (4.9 bar 5 kg/cm^2 , 71psi) and keep distance more than 30 cm (11.8 in).

5. Blow air again into all the radiator core surface once per minute until no water sprays out.

Checking Fuel Lines

ELS0016I

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration. If necessary, repair or replace malfunctioning parts.



CAUTION:

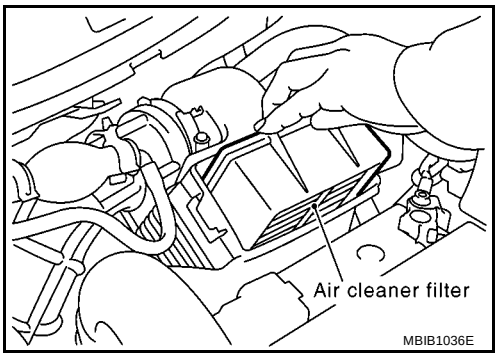
Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.
Tightening torque specifications are the same for all rubber hose clamps.
Ensure that screw does not contact adjacent parts.

Changing Air Cleaner Filter

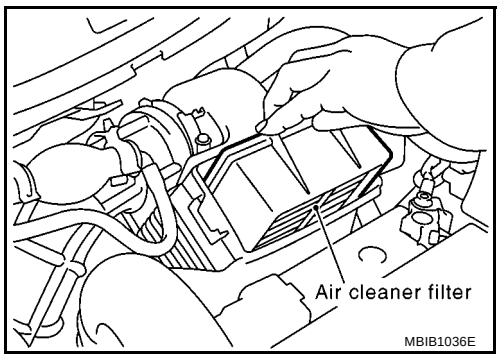
ELS0016J

REMOVAL

1. Open air cleaner case.



2. Remove air cleaner filter.



INSTALLATION

Install in the reverse order of removal.

Changing Engine Oil

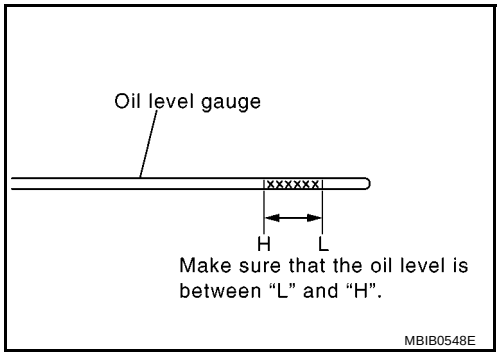
ELS0016K

WARNING:

- **Be careful not to burn yourself, as the engine oil is hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Put vehicle horizontally.
2. Warm up engine, and check for oil leakage from engine components.
3. Stop engine and wait for 10 minutes.
4. Remove drain plug and oil filler cap.
5. Drain oil and refill with new engine oil.

- Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .



Oil capacity (Approximate):

Drain and refill	With oil filter change	4.55 ℓ (4 Imp qt)
	Without oil filter change	4.39 ℓ (3-7/8 Imp qt)
Dry engine (overhaul)		4.71 ℓ (4-1/8 Imp qt)

- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

CAUTION:

- **Be sure to clean drain plug and install with new washer.**
- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.**
  Always use the dipstick to the determine when the proper amount of oil is in the engine.

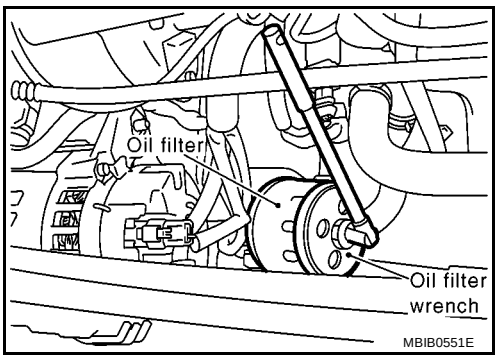
6. Warm up engine and check area around drain plug and oil filter for oil leakage.
7. Stop engine and wait for 10 minutes.
8. Check oil level.

Changing Oil Filter

ELS0016L

REMOVAL

1. Using an oil filter wrench (special service too), remove oil filter.



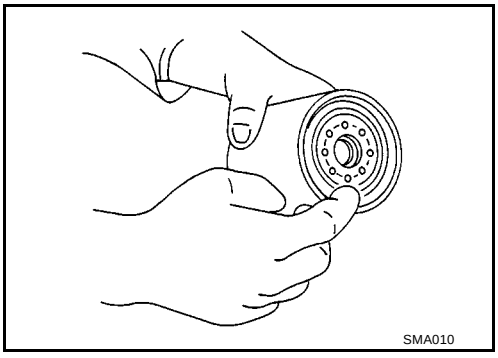
CAUTION:

- **Be careful not to get burned when the engine and engine oil are hot.**
- **When removing, prepare a shop cloth to absorb any oil leakage or spillage.**
- **Do not allow engine oil to adhere to the drive belts.**
- **Completely wipe off any oil that adhere to the engine and the vehicle.**

INSTALLATION

1. Remove foreign materials adhering to the oil filter installation surface.
2. Install oil filter bracket to oil cooler.

   CAUTION:
   Install oil filter bracket, positioning lug in the hole of oil cooler.
3. Apply engine oil to the oil seal contact surface of the new oil filter.



4. Install the oil filter to oil filter bracket.
5. After warming up the engine, check for engine oil leakage.
6. Check oil level and add engine oil. Refer to LU-12, "ENGINE OIL" .

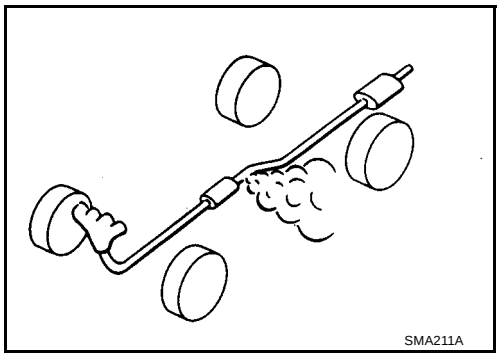
CHASSIS AND BODY MAINTENANCE

PFP:00100

Checking Exhaust System

ELS000LV

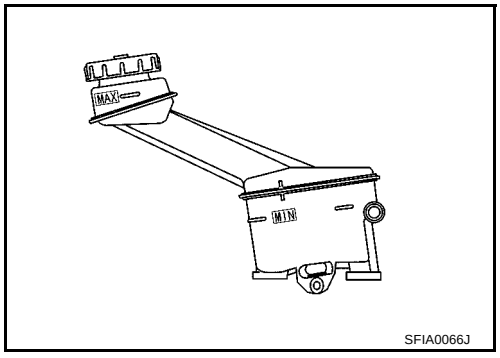
Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.



Checking Clutch Fluid Level and Leaks

ELS000LW

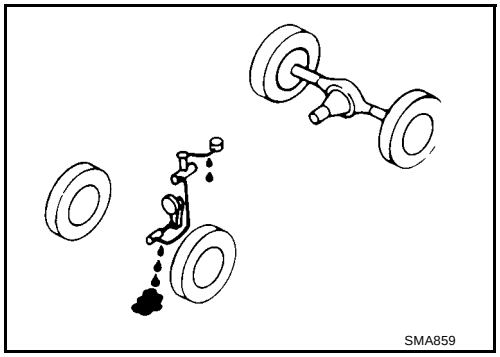
If fluid level is extremely low, check clutch system for leaks.



Checking Clutch System

ELS000LX

Check fluid lines and operating cylinder for improper attachment, cracks, damage, loose connections, chafing and deterioration.



Checking M/T Oil

ELS000LY

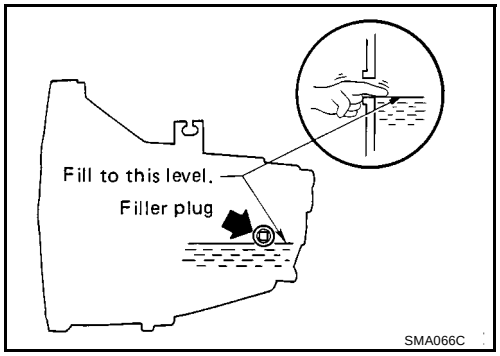
- Check that oil is not leaking from transaxle or around it.
- Check oil level from filler plug mounting hole as shown in the figure.

  CAUTION:
  Never start engine while checking oil level.
- Set a new gasket on the filler plug and install it on the transaxle.

  Filler plug:

  : 2 N·m (0.2 kg-m, 1.8 in-lb)

  CAUTION:
  Do not reuse gasket.



Changing M/T Oil

ELS000LZ

1. Drain oil from drain plug and refill with new gear oil.
2. Check oil level.

Oil grade and viscosity:

Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS"

Oil capacity (Reference):

JH3: Approx. 2.6 ℓ (4-5/8 Imp pt)

JR5: Approx. 2.5 ℓ (4-3/8 Imp pt)

Drain plug:

: 22 N·m (2.2 kg-m, 1.5 - 1.7 ft-lb)

CAUTION:

Do not reuse gasket.

Checking A/T Fluid

ELS000M0

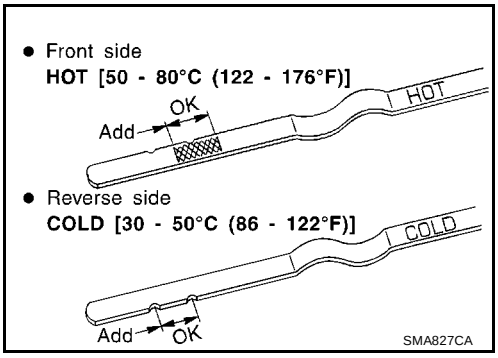
1. Warm up engine.
2. Check for fluid leakage.
3. Before driving, fluid level can be checked at fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on dipstick.

a. Park vehicle on level surface and set parking brake.

b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.

c. Check fluid level with engine idling.

d. Remove dipstick and note reading. If level is at low side of either range, and fluid to the charging pipe.

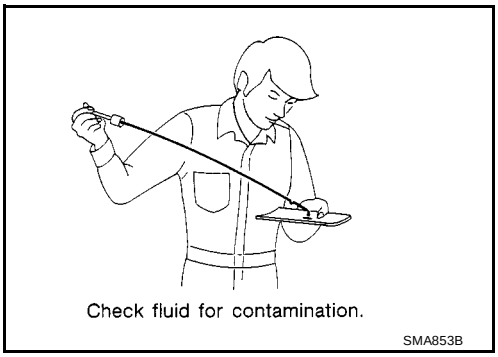


e. Re-insert dipstick into charging pipe as far as it will go.

f. Remove dipstick and note reading. If reading is at low side of range, add fluid to the charging pipe.

Do not overfill.

4. Drive vehicle for approximately 5 minutes in urban areas.
5. Re-check fluid level at fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on dipstick.
6. Check fluid condition.
   - If fluid is very dark or smells burned, refer to AT section for checking operation of A/T. Flush cooling system after repair of A/T.
   - If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-11, "RADIATOR" , CO-17, "RADIATOR (ALUMINUM TYPE)" .



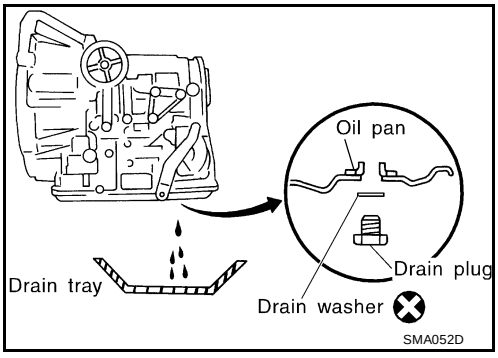
Changing A/T Fluid

ELS000M1

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid from drain plug and refill with new A/T fluid. Always refill same volume with drained fluid.

Fluid grade:

Genuine Nissan ATF or equivalent. Refer to MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .



Fluid capacity (With torque converter):

Approx. 7.7 ℓ (6-3/4 lmp qt)

Drain plug:

: 29 - 39 N·m (3.0 - 3.9 kg-m, 22 - 28 ft-lb)

4. Run engine at idle speed for five minutes.
5. Check fluid level and condition. Refer to “Checking A/T Fluid”. If fluid is still dirty, repeat steps 2 through 5.

Rotation

ELS000M5

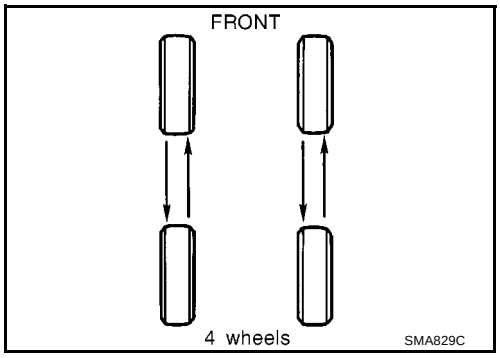
- After rotating the tires, adjust the tire pressure.
- Retighten the wheel nuts when the vehicle has been driven for 1,000 km (600 miles) (also in cases of a flat tire, etc.).

CAUTION:

When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.

Tightening torque of wheel nut:

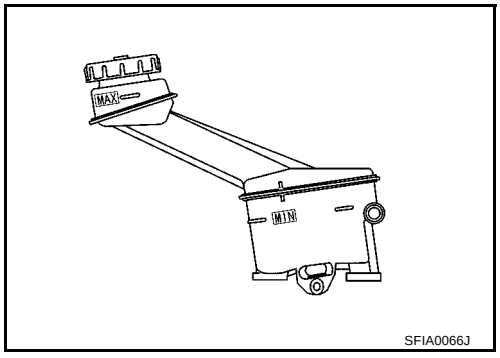
98 - 118N·m (10 - 12 kg·m, 72 - 87 ft·lb)



Checking Brake Fluid Level and Leaks

ELS000M6

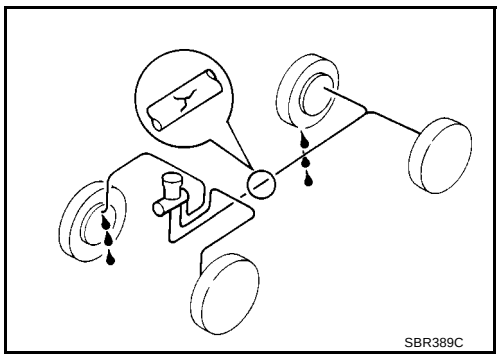
- If fluid level is extremely low, check brake system for leaks.



Checking Brake Lines and Cables

ELS000M7

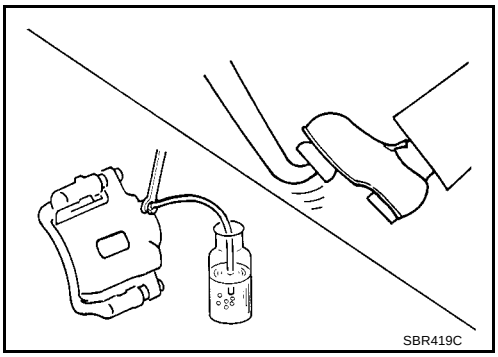
- Check brake fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasions, deterioration, etc.



Changing Brake Fluid

ELS000M8

1. Drain brake fluid from each air bleeder valve.
2. Refill until new brake fluid comes out from each air bleeder valve.
   Use same procedure as in bleeding hydraulic system to refill brake fluid.
   Refer to BR-9, "BRAKE FLUID" .
   - Refill with recommended Genuine Brake Fluid or equivalent “DOT 3” or “DOT 4”.
     Refer toMA-18, "RECOMMENDED FLUIDS AND LUBRICANTS" .
   - Never reuse drained brake fluid.
   - Be careful not to splash brake fluid on painted areas.


SBR419C

Checking Disc Brake

ELS000M9

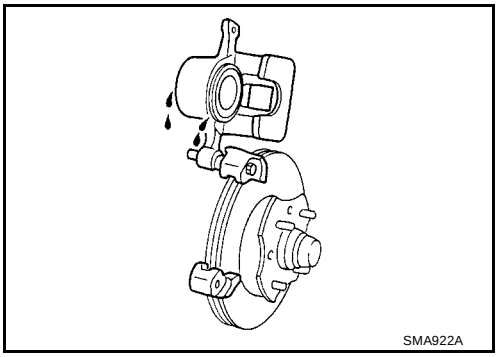
ROTOR

Check condition, wear, and damage.

Applied	Front
Brake model	CL22
Standard thickness	22.0 mm (0.87 in)
Maximum runout	0.058 mm (0.0023 in)
Minimum thickness (Wear limit)	20 mm (0.79 in)

CALIPER

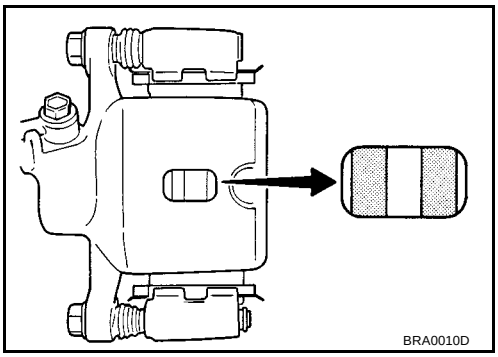
- Check for leakage.


SMA922A

PAD

Check for wear or damage.

Applied	Front
Brake model	CL22
Standard thickness	12.4 mm (0.488 in)
Minimum thickness (Wear Limit)	2.0 mm (0.079 in)


BRA0010D

Checking Drum Brake

ELS000O1

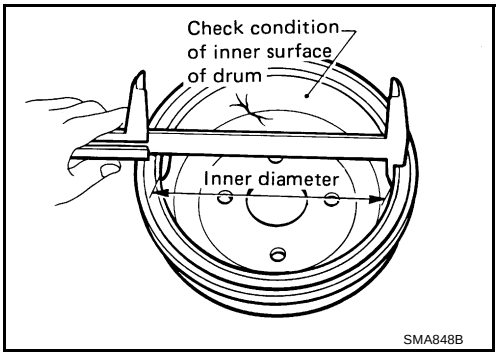
WHEEL CYLINDER

Check for leakage.

DRUM

Check condition and inner surface.

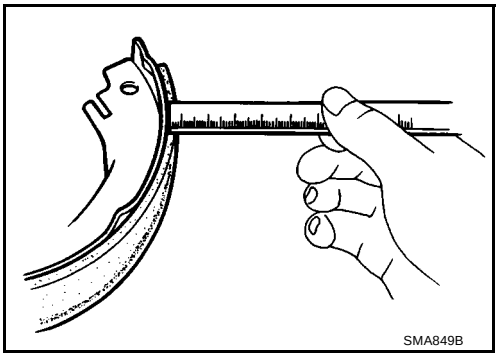
Standard inner diameter	202 mm (7.95 in)
Drum repair limit (Maximum inner diameter)	203.2 mm (8.0 in)



LINING

Check wear or damage.

Standard thickness	4.5 mm (0.177 in)
Lining Wear Limit (Minimum thickness)	1.5 mm (0.059 in)

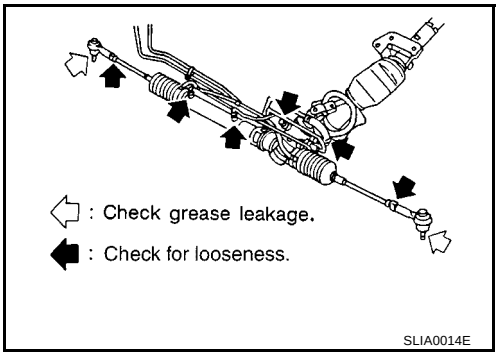


Checking Steering Gear and Linkage

ELS000MA

STEERING GEAR

- Check gear housing and boots for looseness, damage and grease leakage.
- Check connection with steering column for looseness.



STEERING LINKAGE

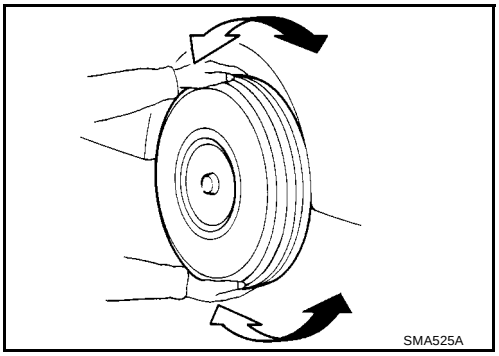
Check ball joint, dust cover and other component parts for looseness, wear, damage and grease leakage.

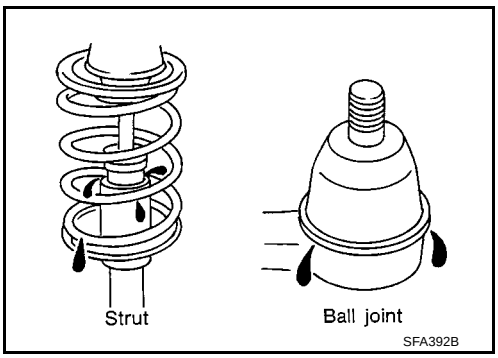
Axle and Suspension Parts

ELS000MC

Check front and rear axle and suspension parts for excessive play, cracks, wear or other damage.

- Shake each wheel to check for excessive play.
- Check wheel bearings for smooth operation.
- Check axle and suspension nuts and bolts for looseness.
- Check strut (shock absorber) for oil leakage or other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks or other damage.

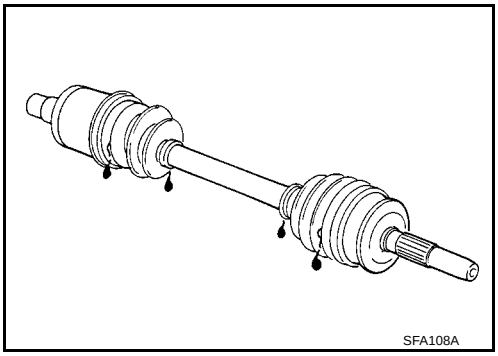




Drive Shaft

ELS000MD

- Check boot and drive shaft for cracks, wear, damage and grease leakage.



Lubricating Locks, Hinges and Hood Latches

ELS000ME

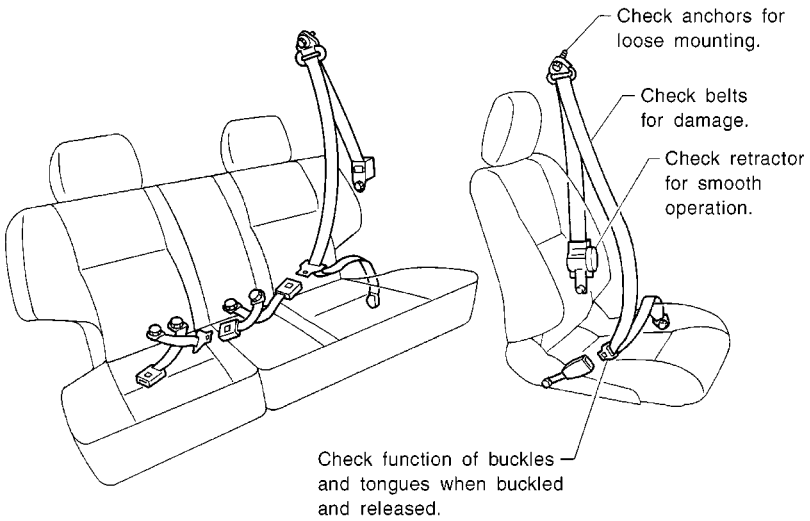
Front door	Refer to BL-204, "DOOR" .
Back door	Refer to BL-216, "BACK DOOR" .

Checking Seat Belts, Buckles, Retractors, Anchors and Adjusters

ELS000MF

CAUTION:

- **After any collision, inspect all seat belt assemblies, including retractors and other attached hardwares (i.e. guide rail set). Nissan recommends to replace all seat belt assemblies in use during a collision, unless not damaged and properly operating after minor collision.**
  Also inspect seat belt assemblies not in use during a collision, and replace if damaged or improperly operating.
- **If any component of seat belt assembly is questionable, do not repair. Replace as seat belt assembly.**
- **If webbing is cut, frayed, or damaged, replace belt assembly.**
- **Never oil tongue and buckle.**
- **Use a genuine seat belt assembly.**



Anchor bolt
43 - 55 N·m (4.4 - 5.6 kg-m, 32 - 41 ft-lb)

Checking Body Corrosion

ELS000MG

Visually check body panels for collision damage (scratches, chipping, rubbing, etc.) or damage to the anti-corrosion materials. In particular, check the following locations.

HEMMED PANELS

Hood front end, door lower end, trunk lid rear end, etc.

PANEL JOINT

Side sill of rear fender and center pillar, rear wheel housing of rear fender, around strut tower in engine compartment, etc.

PANEL EDGE

Trunk lid opening, sunroof opening, fender wheel-arch flange, fuel filler lid flange, around holes in panel, etc.

PARTS CONTACT

Waist moulding, windshield moulding, bumper, etc.

PROTECTORS

Damage or condition of mudguard, fender protector, chipping protector, etc.

ANTI-CORROSION MATERIALS

Damage or separation of anti-corrosion materials under the body.

DRAIN HOLES

Condition of drain holes at door and side sill. When repairing corroded areas, refer to the Corrosion Repair Manual.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

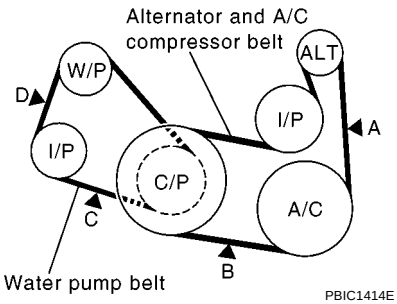
ELS000MH

BELT DEFLECTION AND TENSION

CR Engine

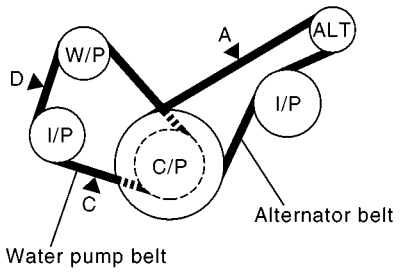
Location	Tension [N (kg, lb)]			Deflection [mm (in)] [When pressed by force of 98.1N (10 kg, 22lb)]			
	New	At adjustment	Limit	Measuring point	New belt	At adjustment	Limit
Alternator and A/C compressor belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	6.6 - 7.8 (0.260 - 0.307)	7.3 - 8.5 (0.287 - 0.335)	13.8 (0.543)
				B	5.6 - 6.6 (0.220 - 0.260)	7.1 - 8.3 (0.280 - 0.327)	11.9 (0.469)
Alternator belt	603 - 691 (61.5 - 70.5, 135.6 - 155.3)	495 - 583 (50.5 - 59.5, 111.3 - 131.1)	196 (20, 44.1)	A	3.1 - 4.1 (0.122 - 0.161)	9.8 - 10.6 (0.386 - 0.417)	13.8 (0.543)
Water pump belt	446 - 534 (45.5 - 54.5, 100.3 - 120.0)	348 - 436 (35.5 - 44.5, 78.2 - 98.0)	137 (14, 30.9)	C	6.7 - 7.3 (0.264 - 0.287)	7.6 - 8.6 (0.299 - 0.339)	12.4 (0.448)
				D	4.7 - 5.6 (0.185 - 0.220)	7.0 - 7.7 (0.276 - 0.303)	8.6 (0.339)

With A/C compressor



PBIC1414E

Without A/C compressor



PBIC1415E

K9K Engine

Refer to EM-121, "DRIVE BELTS" .

ENGINE COOLANT CAPACITY

CR Engine

Unit: ℓ (Imp qt)

Coolant capacity [With reservoir tank (MAX level)]	M/T models with A/C	Approximately 5.3 (4-5/8)
	Except M/T models with A/C	Approximately 4.9 (4-3/8)
Reservoir tank	M/T models with A/C	1.2 (1-1/8)
	Except M/T models with A/C	0.7 (5/8)

K9K Engine

Unit: ℓ (Imp qt)

Coolant capacity [With reservoir tank (MAX level)]	Approximately 6.5 (5-3/4)
Reservoir tank	1.2 (1-1/8)

ENGINE OIL CAPACITY

CR Engine

Unit: ℓ (Imp qt)

With oil filter change	3.0 (2-5/8)
Without oil filter change	2.8 (2-1/2)
Dry engine (engine overhaul)	3.5 (3-1/8)

K9K Engine

Unit: ℓ (Imp qt)

With oil filter change	4.55 (4)
Without oil filter change	4.39 (3-7/8)
Dry engine (engine overhaul)	4.71 (4-1/8)

SPARK PLUG

Make	NGK	Champion
Standard type	LFR5AP-11	REC10PYC4
Hot type	LFR4AP-11	—
Cold type	LFR6AP-11	—
Gap (nominal)	1.1 mm (0.043 in)	

SECTION MT
MANUAL TRANSAXLE

CONTENTS

PRECAUTIONS 3
Cautions 3
PREPARATION 4
Special Service Tools 4

JH3

DESCRIPTION 6
Cross-sectional View 6
REMOVAL AND INSTALLATION 7
Removal 7
Installation 7
TIGHTENING TORQUES 8
Description 8
COMPONENTS 9
Gear Components 9
Differential Gear 10
Shift Control Components 10
Case Components 11
Clutch Housing 11
CONTROL LINKAGE 12
Removal and Installation of Control Device and Cable 12
REMOVAL 12
INSTALLATION 12
RATIOS 13
NISSAN Gearbox 13
CONSUMABLES 14
Description 14
CAPACITIES - LUBRICANTS 15
Description 15
TROUBLE DIAGNOSIS 16
Symptom Chart 16
Back-up Lamp Switch 16
PRECAUTIONS 17
Precautions 17
PARTS TO BE REPLACED SYSTEMATICALLY 18
Description 18
CHECKING 19
Bearings 19
Gearing 19
Synchronizer Ring 19
Sliding Gear Hub 19
SEPARATING THE HOUSINGS 20
Removal 20
REPAIRING THE GEARBOX 22
Removal 22
MAINSHAFT 24
Removal 24
Refitting 25
TRANSAXLE CASE BEARING 26
Removal 26
Refitting 26
CLUTCH HOUSING BEARING 27
Removal 27
Refitting 27
SELECTOR SHAFT RINGS 28
Removal 28
Refitting 28
DIFFERENTIAL BEARINGS 29
Removal and Installation 29
SELECTOR SHAFT 30
Removal 30
Refitting 30
ASSEMBLY 31
Refitting 31
HOUSING ASSEMBLY 33
Assembly 33

JR5

DESCRIPTION 36
Cross-sectional View 36
REMOVAL AND INSTALLATION 37
Removal 37
Installation 37
TIGHTENING TORQUES 38
Description 38
COMPONENTS 39
Gear Components 39

Differential Gear 40
Shift Control Components 40
Case Components 41
Clutch Housing 41
CONTROL LINKAGE 42
Removal and Installation of Control Device and Cable 42
REMOVAL 42
INSTALLATION 42
RATIOS 43
NISSAN Gearbox 43
CONSUMABLES 44
Description 44
CAPACITIES - LUBRICANTS 45
Description 45
TROUBLE DIAGNOSIS 46
Symptom Chart 46
Back-up Lamp Switch 46
PRECAUTIONS 47
Precautions 47
PARTS TO BE REPLACED SYSTEMATICALLY 48
Description 48
CHECKING 49
Bearings 49
Gearing 49
Synchronizer Ring 49
Sliding Gear Hub 49
SEPARATING THE HOUSINGS 50
Removal 50
REPAIRING THE GEARBOX 52
Removal 52
Removing the Gearing 53
Checking Parts 53
Refitting the Gearing 54
TRANSAXLE CASE BEARING 55
Removing the Bearing, Input Shaft Side 55
Refitting 55
CLUTCH HOUSING BEARING 56
Removal and Installation 56
SELECTOR SHAFT RINGS 57
Removal 57
Refitting 57
DIFFERENTIAL BEARINGS 58
Removal and Installation 58
SELECTOR SHAFT 59
Removal 59
Refitting 59
REPAIRING THE GEARBOX 60
Setting the Pre-tensioning of the Output Shaft Bearings 60
ASSEMBLY 61
Refitting 61
HOUSING ASSEMBLY 63
Assembly 63

PRECAUTIONS

PFP:00001

Cautions

ECS00FE3

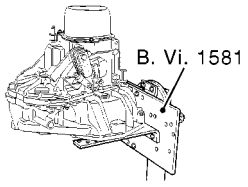
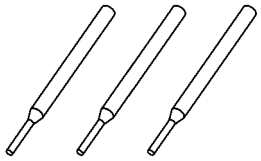
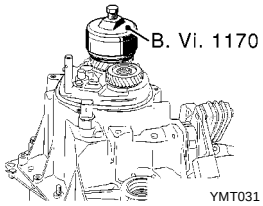
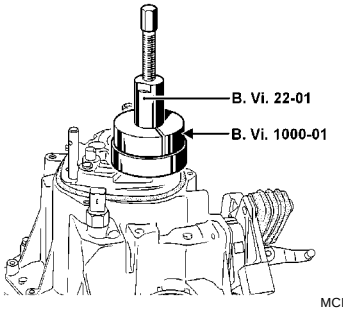
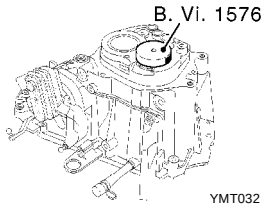
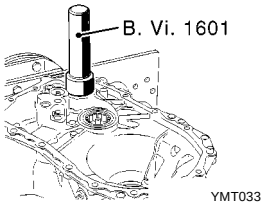
- Do not reuse transaxle oil, once it has been drained.
- Check oil level or replace oil with vehicle on level ground.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation status prior to removal or disassembly. If mating marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten nuts and bolts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Be careful not to damage sliding surfaces and mating surfaces.

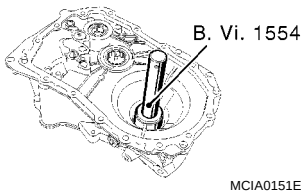
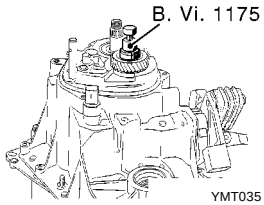
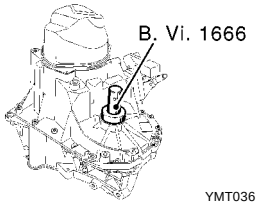
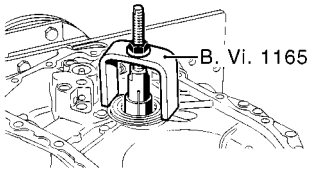
PREPARATION

PFP:00002

Special Service Tools

ECS00FD1

Tool number Tool name	Description	
B. Vi. 1581 Transmission stand	 YMT029	Disassembly and assembly for transmission or transaxle
B. Vi. 31-01 Pin punch	 YMT030	Removing and installing retaining pin
B. Vi. 1170 Puller	 YMT031	Removing 5th synchronizer
B. Vi. 22-01 Puller	 MCIB0026E	Removing 5th gear
B. Vi. 1000-01 Puller		Removing 5th gear
B. Vi. 1576 Mandrel	 YMT032	Removing input shaft bearing
B. Vi. 1601 Mandrel	 YMT033	Installing bearing guide of mainshaft

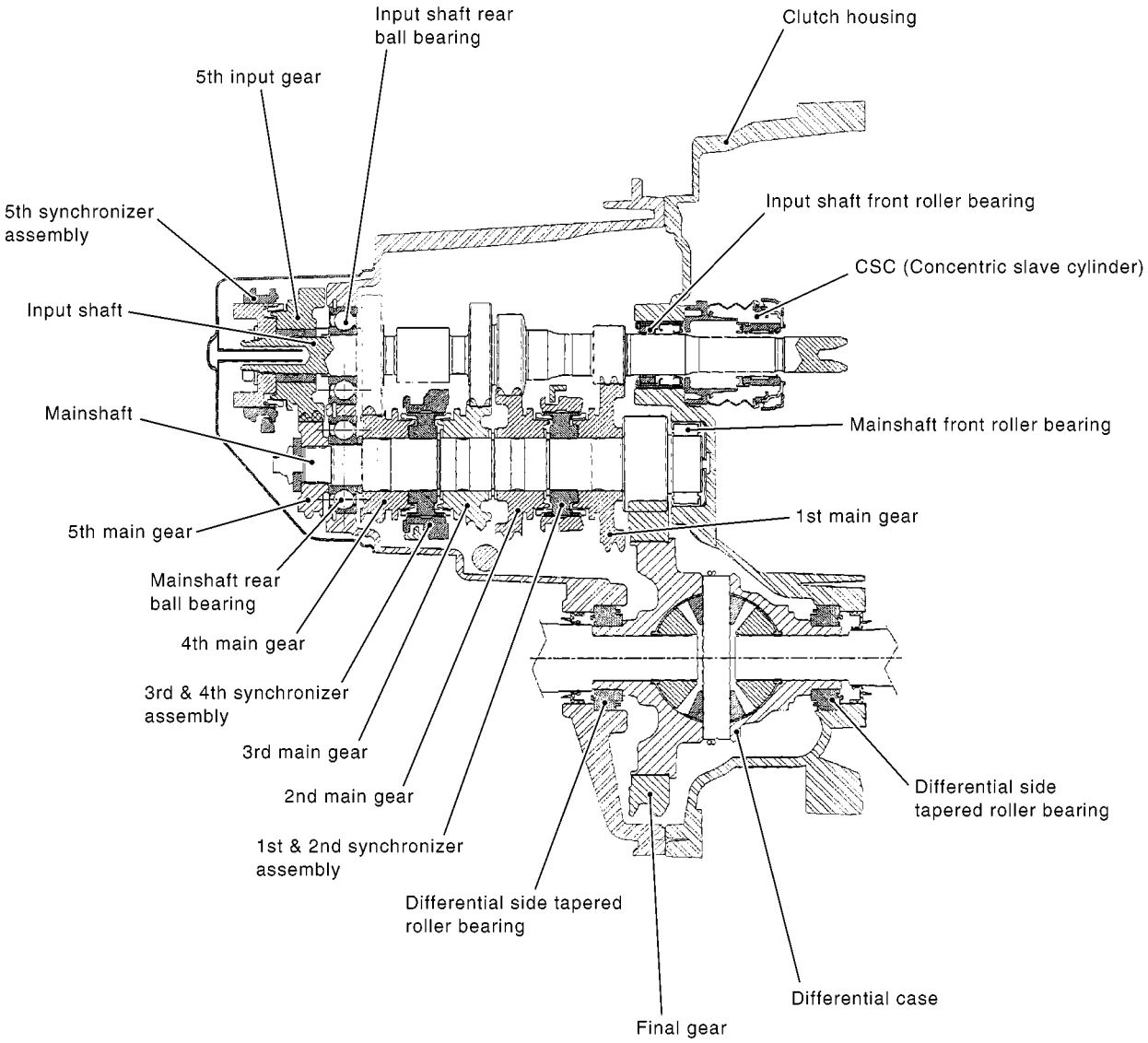
Tool number Tool name	Description	
B. Vi. 1554 Drift kit	 MCIA0151E	Installing bearing race
B. Vi. 1175 Installer	 YMT035	Installing 5th gear
B. Vi. 1666 Drift	 YMT036	Installing differential oil seal
B. Vi. 1165 Extractor	 MCIA0152E	Removing mainshaft bearing

DESCRIPTION

PFP:zzzzz

Cross-sectional View

ECS00FF3



MCIA0153E

REMOVAL AND INSTALLATION

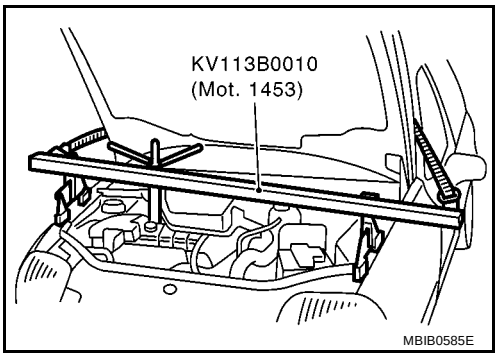
PFP:00000

Removal

ECS00FE4

CAUTION:
Remove the crankshaft position sensor (POS) from transaxle assembly before separating transaxle from engine. Be careful not to damage sensor edge.

1. Remove battery.
2. Remove the air cleaner. Refer to EM-16, "AIR CLEANER AND AIR DUCT" (CR engine) or EM-123, "AIR CLEANER AND AIR DUCT" (K9K engine).
3. Disconnect the cable end ball of the select cable, and the cable end of the shift cable. Refer to MT-12, "CONTROL LINKAGE" .
4. Disconnect the clutch tube.
5. Remove the engine harness clamp.
6. Remove the starter. Refer to SC-45, "Removal and Installation (CR Engine Models)" , “STARTING SYSTEM”.
7. Remove the engine mounting LH side installation bolt. Refer to EM-69, "ENGINE ASSEMBLY" (CR engine) or EM-147, "ENGINE ASSEMBLY" (K9K engine).
8. Set the engine hanger.



9. Lift up the vehicle and remove the front fender protectors (RH & LH).
10. Remove the undercover.
11. Remove the front exhaust pipe. Refer to EX-3, "Removal and Installation" , “EXHAUST SYSTEM”.
12. Remove the turbocharger outlet tube bracket from the transaxle.
13. Remove the RH and LH drive shafts. Refer to FAX-13, "Removal and Installation" , “FRONT DRIVE SHAFT”.
14. Disconnect the ground cable from the transaxle.
15. Set the transmission jack.
16. Remove the rear engine mounting bracket. Then, remove the rear torque link from the transaxle. Refer to EM-69, "ENGINE ASSEMBLY" (CR engine) or EM-147, "ENGINE ASSEMBLY" (K9K engine).

    CAUTION:
    Do not remove the rear torque link from the suspension member.
17. Remove the engine mounting bracket LH.
18. Disconnect the position switch connector.
19. Remove the transaxle mounting nuts and bolts, and remove the transaxle.

Installation

ECS00FE5

Install in the reverse order of removal.

TIGHTENING TORQUES

PFP:32010

Description

ECS00FE6

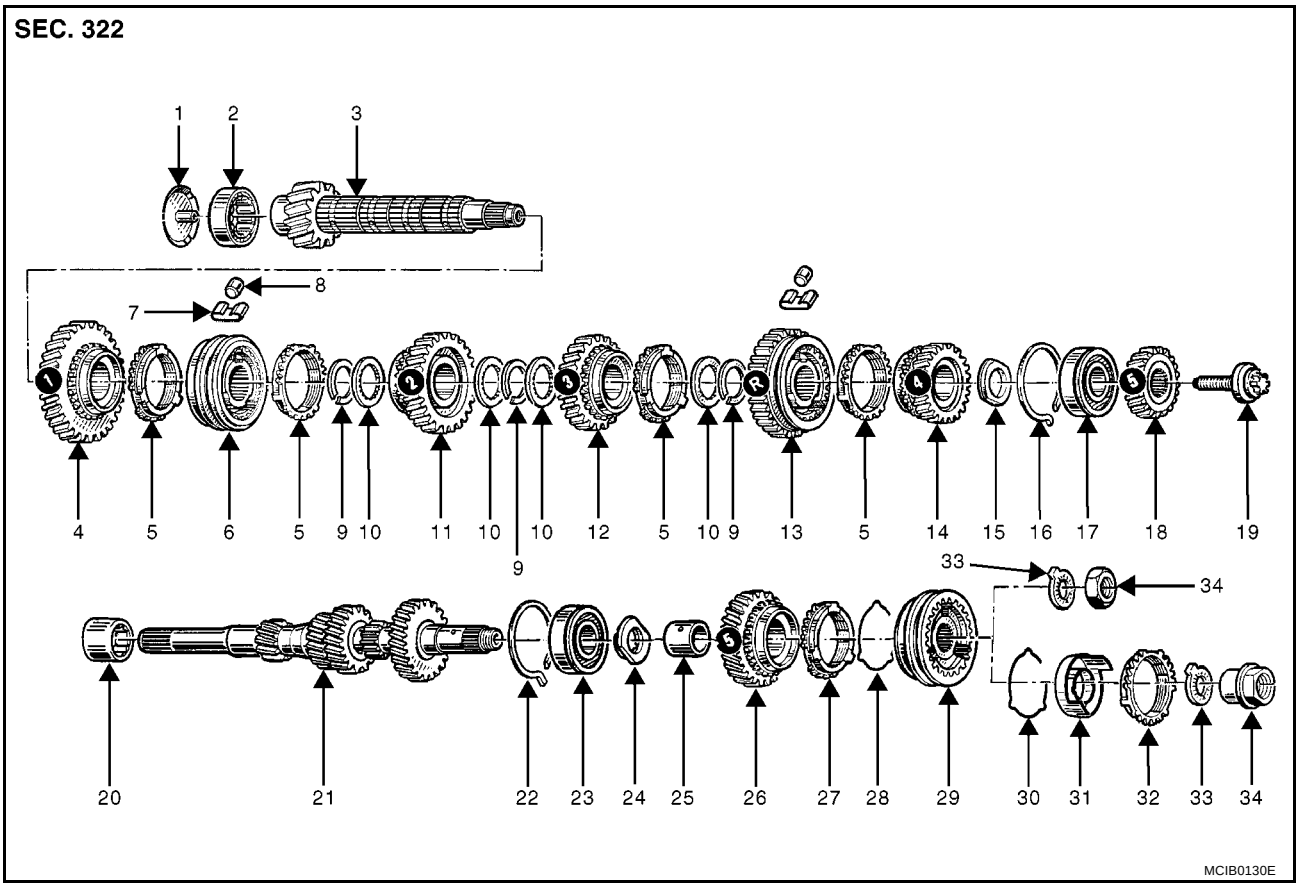
Tightening portion	N·m (kg-m, ft-lb)
Gearbox casing bolt	**25 (2.6, 18)**
Mainshaft bolt	**70 (7.1, 52)**
Input shaft nut	**190 (19, 140)**
Rear cover bolt	**25 (2.6, 18)**
Back-up lamp switch	**25 (2.6, 18)**
Concentric slave cylinder	**21 (2.1, 15)**
Selector shaft bolt	**20 (2.0, 15)**
Gear shift catch bolt	**10 (1.0, 7)**
Reverse gear fork support bolt	**25 (2.6, 18)**
Drain bolt	**25 (2.6, 18)**
Selector shaft balls	**23 (2.3, 17)**

COMPONENTS

PFP:32010

Gear Components

ECS00FE7

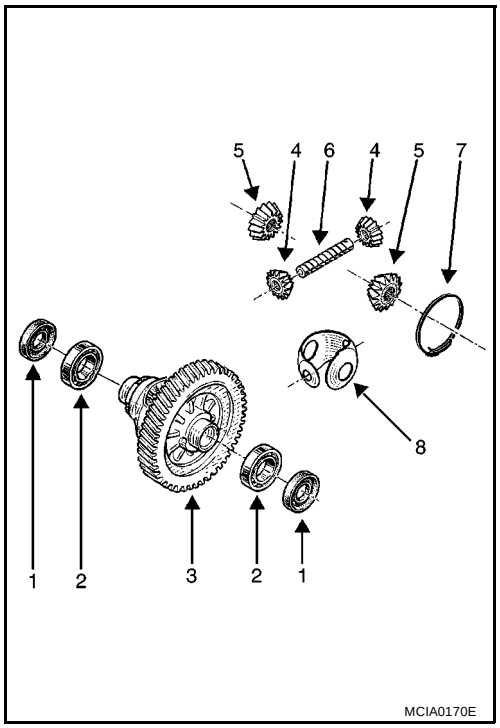


1. Oil channel	2. Mainshaft front bearing	3. Mainshaft
4. 1st main gear	5. Baulk ring	6. 1st & 2nd synchronizer hub
7. Spring	8. Roller	9. Stop ring
10. Adapter plate	11. 2nd main gear	12. 3rd main gear
13. 3rd & 4th synchronizer hub	14. 4th main gear	15. Support washer
16. Retaining clip	17. Mainshaft rear bearing	18. 5th main gear
19. Bolt	20. Bearing guide	21. Input shaft
22. Retaining clip	23. Input shaft rear bearing	24. Support washer
25. 2nd & 3rd gear bushing	26. 5th main gear	27. Baulk ring
28. Spread spring	29. 5th synchronizer hub	30. Spread spring
31. Friction cone	32. Baulk ring	33. Washer
34. Nut		

Differential Gear

ECS00FE8

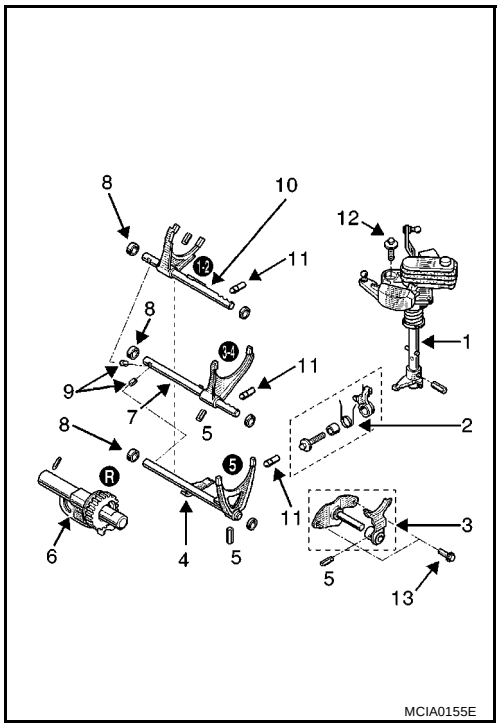
1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer



Shift Control Components

ECS00FE9

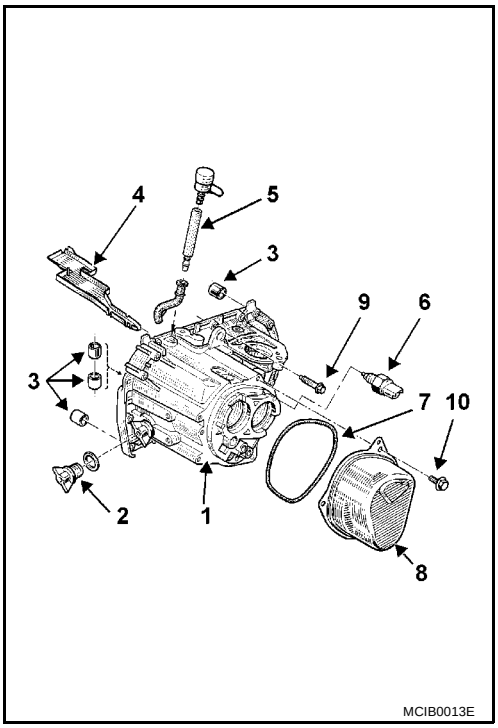
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg-m, 15 ft-lb)]
13	Reverse gear fork shaft bolt [25 N·m (2.6 kg-m, 18 ft-lb)]



Case Components

ECS00FEA

1	Transaxle case
2	Filler plug
3	Dowel pin
4	Oil gutter
5	Breather pipe
6	Back-up lamp switch
7	O-ring
8	Transaxle case cover
9	Gearbox edge bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
10	Fifth gear housing bolt [25 N·m (2.6 kg-m, 18 ft-lb)]

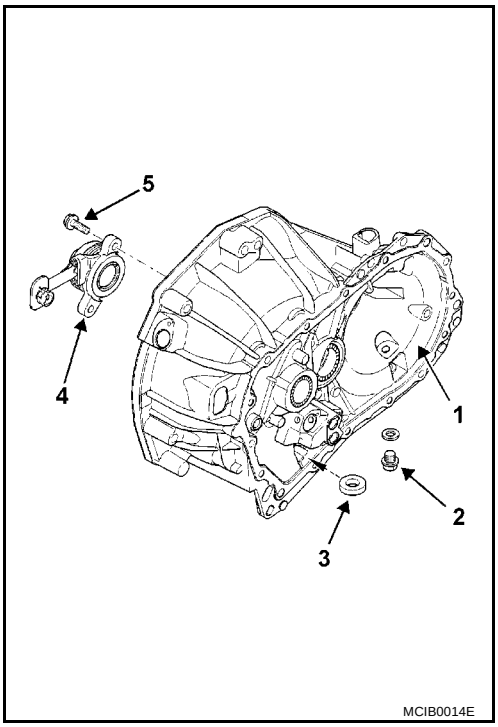


MCIB0013E

Clutch Housing

ECS00FEB

1	Clutch housing
2	Drain bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
3	Magnet
4	Concentric slave cylinder
5	Concentric slave cylinder bolt [21 N·m (2.1 kg-m, 15 ft-lb)]



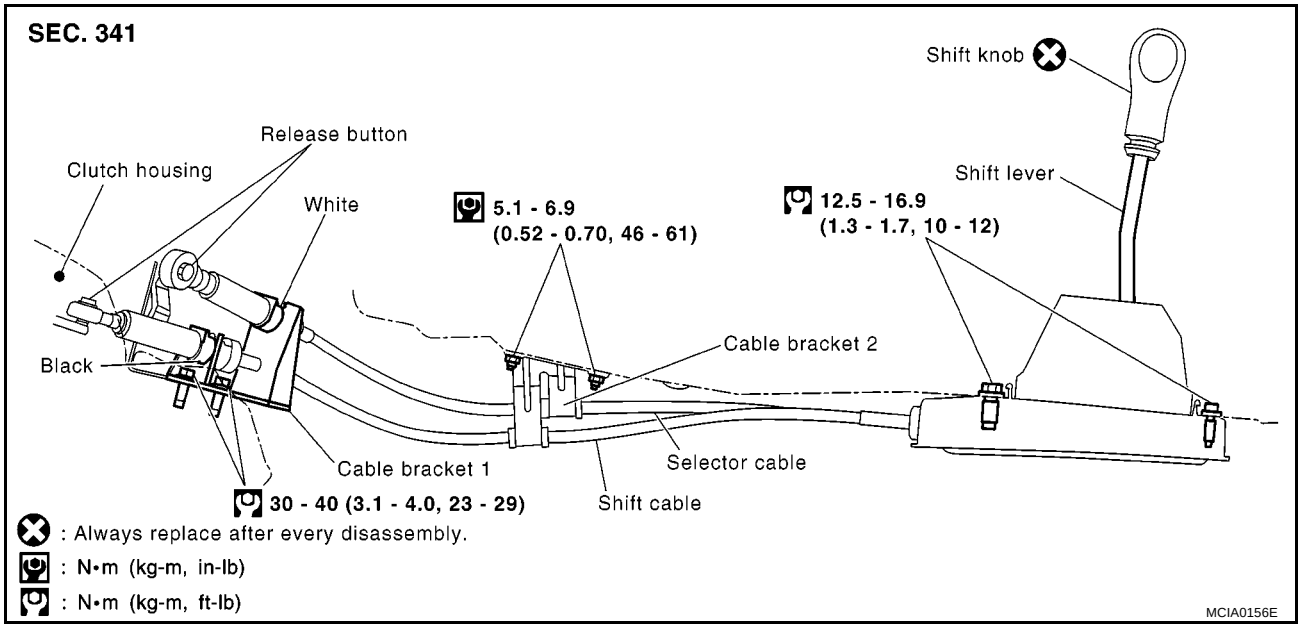
MCIB0014E

CONTROL LINKAGE

PFP:34103

Removal and Installation of Control Device and Cable

ECS00FEC



REMOVAL

1. Remove center console and shift boot. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove control device mounting bolts.
3. Pressing release bottom of cable end, remove cable from either manual transmission shift lever.
4. Lift up cable and remove it from cable bracket 1.
5. Remove center muffler and heat plate. Refer to EX-3, "Removal and Installation" , “EXHAUST SYSTEM”.
6. Separate cable bracket 2 from the vehicle.
7. Remove front and rear claws of control device. Remove control device and cable from the vehicle.

NOTE:
If shift knob needs to be removed, pull it up to remove.

INSTALLATION

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

- When installing, make sure to insert cable end into either manual transmission shift lever.
- After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.
- After installation, make sure that the shift to each position works well.
- When installing shift knob, press it onto selector lever.

  CAUTION:
  Do not reuse shift knob.

RATIOS

PFP:32010

NISSAN Gearbox

ECS00FED

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
JH3-102	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-103	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-110	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-140	11:37	22:41	28:37	30:29	42:31	11:39	15:58
JH3-148	11:41	21:43	28:39	34:35	39:32	11:39	14:59

CONSUMABLES

PFP:32010

Description

ECS00FEE

Types	Packaging	Parts Department No.	Component
Gearbox oil			Cover all parts
RHODORSEAL	100 g tubes	77 01 404 452	Housing assembly
LOCTITE 518	24 ml syringe	77 01 421 162	Back-up lamp switch threading

CAPACITIES - LUBRICANTS

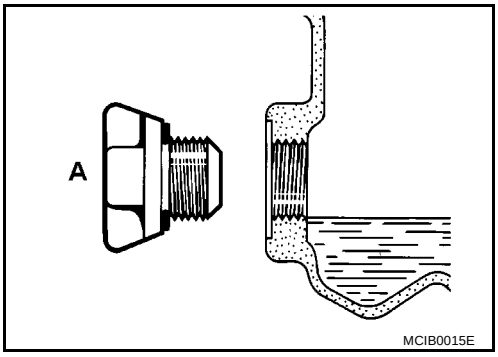
PFP:32010

Description

ECS00FEF

Capacity	Grade
2.6 ℓ (4-5/8 Imp pt)	SAE 75W-80, 75W-85

Fill to the level of the oil filler cap hole.



TROUBLE DIAGNOSIS

PFP:00004

Symptom Chart

ECS00FEG

Symptoms (after checking the clutch)	Possible causes

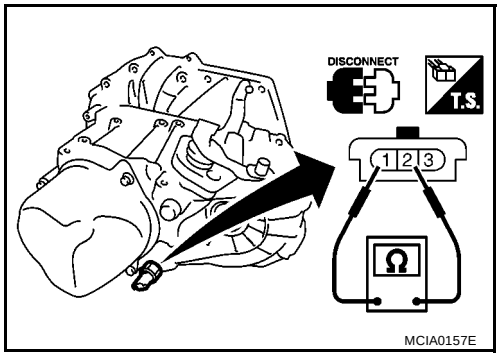
Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

Back-up Lamp Switch

ECS00FEH

Gear position	Continuity
Reverse	Yes
Except reverse	No



MCIA0157E

PRECAUTIONS

PFP:00001

Precautions

ECS00FEI

Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)
Cover all turning and synchronizer points in oil.
Observe the tightening torques.
Carefully carry out the specific settings and adjustments.
Be sure to properly refit parts in the same order and position after removal.
Marking the position of the sliding rods in relation to the hubs before removal is recommended.
During refitting, make sure the inside of the box remains free of dust or impurities.

PARTS TO BE REPLACED SYSTEMATICALLY

PFP:32010

Description

ECS00FEJ

If they have been removed:

- the lip seals,
- the O-rings,
- the gear supporting rings,
- the roll pins,
- the input shaft and mainshaft bearing circlips,
- the sliding gear hub springs.

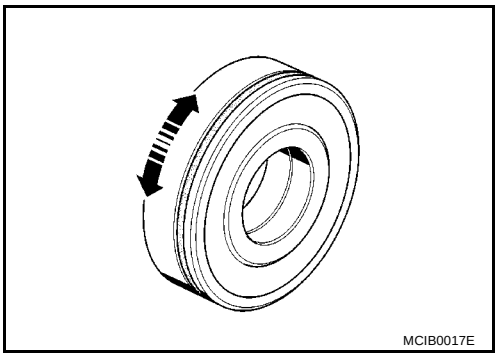
CHECKING

PFP:32010

Bearings

ECS00FEK

Check that the bearings show no signs of damage and that they turn evenly. Replace them if necessary.

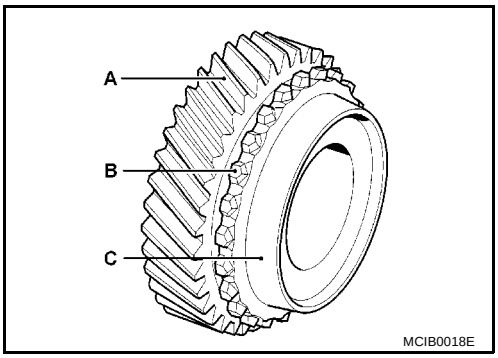

MCIB0017E

Gearing

ECS00FEL

NOTE:
The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

1. Check that the teeth (A) are not broken or chipped.
2. Check that the claws (B) are not broken, chipped or worn.
3. Check that the friction cone (C) shows no scratches or blueness.



MCIB0018E

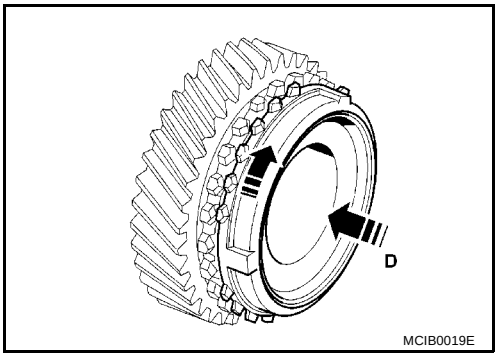
Synchronizer Ring

ECS00FEM

Check that the grooves and ridges on the ring are not worn or damaged.

1. Check that put the ring onto the gear cone.
2. Check that rotate the ring while applying force in the direction of the cone (D).
3. Check that the ring should lock against the cone.

Otherwise, replace the synchronizer ring.

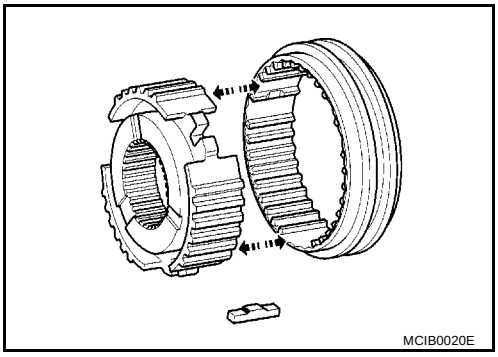


MCIB0019E

Sliding Gear Hub

ECS00FEN

Make sure the sliding gear turns smoothly in the hub.
Check that the rollers or keys are in good condition.


MCIB0020E

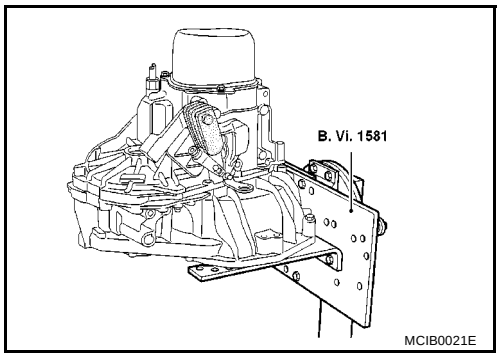
SEPARATING THE HOUSINGS

PFP:32010

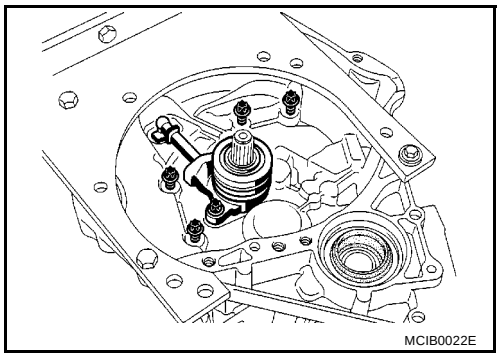
Removal

ECS00FEO

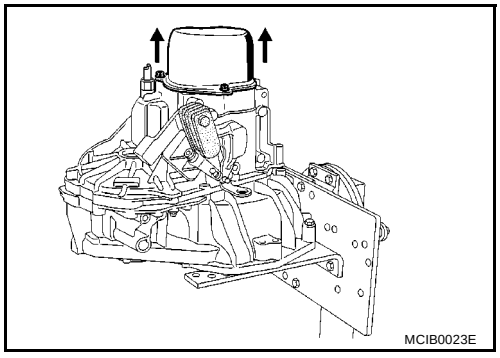
Fit the B. Vi. 1581 support plate on a Desvil stand.
Fit the gearbox on the B. Vi. 1581 support.



1. Remove the concentric slave cylinder.
2. Remove the bolts located inside the housing.

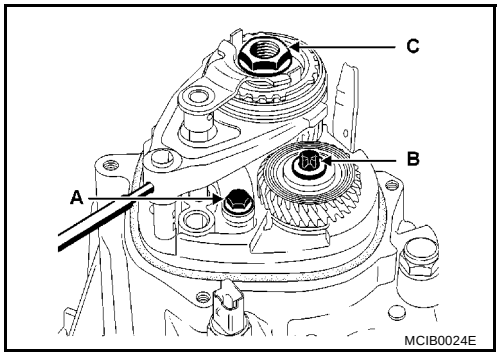


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.

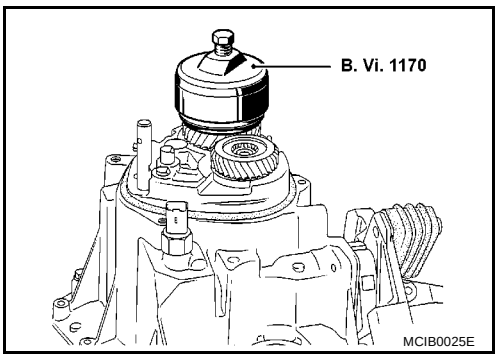


Remove the two reverse gear fork support mounting bolts (A).
Drive in the 5th gear fork using B. Vi. 31-01.
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

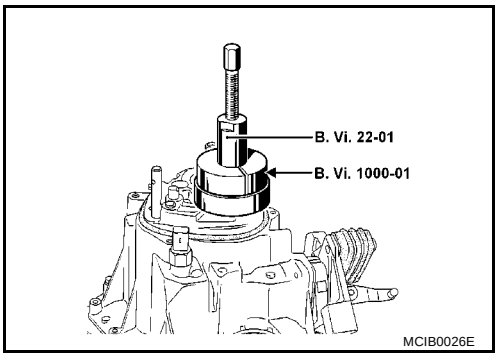
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



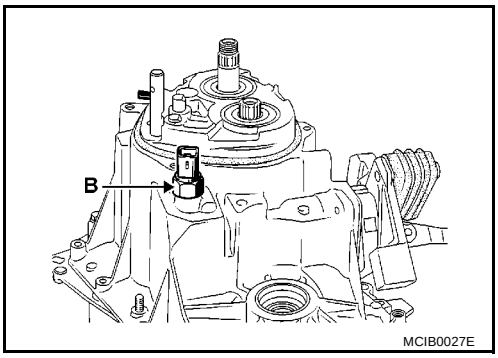
Remove the 5th gear hub using B. Vi. 1170.
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.



Remove the fixed 5th gear using B. Vi. 22-01 and B. Vi. 1000-01.
Remove the gearbox edge bolts.



Remove the back-up lamp switch (B).
Engage 3rd gear.
Lift and remove the mechanism housing.



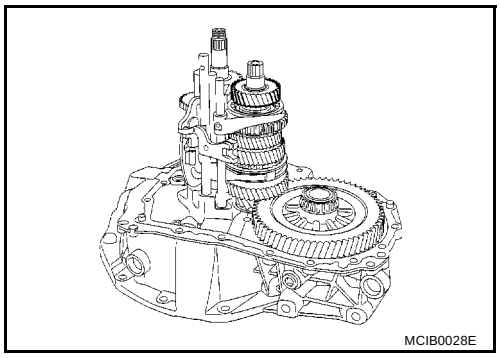
REPAIRING THE GEARBOX

PFP:32010

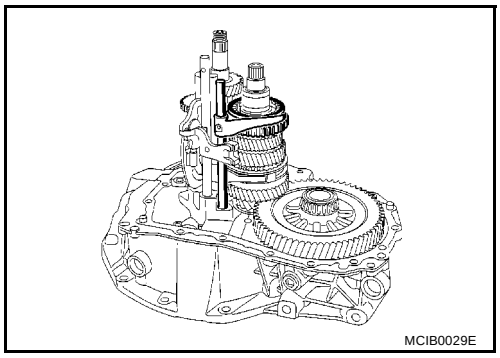
Removal

ECS00FEP

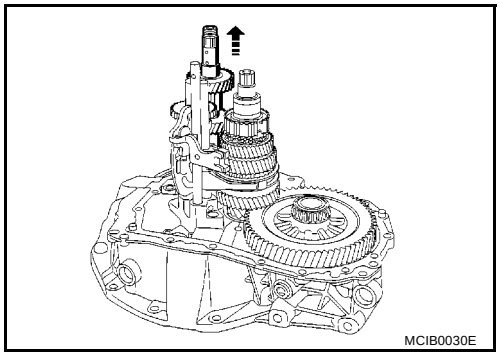
1. Remove the 4th-gear pinion.


MCIB0028E

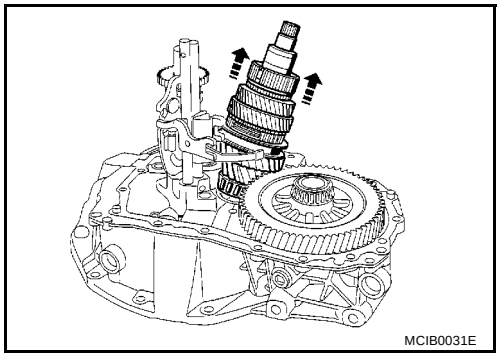
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.


MCIB0029E

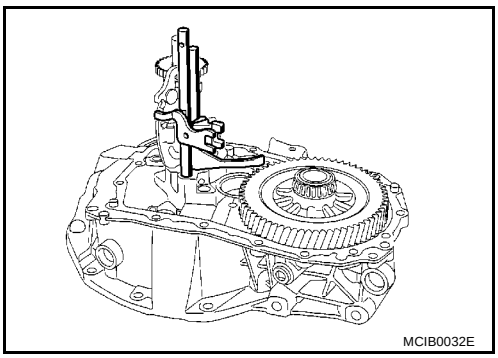
3. Remove input shaft assembly.


MCIB0030E

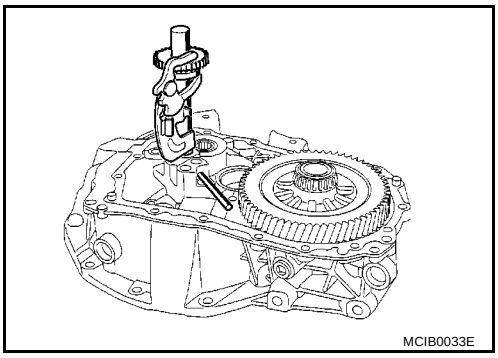
4. Remove mainshaft assembly.


MCIB0031E

5. Remove the 1st/2nd shaft and fork and the 5th gear shaft.


MCIB0032E

6. Remove the pin from the reverse gear and remove the reverse gear.


MCIB0033E

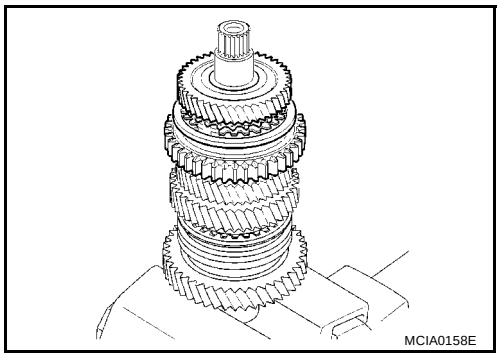
MAINSHAFT

PFP:32241

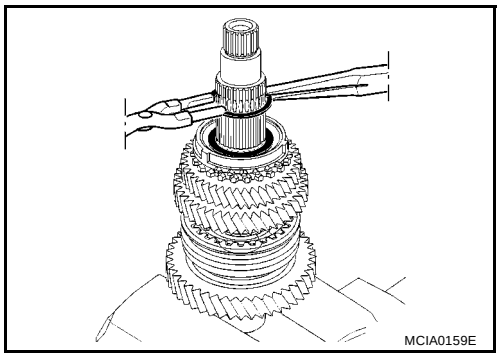
Removal

ECS00FEQ

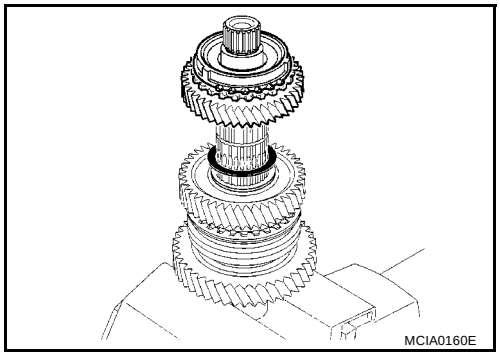
1. Put the mainshaft in a vice with soft jaws.
2. Remove the 4th main gear and the 3rd/4th gear sliding gear hub.


MCIA0158E

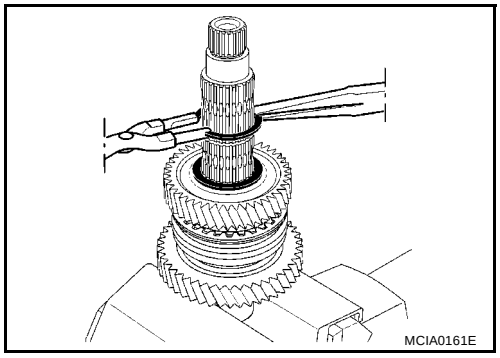
3. Remove the stop ring (systematically replace) and the grooved washer.


MCIA0159E

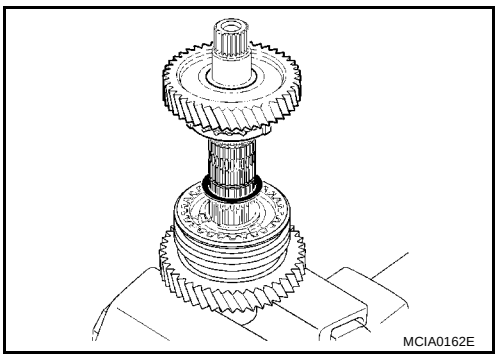
4. Remove the 3rd main gear and the grooved washer.


MCIA0160E

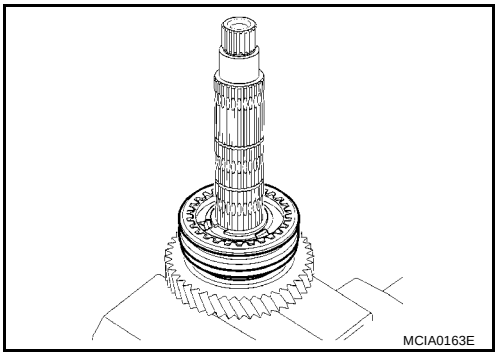
5. Remove the stop ring (systematically replace) and the grooved washer.


MCIA0161E

6. Remove the 2nd main gear and the grooved washer.


MCIA0162E

7. Remove the stop ring and the 1st/2nd gear sliding gear hub.

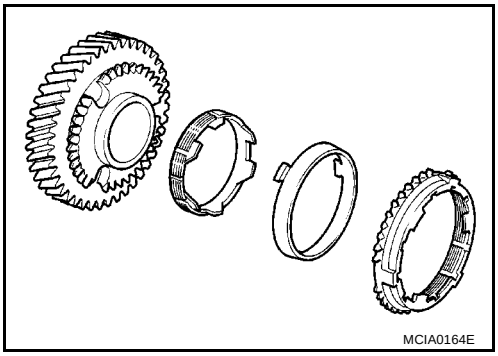

MCIA0163E

Refitting

ECS00FER

Proceed in the reverse order of removal.
The retaining rings must be systematically replaced.
Oil the synchronizer rings.

WARNING:
Make sure that the notches on the synchronizer double cones are correctly positioned.


MCIA0164E

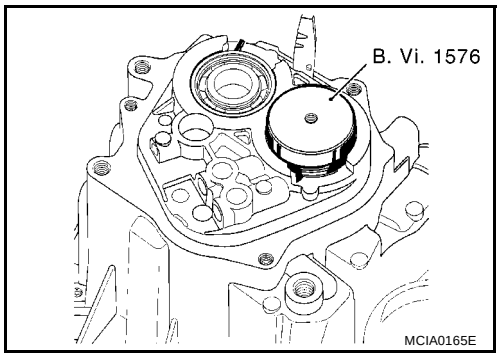
TRANSAXLE CASE BEARING

PFP:32010

Removal

ECS00FES

Remove the circlips with circlip pliers and drive the bearing inside the housing using tool B. Vi. 1576.



Refitting

ECS00FET

Place the new circlips in their respective housings.
Fit the bearings using tool B. Vi. 1576.
Knock the tool with the bearing using a small hammer.

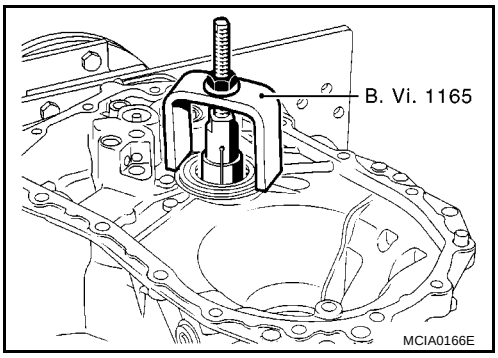
CLUTCH HOUSING BEARING

PFP:32010

Removal

ECS00FEU

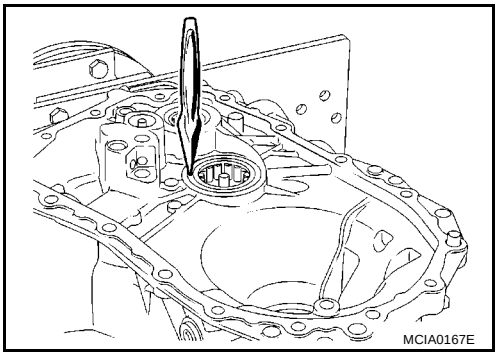
Cut the base of the plastic hollow needle located at the centre of the bearing.
Fit tool B. Vi. 1165 and extract the bearing.



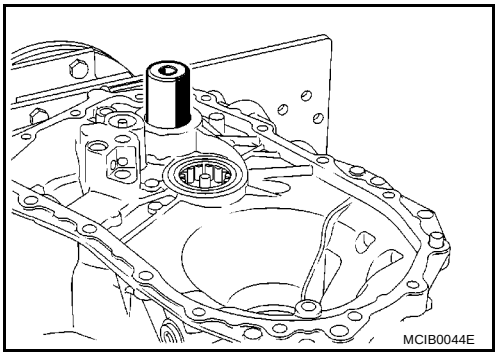
Refitting

ECS00FEV

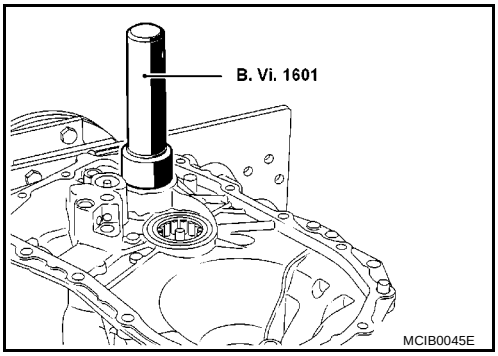
1. Fit a new deflector, then the bearing on the press flush with the inner surface of the housing.
2. Set the bearing with a mortise chisel.



3. Remove the input shaft bearing guide using the press and a 38 mm (1.50 in) diameter tube.



4. Refit the bearing guide using the press and tool B. Vi. 1601.



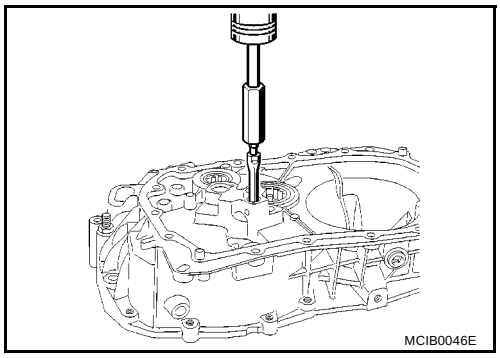
SELECTOR SHAFT RINGS

PFP:32010

Removal

ECS00FEW

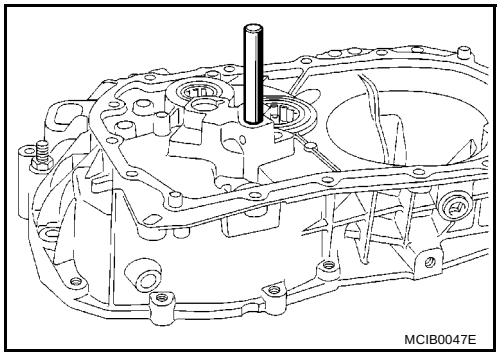
Remove the rings with an inertia puller.



Refitting

ECS00FEX

Refit the rings using a 14.5 mm (0.57 in) tube down to the thrust bearing.



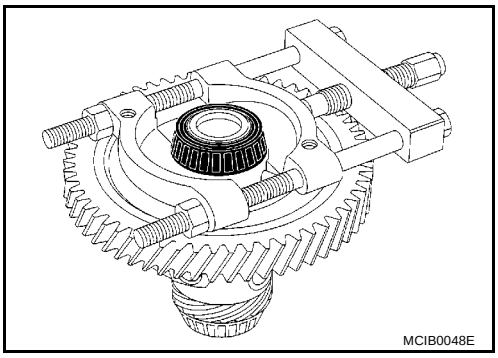
DIFFERENTIAL BEARINGS

PFP:32010

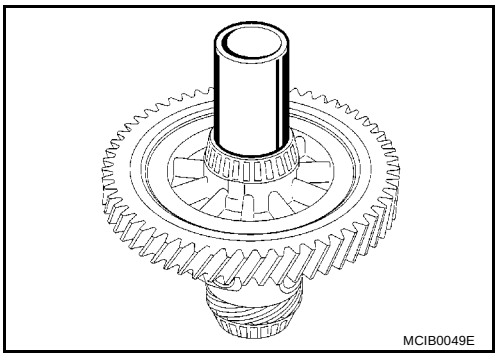
Removal and Installation

ECS00FEY

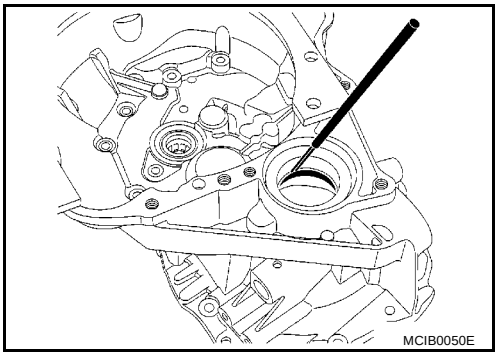
1. Remove the bearing using an antisticking pin.


MCIB0048E

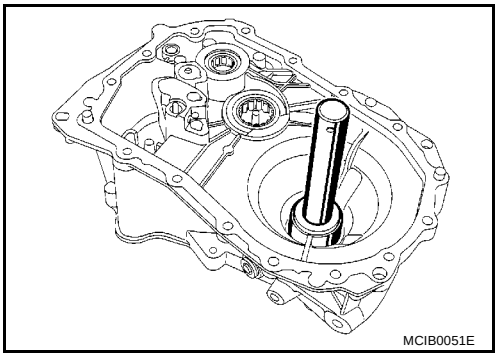
2. Refit the bearings using a 40 mm (1.57 in) tube.


MCIB0049E

3. Remove the bearing races using a roll pin punch.


MCIB0050E

4. Refit the bearing races using tools C-F from the B. Vi. 1554 kit.


MCIB0051E

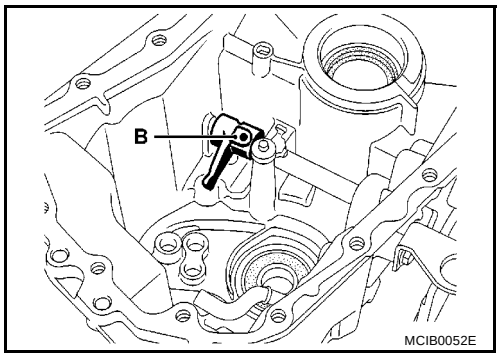
SELECTOR SHAFT

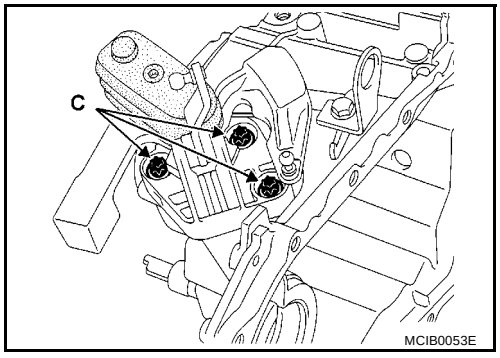
PFP:32010

Removal

ECS00FEZ

After removing the pin from the selector finger (B), remove the mounting bolts (C) and remove the control shaft unit.



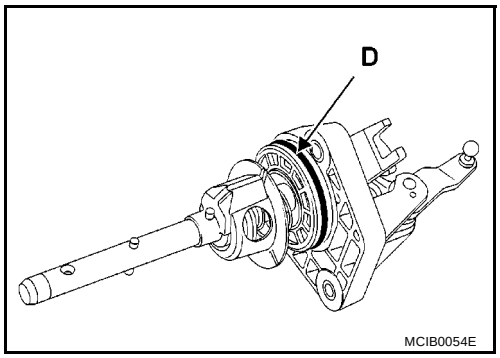


Refitting

ECS00FF0

Proceed in the reverse order to removal.

NOTE:
Replace the O-ring (D).



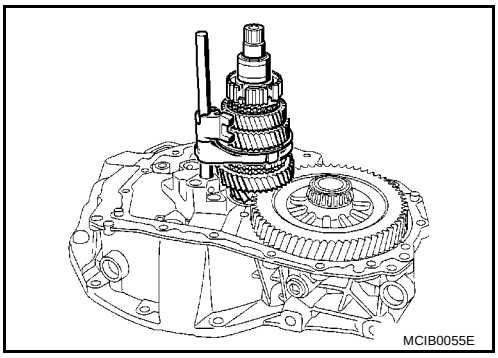
ASSEMBLY

PFP:00000

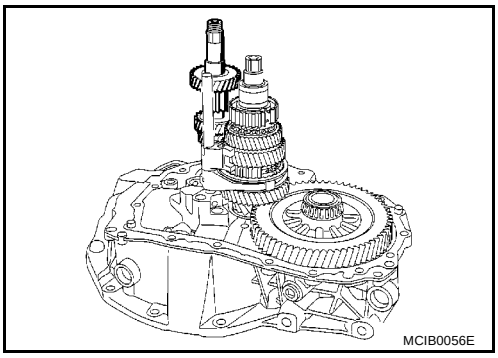
Refitting

ECS00FF1

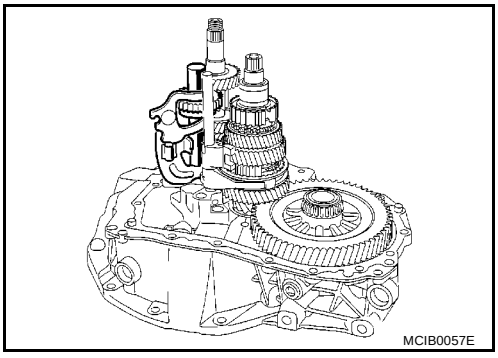
1. Fit the mainshaft and 1st/2nd gear fork assembly.


MCIB0055E

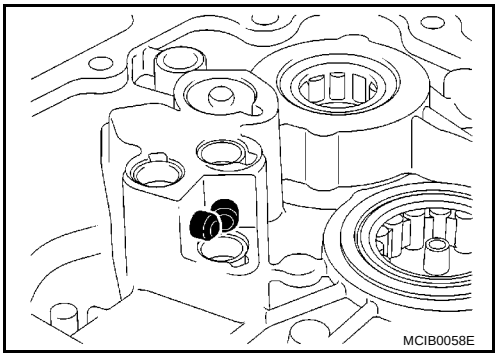
2. Fit the input shaft.


MCIB0056E

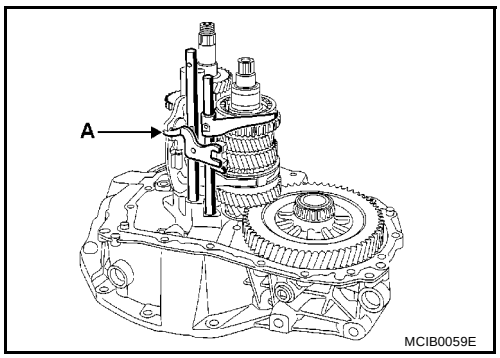
3. Fit the reverse gear assembly.


MCIB0057E

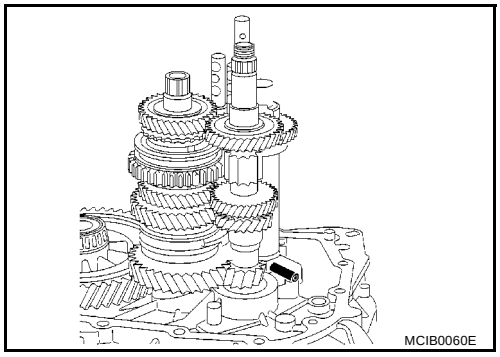
4. Fit the two locking shafts.


MCIB0058E

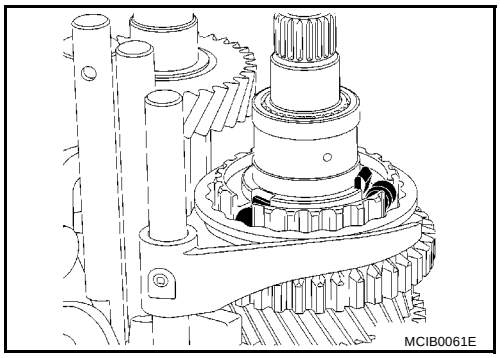
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly.
Rotate the reverse gear assembly to position the 5th gear fork (A).



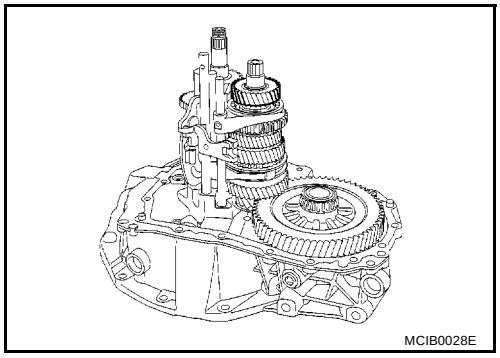
6. Pin the reverse gear assembly.



7. Shift to 3rd gear and insert the rollers and clawing springs.



8. Refit the 4th main gear fitted with its synchronizer ring.



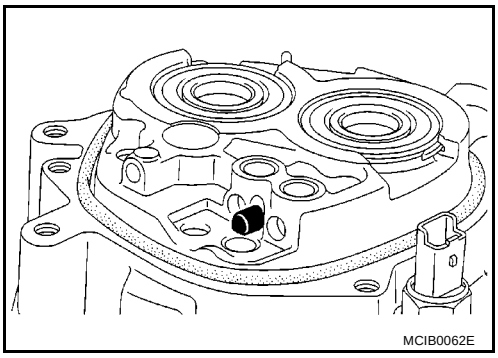
HOUSING ASSEMBLY

PFP:32010

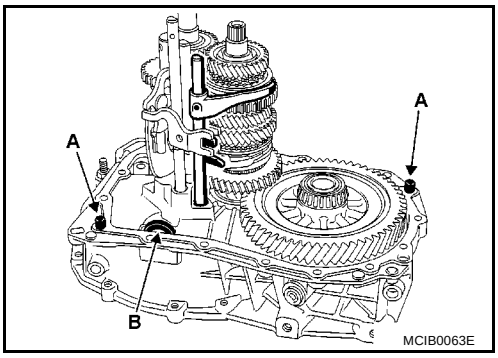
Assembly

ECS00FF2

1. Fit the 1st/2nd, 3rd/4th, and 5th gear shaft ball cartridges into the housing mechanism.
2. Engage 3rd gear.

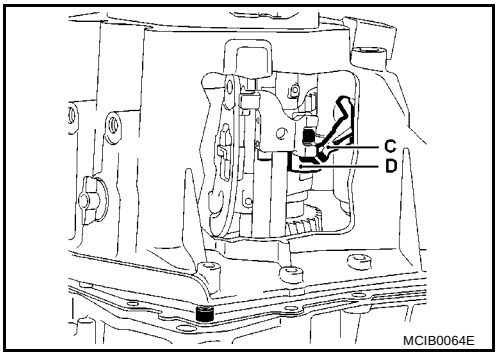

MCIB0062E

3. Check the positioning of the centring dowels (A).
4. Check the positioning of magnet (B).



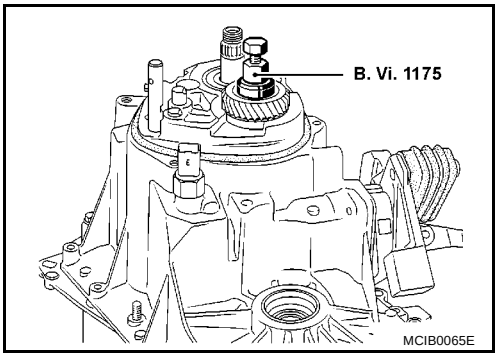
MCIB0063E

5. Apply a line of LOCTITE 518 to the gasket face.
6. Offer up the housing while guiding the selector finger (C) into fork (D) of the 3rd gear.



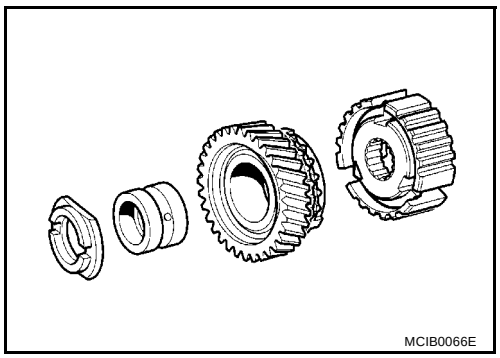
MCIB0064E

7. Pretighten the peripheral bolts and rotate the input shaft to check that they make contact with the bearings.
8. Tighten the bolts to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
9. Put three drops of LOCTITE Frenbloc on the splines of the fixed 5th gear and fit it using tool B. Vi. 1175.

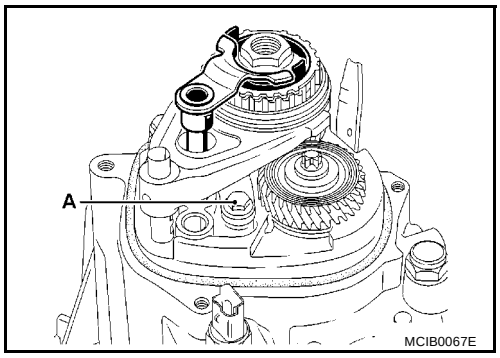


MCIB0065E

10. On the input shaft, fit the support washer (top side gear side).
11. On the input shaft, fit the sprocket bushing.
12. On the input shaft, fit the 5th main gear fitted with its synchronizer ring.
13. On the input shaft, fit the 5th gear hub fitted with its spring.


MCIB0066E

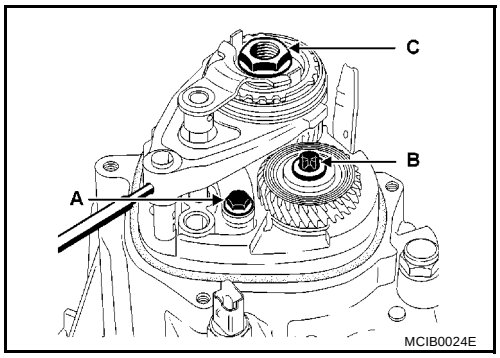
14. Refit the 5th gear fork/sliding gear/reverse gear fork assembly.
15. Fit the reverse gear synchronizer.
16. Screw on the reverse gear fork support and tighten the bolts (A) to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
17. Slide the 5th gear fork on its shaft to engage 5th gear.



MCIB0067E

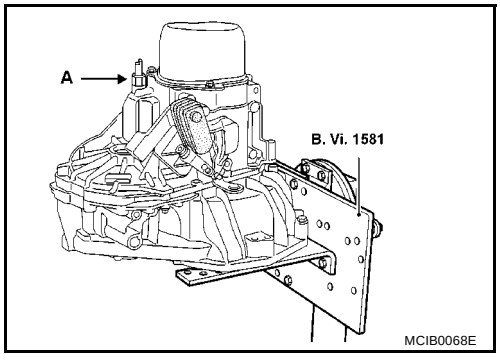
18. Tighten the gear bolt and nut to torque of:

    output shaft bolt (B) : [70 N·m (7.1 kg-m, 52 ft-lb)]
    input shaft nut (C) : [190 N·m (19 kg-m, 140 ft-lb)]
19. Reset to neutral and pin the 5th gear fork.



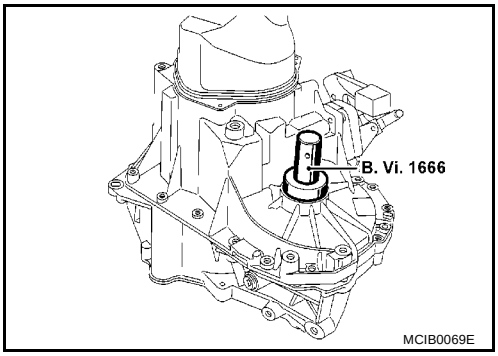
MCIB0024E

20. Fit a new O-ring, position the 5th gear cover and tighten the bolts to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
21. Fit the back-up lamp switch (A) and tighten to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].



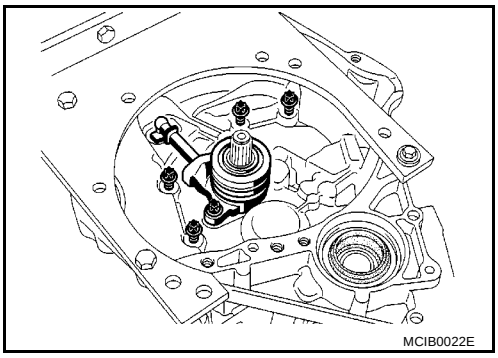
MCIB0068E

22. Refit the new differential output seals using B. Vi. 1666.



23. Refit the concentric slave cylinder and tighten the bolts.

Tightening torque : 21 N·m (2.1 kg-m, 15 ft-lb)

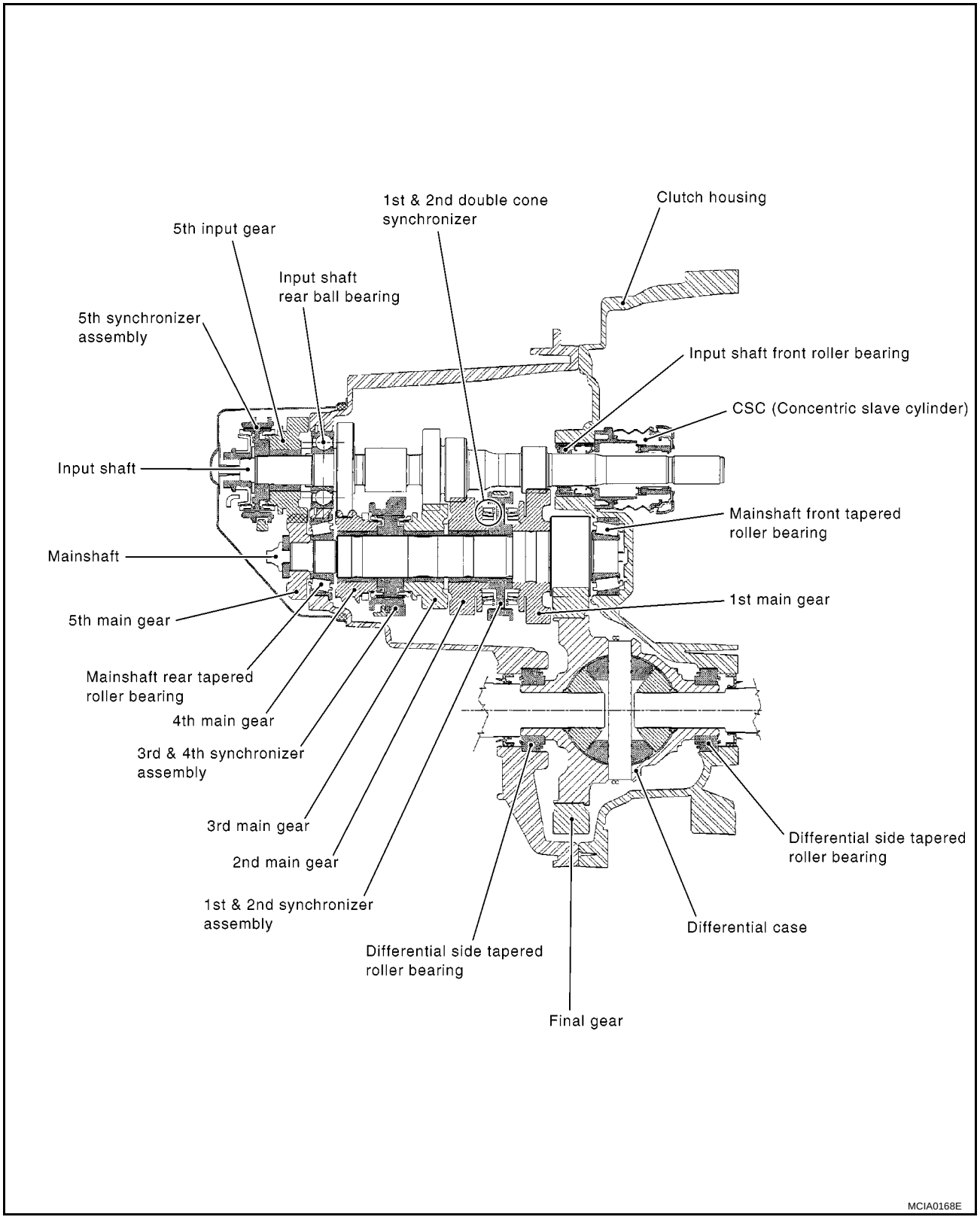


DESCRIPTION

PFP:00000

Cross-sectional View

ECS00FD2



REMOVAL AND INSTALLATION

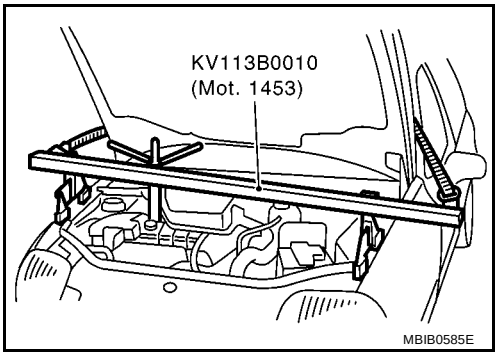
PFP:00000

Removal

ECS00FD3

CAUTION:
Remove the crankshaft position sensor (POS) from transaxle assembly before separating transaxle from engine. Be careful not to damage sensor edge.

1. Remove battery.
2. Remove the air cleaner. Refer to EM-123, "AIR CLEANER AND AIR DUCT" .
3. Disconnect the cable end ball of the select cable, and the cable end of the shift cable. Refer to MT-42, "CONTROL LINKAGE" .
4. Disconnect the clutch tube.
5. Remove the engine harness clamp.
6. Remove the starter. Refer to SC-45, "Removal and Installation (CR Engine Models)" , “STARTING SYSTEM”.
7. Remove the engine mounting LH side installation bolt. Refer to .
8. Set the engine hanger.



9. Lift up the vehicle and remove the front fender protectors (RH & LH).
10. Remove the undercover.
11. Remove the front exhaust pipe. Refer to EX-3, "Removal and Installation" , “EXHAUST SYSTEM”.
12. Remove the turbocharger outlet tube bracket from the transaxle.
13. Remove the RH and LH drive shafts. Refer to FAX-13, "Removal and Installation" , “FRONT DRIVE SHAFT”.
14. Disconnect the ground cable from the transaxle.
15. Set the transmission jack.
16. Remove the rear engine mounting bracket. Then, remove the rear torque link from the transaxle. Refer to EM-147, "ENGINE ASSEMBLY" .

    CAUTION:
    Do not remove the rear torque link from the suspension member.
17. Remove the engine mounting bracket LH.
18. Disconnect the position switch connector.
19. Remove the transaxle mounting nuts and bolts, and remove the transaxle.

Installation

ECS00FD4

Install in the reverse order of removal.

TIGHTENING TORQUES

PFP:32010

Description

ECS00FD5

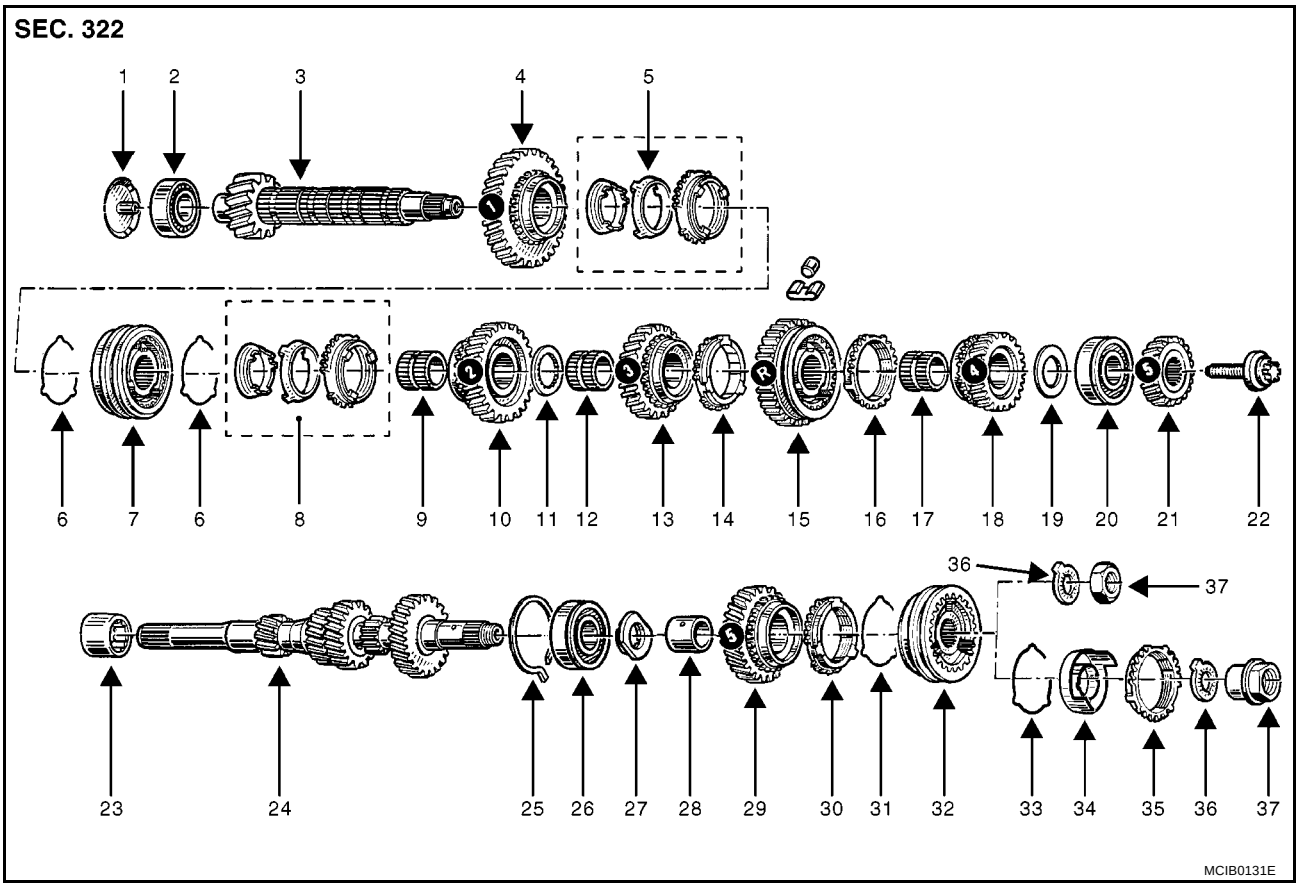
Tightening portion	N·m (kg-m, ft-lb)
Gearbox casing bolt	**25 (2.6, 18)**
Mainshaft bolt	**70 (7.1, 52)**
Input shaft nut	**190 (19, 140)**
Rear cover bolt	**25 (2.6, 18)**
Back-up lamp switch	**25 (2.6, 18)**
Concentric slave cylinder	**21 (2.1, 15)**
Selector shaft bolt	**20 (2.0, 15)**
Gear shift catch bolt	**10 (1.0, 7)**
Reverse gear fork support bolt	**25 (2.6, 18)**
Drain bolt	**25 (2.6, 18)**
Selector shaft balls	**23 (2.3, 17)**

COMPONENTS

PFP:32010

Gear Components

ECS00FD6

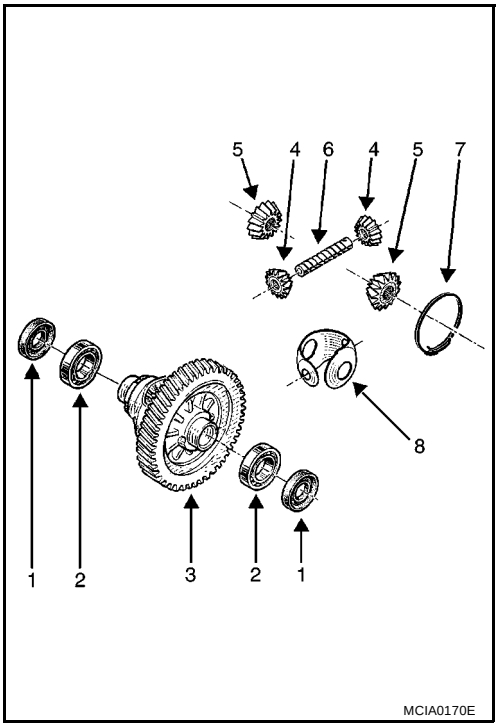


1. Oil channel	2. Mainshaft front bearing	3. Mainshaft
4. 1st main gear	5. Synchronizer ring	6. Spread spring
7. 1st & 2nd synchronizer hub	8. Synchronizer ring	9. Mainshaft bearing
10. 2nd main gear	11. Adapter plate	12. Mainshaft bearing
13. 3rd main gear	14. Baulk ring	15. 3rd & 4th synchronizer hub and reverse gear
16. Baulk ring	17. Mainshaft bearing	18. 4th main gear
19. Adapter plate	20. Mainshaft rear bearing	21. 5th main gear
22. Bolt	23. Bearing guide	24. Input shaft
25. Retaining clip	26. Input shaft rear bearing	27. Adapter plate
28. 2nd & 3rd gear bushing	29. 5th main gear	30. Baulk ring
31. Spread spring	32. 5th synchronizer hub	33. Spread spring
34. Friction cone	35. Baulk ring	36. Washer
37. Nut		

Differential Gear

ECS00FD7

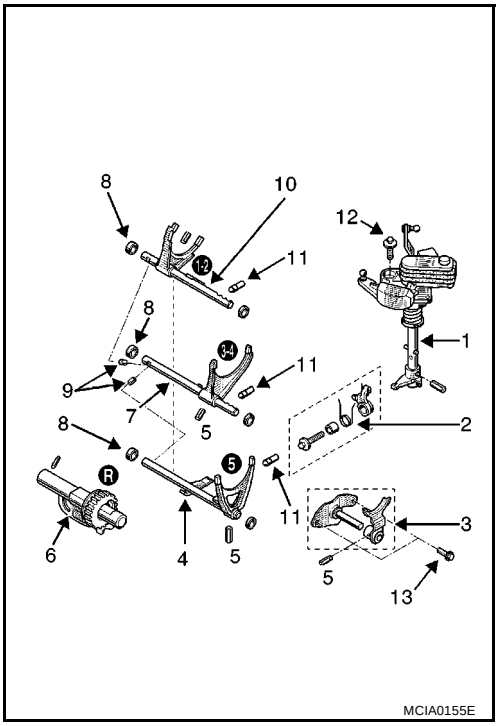
1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer



Shift Control Components

ECS00FD8

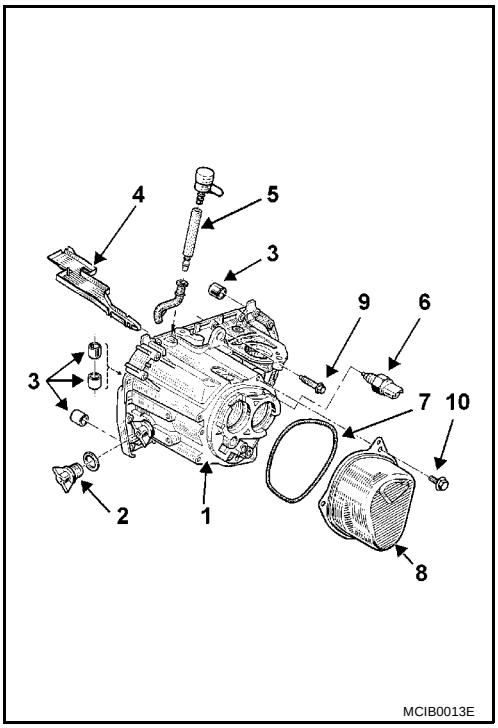
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg-m, 15 ft-lb)]
13	Reverse gear fork shaft bolt [25 N·m (2.6 kg-m, 18 ft-lb)]



Case Components

ECS00FD9

1	Transaxle case
2	Filler plug
3	Dowel pin
4	Oil gutter
5	Breather pipe
6	Back-up lamp switch
7	O-ring
8	Transaxle case cover
9	Gearbox edge bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
10	Fifth gear housing bolt [25 N·m (2.6 kg-m, 18 ft-lb)]

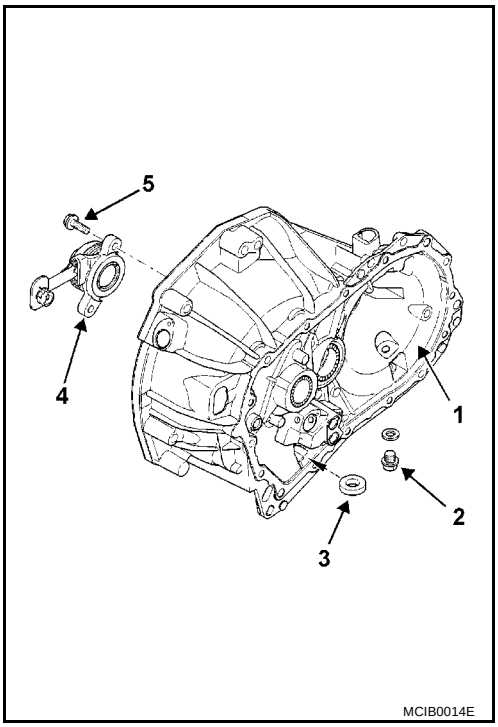


MCIB0013E

Clutch Housing

ECS00FDA

1	Clutch housing
2	Drain bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
3	Magnet
4	Concentric slave cylinder
5	Concentric slave cylinder bolt [21 N·m (2.1 kg-m, 15 ft-lb)]



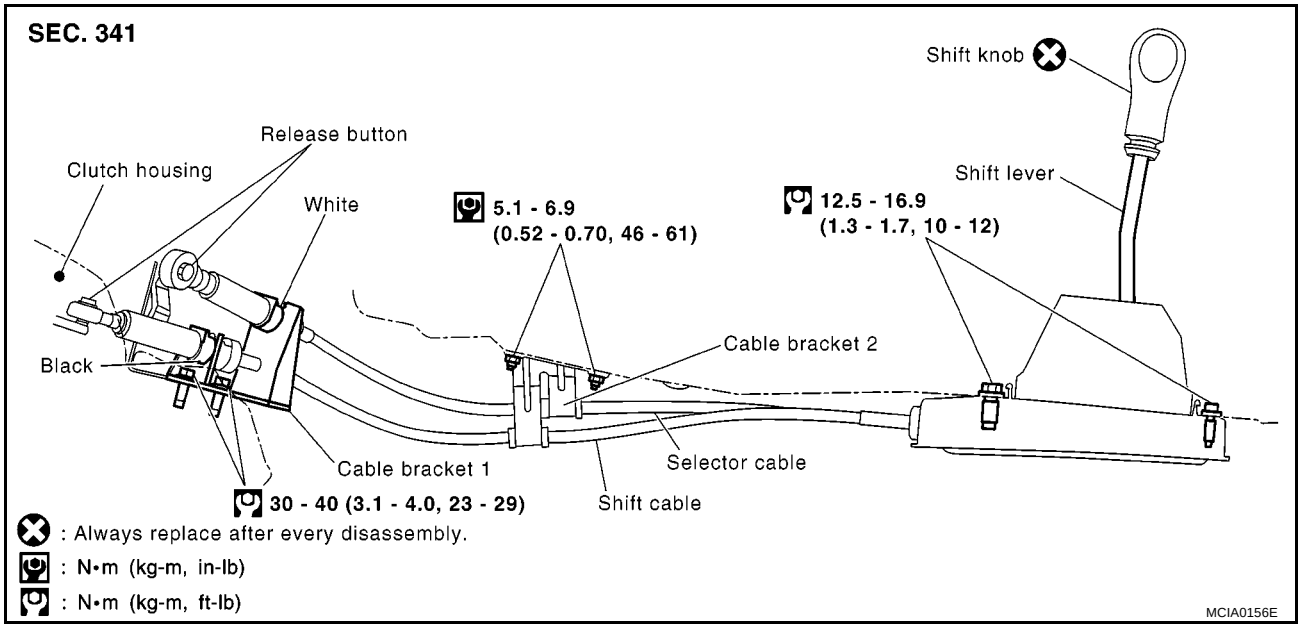
MCIB0014E

CONTROL LINKAGE

PFP:34103

Removal and Installation of Control Device and Cable

ECS00FDB



REMOVAL

1. Remove center console and shift boot. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove control device mounting bolts.
3. Pressing release bottom of cable end, remove cable from either manual transmission shift lever.
4. Lift up cable and remove it from cable bracket 1.
5. Remove center muffler and heat plate. Refer to EX-3, "Removal and Installation" , “EXHAUST SYSTEM”.
6. Separate cable bracket 2 from the vehicle.
7. Remove front and rear claws of control device. Remove control device and cable from the vehicle.

NOTE:
If shift knob needs to be removed, pull it up to remove.

INSTALLATION

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

- When installing, make sure to insert cable end into either manual transmission shift lever.
- After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.
- After installation, make sure that the shift to each position works well.
- When installing shift knob, press it onto selector lever.

  CAUTION:
  Do not reuse shift knob.

RATIOS

PFP:32010

NISSAN Gearbox

ECS00FDC

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
JR5-106	11:41	21:43	28:37	35:34	42:31	11:39	15:56
JR5-114	11:41	21:43	28:37	35:34	42:31	11:39	15:56

CONSUMABLES

PFP:32010

Description

ECS00FDD

Types	Packaging	Parts Department No.	Component
Gearbox oil			Cover all parts
RHODORSEAL	100 g tubes	77 01 404 452	Housing assembly
LOCTITE 518	24 ml syringe	77 01 421 162	Back-up lamp switch threading

CAPACITIES - LUBRICANTS

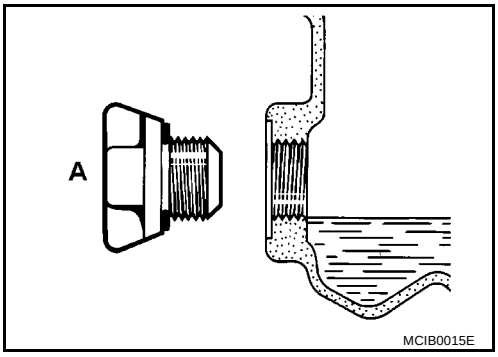
PFP:32010

Description

ECS00FDE

Capacity	Grade
2.5 ℓ (4-3/8 Imp pt)	SAE 75W-80, 75W-85

Fill to the level of the oil filler cap hole.



TROUBLE DIAGNOSIS

PFP:00004

Symptom Chart

ECS00FDF

Symptoms (after checking the clutch)	Possible causes

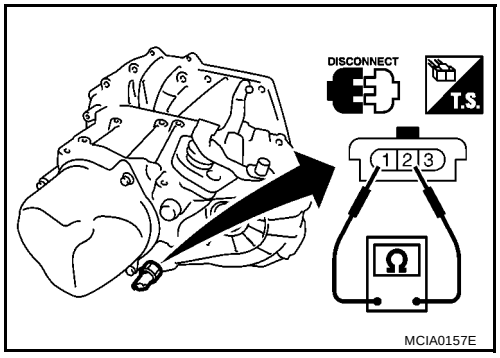
Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

Back-up Lamp Switch

ECS00FDG

Gear position	Continuity
Reverse	Yes
Except reverse	No



PRECAUTIONS

PFP:00001

Precautions

ECS00FDH

Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)
Cover all turning and synchronizer points in oil.
Observe the tightening torques.
Carefully carry out the specific settings and adjustments.
Be sure to properly refit parts in the same order and position after removal.
Marking the position of the sliding rods in relation to the hubs before removal is recommended.
During refitting, make sure the inside of the box remains free of dust or impurities.

PARTS TO BE REPLACED SYSTEMATICALLY

PFP:32010

Description

ECS00FDI

If they have been removed:

- the lip seals,
- the O-rings,
- the gear supporting rings,
- the roll pins,
- the input shaft and mainshaft bearing circlips,
- the sliding gear hub springs.

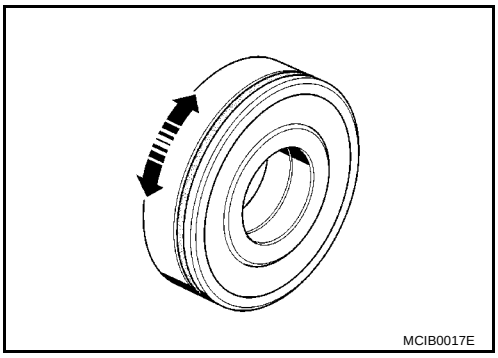
CHECKING

PFP:32010

Bearings

ECS00FDJ

Check that the bearings show no signs of damage and that they turn evenly. Replace them if necessary.

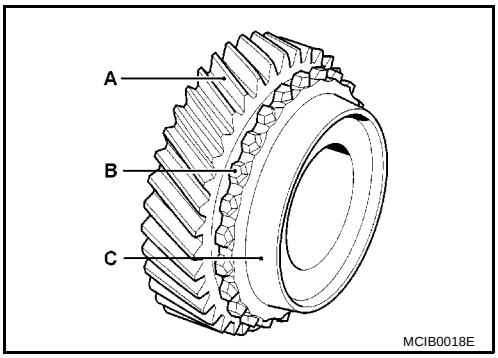

MCIB0017E

Gearing

ECS00FDK

NOTE:
The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

1. Check that the teeth (A) are not broken or chipped.
2. Check that the claws (B) are not broken, chipped or worn.
3. Check that the friction cone (C) shows no scratches or blueness.



MCIB0018E

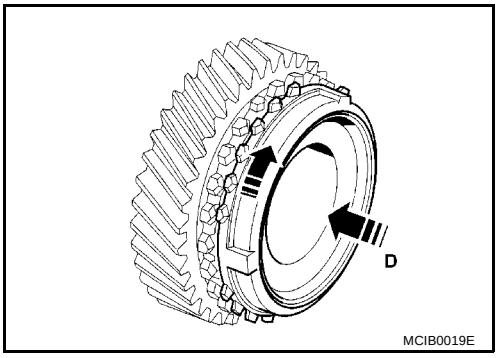
Synchronizer Ring

ECS00FDL

Check that the grooves and ridges on the ring are not worn or damaged.

1. Check that put the ring onto the gear cone.
2. Check that rotate the ring while applying force in the direction of the cone (D).
3. Check that the ring should lock against the cone.

Otherwise, replace the synchronizer ring.

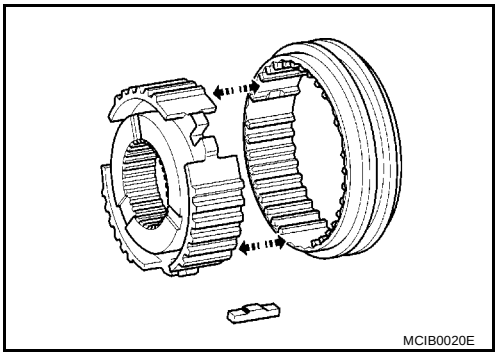


MCIB0019E

Sliding Gear Hub

ECS00FDM

Make sure the sliding gear turns smoothly in the hub.
Check that the rollers or keys are in good condition.


MCIB0020E

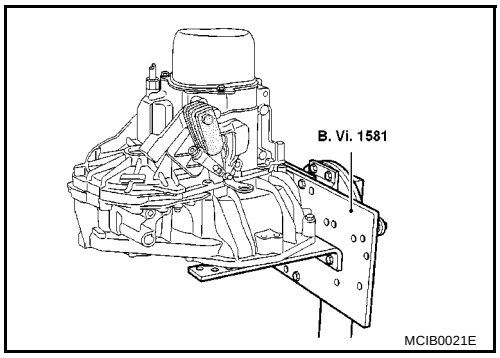
SEPARATING THE HOUSINGS

PFP:32010

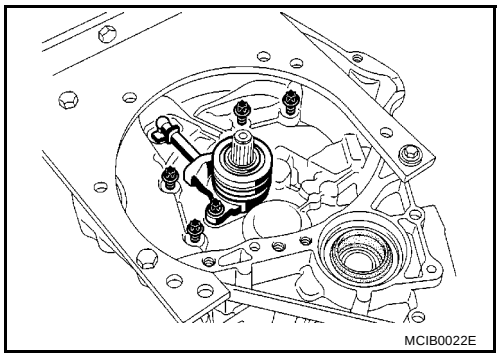
Removal

ECS00FDN

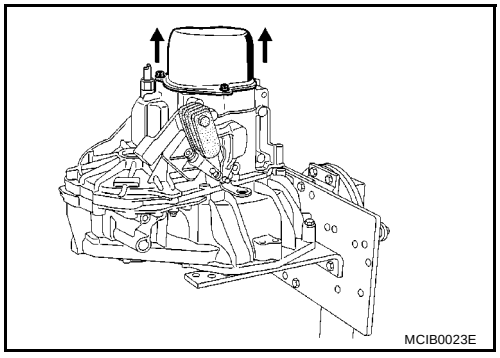
Fit the B. Vi. 1581 support plate on a Desvil stand.
Fit the gearbox on the B. Vi. 1581 support.



1. Remove the concentric slave cylinder.
2. Remove the bolts located inside the housing.

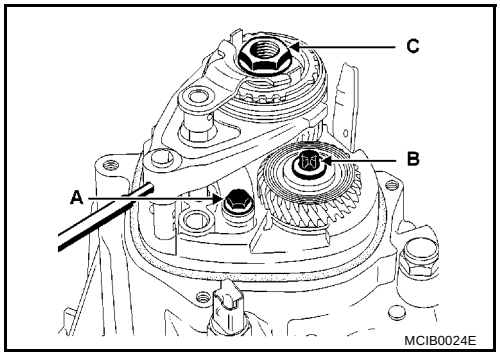


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.

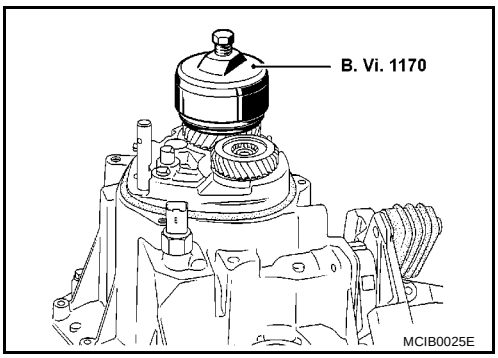


Remove the two reverse gear fork support mounting bolts (A).
Drive in the 5th gear fork using B. Vi. 31-01.
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

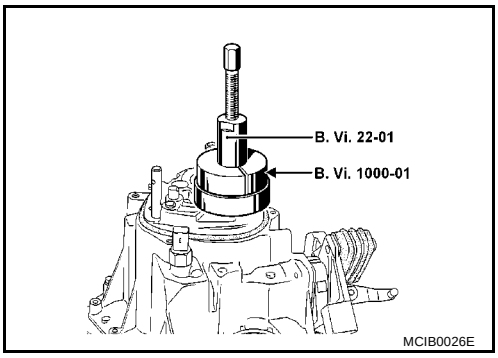
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



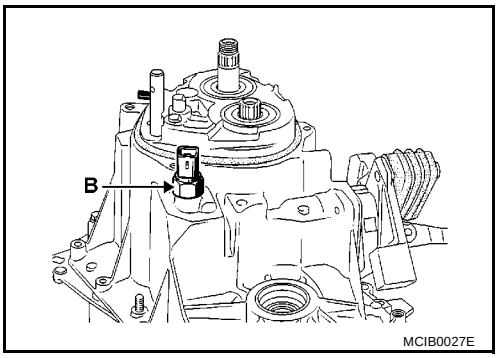
Remove the 5th gear hub using B. Vi. 1170.
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.



Remove the fixed 5th gear using B. Vi. 22-01 and B. Vi. 1000-01.
Remove the gearbox edge bolts.



Remove the back-up lamp switch (B).
Engage 3rd gear.
Lift and remove the mechanism housing.



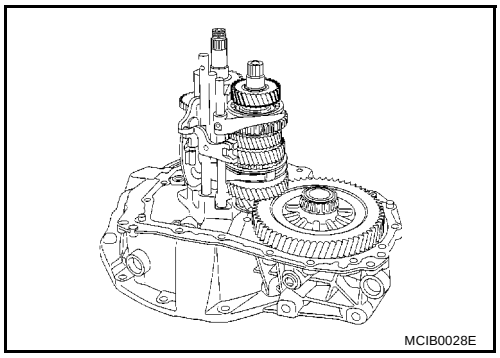
REPAIRING THE GEARBOX

PFP:32010

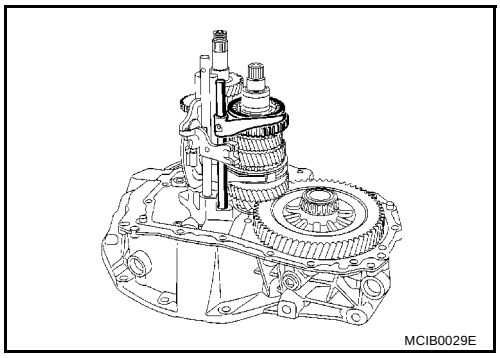
Removal

ECS00FDO

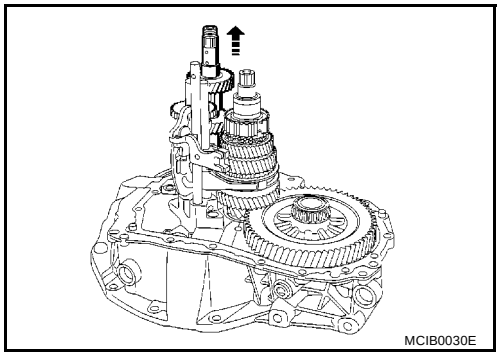
1. Remove the 4th-gear pinion.


MCIB0028E

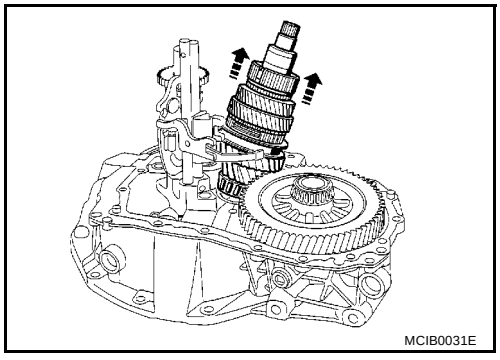
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.


MCIB0029E

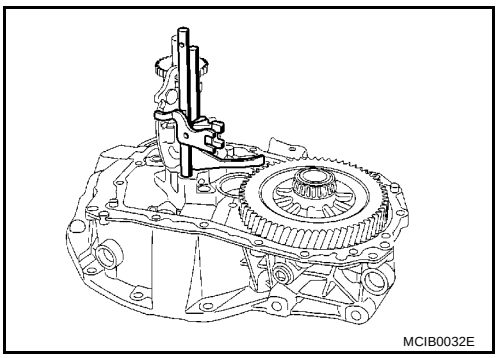
3. Remove input shaft assembly.


MCIB0030E

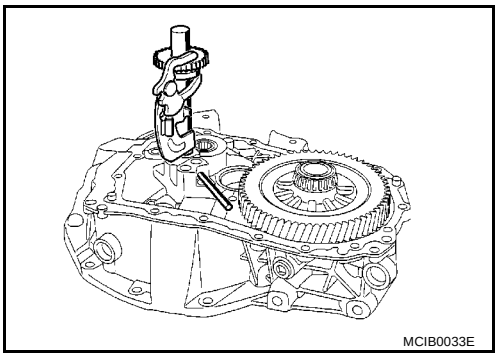
4. Remove mainshaft assembly.


MCIB0031E

5. Remove the 1st/2nd shaft and fork and the 5th gear shaft.


MCIB0032E

6. Remove the pin from the reverse gear and remove the reverse gear.

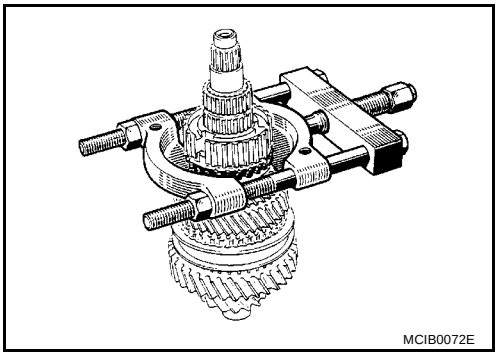

MCIB0033E

Removing the Gearing

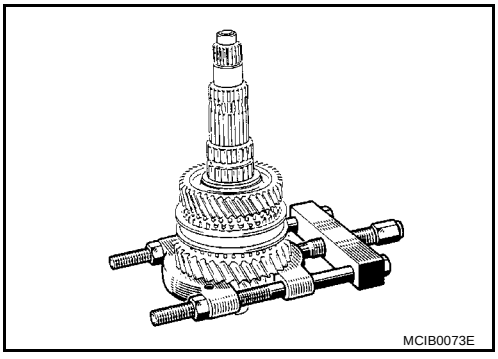
ECS00FDP

NOTE:
The rings underneath the 2nd, 3rd and 4th gears are fitted tightened. They will be systematically replaced during refitting.

1. Remove the ring/hub/3rd gear assembly with the press, resting underneath the 3rd gear claw teeth.


MCIB0072E

2. Remove the rings/1st and 2nd gears/hub/sliding gear assembly with the press, resting underneath the 1st gear.


MCIB0073E

Checking Parts

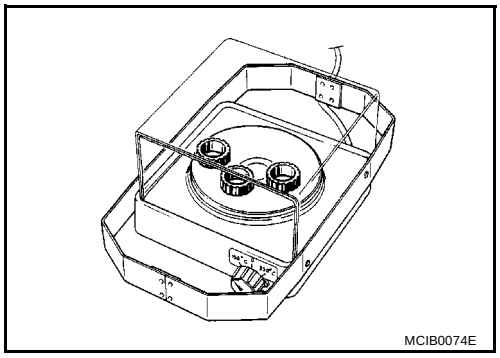
ECS00FDQ

The sprocket teeth and the claws should not be chipped or excessively worn.
Also ensure that there are no signs of grating or abnormal wear on the surfaces of the shafts or the inner walls of the sprockets.
It is advisable to mark the position of the sliding shafts in relation to the hub.

Refitting the Gearing

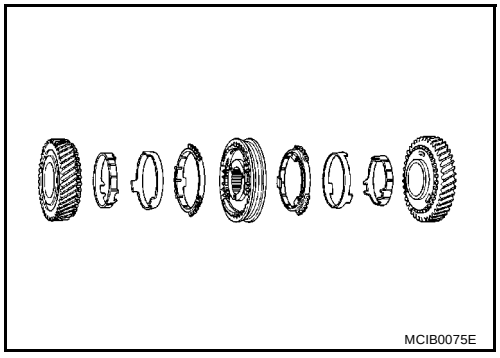
ECS00FDR

A hot plate with a setting of 150°C (302°F) should be used for refitting.
Place the new rings on the cold hot plate. Heat them for 15 minutes with a thermostat setting of 150°C (302°F).


MCIB0074E

Proceed in the reverse order to removal.
Refit the rings:
Remove a ring from the heating plate, using pliers, and use a tube with an internal diameter of 33 mm (1.30 in) to fit it on the shaft until it is resting on the hub.

NOTE:
The 1st/2nd gear has double-cone synchronizer, bring the notches of the synchro rings together with those on the hubs and gears.


MCIB0075E

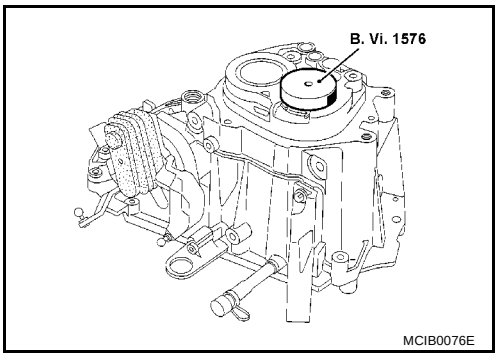
TRANSAXLE CASE BEARING

PFP:32010

Removing the Bearing, Input Shaft Side

ECS00FDS

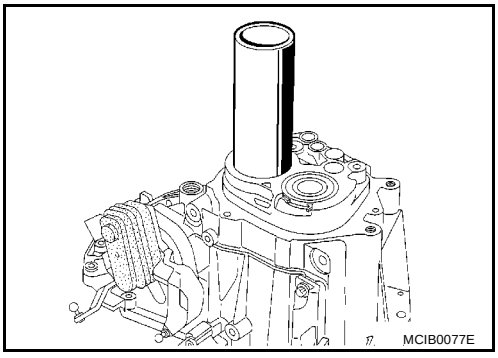
Remove the circlips and drive the bearing inside the housing using tool B. Vi. 1576.



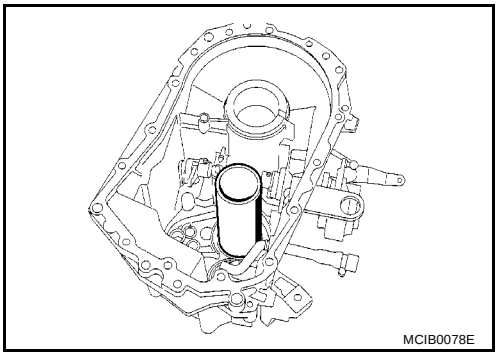
Refitting

ECS00FDT

1. Fit a new circlip.
2. Fit the bearing using tool B. Vi. 1576.
3. Remove the bearing race, output shaft side using a tube with a diameter of 55 mm (2.17 in).



4. Refit the race using a 60 mm (2.36 in) diameter tube.



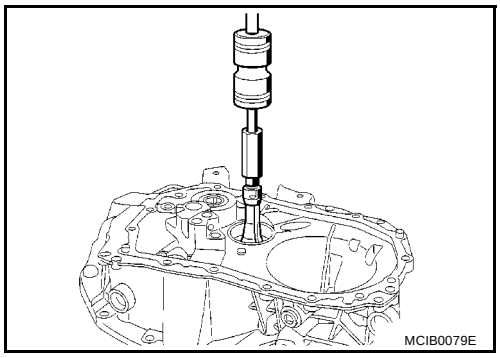
CLUTCH HOUSING BEARING

PFP:32010

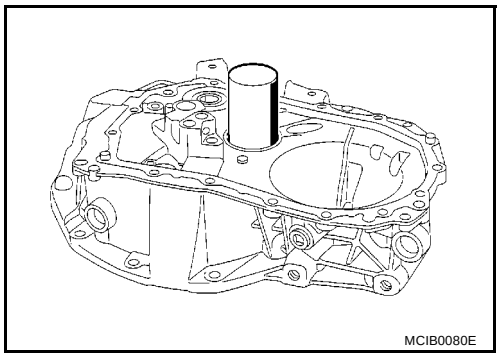
Removal and Installation

ECS00FDU

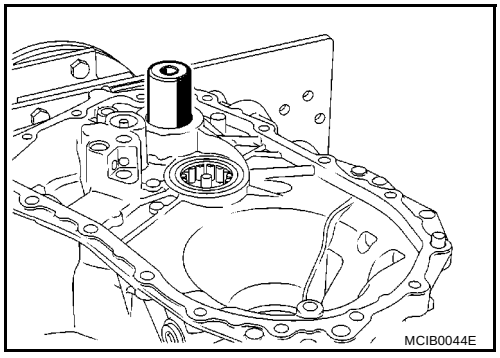
1. Cut the base of the deflector plastic hollow needle located at the centre of the bearing.
   Drive out the cup using a puller.



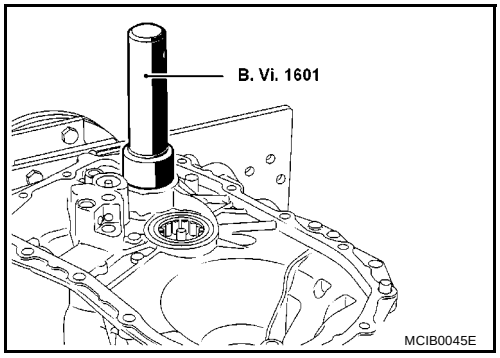
2. Fit a new deflector, then the bearing race using a 55 mm (2.17 in) diameter tube.



3. Remove the input shaft bearing guide using the press and a 38 mm (1.50 in) diameter tube.



4. Refit the bearing guide using the press and tool B. Vi. 1601.



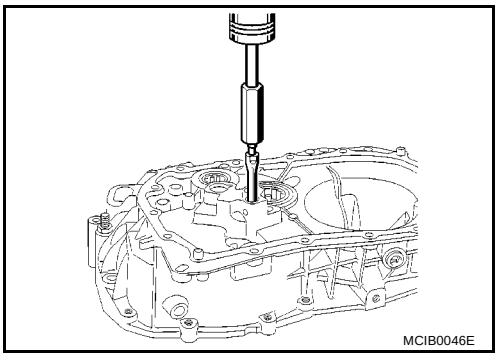
SELECTOR SHAFT RINGS

PFP:32010

Removal

ECS00FDV

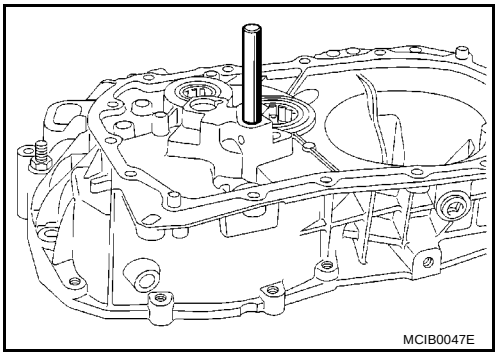
Remove the rings with an inertia puller.



Refitting

ECS00FDW

Refit the rings using a 14.5 mm (0.57 in) tube down to the thrust bearing.



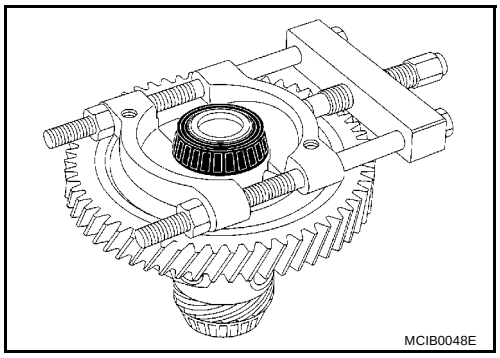
DIFFERENTIAL BEARINGS

PFP:32010

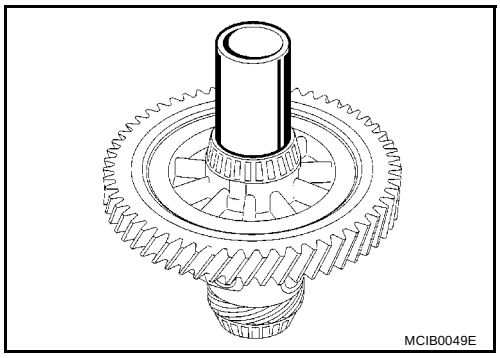
Removal and Installation

ECS00FDX

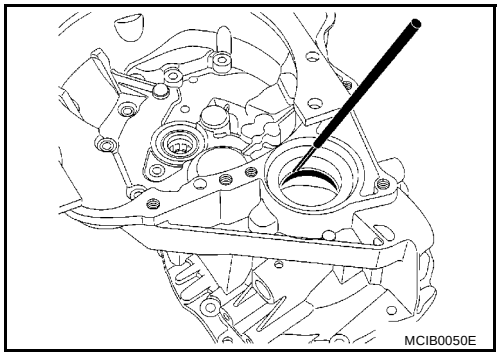
1. Remove the bearing using an antisticking pin.


MCIB0048E

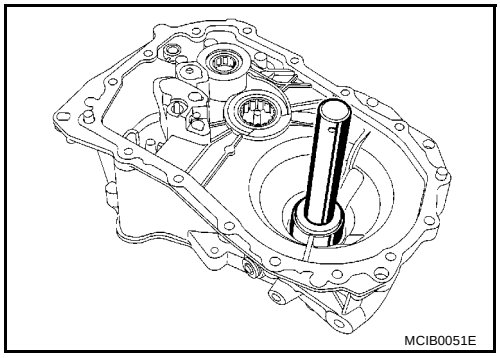
2. Refit the bearings using a 40 mm (1.57 in) tube.


MCIB0049E

3. Remove the bearing races using a roll pin punch.


MCIB0050E

4. Refit the bearing races using tools C-F from the B. Vi. 1554 kit.


MCIB0051E

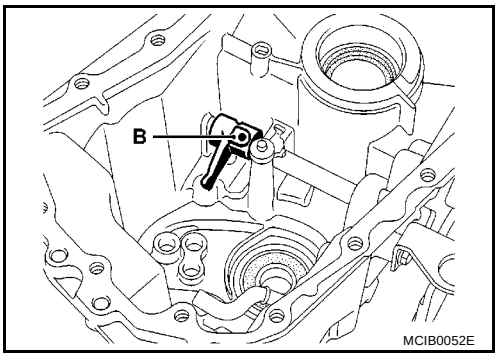
SELECTOR SHAFT

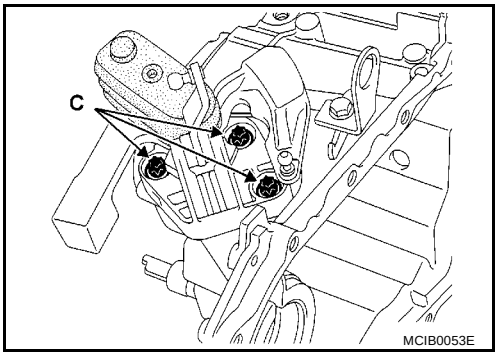
PFP:32010

Removal

ECS00FDY

After removing the pin from the selector finger (B), remove the mounting bolts (C) and remove the control shaft unit.



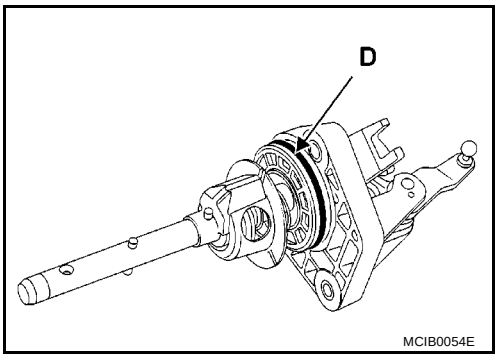


Refitting

ECS00FDZ

Proceed in the reverse order to removal.

NOTE:
Replace the O-ring (D).



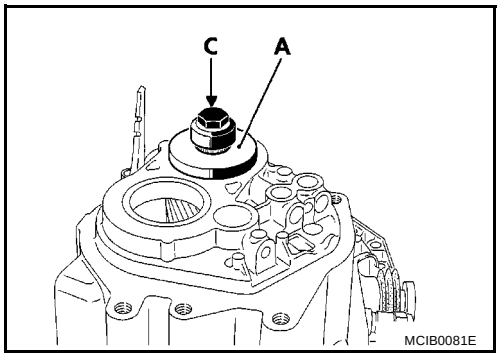
REPAIRING THE GEARBOX

PFP:32010

Setting the Pre-tensioning of the Output Shaft Bearings

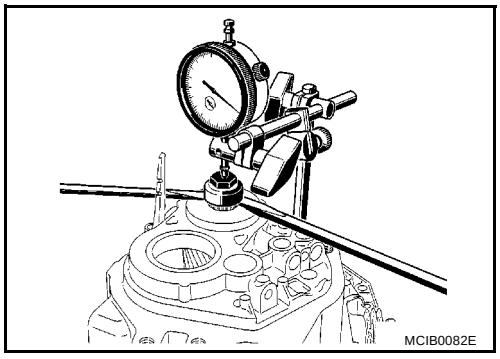
ECS00FE0

NOTE:
This operation is carried out in the event of replacing the bearings, housings or mainshaft.
Clutch housing without differential and without input shaft.
Fit the mainshaft in the clutch housing with the bearings and the pre-setting washer B. Vi. 1161, or equivalent, of 1.60 mm (0.06 in) (large outer ý).
Fit the transaxle case assembly.
Fit and tighten to torque the box belt bolts.
Fit the dial gauge support plate B. Vi. 1161, or equivalent, on the tripod basin mountings.



1. Fit the B. Vi. 1527 special spacer (A).
2. Fit the bolt (C).
3. Fit the dial gauge with its magnetic holder.

1	Rotate the mainshaft several times to fit the bearings.
2	Set the dial gauge to zero.
3	Pull the mainshaft upwards by making a lever out of two screwdrivers.
4	Take a reading from the dial gauge.



Repeat the operations several times (1 to 4).
Calculate the average of the readings.
Calculation of the value of the pre-load washer.
Prescribed value + value of the pre-setting washer + average of the readings on the dial gauge = value of the pre-tensioning dial gauge washer.
Example: [Value in mm (in)]

0.26	**+**	**0.49**	**+**	**1.60**	**=**	**2.35**
↓		↓		↓		↓
Prescribed value		Average reading		Pre-setting washer value		Pre-load washer value

NOTE:
A set of pre-load washers of 2.15 mm (0.08 in) to 2.43 mm (0.10 in) from 0.04 mm (0.002 in) to 0.04 mm (0.002 in) thickness is supplied as replacement parts.

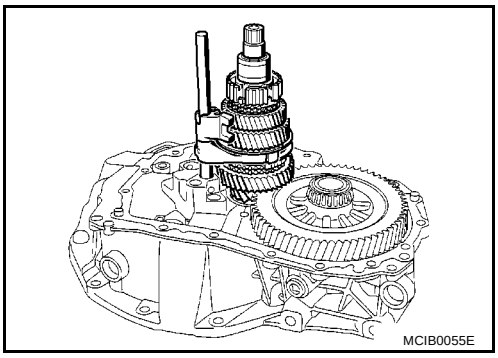
ASSEMBLY

PFP:00000

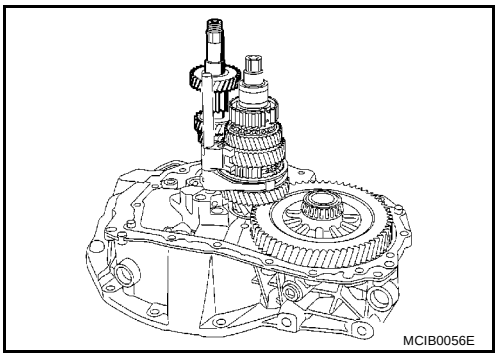
Refitting

ECS00FE1

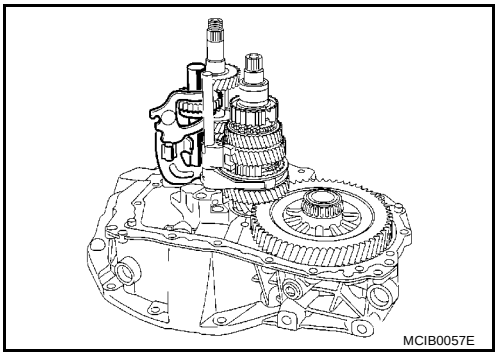
1. Fit the mainshaft and 1st/2nd gear fork assembly.


MCIB0055E

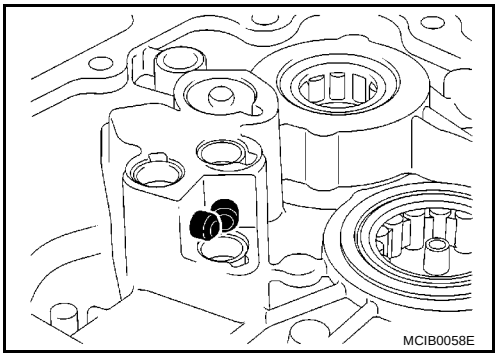
2. Fit the input shaft.


MCIB0056E

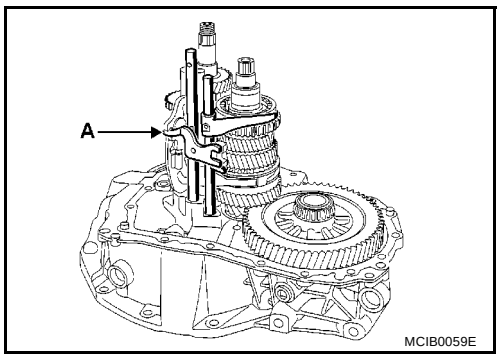
3. Fit the reverse gear assembly.


MCIB0057E

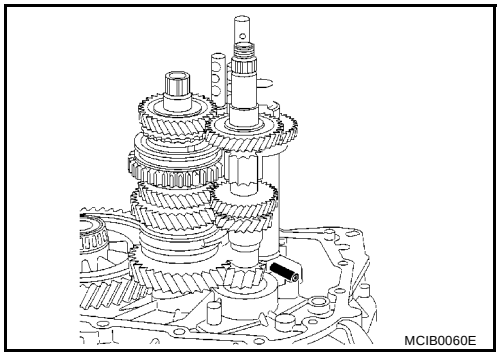
4. Fit the two locking shafts.


MCIB0058E

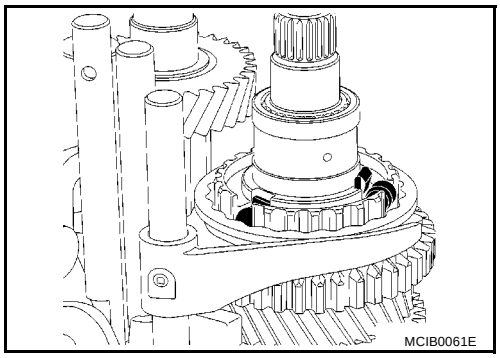
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly.
Rotate the reverse gear assembly to position the 5th gear fork (A).



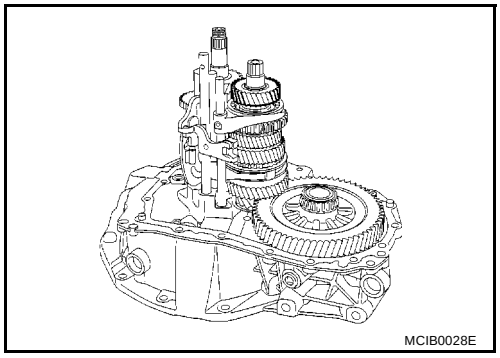
6. Pin the reverse gear assembly.



7. Shift to 3rd gear and insert the rollers and clawing springs.



8. Refit the 4th main gear fitted with its synchronizer ring.



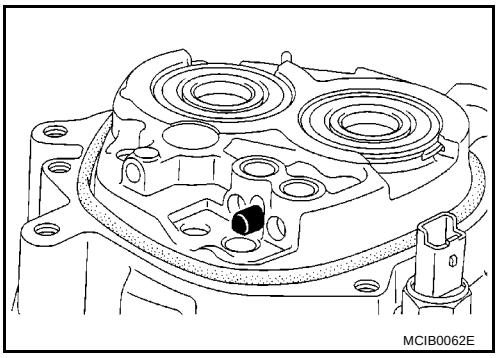
HOUSING ASSEMBLY

PFP:32010

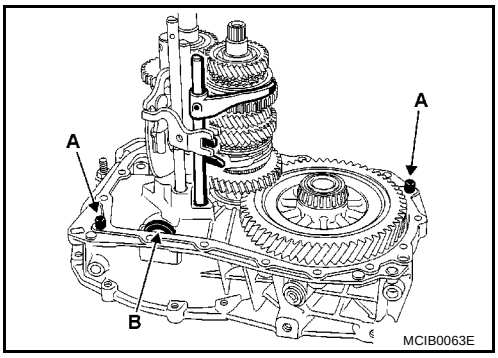
Assembly

ECS00FE2

1. Fit the 1st/2nd, 3rd/4th, and 5th gear locking balls into the transaxle case.
2. Engage 3rd gear.

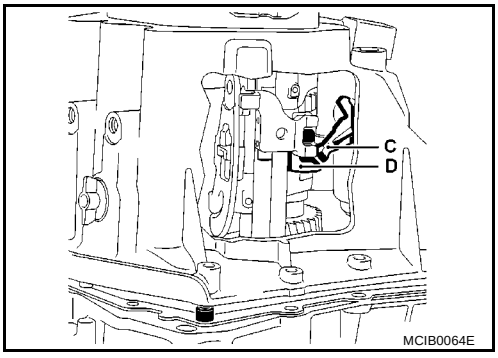

MCIB0062E

3. Check the positioning of the centring dowels (A).
4. Check the positioning of magnet (B).



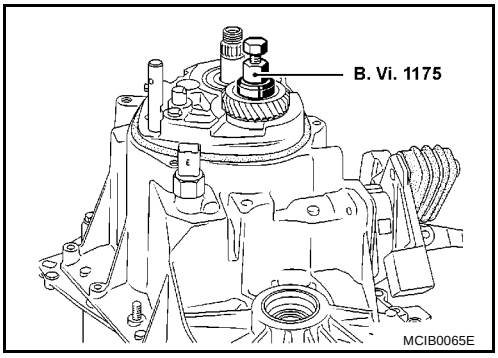
MCIB0063E

5. Apply a line of LOCTITE 518 to the gasket face.
6. Offer up the housing while guiding the selector finger (C) into fork (D) of the 3rd gear.



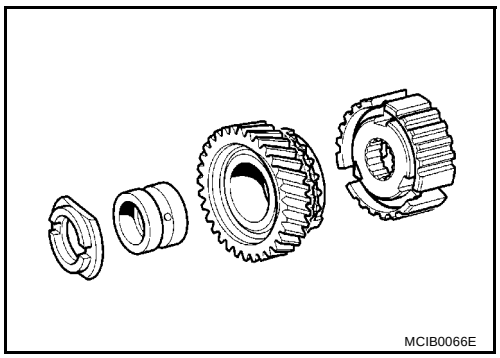
MCIB0064E

7. Pretighten the peripheral bolts and rotate the input shaft to check that they make contact with the bearings.
8. Tighten the bolts to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
9. Put three drops of LOCTITE Frenbloc on the splines of the fixed 5th gear and fit it using tool B. Vi. 1175.

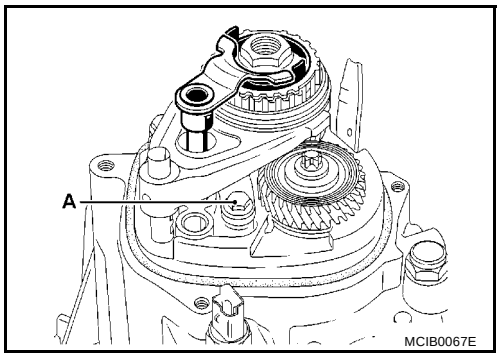


MCIB0065E

10. On the input shaft, fit the support washer (top side gear side).
11. On the input shaft, fit the sprocket bushing.
12. On the input shaft, fit the 5th main gear fitted with its synchronizer ring.
13. On the input shaft, fit the 5th gear hub fitted with its spring.


MCIB0066E

14. Refit the 5th gear fork/sliding gear/reverse gear fork assembly.
15. Fit the reverse gear synchronizer.
16. Screw on the reverse gear fork support and tighten the bolts (A) to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
17. Slide the 5th gear fork on its shaft to engage 5th gear.

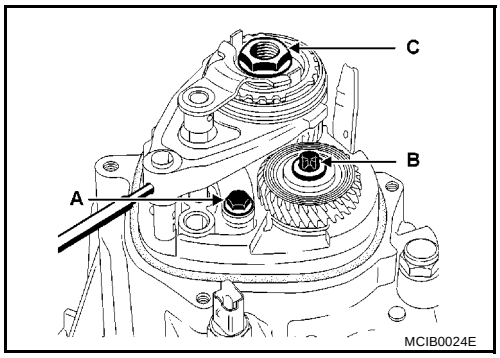


MCIB0067E

18. Tighten the gear bolt and nut to torque of:

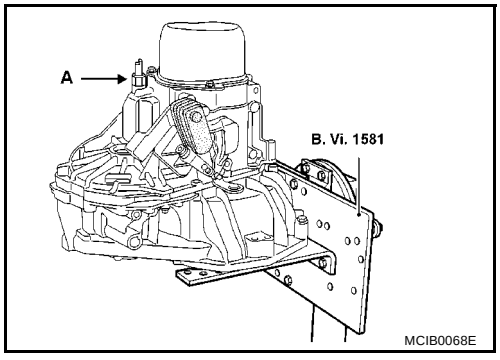
    output shaft bolt (B) : [70 N·m (7.1 kg-m, 52 ft-lb)]
    input shaft nut (C) : [190 N·m (19 kg-m, 140 ft-lb)]

19. Reset to neutral and pin the 5th gear fork.



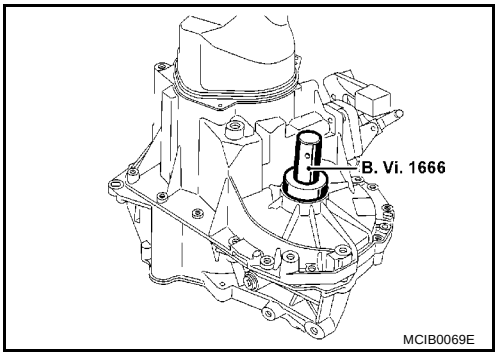
MCIB0024E

20. Fit a new O-ring, position the 5th gear cover and tighten the bolts to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
21. Fit the back-up lamp switch (A) and tighten to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].



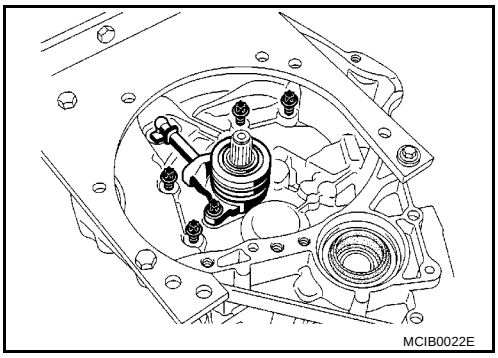
MCIB0068E

22. Refit the new differential output seals using B. Vi. 1666.



23. Refit the concentric slave cylinder and tighten the bolts.

Tightening torque : 21 N·m (2.1 kg-m, 15 ft-lb)



SECTION MTC

MANUAL AIR CONDITIONER

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for Working with HFC-134a (R-134a) 3
General Refrigerant Precautions 3
Lubricant Precautions 4
Precautions for Refrigerant Connection 4
FEATURES OF NEW TYPE REFRIGERANT CONNECTION 4
O-RING AND REFRIGERANT CONNECTION 5
Precautions for Servicing Compressor 6
Precautions for Service Equipment 6
RECOVERY/RECYCLING EQUIPMENT 6
ELECTRONIC LEAK DETECTOR 6
VACUUM PUMP 7
MANIFOLD GAUGE SET 7
SERVICE HOSES 7
SERVICE COUPLERS 8
REFRIGERANT WEIGHT SCALE 8
CALIBRATING ACR4 WEIGHT SCALE 8
CHARGING CYLINDER 9
Precautions for Leak Detection Dye 9
IDENTIFICATION 9
IDENTIFICATION LABEL FOR VEHICLE 9
Wiring Diagram and Trouble Diagnosis 9
PREPARATION 10
Special Service Tools 10
HFC-134a (R-134a) Service Tools and Equipment 10
REFRIGERATION SYSTEM 14
Refrigerant Cycle 14
REFRIGERANT FLOW 14
Refrigerant System Protection 14
REFRIGERANT PRESSURE SENSOR 14
LUBRICANT 15
Adjustment of Compressor Lubricant Amount 15
LUBRICANT 15
PROCEDURES FOR LUBRICANT RETURN OPERATION 15
LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR 16
LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR 16
TROUBLE DIAGNOSIS 17
CONSULT-II Functions 17
CONSULT-II BASIC OPERATION 17
DATA MONITOR 18
Diagnosis Procedure 19
DIAGNOSIS CHART BY SYMPTOM 19
Component Parts Location 20
CR ENGINE MODELS 20
K9K ENGINE MODELS 21
Wiring Diagram —HEATER— 22
Wiring Diagram —PTC/H— 23
Wiring Diagram —A/C— CR Engine Models 24
Wiring Diagram —A/C— K9K Engine Models 26
Function Inspection 28
Blower Fan Motor System 29
INSPECTION PROCEDURE 29
Magnetic Clutch System 31
INSPECTION PROCEDURE 31
Insufficient Cooling 37
CHECK FUNCTION (FOR CR ENGINE) 37
DIAGNOSIS BY PRESSURE GAUGE 39
DIAGNOSIS OF COMPRESSOR 41
Detecting Leaks With Fluorescent Indicator 42
METHOD FOR DETECTING REFRIGERANT LEAKAGE. 42
CONTROL UNIT 43
Removal and Installation 43
REMOVAL 43
INSTALLATION 43
Disassembly and Assembly 43
A/C UNIT ASSEMBLY 45
Removal and Installation 45
REMOVAL 45
INSTALLATION 46
Disassembly and Assembly 47

HEATER CORE 49
Removal and Installation 49
REMOVAL 49
INSTALLATION 49
BLOWER MOTOR 50
Removal and Installation 50
REMOVAL 50
INSTALLATION 50
BLOWER FAN RESISTOR 51
Removal and Installation 51
REMOVAL 51
INSTALLATION 51
AIR CONDITIONER FILTER 52
Removal, Replacement and Installation 52
REMOVAL 52
REPLACEMENT 52
INSTALLATION 52
INTAKE DOOR 53
Intake Door Cable Adjustment 53
MODE DOOR 54
Mode Door Cable Adjustment 54
AIR MIX DOOR 55
Air Mix Door Cable Adjustment 55
THERMO CONTROL AMPLIFIER 56
Removal and Installation 56
REMOVAL 56
INSTALLATION 56
DUCTS AND GRILLES 57
Removal and Installation 57
COMPONENT PARTS LOCATION 57
CENTRAL VENTILATOR GRILLE 57
SIDE VENTILATOR GRILLE 57
DEFROSTER NOZZLE AND DUCT 58
SIDE VENTILATOR DUCT 59
CENTER VENTILATOR DUCT 60
FOOT DUCT 60
REFRIGERANT LINES 61
HFC-134a (R-134a) Service Procedure 61
SETTING OF SERVICE TOOLS AND EQUIPMENT 61
Component Parts Location 62
CR ENGINE MODELS 62
K9K ENGINE MODELS 62
Removal and Installation for Compressor 63
REMOVAL 63
INSTALLATION 64
Removal and Installation for Compressor Clutch (CR Engine Models) 64
REMOVAL 64
INSTALLATION 66
Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models) 67
REMOVAL 67
INSTALLATION 68
Removal and Installation for High-Pressure Flexible Hose (CR Engine Models) 68
REMOVAL 68
INSTALLATION 69
Removal and Installation for High-Pressure Pipe (CR Engine Models) 69
REMOVAL 69
INSTALLATION 70
Removal and Installation for Pipe and Hose (K9K Engine Models) 70
COMPONENTS 70
REMOVAL 70
INSTALLATION 71
Removal and Installation for Refrigerant Pressure Sensor 71
REMOVAL AND INSTALLATION 71
Removal and Installation for Condenser (CR Engine Models) 71
REMOVAL 71
INSTALLATION 72
Removal and Installation for Condenser (K9K Engine Models) 72
REMOVAL 72
INSTALLATION 72
Removal and Installation for Liquid Tank (CR Engine Models) 73
REMOVAL 73
INSTALLATION 73
Removal and Installation for Liquid Tank (K9K Engine Models) 74
REMOVAL 74
INSTALLATION 74
Removal and Installation for Evaporator 74
REMOVAL 74
INSTALLATION 75
Removal and Installation for Expansion Valve 75
REMOVAL 75
INSTALLATION 75
Checking for Refrigerant Leaks 75
Checking System for Leaks Using the Fluorescent Leak Detector 76
Dye Injection 76
Electronic Refrigerant Leak Detector 76
PRECAUTIONS FOR HANDLING LEAK DETECTOR 76
CHECKING PROCEDURE 77
SERVICE DATA AND SPECIFICATIONS (SDS) 79
COMPRESSOR 79
LUBRICANT 79
REFRIGERANT 79
ENGINE IDLING SPEED 79
BELT TENSION 79

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EJS004G7

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions for Working with HFC-134a (R-134a)

EJS002FU

WARNING:

- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J2210 HFC-134a (R-134a) recycling equipment, or J2209 HFC-134a (R-134a) recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
- **Do not allow lubricant (Nissan A/C System Oil Type S or R) to come in contact with styrofoam parts. Damage may result.**

General Refrigerant Precautions

EJS002FV

WARNING:

- **Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (125°F).**
- **Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Do not intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a)**

have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

Lubricant Precautions

EJS002FW

- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J2210 HFC-134a (R-134a) recycling equipment, or J2209 HFC-134a (R-134a) recovery equipment. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Do not allow lubricant (Nissan A/C System Oil Type R) to come in contact with styrofoam parts. Damage may result.

Precautions for Refrigerant Connection

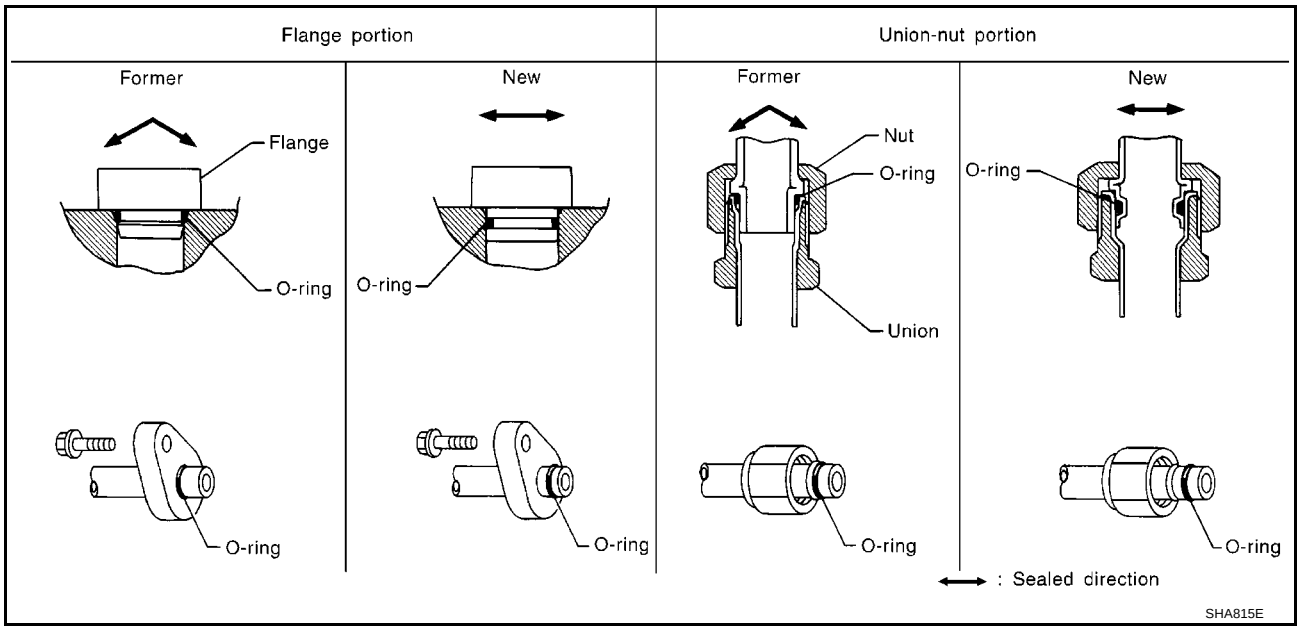
EJS002FX

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit
- Refrigerant pressure sensor to liquid tank

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.

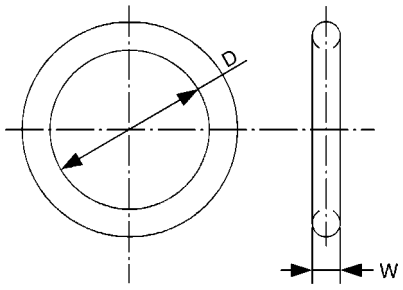


O-RING AND REFRIGERANT CONNECTION

CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Part Numbers and Specifications (CR Engine Models)



Connection type	O-ring size	Part number	D mm (in)	W mm (in)
New	8	92471 N8210	6.8 (0.268)	1.85 (0.0728)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
Former	10	J2476 89956	9.25 (0.3642)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

O-Ring Part Numbers and Specifications (K9K Engine Models)

Connection type	Piping connection point		Part number	Qty.	Remarks
New	Low-pressure flexible hose to heater & cooling unit		77030 65314	2	Renault part
	High-pressure pipe to heater & cooling unit		77030 65318	2	Renault part
	Condenser to high-pressure flexible hose		77030 65316	2	Renault part
	Condenser to high-pressure pipe		77030 65318	2	Renault part
	Compressor to low-pressure flexible hose		77030 65315	2	Renault part
	Compressor to high-pressure flexible hose		77030 65316	2	Renault part
	Liquid tank to condenser pipe		—	—	—
Former	Refrigerant pressure sensor		—	—	—
	Expansion valve to evaporator	Inlet	—	—	—
		Outlet	—	—	—

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

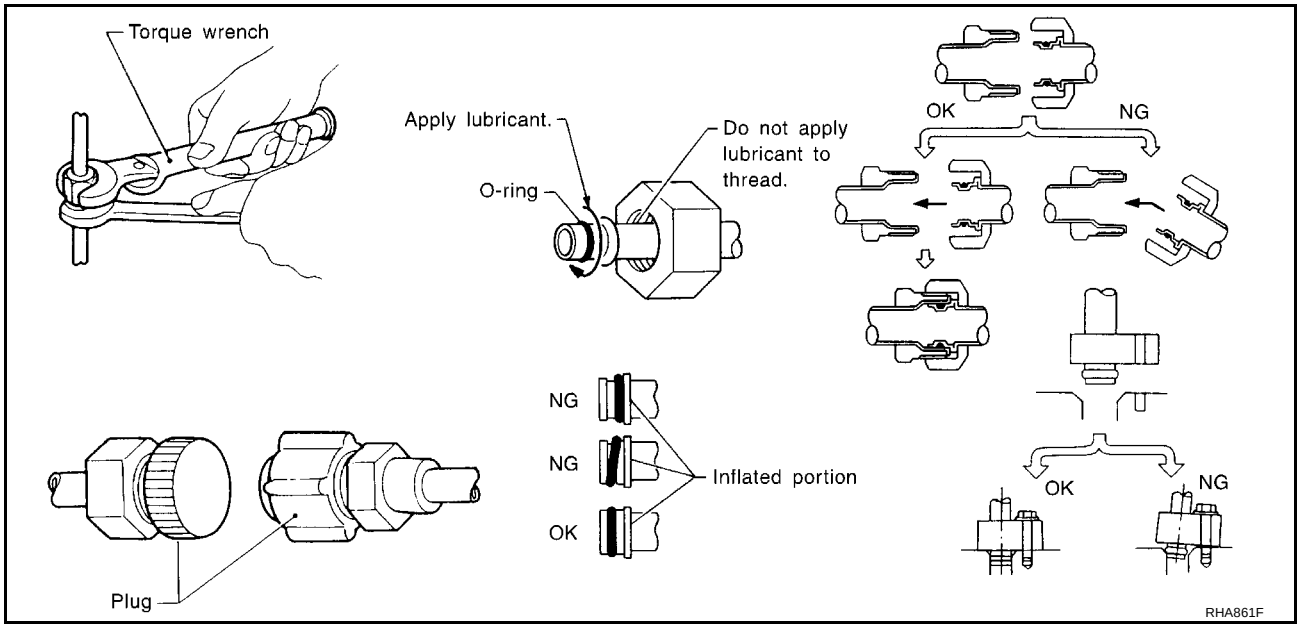
CAUTION:

When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same position as it is when mounted on the car. Malfunction to do so will cause lubricant to enter the low pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

	KC59G Compressor
Lubricant name:	**Nissan A/C System Oil Type R**
Part number:	**KLH00-PAGR0**

- **O-ring must be closely attached to dented portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.**
- **After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Precautions for Servicing Compressor

EJS002FY

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to MTC-15, "Adjustment of Compressor Lubricant Amount" .**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

Precautions for Service Equipment

EJS002FZ

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturers instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

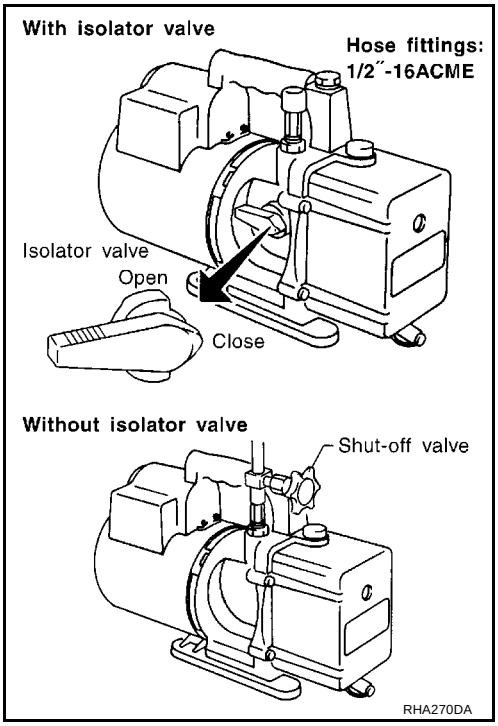
Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

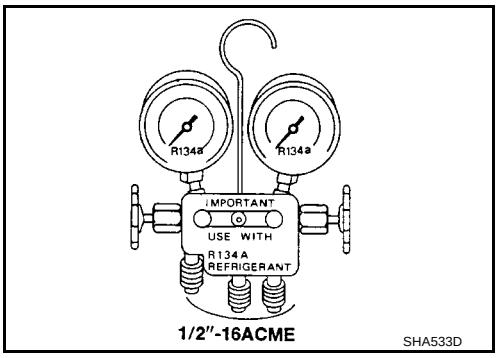
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



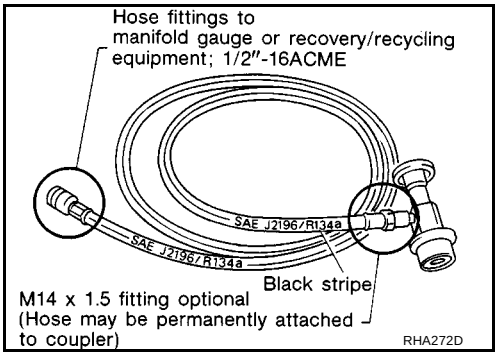
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a (R-134a) or 134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

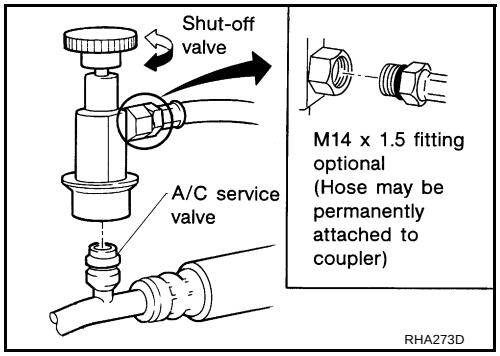
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

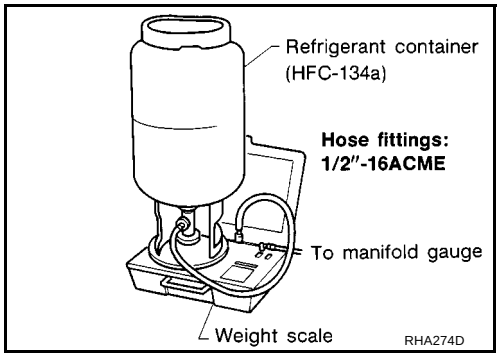
Never attempt to connect HFC-134a (R-134a) service couplers to an CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CALIBRATING ACR4 WEIGHT SCALE

Calibrate the scale every three months.
To calibrate the weight scale on the ACR4:

1. Press **Shift/Reset** and **Enter** at the same time.
2. Press **8787** . "**A1** " will be displayed.
3. Remove all weight from the scale.
4. Press **0** , then press **Enter** . "**0.00** " will be displayed and change to "**A2** ".
5. Place a known weight (dumbbell or similar weight), between 4.5 and 8.6 kg (10 and 19 lb) on the center of the weight scale.
6. Enter the known weight using four digits. (Example 10 lb = 10.00, 10.5 lb = 10.50)
7. Press **Enter** — the display returns to the vacuum mode.
8. Press **Shift/Reset** and **Enter** at the same time.
9. Press **6** — the known weight on the scale is displayed.
10. Remove the known weight from the scale. "**0.00** " will be displayed.
11. Press **Shift/Reset** to return the ACR4 to the program mode.

CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

Precautions for Leak Detection Dye

EJS002G0

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to (J-41995) pin-point refrigerant leaks.
- For your safety and your Customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector (J-41995).
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.
- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce / 7.4 CC) per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detector dye in HFC-134a (R-134a) A/C systems or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor malfunction occurs.

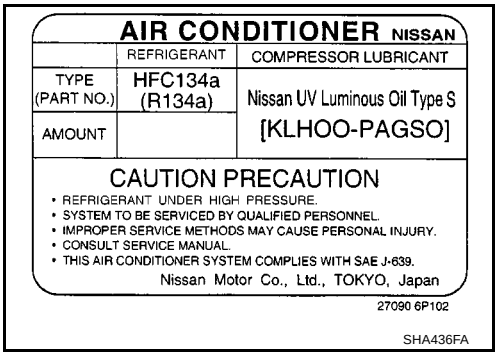
IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have this identification label on the front side of hood.



Wiring Diagram and Trouble Diagnosis

EJS002G1

When you read wiring diagrams, refer to the followings:

- GI-14, "How to Read Wiring Diagrams".
- PG-4, "POWER SUPPLY ROUTING".

When you perform trouble diagnosis, refer to the followings:

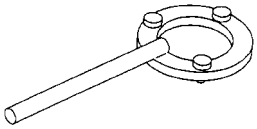
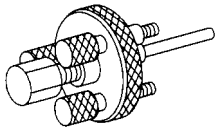
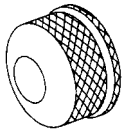
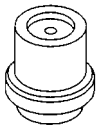
- GI-10, "How to Follow Trouble Diagnoses".
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident".

PREPARATION

PFP:00002

Special Service Tools

EJS002G9

Tool number Tool name	Description	
KV99231260 Clutch disc wrench	 RJIA0475E	Removing shaft nut and clutch disc
KV992T0001 Clutch disc puller	 RJIA0476E	Removing clutch disc
KV992T0002 Pulley installer	 RJIA0477E	Installing pulley
KV99233130 Pulley puller	 RJIA0478E	Removing pulley

HFC-134a (R-134a) Service Tools and Equipment

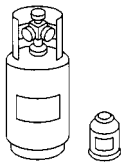
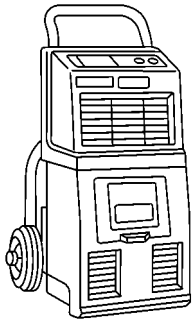
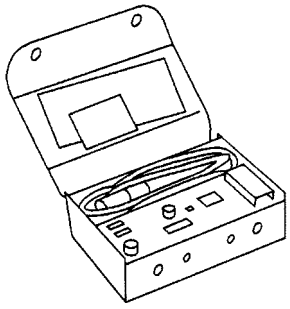
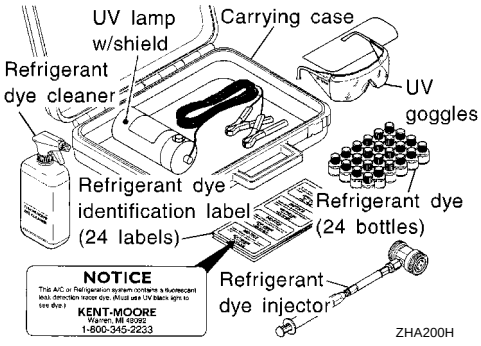
EJS002GA

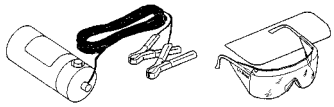
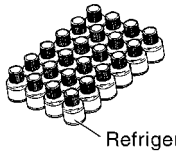
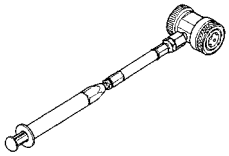
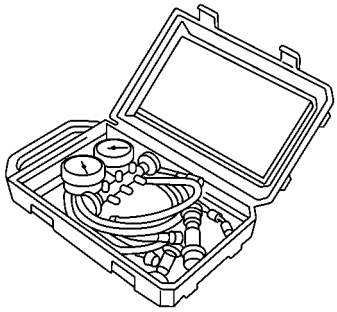
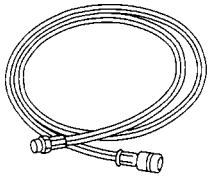
Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.

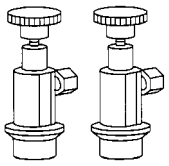
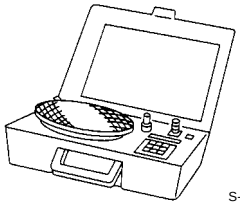
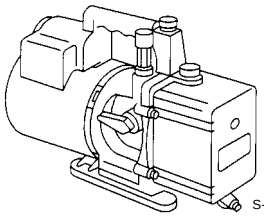
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.

Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

Tool number Tool name	Description	
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2″ -16 ACME
KLH00-PAGR0 Nissan A/C System Oil Type R	 S-NT197	Type: Poly alkaline glycol oil (PAG), type R Application: HFC-134a (R-134a) vane rotary compressors (Nissan only) Lubricity: 40 m ℓ (1.4 Imp fl oz.)
Recovery/Recycling Recharging equipment (ACR4)	 RJIA0195E	Function: Refrigerant Recovery and Recycling and Recharging
Electrical leak detector	 A/C leak detector SHA705EB	Power supply: ● DC 12V (Power socket)
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)

Tool number Tool name	Description	
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system. Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 Refrigerant dye (24 bottles) SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills.
Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: ● The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size ● 1/2″ -16 ACME
Service hoses ● High side hose ● Low side hose ● Utility hose	 S-NT201	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2″ -16 ACME

Tool number Tool name	Description	
Service couplers ● High side coupler ● Low side coupler	 S-NT202	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size ● 1/2″ -16 ACME
Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: ● Air displacement:4 CFM ● Micron rating:20 microns ● Oil capacity:482 g (17 oz.) Fitting size: Thread size ● 1/2″ -16 ACME

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle

EJS002GB

REFRIGERANT FLOW

Refrigerant basically circulates through compressor, condenser, liquid tank and evaporator and returns to compressor. Vaporization of refrigerant is controlled by expansion valve.

Refrigerant System Protection

EJS002GC

REFRIGERANT PRESSURE SENSOR

- Refrigerant system is protected from significant high-pressure or low-pressure by refrigerant pressure sensor attached to condenser.
- If unexpected pressures are detected in the cooler system (approx. 2.74 MPa (approx. 27.9 kg/cm^2) or more or 0.14 MPa (approx. 1.4 kg/cm^2) or less, the compressor is stopped by the refrigerant pressure sensor.)

Note: Values in the ( ) indicate gauge pressure.

LUBRICANT

PFP:KLG00

Adjustment of Compressor Lubricant Amount

EJS002GD

Compressor lubricant circulates through the system with refrigerant. When cooler system component is replaced or after the large refrigerant leak, lubricant needs to be added to compressor. Also it is important to maintain lubricant level properly. If lubricant level is not proper, following might happen.

- Insufficient lubricant: Compressor adherence
- Lubricant overfill: Insufficient cooling (insufficient heat exchange)

LUBRICANT

	KC59G Compressor
Lubricant name:	**Nissan A/C System Oil Type R**
Part number:	**KLH00-PAGR0**

PROCEDURES FOR LUBRICANT RETURN OPERATION

Follow the steps bellow to adjust the lubricant level.

1. CHECK A/C SYSTEM

1. Make sure A/C system operates normally.
2. Make sure a large amount of refrigerant or lubricant does not leak.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. LUBRICANT RETURN OPERATION

1. Start the engine. Put it in the following state.
- Engine speed: Idling - 1,200 rpm
- A/C switch: ON
- Fan speed: HI
- Air intake: Recirculation
- Set temperature: FULL HOT
2. Keep running for approximately 10 minutes.
3. Stop the engine.

CAUTION:
When a large leak of refrigerant or lubricant is found, do not perform lubricant return operation.

>> GO TO 3.

3. CHECK COMPRESSOR

Is compressor replaced?

YES >> GO TO MTC-16, "LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR" .
NO >> GO TO 4.

4. CHECK OTHER COMPONENTS

Is any other component to be replaced? (evaporator, condenser, liquid tank, large refrigerant or lubricant)

YES >> GO TO MTC-16, "LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR" .
NO >> GO TO MTC-37, "CHECK FUNCTION (FOR CR ENGINE)" .

LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPONENTS OTHER THAN COMPRESSOR

Add compressor lubricant from the high-pressure port of the compressor according to the table below. α indicates lubricant amount that spouts with refrigerant when refrigerant is discharged.

Components to be replaced	Lubricant amount to be added
Evaporator	35+α cm^3
Condenser	15+α cm^3
Liquid tank	5+α cm^3

CAUTION:

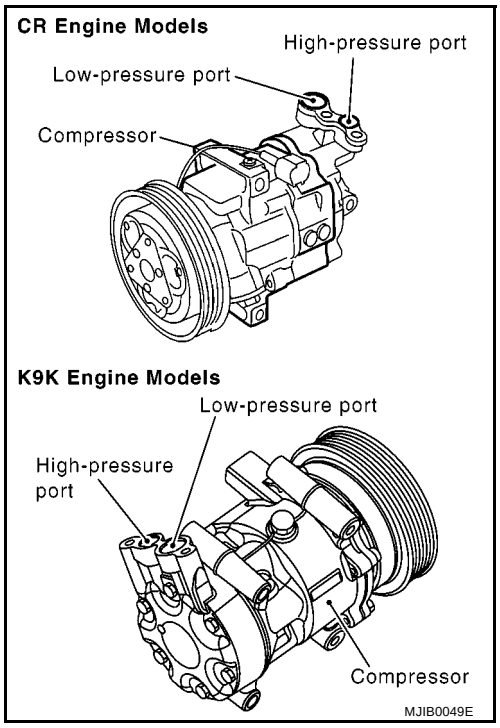
When replacing 2 or more parts, do not sum up α.

Ex. Lublicant amount to be added to evaporator and liquid tank (cm^3) = 35 + 5 + α

LUBRICANT LEVEL ADJUSTMENT WHEN REPLACING COMPRESSOR

1. Drain the compressor lubricant from the removed compressor's high and low-pressure ports and measure the amount of lubricant.
2. Drain the compressor lubricant from a new compressor according to the formula below. α indicates lubricant amount that spouts with refrigerant when refrigerant is discharged.

   Lubricant amount drained from new compressor^3)
   = Lubricant amount contained in the new compressor (80) - Lubricant amount discharged from the removed compressor - Lubricant amount that adheres to inside of compressor (20) - α
   = 60 - Lubricant amount discharged from the removed compressor - α
3. When adding lubricant, add the appropriate amount of compressor lubricant from the compressor's high-pressure port.



TROUBLE DIAGNOSIS

PFP:00004

CONSULT-II Functions

EJS002FE

CONSULT-II has display functions for work support, self-diagnosis, data monitor, and active tests for each part by combining data reception and command transmission via communication lines from the BCM.

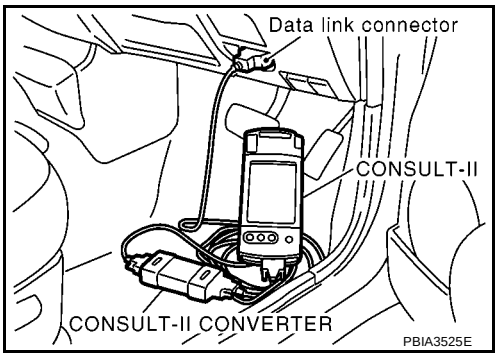
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Air conditioner	Data monitor	Displays BCM input data in real time.

CONSULT-II BASIC OPERATION

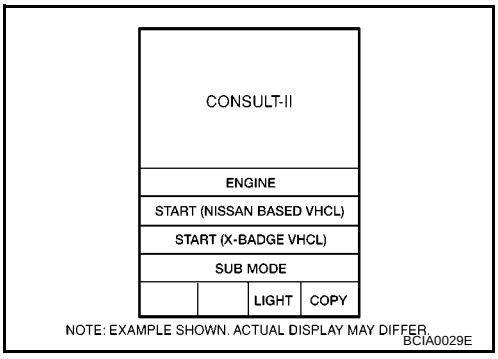
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

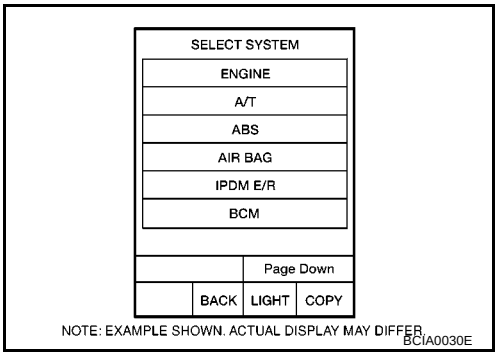
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector.
3. Turn ignition switch ON.



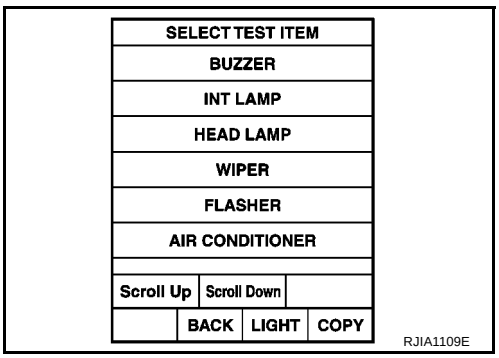
4. Touch “START (NISSAN BASED VHCL)”.



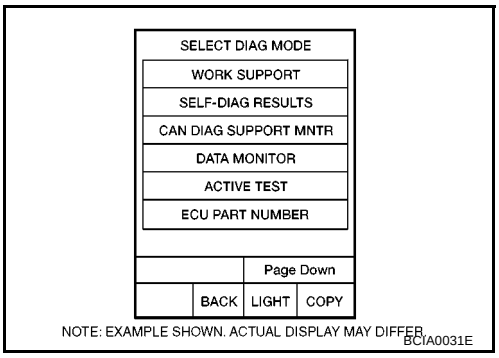
5. Touch “BCM” on the “SELECT SYSTEM” screen.
   - If “BCM” is not displayed, print the “SELECT SYSTEM” screen, and then refer to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “AIR CONDITIONER” on the “SELECT TEST ITEM” screen.



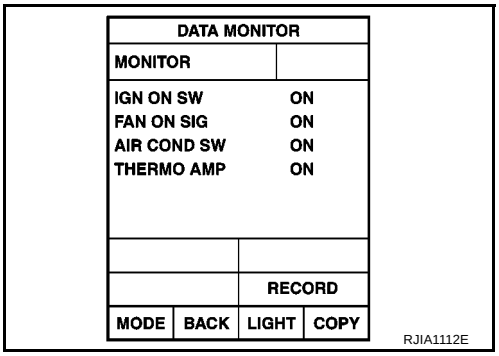
7. Touch “DATA MONITOR” on the “SELET DIAG MODE” screen. For details, refer to separate volume “CONSULT-II Operation Manual”.



DATA MONITOR

Operation Procedure

1. Touch “AIR CONDITIONER” on the “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on the “SELET DIAG MODE” screen. For details, refer to separate volume “CONSULT-II Operation Manual”.
3. Touch “All SIGNALS” on the “DATA MONITOR” screen.
4. Touch “START”.
5. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.



Monitored Item

Monitor item “UNIT”		Contents
FAN ON SIG	[ON/OFF]	Displays status “Blower fan on (ON)/blower fan off (OFF)” as judged by the BCM from the input from fan switch.
AIR COND SW	[ON/OFF]	Displays status “Compressor on (ON)/compressor off (OFF)” as judged by the BCM from the input from the controller.
THERMO AMP	[ON/OFF]	Displays status “Thermal control amplifier on (ON)/thermal amplifier off (OFF)” judged by the BCM from the input from thermal control amplifier.
IGN ON SW	[ON/OFF]	Displays status “IGN position (ON)/OFF, ACC position (OFF)” as judged from the key switch signal.

Diagnosis Procedure

EJS002FF

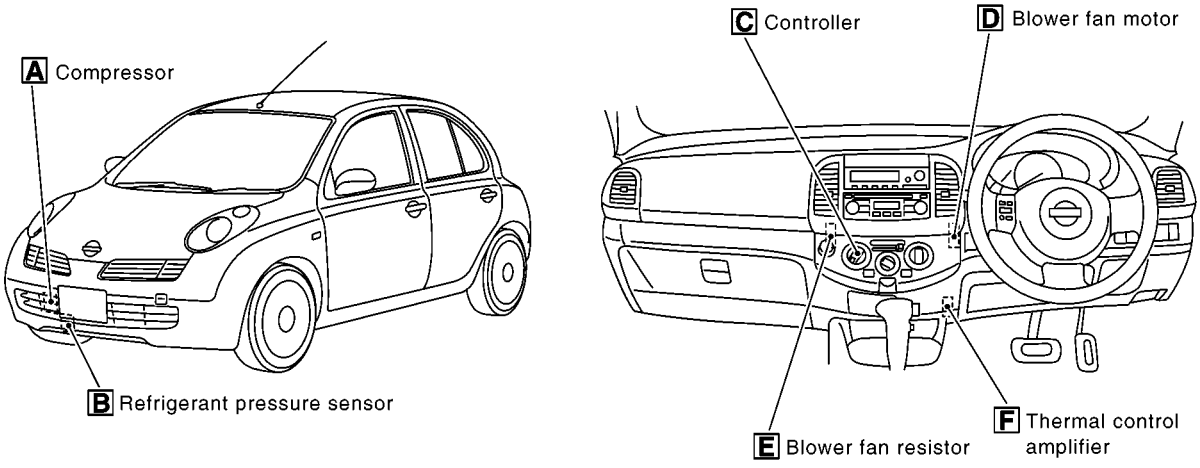
DIAGNOSIS CHART BY SYMPTOM

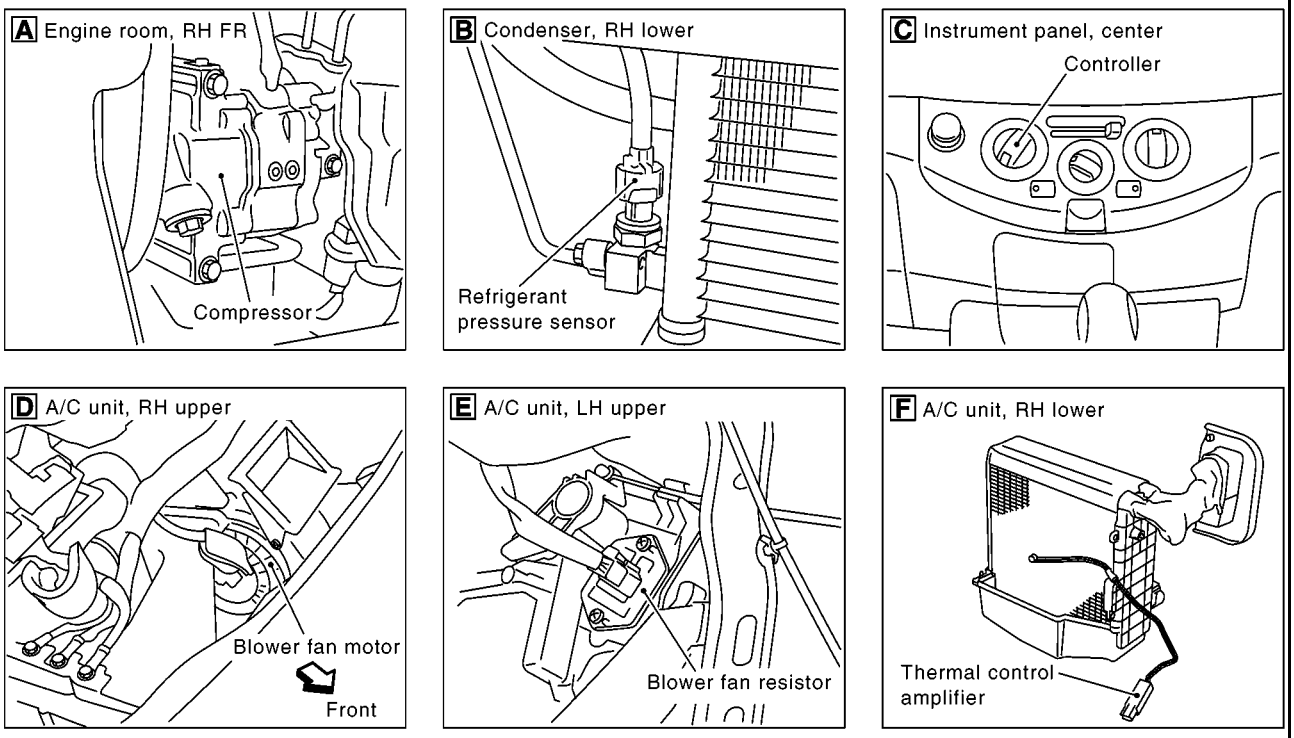
Symptom		Operation inspection	Suspect systems	Possible causes
No air comes out. Airflow volume does not change.		Check blower fan motor operation.	Blower fan motor harness	Refer to MTC-29, "Blower Fan Motor System" .
Inaccurate temperature control	Common items (Check these items for either of two malfunctions listed below.)	Operate temperature control dial. Confirm that air mix door moves through full stroke.	Air mix door harness	● Improper air mix door lever installation ● Air mix door system malfunction (damage, locking, etc.) ● Air mix door cable inoperative ● Refer to MTC-55, "Air Mix Door Cable Adjustment" .
	No cold air comes out. (Normal airflow amount)	With the fan setting dial and A/C switch ON, check operation of the magnetic clutch.	Magnetic clutch harness	Refer to MTC-31, "Magnetic Clutch System" .
		● Check refrigerant level. ● Performance check	Cooler system	● Refer to MTC-37, "CHECK FUNCTION (FOR CR ENGINE)" in “Cooling malfunction”. ● Refer to MTC-39, "DIAGNOSIS BY PRESSURE GAUGE" in “Cooling malfunction”.
	No warm air comes out. (Airflow volume is normal.)	After warming up engine, heater core inlet and outlet sides of the heater hose do not become warm.	Coolant route	● Poor engine coolant ● Blockage of heater hose or heater core
Unable to switch air outlets to others.		Operate the mode dial to confirm that the mode door moves through the full stroke.	Mode door harness	● Improper installation of mode door lever ● Mode door system malfunction (damage, locking, etc.) ● Mode door cable inoperative ● Refer to MTC-54, "Mode Door Cable Adjustment" .
Unable to switch intake inlets to others.		Operate the intake switch lever and make sure the intake door moves through a full stroke.	Intake door harness	● Improper installation of intake door lever ● Intake door system malfunction (damage, locking, etc.) ● Intake door cable inoperative ● Refer to MTC-53, "Intake Door Cable Adjustment" .

Component Parts Location

EJS002FG

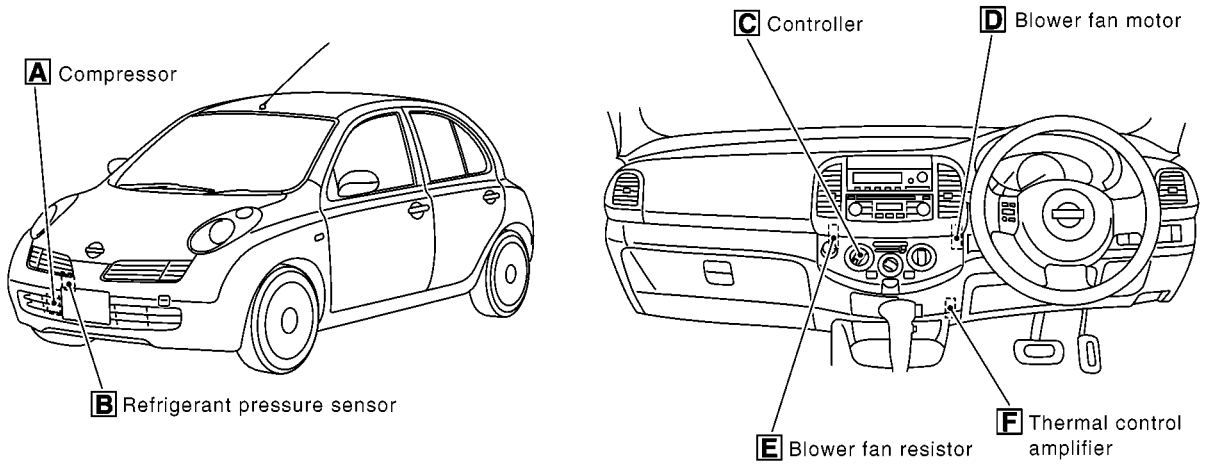
CR ENGINE MODELS

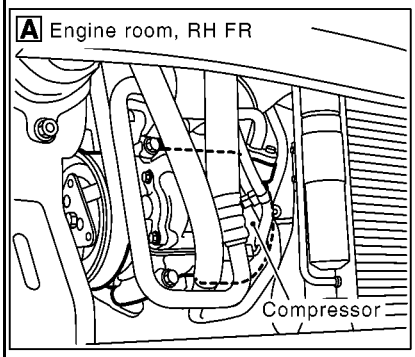


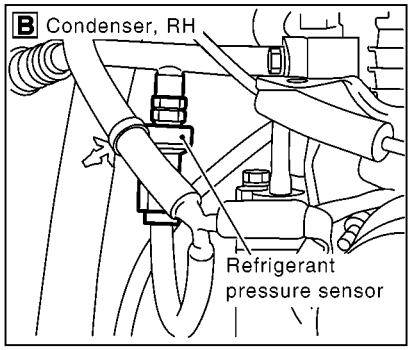


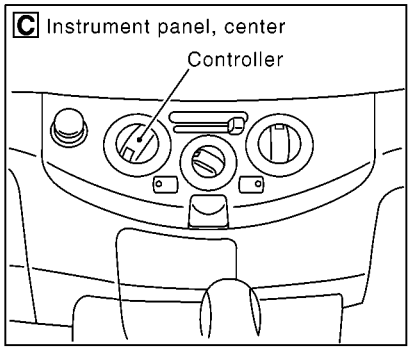
MJIA0175E

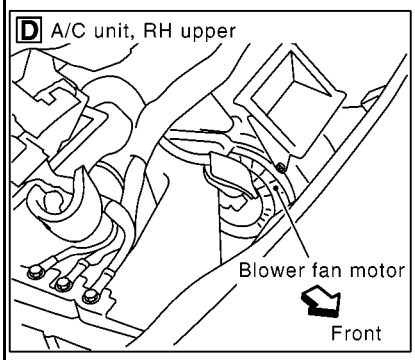
K9K ENGINE MODELS

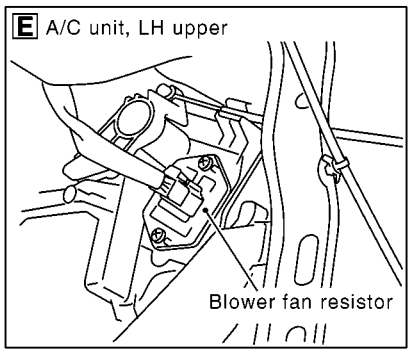


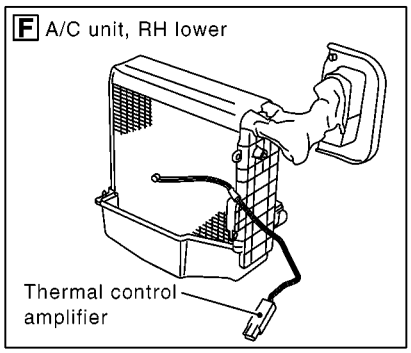












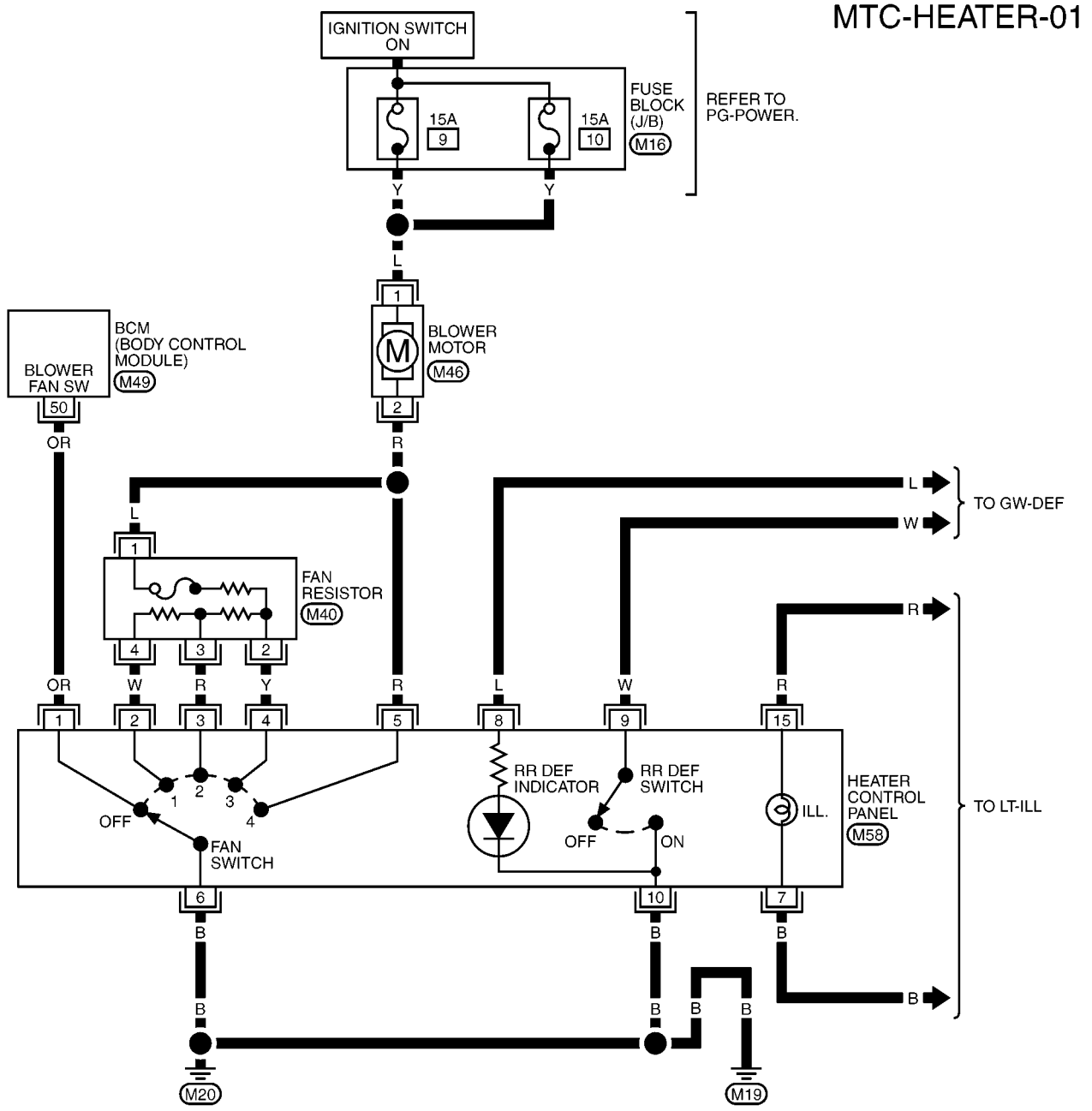
MJIA0198E

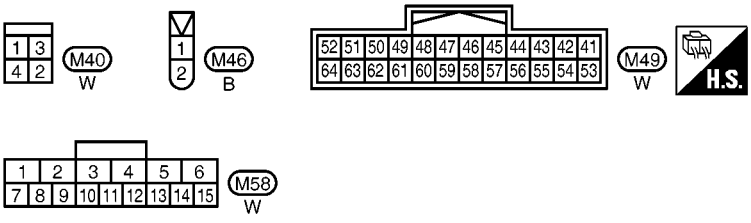
Wiring Diagram —HEATER—

SMA for VIN >SJN**AK12U1309269

EJS002FH

MTC-HEATER-01



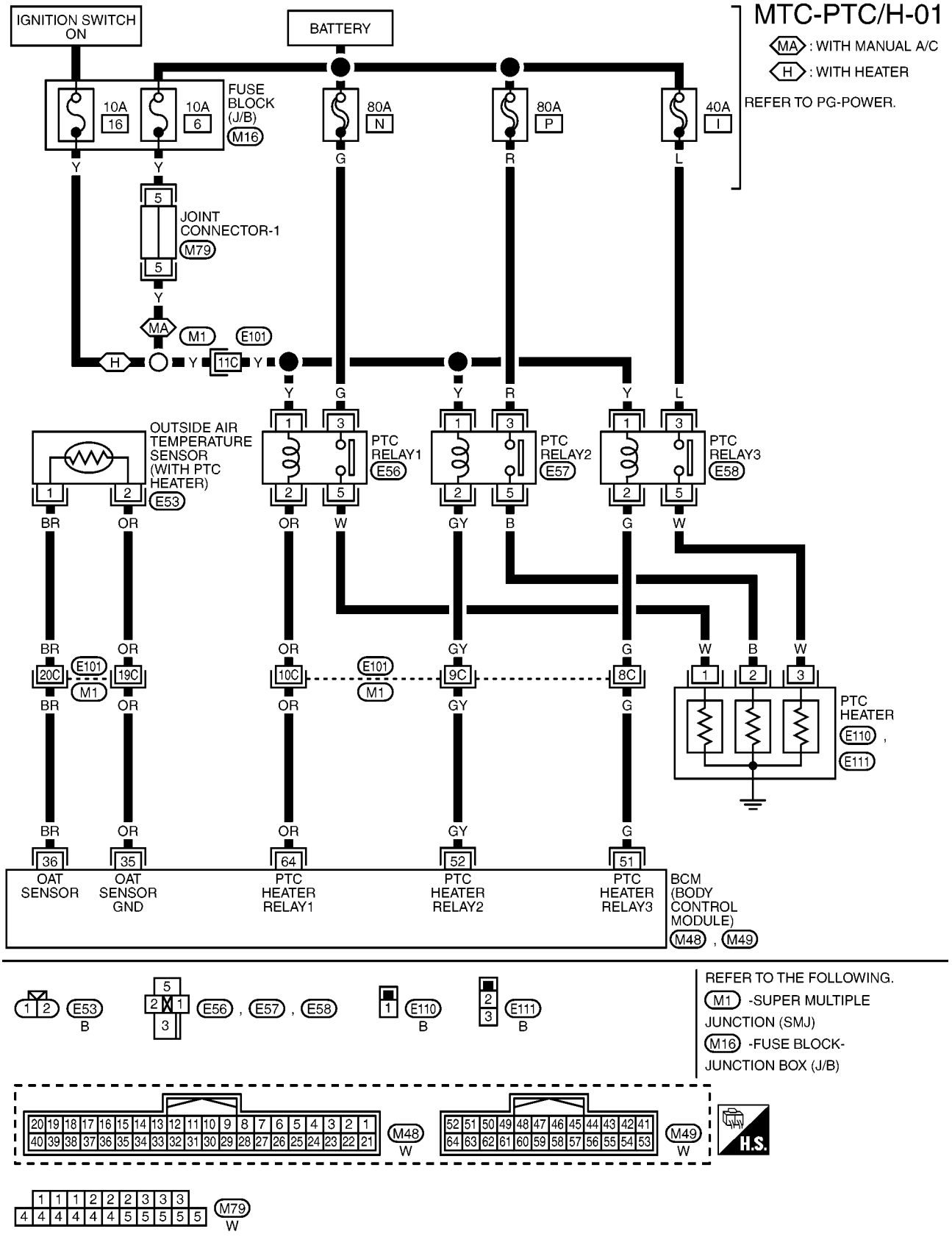


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MJWA0142E

Wiring Diagram —PTC/H—

SMA for VIN >SJN**AK12U1309269 EJS005KI

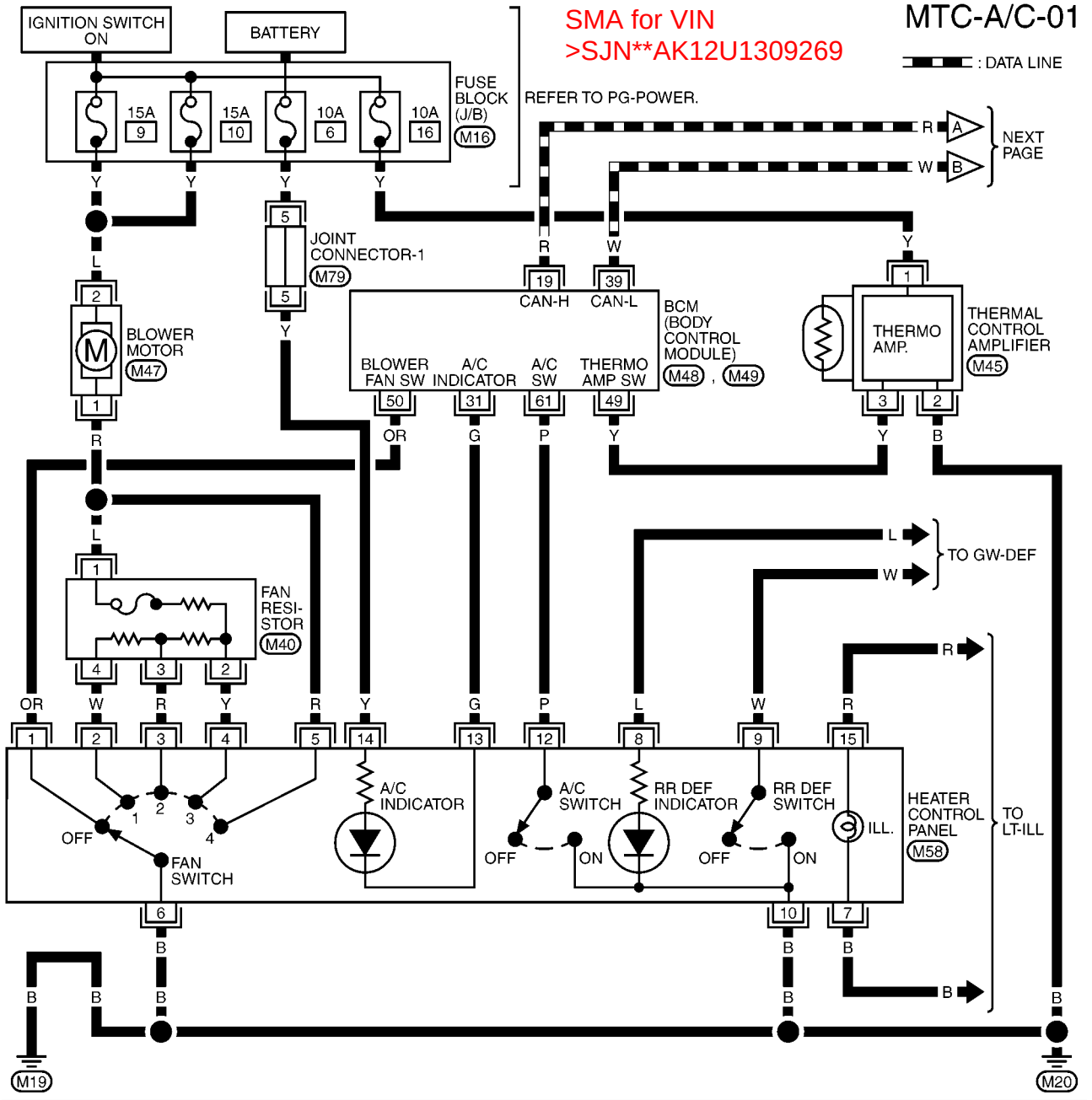


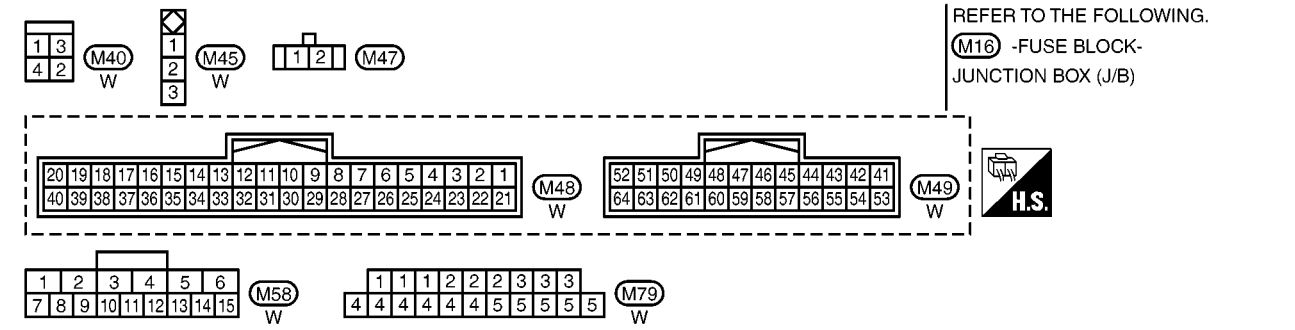
MJWA0043E

PTC heater function is intended to improve the heating performance with CTP electrical system for air heating system which is broken down into several stages controlled by relays.

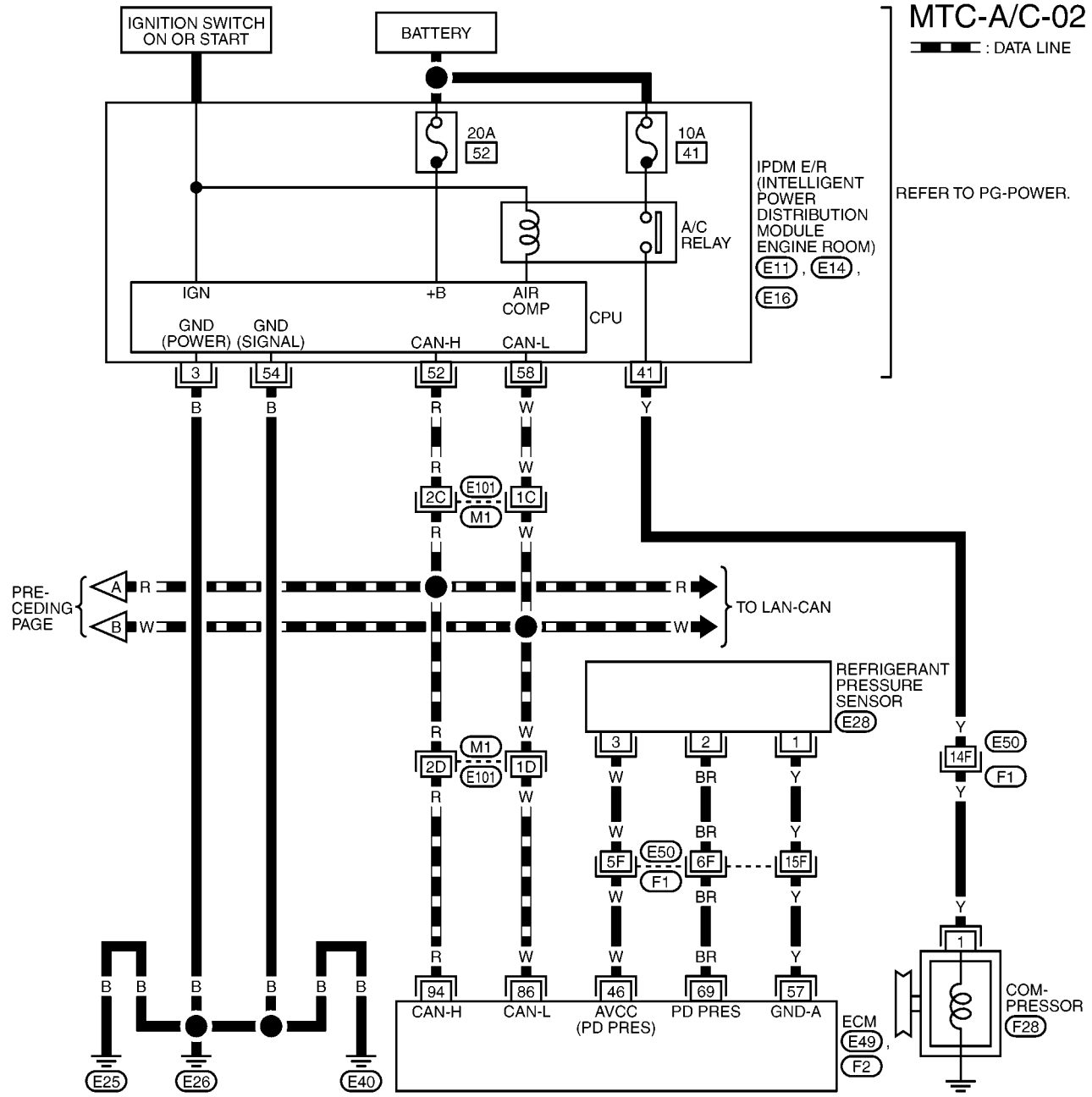
Wiring Diagram —A/C— CR Engine Models

EJS002FN





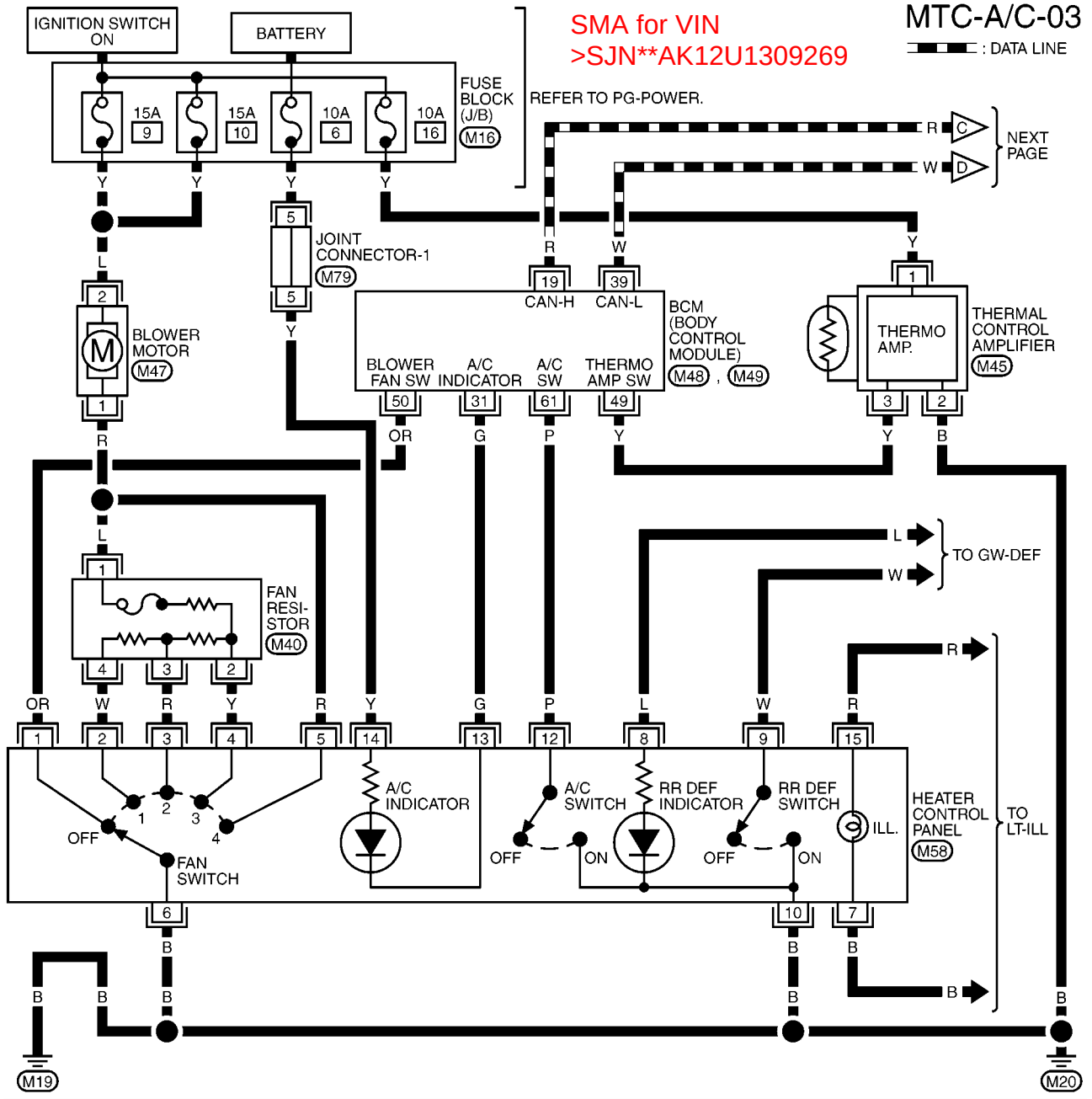
MJWA0143E

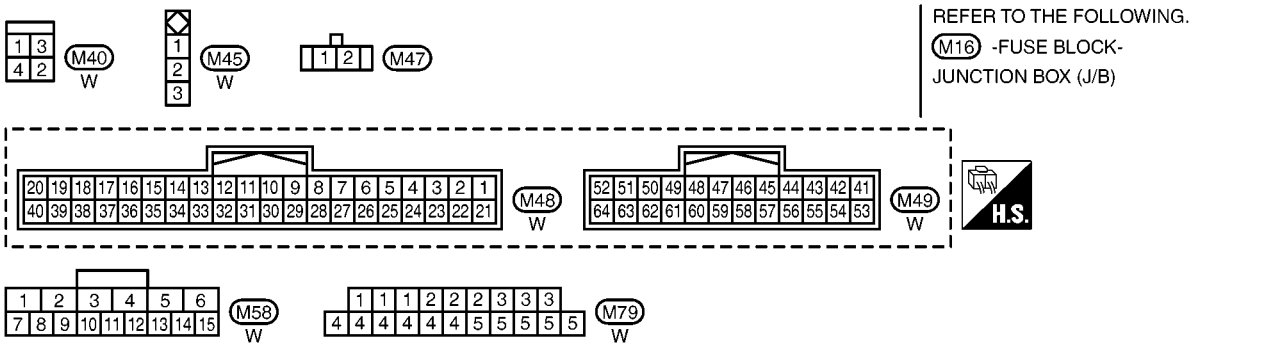

MTC-A/C-02
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
20A 52
10A 41
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11, E14, E16
A/C RELAY
REFER TO PG-POWER.
IGN
+B
AIR COMP
GND (POWER)
GND (SIGNAL)
CAN-H
CAN-L
CPU
3 54 52 58 41
B B R W Y
2C E101 M1 1C
PRE-CEDING PAGE
A R
B W
TO LAN-CAN
REFRIGERANT PRESSURE SENSOR E28
2D M1 E101 1D
3 2 1
W BR Y
5F E50 F1 6F 15F
14F E50 F1
B B B B B B
E25 E26 E40
94 86 46 69 57
CAN-H CAN-L AVCC (PD PRES) PD PRES GND-A
ECM E49, F2
1
COM-PRESSOR F28
3 4 5 6 7 8 E11 B
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 E14 W
51 52 53 54 55 56 57 58 59 60 61 62 E16 W
H.S.
3 2 1 E28 B
1 F28 B
REFER TO THE FOLLOWING.
M1, F1 -SUPER MULTIPLE JUNCTION (SMJ)
E49, F2 -ELECTRICAL UNITS

MJWA0019E

Wiring Diagram —A/C— K9K Engine Models

EJS0057F





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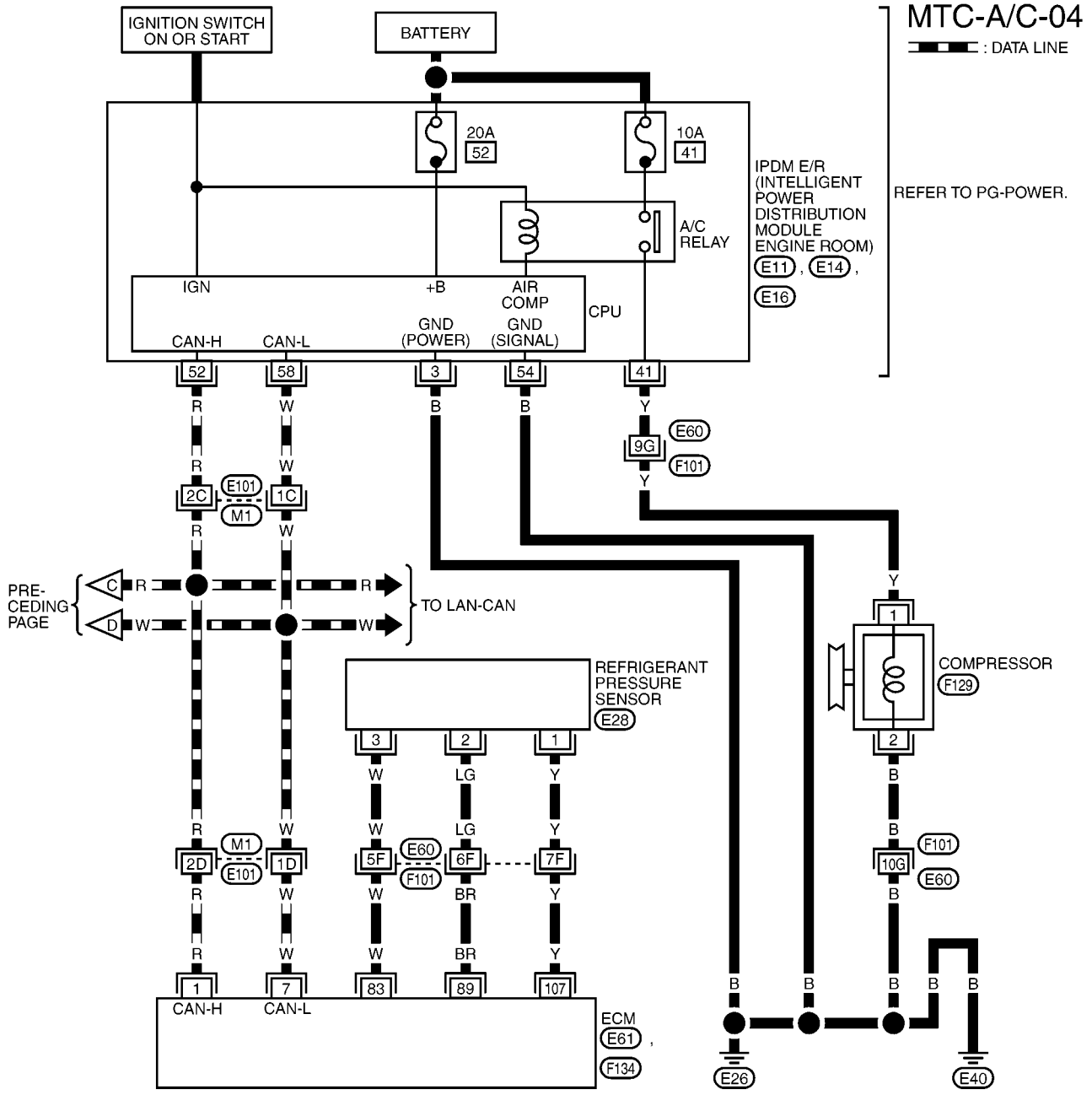

MTC-A/C-04
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
20A 52
10A 41
A/C RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E11, E14, E16
REFER TO PG-POWER.
IGN
+B
AIR COMP
CPU
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
52
58
3
54
41
R
W
B
B
Y
9G
E60
F101
2C
E101
M1
1C
PRE-CEDING PAGE
C
D
TO LAN-CAN
REFRIGERANT PRESSURE SENSOR E28
COMPRESSOR F129
2D
1D
5F
6F
7F
10G
1
7
83
89
107
CAN-H
CAN-L
ECM E61, F134
E26
E40
E11 B
E14 W
E16 W
H.S.
E28
F129 GY
REFER TO THE FOLLOWING.
M1, F101 -SUPER MULTIPLE JUNCTION (SMJ)
E61, F134 -ELECTRICAL UNITS

MJWA0042E

Function Inspection

EJS0057G

1. CHECK FAN SPEED

Operate the fan setting dial to make sure the fan speed changes. Confirm operation for all fan speeds.

OK or NG

OK >> Switch fan speed to “4” and GO TO 2.
NG >> Refer to MTC-29, "Blower Fan Motor System" , MTC-31, "Magnetic Clutch System" .

2. CHECK A/C SWITCH

1. Push A/C switch.
2. Check visually that indicator lamp turns on. Check by sound that compressor is operating.

OK or NG

OK >> GO TO 3.
NG >> Magnetic clutch system malfunction: Refer to MTC-31, "Magnetic Clutch System" .

3. CHECK AIR OUTLET

Operate the mode dial to make sure the air outlet changes.

OK or NG

OK >> GO TO 4.
NG >> Mode door system malfunction: Refer to MTC-54, "Mode Door Cable Adjustment" .

4. CHECK AIR INLET

Operate intake air control lever and listen to intake sound to confirm that inlet switches.

OK or NG

OK >> GO TO 5.
NG >> Intake door system malfunction: Refer to MTC-53, "Intake Door Cable Adjustment" .

5. CHECK WITH TEMPERATURE SETTING LOWERED

1. Turn compressor ON.
2. Set temperature control dial to “FULL COLD”.
3. Confirm cool air blows from outlets.

OK or NG

OK >> GO TO 6.
NG >> Air mix door system malfunction: Refer to MTC-55, "Air Mix Door Cable Adjustment" .

6. CHECK WITH TEMPERATURE SETTING RAISED

1. Warm up the engine.
2. Set temperature control dial to “FULL HOT”.
3. Confirm warm air blows from outlets.

OK or NG

OK >> If all function checks are normal (no phenomena reoccurrence), refer to MTC-19, "DIAGNOSIS CHART BY SYMPTOM" and perform appropriate diagnosis.
NG >> Air mix door system malfunction: Refer to MTC-55, "Air Mix Door Cable Adjustment" .

Blower Fan Motor System
INSPECTION PROCEDURE

SMA for VIN >SJN**AK12U1309269

EJS0057H

Symptom: Blower fan motor does not operate.

1. START INSPECTION

Check blower fan motor operation at each fan speed.

1 : Blower fan motor does not operate at all.

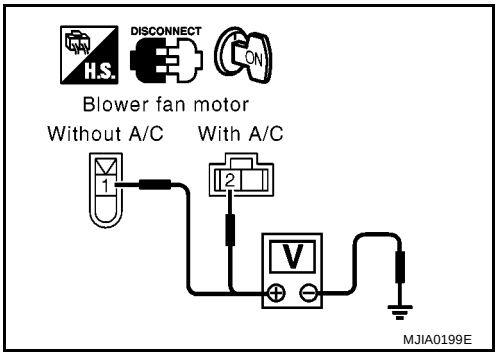
2 : Blower fan motor does not operate at one of speeds 1 - 4.

Do inspection results indicate 1 or 2 above?

1 >> GO TO 2.
2 >> GO TO 6.

2. CHECK POWER SUPPLY CIRCUIT

Disconnect blower fan motor connector, turn ignition switch ON, and check voltage between blower fan motor connector terminal and ground.



Connector terminal		Voltage
Blower fan motor	Ground	Battery voltage
1 (Without air conditioner)		
2 (With air conditioner)		

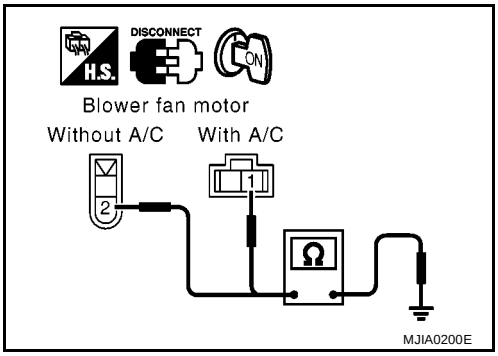
OK or NG

OK >> GO TO 3.
NG >> Check power supply circuit and 15A fuses [Nos. 9 and 10, located in the fuse block (J/B)]. Refer to PG-4, "POWER SUPPLY ROUTING" .

- If OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

3. CHECK CIRCUIT CONTINUITY

1. Turn the fan setting dial (fan switch) to any position except OFF.
2. Check continuity between blower fan motor connector terminal and ground.



Connector terminal		Continuity
Blower fan motor	Ground	Yes
2 (Without air conditioner)		
1 (With air conditioner)		

Does continuity exist?

YES >> GO TO 4.
NO >> GO TO 5.

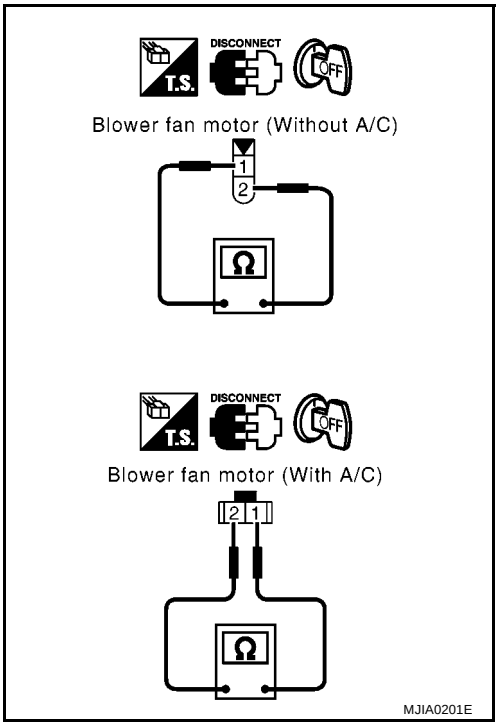
4. CHECK BLOWER FAN MOTOR

Disconnect the blower fan motor connector, and check continuity between blower fan motor terminals 1 and 2.

Connector terminal		Continuity
Blower fan motor		
1	2	Yes

Does continuity exist?

YES >> End of trouble diagnosis
NO >> Replace the blower fan motor.



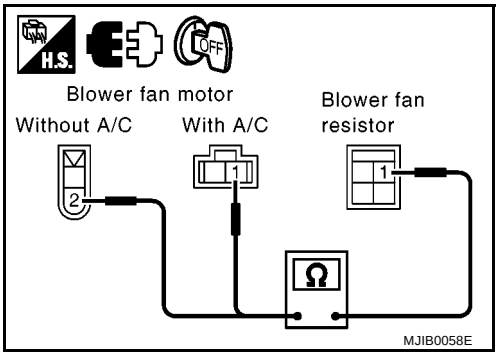
5. CHECK CIRCUIT CONTINUITY

Check continuity between blower fan motor connector terminal and blower fan resistor terminal 1.

Connector terminal		Continuity
Blower fan motor	Blower fan Resistor	
2 (Without air conditioner)	1	Yes
1 (With air conditioner)		

Does continuity exist?

YES >> GO TO 6.
NO >> Repair harness or connector.



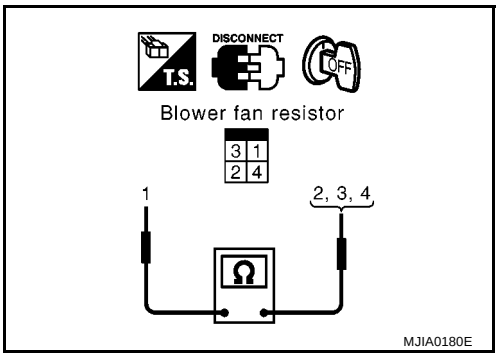
6. CHECK BLOWER FAN RESISTOR

Disconnect blower fan resistor connector, and check continuity between blower fan resistor terminals 1 and 2, 3, 4.

Connector terminal		Continuity
Blower fan resistor		
1	2	Approx. 0.32Ω
	3	Approx. 1.4Ω
	4	Approx. 2.7Ω

Does continuity exist?

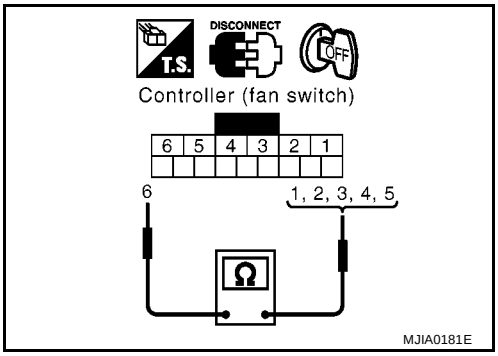
YES >> GO TO 7.
NO >> Replace blower fan resistor.



7. CHECK FAN SWITCH

Disconnect controller connector, and check continuity between controller terminals 1 and 2, 3, 4, 5, 6.

Connector terminal		Condition	Continuity
Controller			
6	1	Fan: OFF	Yes
	5	Fan: Speed 4	
	4	Fan: Speed 3	
	3	Fan: Speed 2	
	2	Fan: Speed 1	



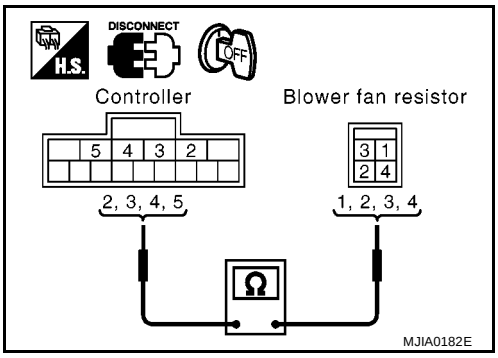
OK or NG

OK >> GO TO 8.
NG >> Replace controller.

8. CHECK CIRCUIT CONTINUITY

Check continuity between the controller and the blower fan resistor terminals.

Connector terminal		Continuity
Controller	Blower fan Resistor	
5	1	Yes
4	2	
3	3	
2	4	



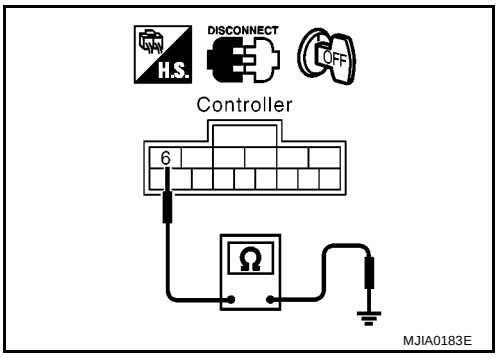
Does continuity exist?

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK FAN SWITCH GROUND CIRCUIT

Check continuity between controller terminal 6 and ground.

Connector terminal		Continuity
Controller	Ground	Yes
6		



Does continuity exist?

YES >> End of trouble diagnosis
NO >> Repair harness or connector.

Magnetic Clutch System

EJS0057I

INSPECTION PROCEDURE

Symptom: When A/C switch and fan switch are turned ON, magnetic clutch does not operate.

1. CHECK WITH AUTO ACTIVE TEST MODE

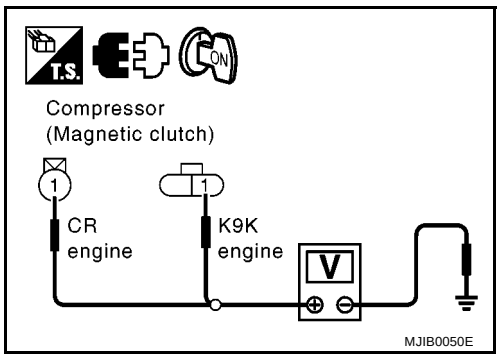
Perform auto active test to make sure magnetic clutch operates. Refer to PG-42, "Auto Active Test" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. CHECK MAGNETIC CLUTCH VOLTAGE

Disconnect compressor connector, turn ignition switch ON, and check voltage between compressor terminal 1 and ground.



Connector terminal		Voltage
Compressor	Ground	Battery voltage
1		

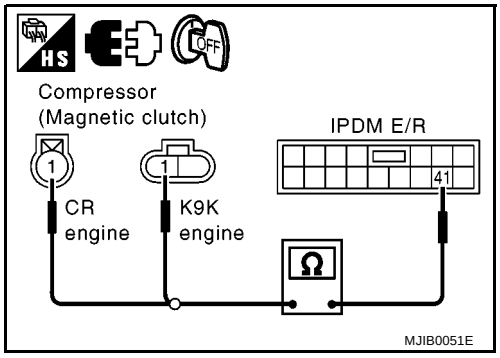
OK or NG

OK >> ● GO TO 4. (CR engine models)
● GO TO 5. (K9K engine models)

NG >> After Checking the Fuse (#41), GO TO 3. For the Fuse Block Layout, Refer to PG-4, "POWER SUPPLY ROUTING" .
● If fuse is OK, check for open circuit in harness.
● If a fuse is NG, determine the possible cause, repair circuit and replace blown fuse.

3. CHECK CIRCUIT CONTINUITY

Disconnect the IPDM E/R connector, and check continuity between compressor terminal 1 and IPDM E/R terminal 41.



Connector terminal		Continuity
Compressor	IPDM E/R	Yes
1	41	

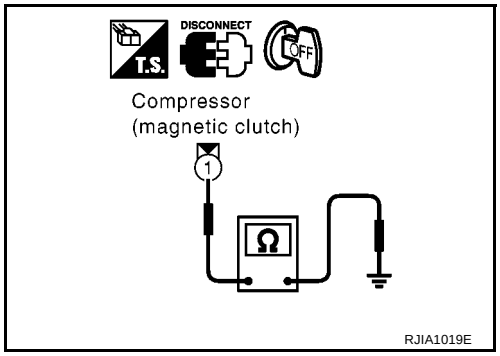
Does continuity exist?

YES >> ● GO TO 4. (CR engine models)
● GO TO 6. (K9K engine models)

NO >> Repair harness or connector.

4. CHECK MAGNETIC CLUTCH

Check continuity between compressor terminal 1 and ground.



Connector terminal		Continuity
Compressor	Ground	Yes
1		

Does continuity exist?

YES >> Apply battery voltage to magnetic clutch directly and check operation sound.
1. If inspection results are NG, replace magnetic clutch.
2. If magnetic clutch is normal, replace IPDM E/R.

NO >> Replace magnetic clutch.

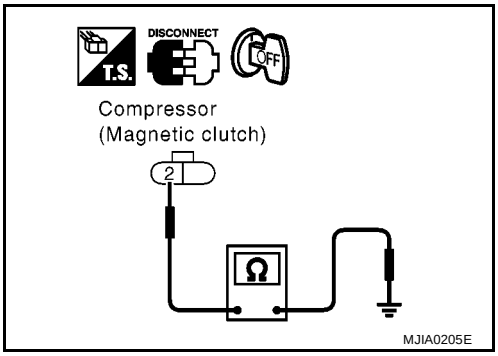
5. CHECK GROUND CIRCUIT

Check continuity between compressor terminal 2 and ground.

Connector terminal		Continuity
Compressor	Ground	Yes
2		

Does continuity exist?

YES >> GO TO 6.
NO >> Repair harness or connector.



6. CHECK MAGNETIC CLUTCH

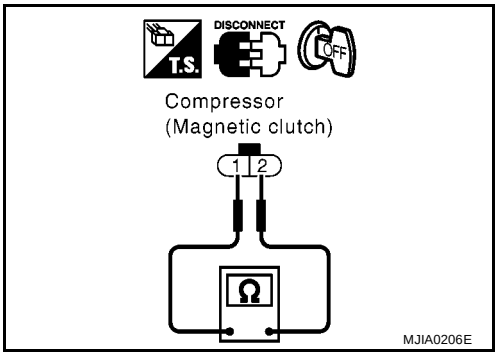
Check continuity between compressor terminals 1 and 2.

Connector terminal		Continuity
Compressor		Yes
1	2	

Does continuity exist?

YES >> Apply battery voltage to magnetic clutch directly and check operation sound.
1. If inspection results are NG, replace magnetic clutch.
2. If magnetic clutch is normal, replace IPDM E/R.

NO >> Replace magnetic clutch.



7. CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to MTC-14, "REFRIGERANT PRESSURE SENSOR" .

OK or NG

OK >> Connect compressor and IPDM E/R connectors, then GO TO 8.
NG >> Repair or replace parts according to the inspection results.

8. CHECK BCM INPUT SIGNAL

With CONSULT-II

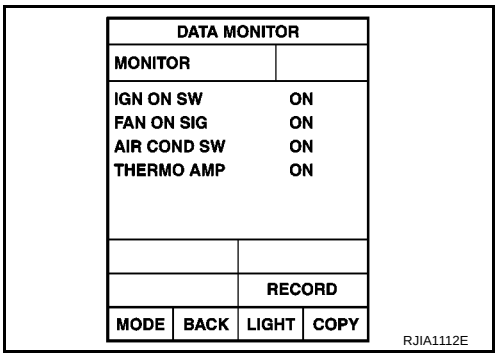
- Check if the compressor ON-OFF, fan ON-OFF and thermal amplifier ON-OFF using the BCM can “air conditioner” data monitor Refer to MTC-17, "CONSULT-II Functions" .

Without CONSULT-II

- GO TO 9.

OK or NG

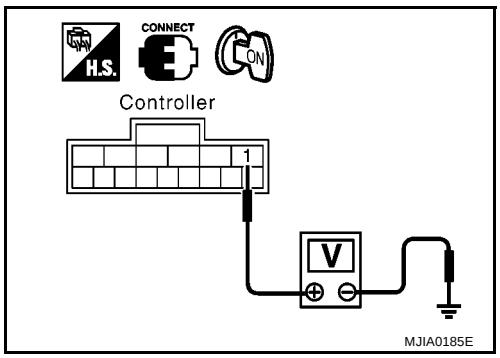
OK >> GO TO 21.
NG >>
- Blower fan switch malfunction: GO TO 9.
- A/C switch malfunction: GO TO 13.
- Thermal amplifier malfunction: GO TO 17.



9. CHECK FAN ON SIGNAL

Check voltage between controller terminal 1 and ground.

Connector terminal		Condition	Voltage
Controller	Ground	Fan: ON	Approx. 12V
1		Fan: OFF	Approx. 1V



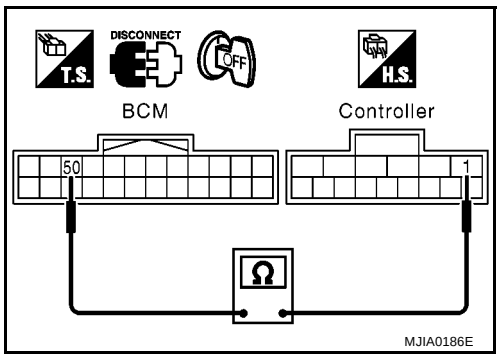
OK or NG

OK >> GO TO 13.
NG >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY

Disconnect controller and BCM connectors, and check continuity between BCM terminal 50 and controller terminal 1.

Connector terminal		Continuity
BCM	Controller	
50	1	Yes



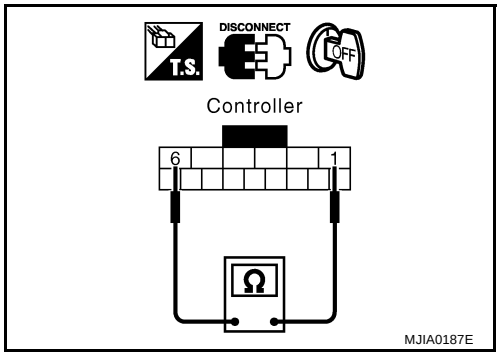
Does continuity exist?

YES >> GO TO 11.
NO >> Repair harness or connector.

11. CHECK FAN SWITCH

Check continuity between controller terminals 1 and 6.

Connector terminal		Condition	Continuity
Controller			
1	6	Fan: OFF	Yes



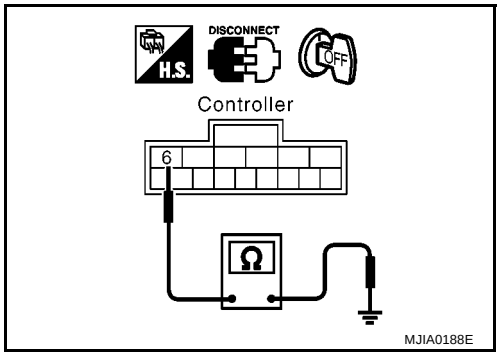
Does continuity exist?

YES >> GO TO 12.
NO >> Replace controller.

12. CHECK GROUND CIRCUIT

Check continuity between controller terminal 6 and ground.

Connector terminal		Continuity
Controller	Ground	Yes
6		



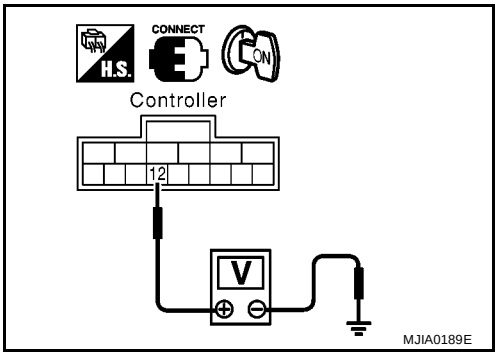
Does continuity exist?

YES >> Connect controller connector, and GO TO 13.
NO >> Repair harness or connector.

13. CHECK AIR CONDITIONER SIGNAL

Check voltage between controller terminal 12 and ground.

Connector terminal		Voltage
Controller	Ground	Battery voltage
12		



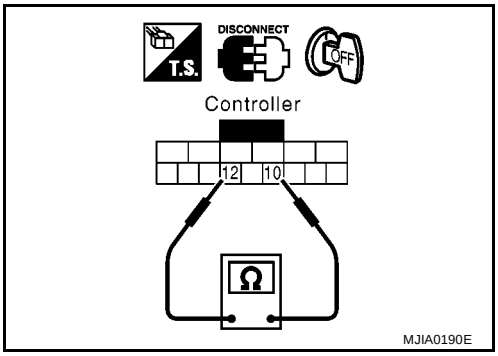
OK or NG

OK >> GO TO 14.
NG >> GO TO 16.

14. CHECK A/C SWITCH

Check continuity between controller terminals 10 and 12.

Connector terminal		Condition	Continuity
Controller			
10	12	A/C switch: Only during operation	Yes



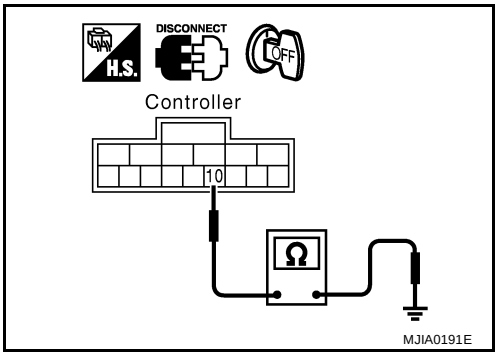
OK or NG

OK >> GO TO 15.
NG >> Replace controller.

15. CHECK GROUND CIRCUIT

Check continuity between controller terminal 10 and ground.

Connector terminal		Continuity
Controller	Ground	Yes
10		



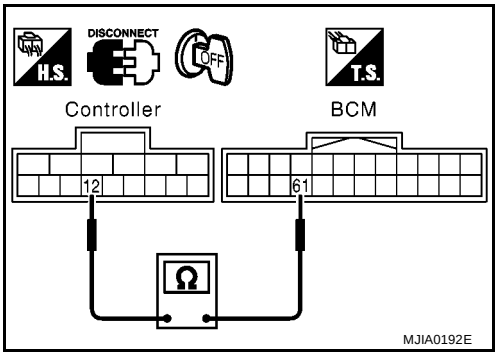
Does continuity exist?

YES >> GO TO 17.
NO >> Repair harness or connector.

16. CHECK CIRCUIT CONTINUITY

Disconnect BCM connector and check continuity between controller terminal 12 and BCM terminal 61.

Connector terminal		Continuity
Controller	BCM	Yes
12	61	

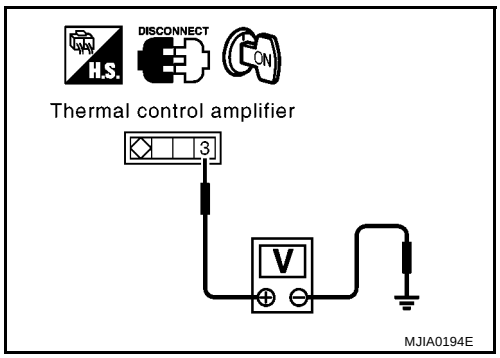


Does continuity exist?

YES >> Replace BCM.
NO >> Repair harness or connector.

17. CHECK 1: THERMAL CONTROL AMPLIFIER POWER SUPPLY CIRCUIT

Disconnect thermal control amplifier connector, turn ignition switch ON, and check voltage between thermal control amplifier terminal 3 and ground.



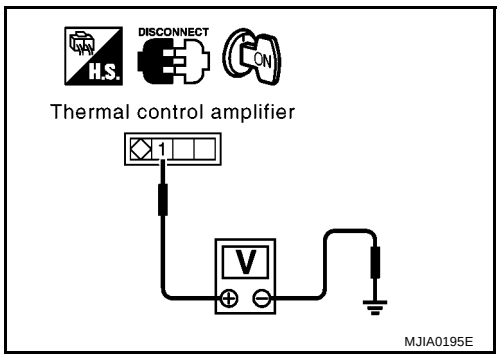
Connector terminal		Voltage
Thermal control amplifier	Ground	Approx. 12V
3		

OK or NG

OK >> GO TO 18.
NG >> GO TO 20.

18. CHECK 2: THERMAL CONTROL AMPLIFIER POWER SUPPLY CIRCUIT

Check voltage between thermal control amplifier terminal 1 and ground.



Connector terminal		Voltage
Thermal control amplifier	Ground	Battery voltage
1		

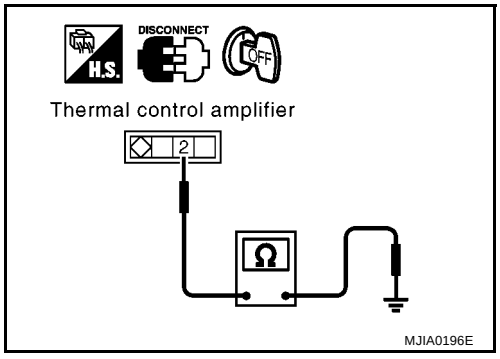
OK or NG

OK >> GO TO 19.
NG >> Check fuse (#16). For the Fuse Block Layout, Refer to PG-4, "POWER SUPPLY ROUTING" .

- If fuse is OK, check for open circuit in harness.
- If a fuse is NG, determine the possible cause, repair circuit and replace blown fuse.

19. CHECK GROUND CIRCUIT

Check continuity between thermal control amplifier terminal 2 and ground.



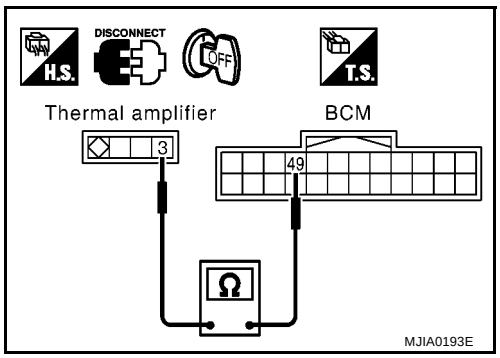
Connector terminal		Continuity
Thermal control amplifier	Ground	Yes
2		

Does continuity exist?

YES >> Replace thermal control amplifier.
NO >> Repair harness or connector.

20. CHECK CIRCUIT CONTINUITY

Disconnect BCM connector, and check continuity between thermal control amplifier terminal 3 and BCM terminal 49.



Connector terminal		Continuity
Thermal control amplifier	BCM	
3	49	Yes

Does continuity exist?

YES >> Replace BCM.
NO >> Repair harness or connector.

21. CHECK CAN COMMUNICATION CIRCUIT

Check the CAN communication between the BCM and ECM control unit, and the ECM control unit and IPDM E/R. Refer to BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" and LAN-6, "CAN Communication Unit" .

OK or NG

OK >> End of trouble diagnosis
NG >> Repair or replace parts based on the diagnosis results.

Insufficient Cooling

EJS0057J

CHECK FUNCTION (FOR CR ENGINE)

Inspection Procedure

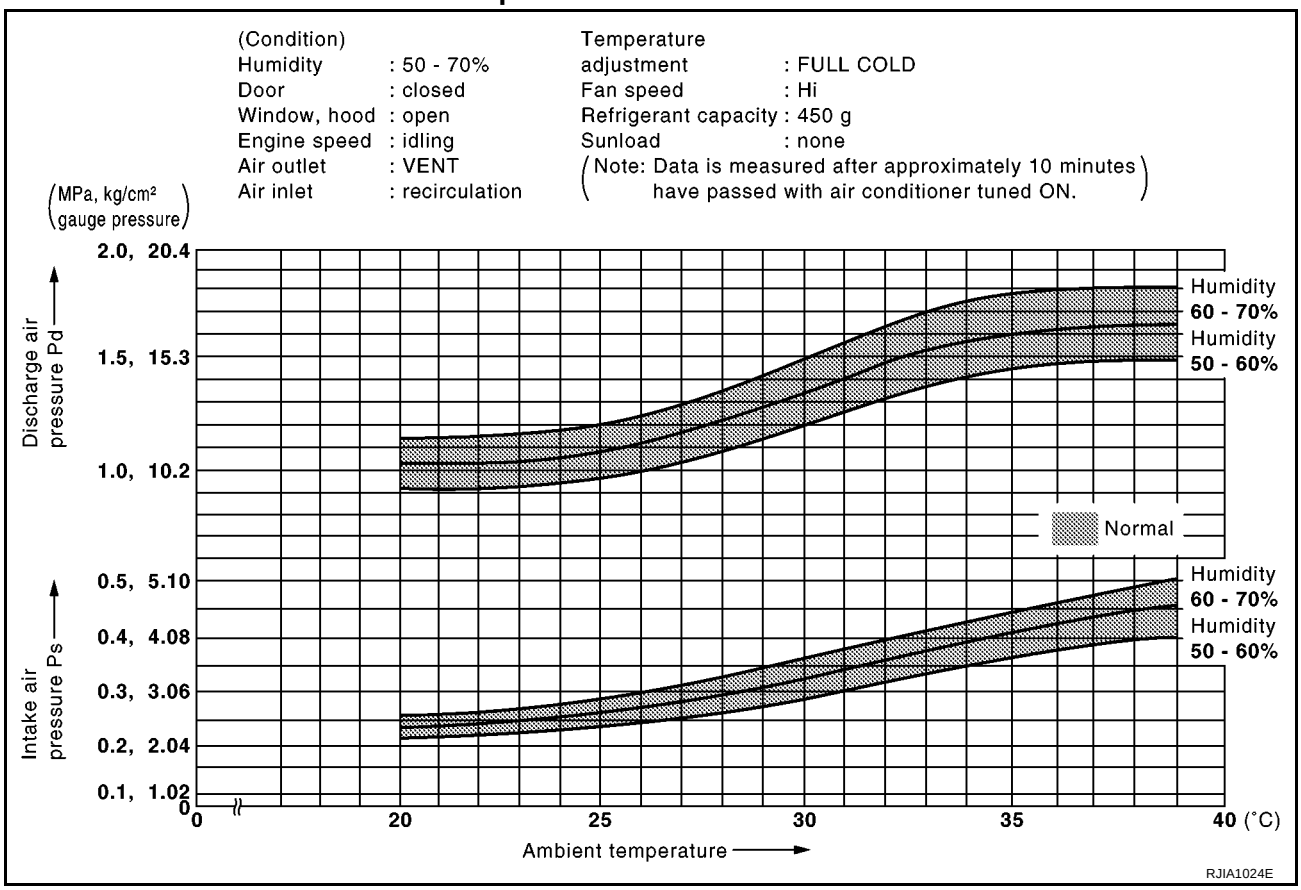
1. Connect manifold gauge to vehicle cooler system (service valve).
2. Attach a psychrometer to blower unit air inlet (under glove box). Attach a dry-bulb thermometer to right-center of ventilator grille.
3. Start and warm up the engine.
4. After warming-up engine, make sure engine speed is the specified idle speed.
5. Operate compressor. Adjust controller to match conditions below.

Fan speed	**: HI**
Inlet	**: Recirculation (REC)**
Outlet	**: Ventilation (VENT)**
Predetermined temperature	**: FULL COLD**

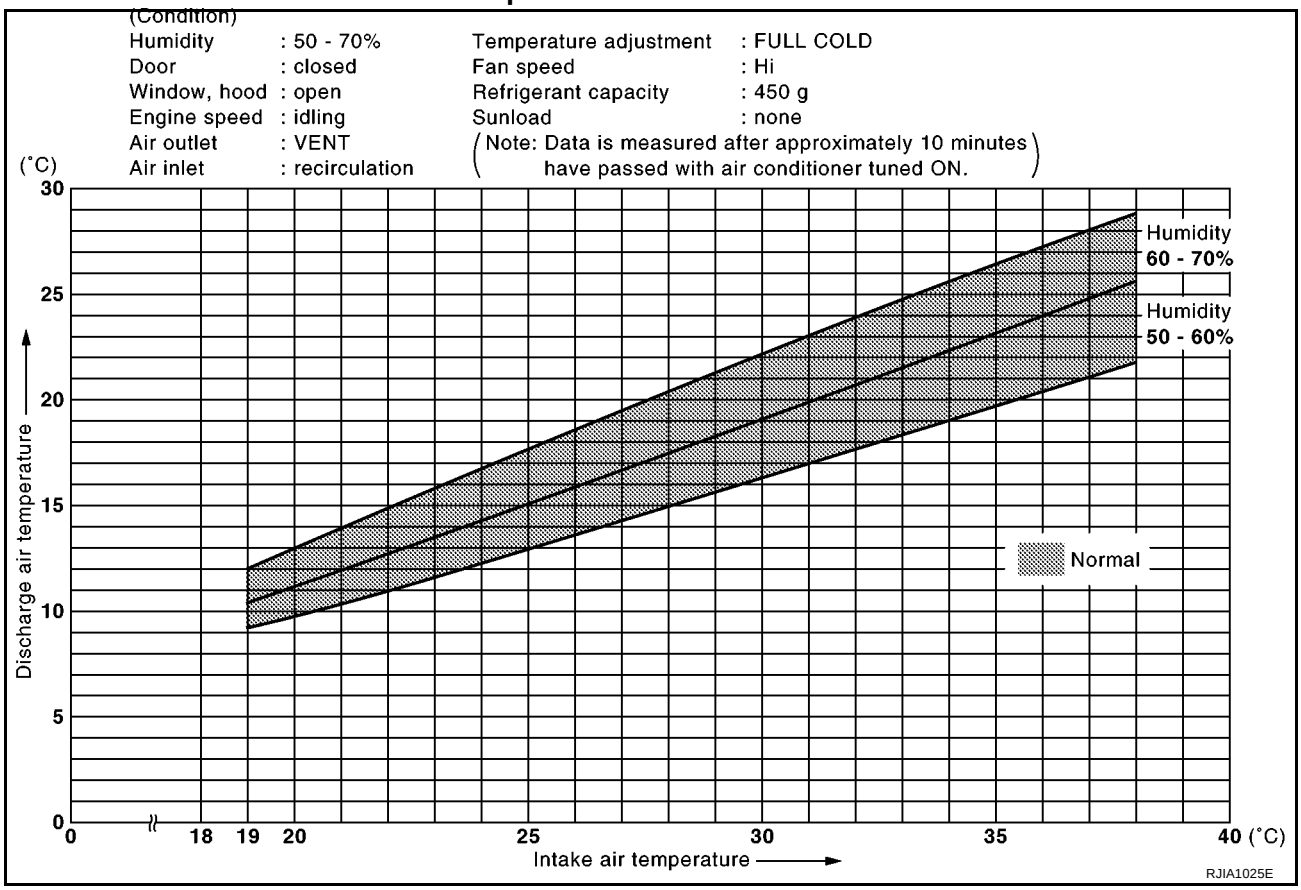
6. Fully open the hood and door windows, and close all the doors.
7. Keep this state until the cooler system becomes stable (after approximately 10 minutes).
8. Keep the engine speed at idle.
9. Measure the temperature and humidity at the air inlets, temperature at the air outlets, and the high-pressure and low-pressure of the cooler cycle, and compare them to “Ambient temperature - pressure characteristic”, “Intake air temperature - outlet air temperature characteristic” for estimating.

Performance Curve

Ambient Temperature - Pressure Characteristics



Intake Air Temperature - Pressure Characteristics



DIAGNOSIS BY PRESSURE GAUGE

Connect a manifold gauge to the cooler cycle (service valve), and determine faulty parts and possible causes by pressure in the cooler cycle, then troubleshoot.

Symptom	Cycle status	Possible causes	Action
High-pressure and low-pressure are both high.	They return to normal when condenser is cooled with water.	Insufficient cooling of condenser ● Operation malfunction of radiator and condenser fan ● Improper installation of air guide ● Clogged condenser or dirty fins	● Repair or replace as necessary ● Clean and repair condenser fins.
		Excessively charged refrigerant	Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.
	When the compressor has been stopped, pressure drops quickly by approximately 2 kg/cm^2 , and then decreases gradually.	Mixed air in the cooler system	Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.
	Temperature at low-pressure pipe is lower than that at evaporator outlet, or low-pressure pipe becomes frosted.	Expansion valve opened too far (excessive refrigerant flow).	Replace expansion valve.
High-pressure is extremely high.	Temperature differences occur at points where high-pressure pipe is crushed or clogged.	Crushed points or clogs in high-pressure pipe between compressor and condenser	Repair or replace as necessary
High-pressure and low-pressure are both low (low-pressure occasionally becomes minus).	Evaporator outlet is not cold. Frost forms on evaporator inlet.	Expansion valve is blocked. ● Gas leakage around sensor unit. ● Clogged by foreign material	Remove foreign materials from expansion valve or replace expansion valve.
	Temperature differences occur at the outlet and inlet pipe of the liquid tank or the liquid tank becomes frosted.	Liquid tank malfunction (strainer clogged)	Replace liquid tank
	Evaporator becomes frosted.	Evaporator fins are clogged or crushed.	Repair or replace.
		Insufficient airflow	Refer to MTC-29, "Blower Fan Motor System" .
	Some temperature difference occurs between high-pressure and low-pressure pipes of the compressor.	Insufficient refrigerant amount	● Check for refrigerant leaks. ● Discharge refrigerant completely, evacuate again, and recharge with proper amount of refrigerant.

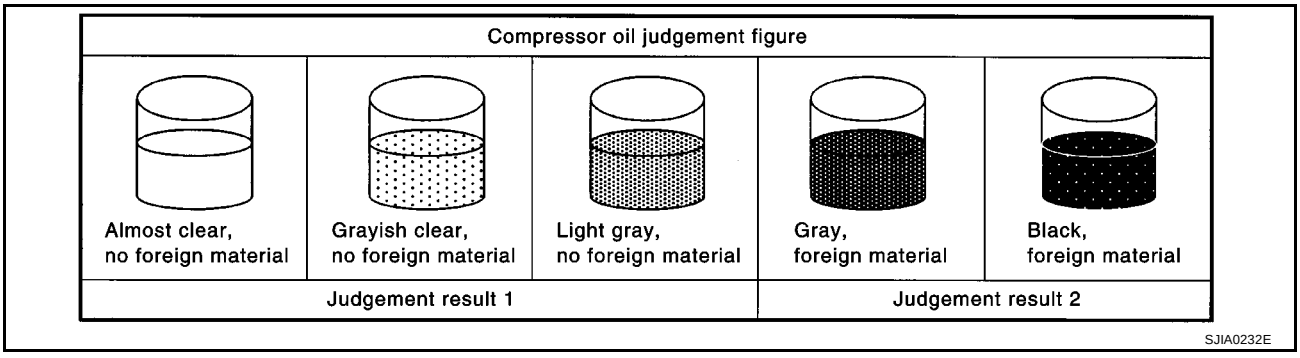
Symptom	Cycle status	Possible causes	Action
Occasionally high-pressure becomes low, and low-pressure becomes minus.	Sometimes evaporator outlet is not cold and sometimes frost forms on evaporator inlet.	Water mixed in cooler system. (Blockage caused by moisture freezing at the expansion valve.)	Discharge refrigerant completely, evacuate again to remove all moisture, and recharge with proper amount of refrigerant. Be certain to replace liquid tank.
High-pressure is low, and low-pressure is high.	When compressor is stopped, pressure equalizes quickly and there is no temperature difference between compressor high-pressure pipes and low-pressure pipes.	Compressor malfunction (improper compression) ● Damage or breakage of valve ● Gasket worn or damaged	Replace compressor.

DIAGNOSIS OF COMPRESSOR

If there is a compressor unit malfunction (internal noise, insufficient cooling), follow table below and perform trouble diagnosis.

Symptom	Checklist	Inspection Method	Result	Action
Noise (rattling or rolling sound) from compressor unit when A/C is ON.	Cooler system internal pressure	Check with a manifold gauge.	Both high- and low-pressure sides are high. (Note 2)	Recharge with proper amount of refrigerant.
			High/low-pressures hunt. (Note 2)	Replace compressor only.
	Check compressor oil condition.	Sample compressor oil and judge.	Refer to the criteria shown in compressor lubricant.	Diagnostic Result 1: Replace compressor only. Diagnostic result 2: Replace compressor and liquid tank.
Insufficient cooling (Note 1)	Compressor body	Check rotation of compressor. If seized or stuck, sample compressor oil and judge.		
	Cooler system internal pressure	Check with a manifold gauge. If the difference between high-pressure and low-pressure is small or almost the same, sample compressor oil and judge.		
Outlet air temperature rises temporarily while driving. (Note 2)	—	—	—	Replace compressor only.

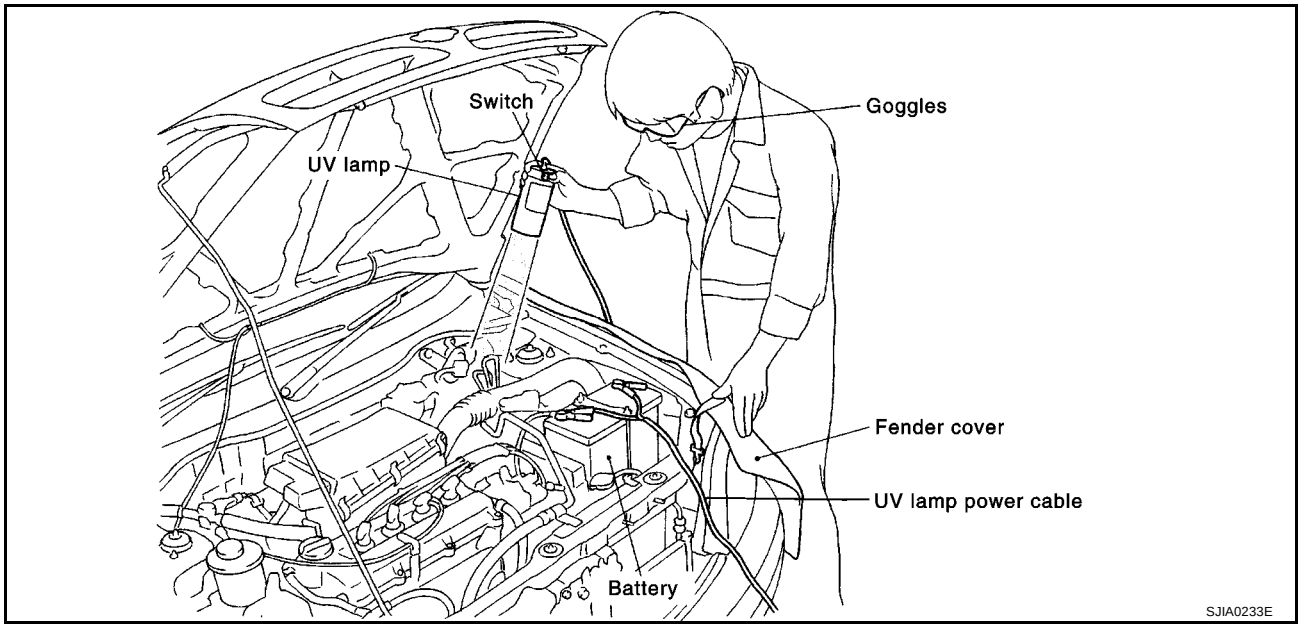
Note 1: First conduct inspection according to trouble diagnosis for each malfunction.
Note 2: Applicable only to variable-capacity compressor



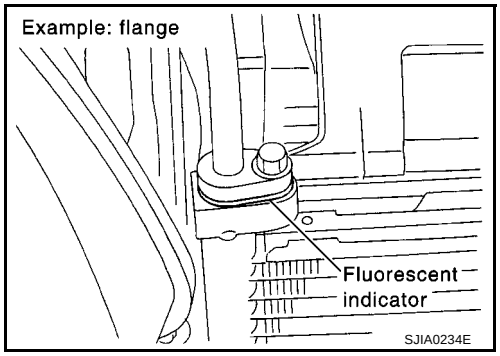
Detecting Leaks With Fluorescent Indicator

EJS0057K

METHOD FOR DETECTING REFRIGERANT LEAKAGE.



1. Wear goggles provided with the fluorescent detector.
2. Connect the UV lamp power cable to the negative battery terminal.
3. Press UV lamp switch. Check for cooler system leaks. (Light green fluorescent will appear at the leak.)
4. Repair or replace parts with refrigerant leaks and wipe off the fluorescent indicator.



CAUTION:

Completely wipe off all fluorescent indicators. Use a cotton swab or something similar to remove indicator from gaps between parts, screw threads, and similar places.

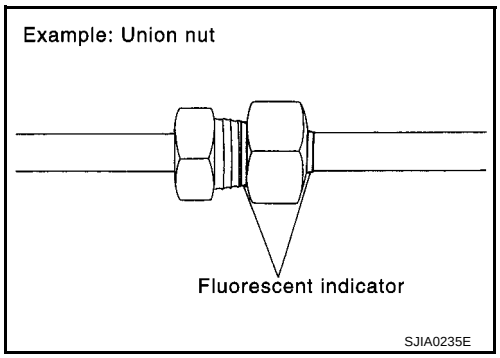
5. After finishing work, use a UV lamp to make sure no fluorescent indicator remains.

CAUTION:

- **Do not look directly into the UV lamp light source.**
- **For continuous operating time of UV lamp and other details, follow the Owner's Manual when performing the operation.**
- **Dust, dirt, and adhesive of packing materials used in condenser, evaporator, and other locations may fluoresce. Be careful to avoid misidentifying leaks.**

Inspection Procedure

- Shine UV lamp on pipe joints from different angles to make sure there are no leaks.
- Use a cotton swab or something similar to wipe water off of drain hoses. By shining UV lamp, a check can also be made to detect leaks from evaporator.
- Use a mirror to check for refrigerant leaks in difficult to see areas.



CONTROL UNIT

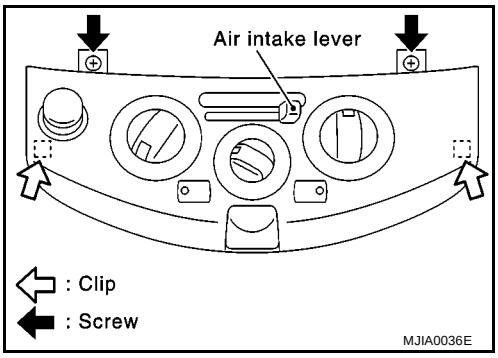
PFP:27500

Removal and Installation

EJS002GE

REMOVAL

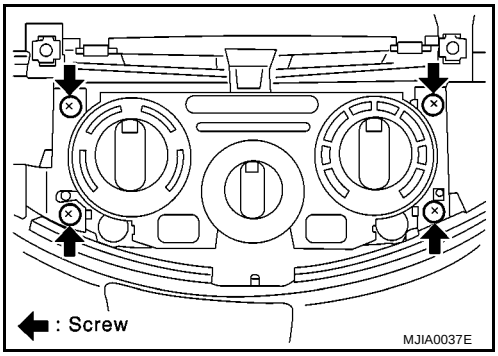
1. Remove cluster lid “C”. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove the air intake lever.
3. Remove the screws and clips, and then remove the air conditioner finisher.



4. Remove the air mix door cable, mode door cable, and intake door cable from the air conditioner unit.
5. Remove screws, and pull out controller.
6. Disconnect connector and remove controller.

CAUTION:

Adjust the door cables during installation. Refer to MTC-53, "Intake Door Cable Adjustment" , MTC-54, "Mode Door Cable Adjustment" and MTC-55, "Air Mix Door Cable Adjustment" .

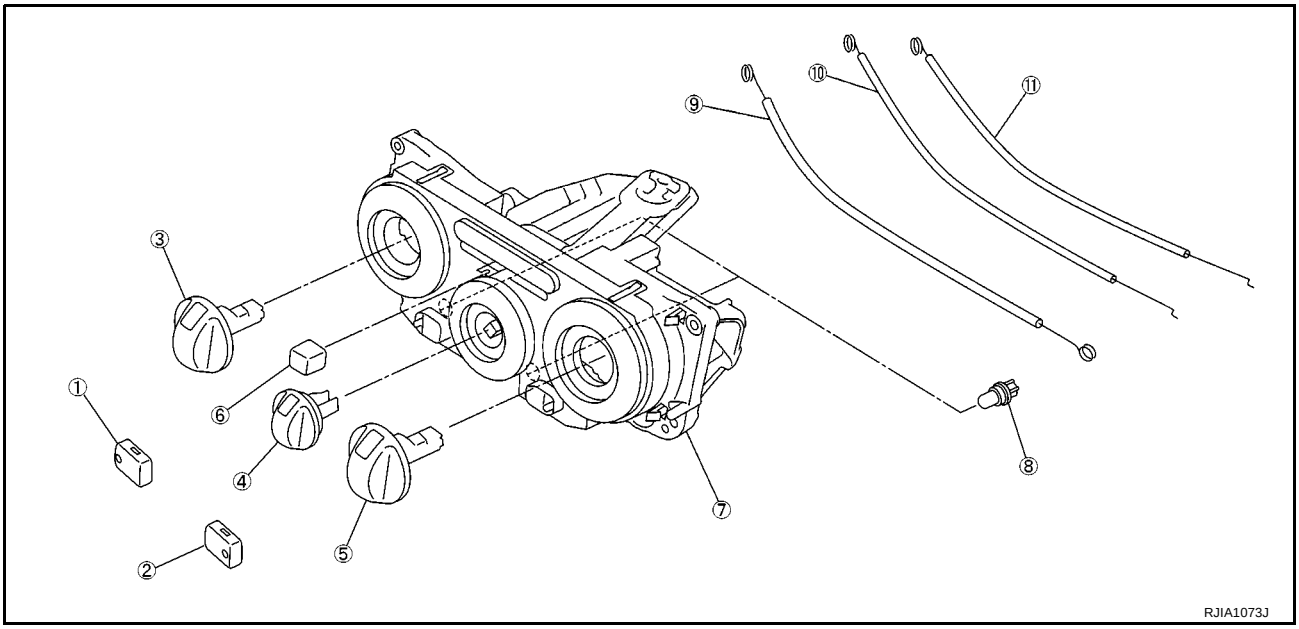


INSTALLATION

Install in the reverse order of removal.

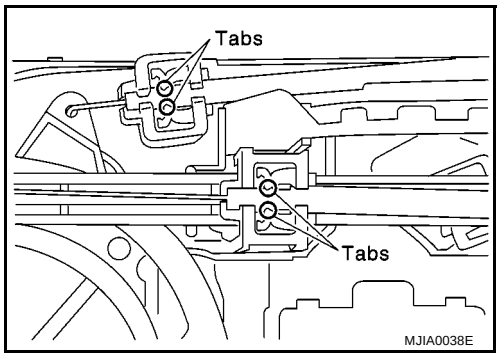
Disassembly and Assembly

EJS002GF



1. Rear window defogger switch
2. Air conditioner switch
3. Mode dial
4. Fan control dial
5. Temperature control dial
6. Air intake lever
7. Controller
8. Illumination bulb
9. Mode door cable
10. Intake door cable
11. Air mix door cable

NOTE:
Install the inner cable of each door cable to the corresponding lever, as shown in the figure. Press the outer cable until it hooks on the tabs and becomes fixed.



A/C UNIT ASSEMBLY

PFP:27210

Removal and Installation

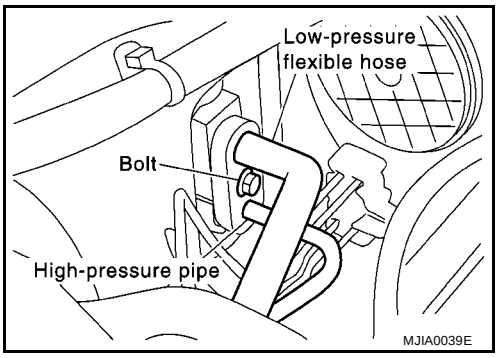
EJS002GG

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Drain engine coolant.
3. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.

CAUTION:

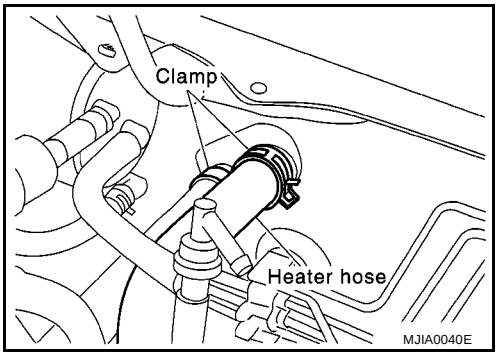
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



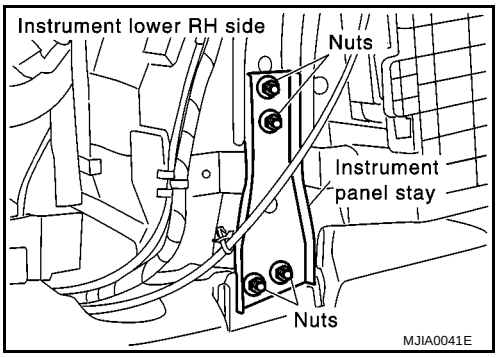
4. Pull out the heater hoses from the heater core.

CAUTION:

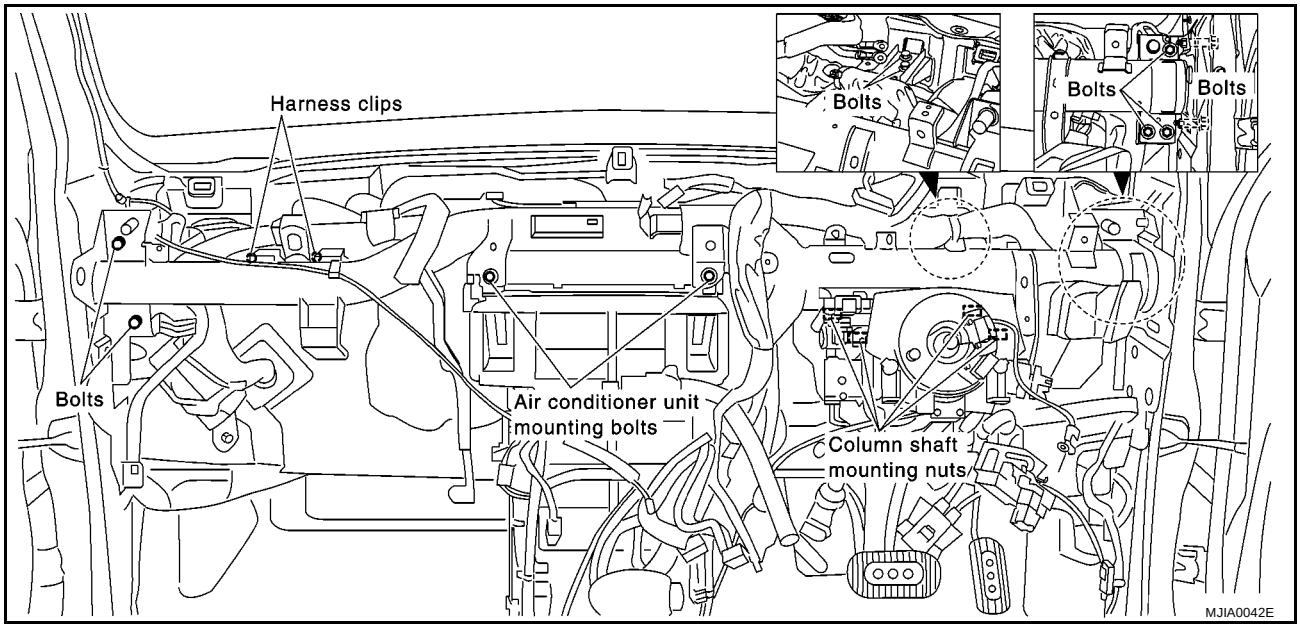
- **Some coolant may spill when heater hoses are disconnected.**
- **Close off the coolant inlet and outlet on the heater core (2 locations) with waste.**



5. Remove instrument panel. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
6. Remove the vehicle harness clips and then remove the instrument panel stay.



NOTE:
This illustration is for RHD model. The layout for LHD model is symmetrically opposite.



7. Remove the ventilator duct mounting screws and clips.
8. Remove the air conditioner mounting bolts, steering member mounting bolts, column shaft mounting bolts, and the harness clips.
9. Remove the BCM. Refer to BCS-31, "Removal and Installation of BCM" .
10. Remove the steering member, and then remove the air conditioner unit.

INSTALLATION

CAUTION:

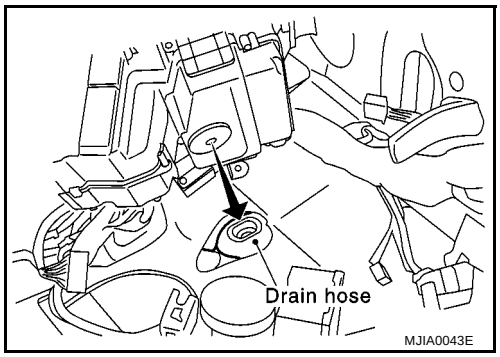
- **Replace all O-rings on the pipes with new ones. Apply a coat of compressor lubricant prior to installation.**
- **After charging with refrigerant, check for refrigerant leaks.**

1. Install the air conditioner unit.

   CAUTION:
   Confirm that the air conditioner drain and drain hose positions match up.

   Air conditioner unit mounting bolt.

   Tightening torque : 5.98 - 7.65 N·m (0.61 - 0.78 kg-m, 53 - 67 in-lb)



2. Perform removal steps 3-10 in reverse order.

   Steering member mounting nut and bolt

   Tightening torque :11 - 13 N·m (1.1 - 1.4 kg-m, 8.2 - 9.5 ft-lb)

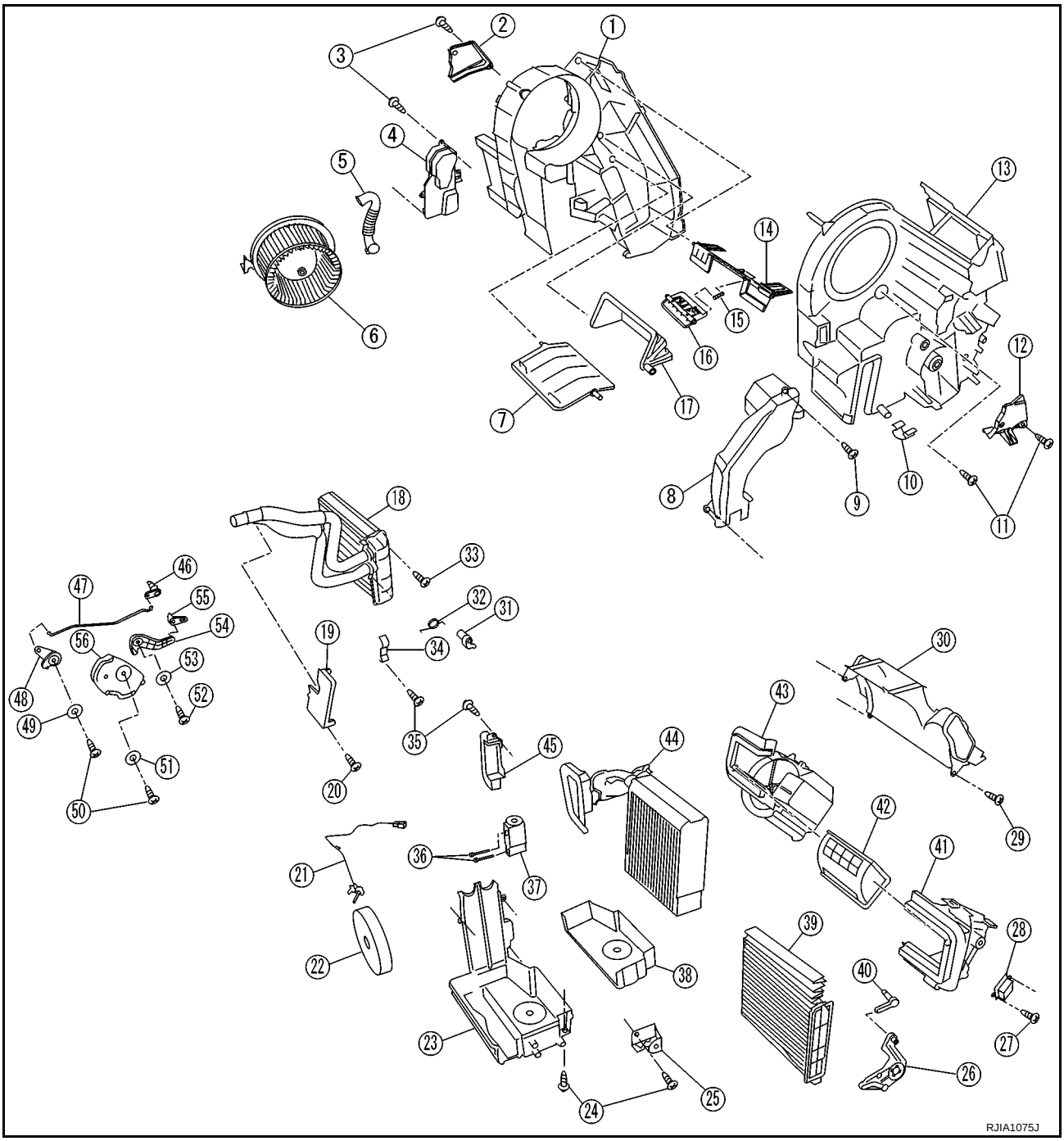
   Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.

   Tightening torque :2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

3. Fill engine coolant.
4. Charge refrigerant using refrigerant recovery unit [for HFC-134a(R-134a)].

Disassembly and Assembly

EJS002GH



1. Blower fan motor case (RH)	2. Cover (RH)	3. Screw
4. Foot duct (RH)	5. Cooling hose	6. Blower fan motor
7. Air mix door	8. Foot duct (LH)	9. Screw
10. Clips	11. Screw	12. Cover (LH)
13. Blower fan motor case (LH)	14. Ventilation door	15. Defroster rod
16. Deflator door	17. Foot door	18. Heater core
19. Heater pipe cover	20. Screw	21. Thermal control amplifier
22. Heater pipe packing	23. Lower blower fan motor case	24. Screw
25. Bracket	26. Intake door link	27. Screw
28. Blower fan resistor	29. Screw	30. Attachment case
31. Air mix door lever	32. Spring	33. Screw
34. Heater pipe clip	35. Screw	36. Bolt

37. Expansion valve
38. Insulator
39. Air conditioner filter
40. Intake lever
41. Intake case (LH)
42. Intake door
43. Intake case (RH)
44. Evaporator
45. Expansion valve cover
46. Ventilation/ Deflator lever
47. Ventilation/ Deflator rod
48. Ventilation/ Deflator link
49. Washer
50. Screw
51. Washer
52. Screw
53. Washer
54. Foot link
55. Foot lever
56. Main link

HEATER CORE

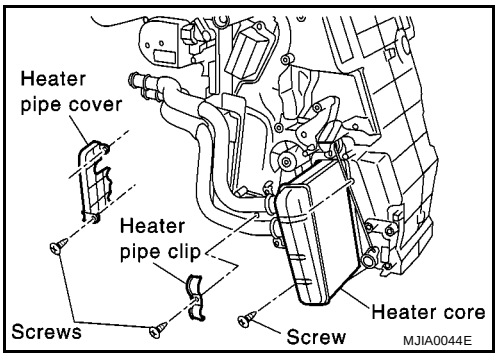
PFP:27140

Removal and Installation

EJS002GI

REMOVAL

1. Remove the air conditioner unit. Refer to MTC-45, "A/C UNIT ASSEMBLY" .
2. Remove the foot duct (LH), screws, and heater pipe cover.
3. Remove the main link and ventilation/defroster link.
4. Remove the heater pipe clip, and then pull out the heater core from air conditioner unit.



INSTALLATION

Install in the reverse order of removal.

BLOWER MOTOR

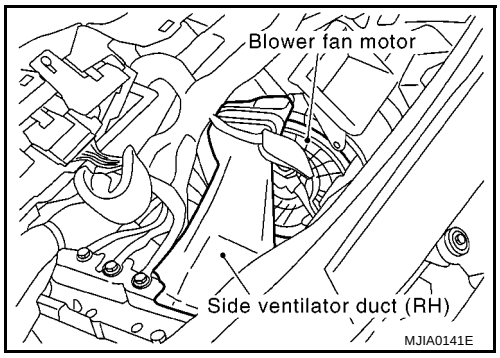
PFP:27226

Removal and Installation

EJS002GJ

REMOVAL

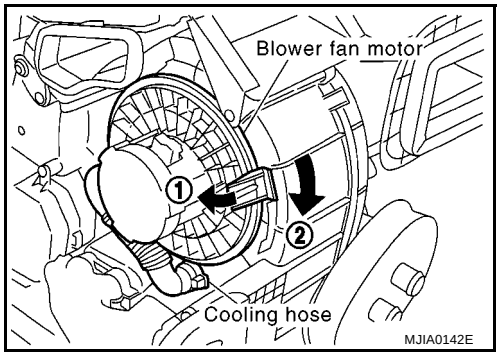
1. Remove instrument panel assembly. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove the side ventilator duct (RH). Refer to MTC-59, "SIDE VENTILATOR DUCT" .



3. Disconnect the cooling hose, and remove the blower fan motor.

CAUTION:

When the blower fan and blower fan motor are assembled, the balance is adjusted, so do not replace the individual parts.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Firmly fasten the blower fan motor assembly flange fastening hooks in the air conditioner unit.

BLOWER FAN RESISTOR

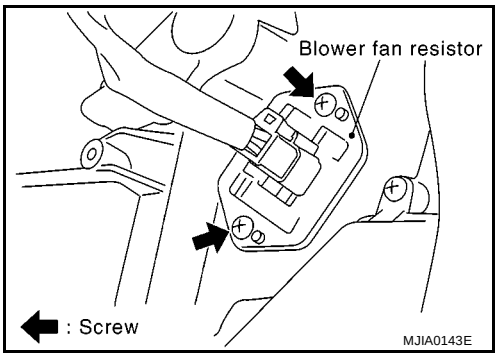
PFP:27150

Removal and Installation

EJS002GL

REMOVAL

1. Remove the glove box cover assembly. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove the blower fan resistor.



INSTALLATION

Install in the reverse order of removal.

AIR CONDITIONER FILTER

PFP:27277

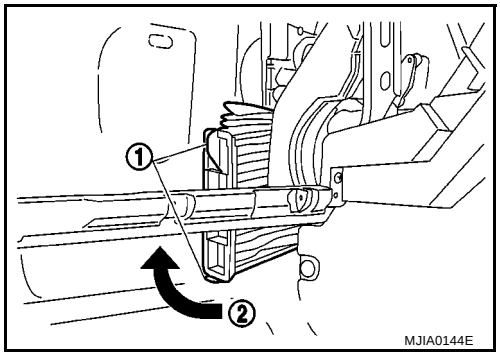
Removal, Replacement and Installation

EJS002JJ

REMOVAL

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the glove box cover assembly. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Compress the air conditoner filter downward while sliding it to the left side of the vehicle as shown in the figure 1.
3. Turn the bottom of the air conditoner filter upward, and then remove it as shown in the figure 2.

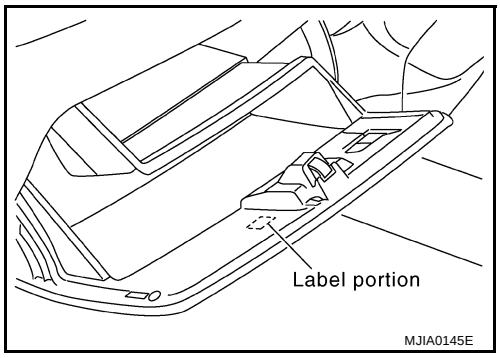


REPLACEMENT

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

Air conditoner filter Replacement interval : Once a year or every 12,000 km (7,500 miles)

Fill in the necessary information on the label, and stick it on the inside of the glove box as shown in the figure.



INSTALLATION

Install in the reverse order of removal.

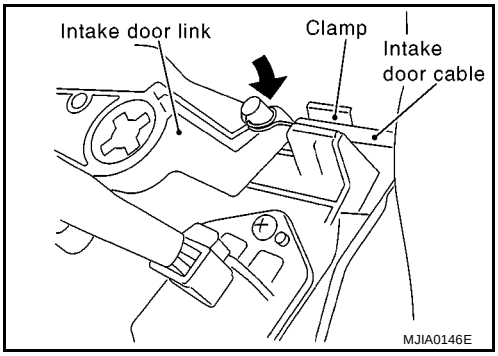
INTAKE DOOR

PFP:27245

Intake Door Cable Adjustment

EJS002GO

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the outer cable of intake door cable from the clamp.
3. Set the intake air control lever to “RECIRCULATION”.
4. Push the intake door link in the direction shown by the arrow while carefully pulling the outer cable to the controller side and attaching the clamp.
5. Operate the intake air control lever and check if the intake door cable moves smoothly.



CAUTION:

When clamping the outer cable, do not move the inner cable.

MODE DOOR

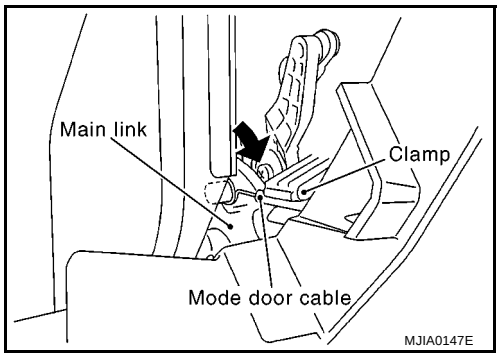
PFP:27181

Mode Door Cable Adjustment

EJS002HO

1. Remove the instrument panel stay cover. Refer to IP-8, "M. Instrument Panel Stay Cover" .
2. Remove the outer cable of mode door cable from the clamp.
3. Set mode dial to “ventilation” position.
4. Push the main link in the direction shown by the arrow, then carefully pull outer cable to the controller side, and install the clamp.
5. Operate the mode dial to insure that the inner cable moves smoothly.

CAUTION:
When clamping the outer cable, do not move the inner cable.



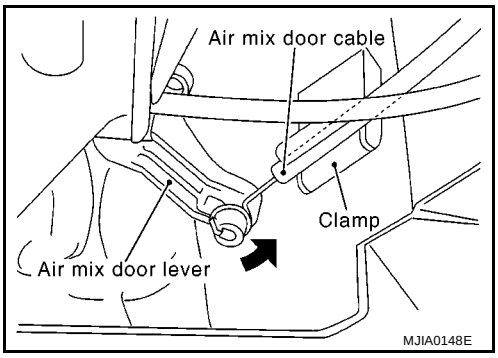
AIR MIX DOOR

PFP:27180

Air Mix Door Cable Adjustment

EJS002HP

1. Remove the instrument panel stay cover. Refer to IP-8, "M. Instrument Panel Stay Cover" .
2. Remove the outer cable of air mix door cable from the clamp.
3. Set temperature control dial to “full cold” position.
4. Push the air mix door lever in the direction shown by arrow and then carefully pull the outer cable toward controller side, and install the clamp.
5. Operate the temperature control dial to insure that the inner cable moves smoothly.



CAUTION:
When clamping the outer cable, do not move the inner cable.

THERMO CONTROL AMPLIFIER

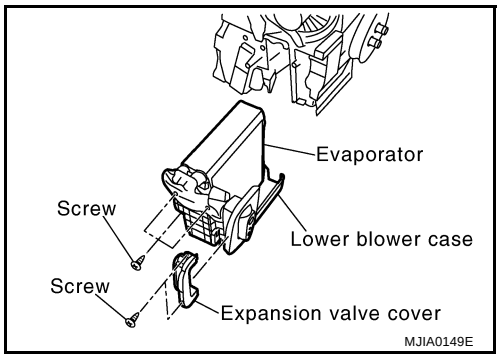
PFP:27675

Removal and Installation

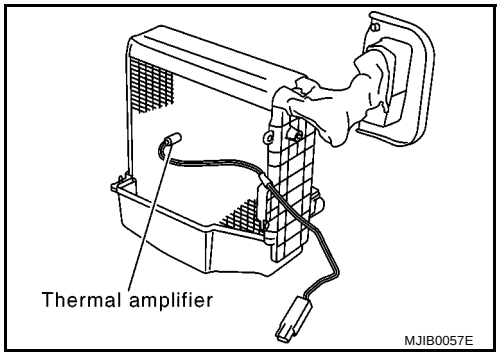
EJS002GR

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a(R134a)] to discharge refrigerant.
2. Remove the air conditioner unit. Refer to MTC-45, "A/C UNIT ASSEMBLY" .
3. Remove the air conditoner filter and foot duct (RH). Refer to MTC-52, "AIR CONDITIONER FILTER" and MTC-57, "DUCTS AND GRILLES" .
4. Remove the lower blower fun motor case and expansion valve cover.



5. Slide the evaporator and door blower case downward, and remove the thermal amplifier.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the low-pressure and high-pressure flexible hoses and high-pressure pipe O-rings with new ones. Apply compressor lubricant to them during installation.**
- **When replacing the thermal amplifier, install the thermal amplifier thermistor in the same position as the removed thermal amplifier.**
- **When removing and installing the thermal amplifier, do not rotate the thermistor's insertion part.**
- **After charging with refrigerant, check for refrigerant leaks.**

High-pressure flexible hose and high-pressure pipe mounting bolts

Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

DUCTS AND GRILLES

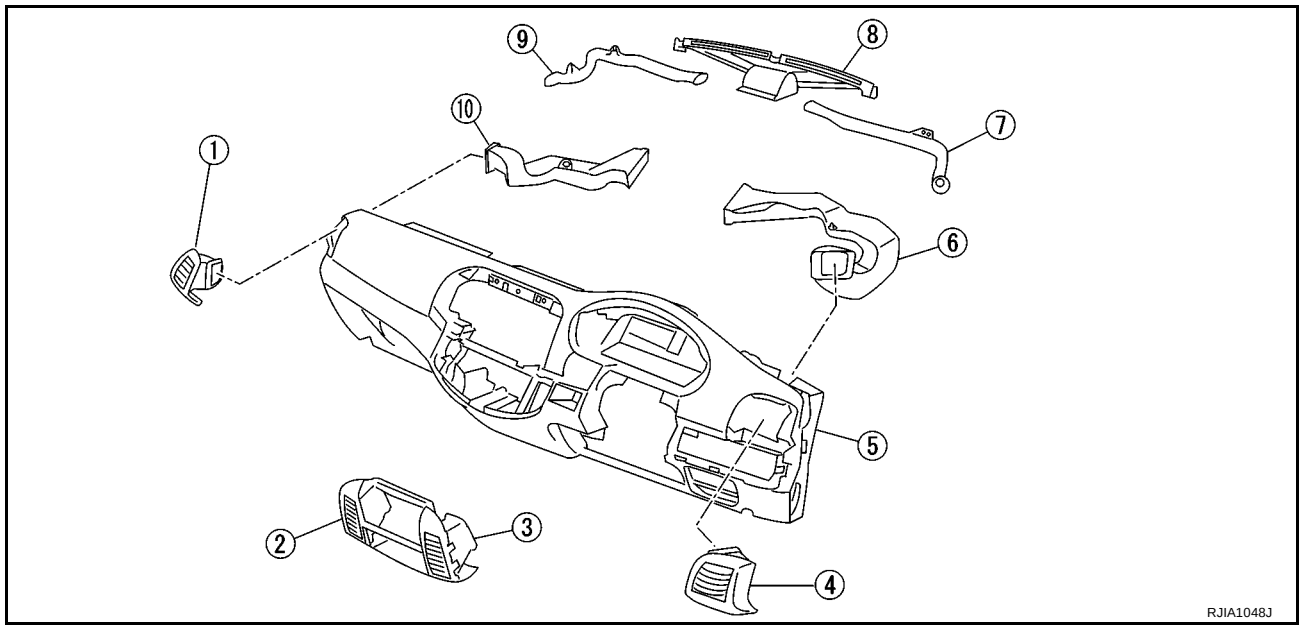
PFP:27860

Removal and Installation

EJS002GT

COMPONENT PARTS LOCATION

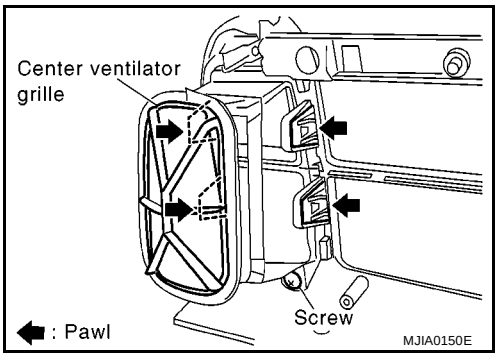
NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.



1. Side ventilator grille (LH)
2. Central ventilator grille (LH)
3. Central ventilator grille (RH)
4. Side ventilator grille (RH)
5. Instrument panel assembly
6. Side ventilator duct (RH)
7. Side defroster duct (RH)
8. Defroster nozzle
9. Side defroster duct (LH)
10. Side ventilator duct (LH)

CENTRAL VENTILATOR GRILLE

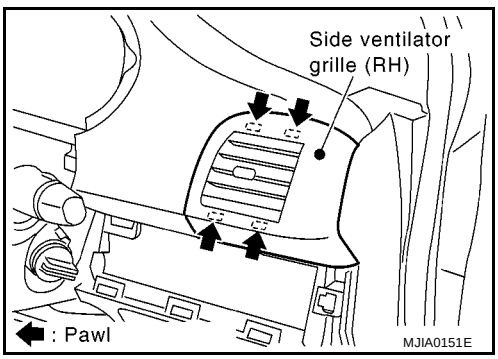
1. Remove cluster lid “C”. Refer to IP-7, "K. Cluster Lid C" .
2. Remove the audio. Refer to AV-12, "Removal and Installation of Audio Unit" .
3. Remove the center ventilator grille (LH/RH).



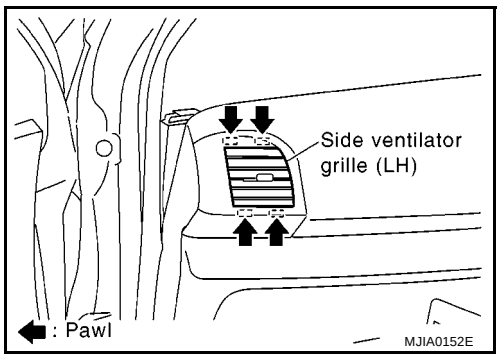
SIDE VENTILATOR GRILLE

NOTE:
Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .
2. Remove the switch panel finisher. Refer to IP-6, "E. Switch Panel Finisher" .
3. Remove the side ventilator grille (RH) hooks from the back side of the instrument panel, and then remove the side ventilator grille (RH).
4. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .



5. Remove the side ventilator grille (LH) hooks from the back side of the instrument panel, and then remove the side ventilator grille (LH).

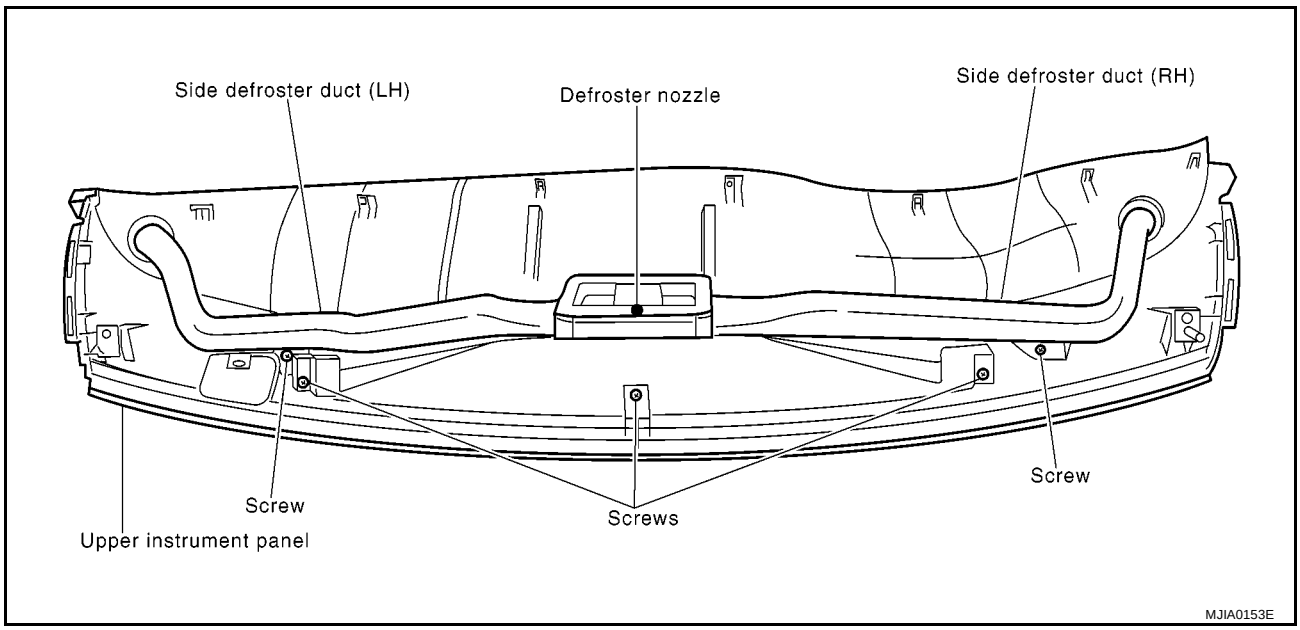


DEFROSTER NOZZLE AND DUCT

NOTE:

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the upper instrument panel. Refer to IP-6, "B. Upper Instrument Panel" .



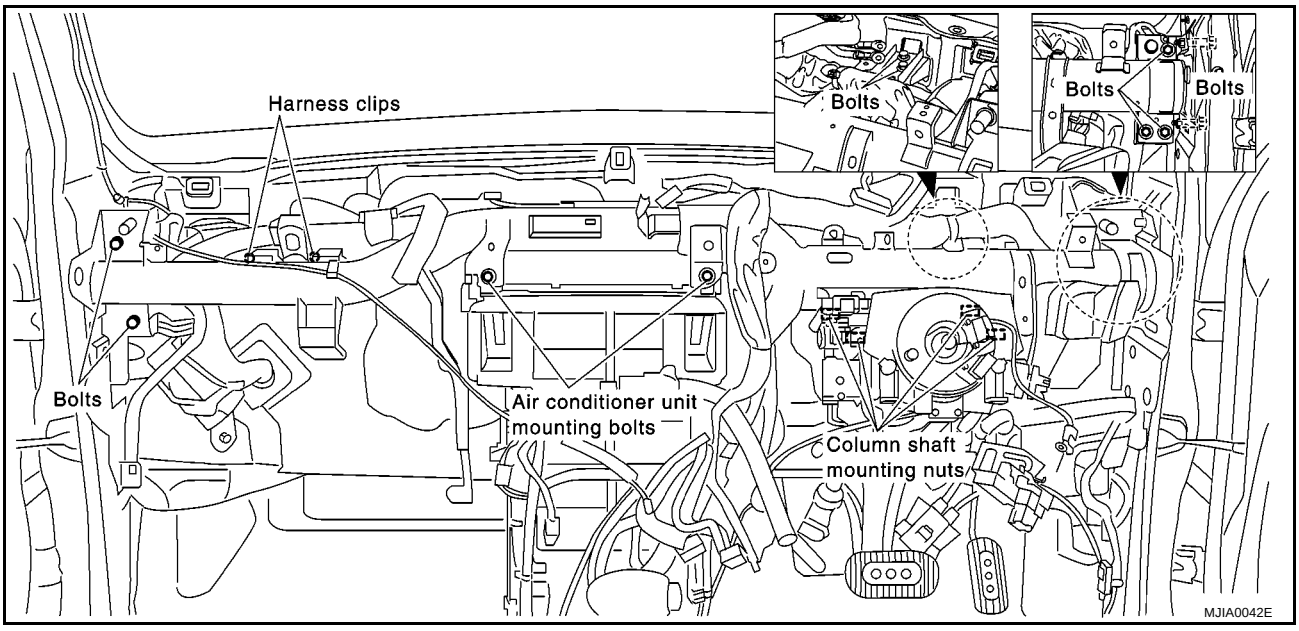
2. Remove the side defroster ducts (LH/RH) and defroster nozzles from the upper instrument panel.

SIDE VENTILATOR DUCT

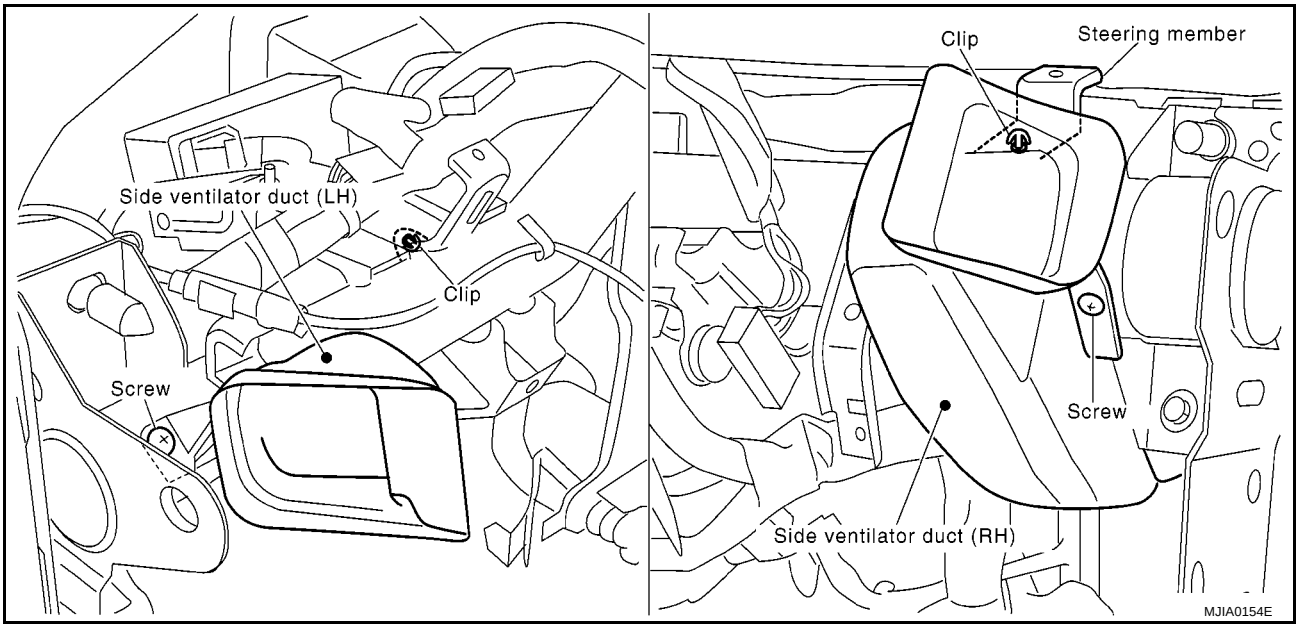
NOTE:

Following illustration is for RHD model. The layout for LHD model is symmetrically opposite.

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the side ventilator duct (LH).
3. Remove instrument panel. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
4. Remove the BCM. Refer to BCS-31, "Removal and Installation of BCM" .
5. Remove the air conditioner mounting bolts, steering member mounting bolts, column shaft mounting bolts, and the harness clips.



6. Remove the steering member, and then remove the side ventilator duct (RH).

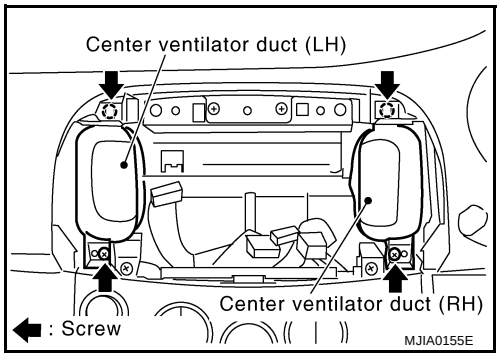


Steering member mounting nut and bolt

Tightening torque :11 - 13 N·m (1.1 - 1.4 kg-m, 8.2 - 9.5 ft-lb)

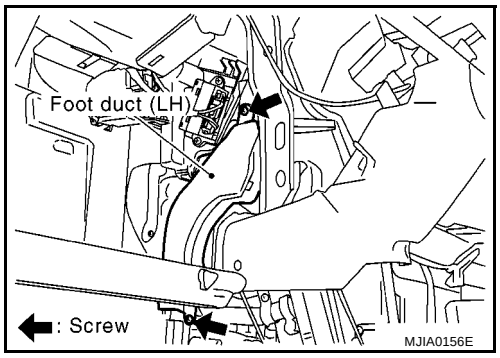
CENTER VENTILATOR DUCT

1. Remove cluster lid “C”. Refer to IP-7, "K. Cluster Lid C" .
2. Remove the screws and then remove the center ventilator ducts (LH/RH).

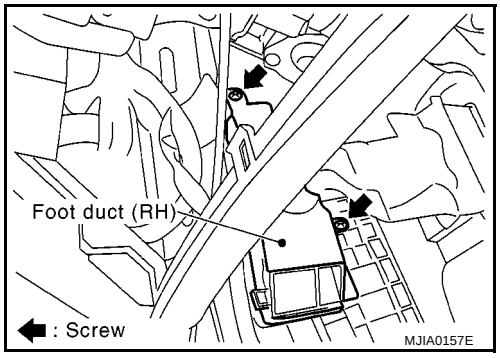


FOOT DUCT

1. Remove the glove box cover assembly. Refer to IP-8, "O. Glove Box Cover Assembly" .
2. Remove the screws and then remove the food duct (LH).



3. Remove the instrument panel under tray. Refer to IP-6, "D. Instrument Panel Under Tray" .
4. Remove the screws and thermal control amplifier connector, and then remove the foot duct (RH).



REFRIGERANT LINES

PFP:92600

HFC-134a (R-134a) Service Procedure

EJS002HN

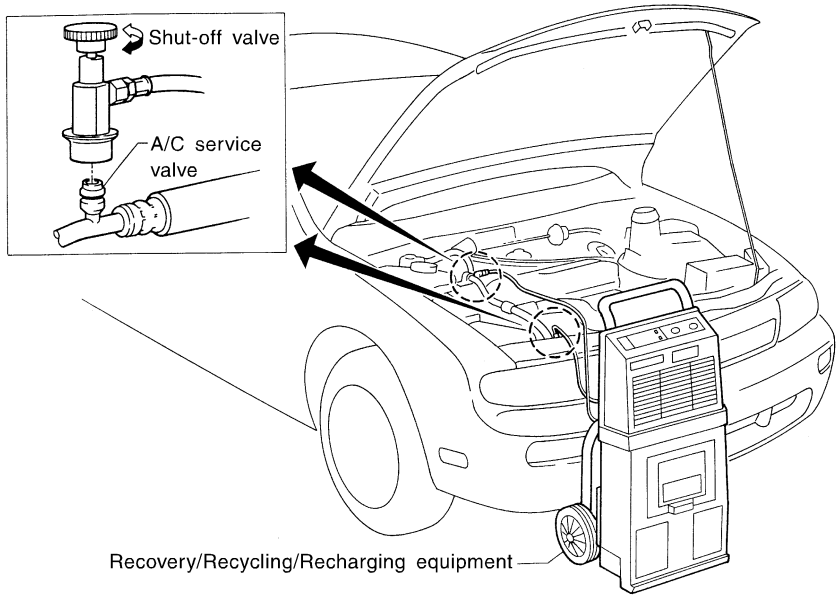
SETTING OF SERVICE TOOLS AND EQUIPMENT

Discharging Refrigerant

WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

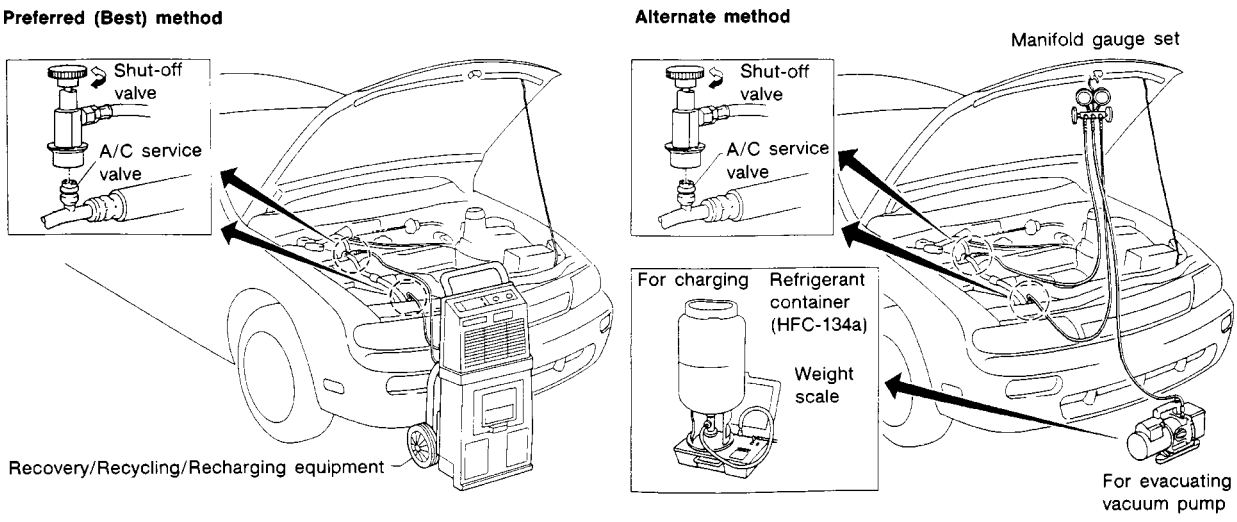
Example



SHA539DE

Evacuating System and Charging Refrigerant

Example

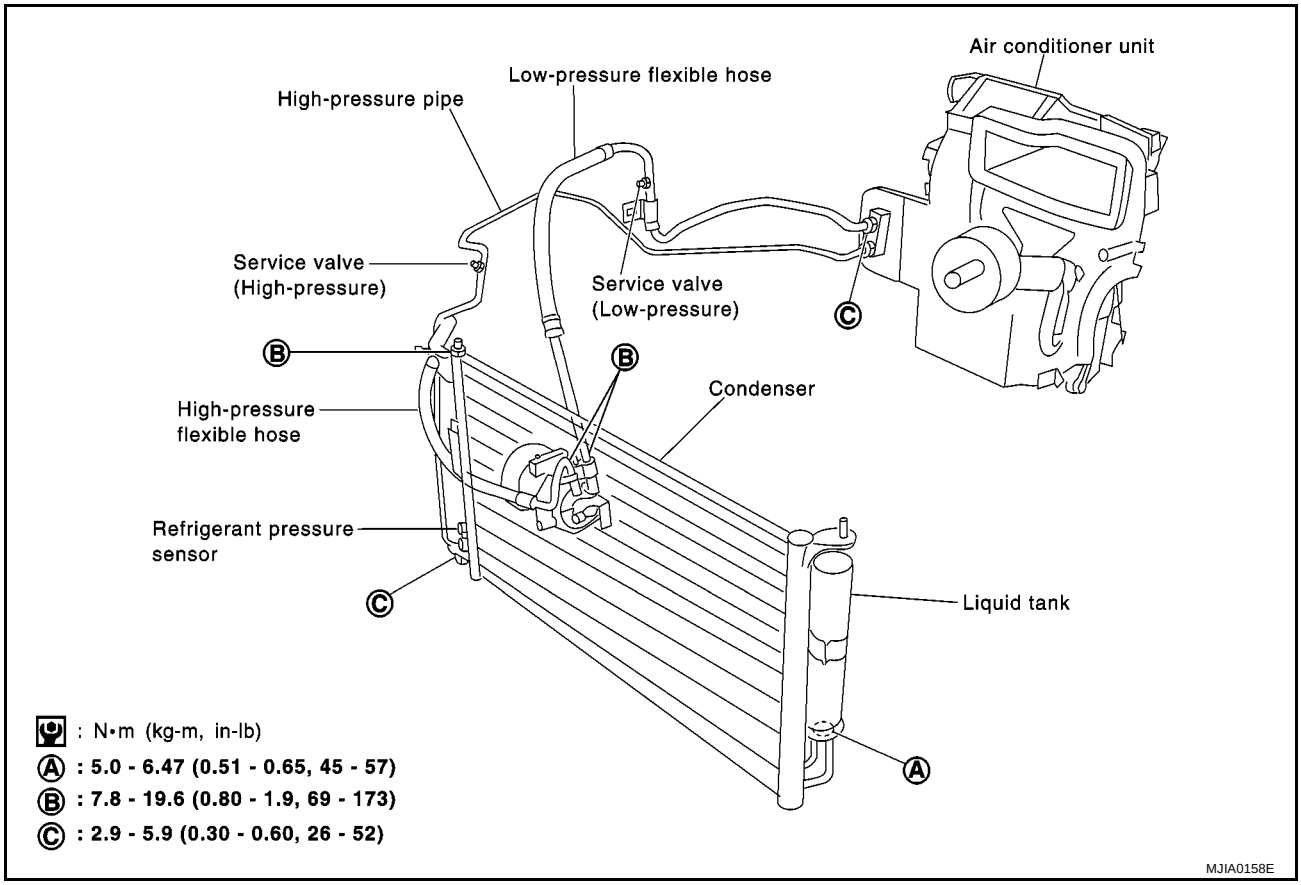


SHA540DC

Component Parts Location

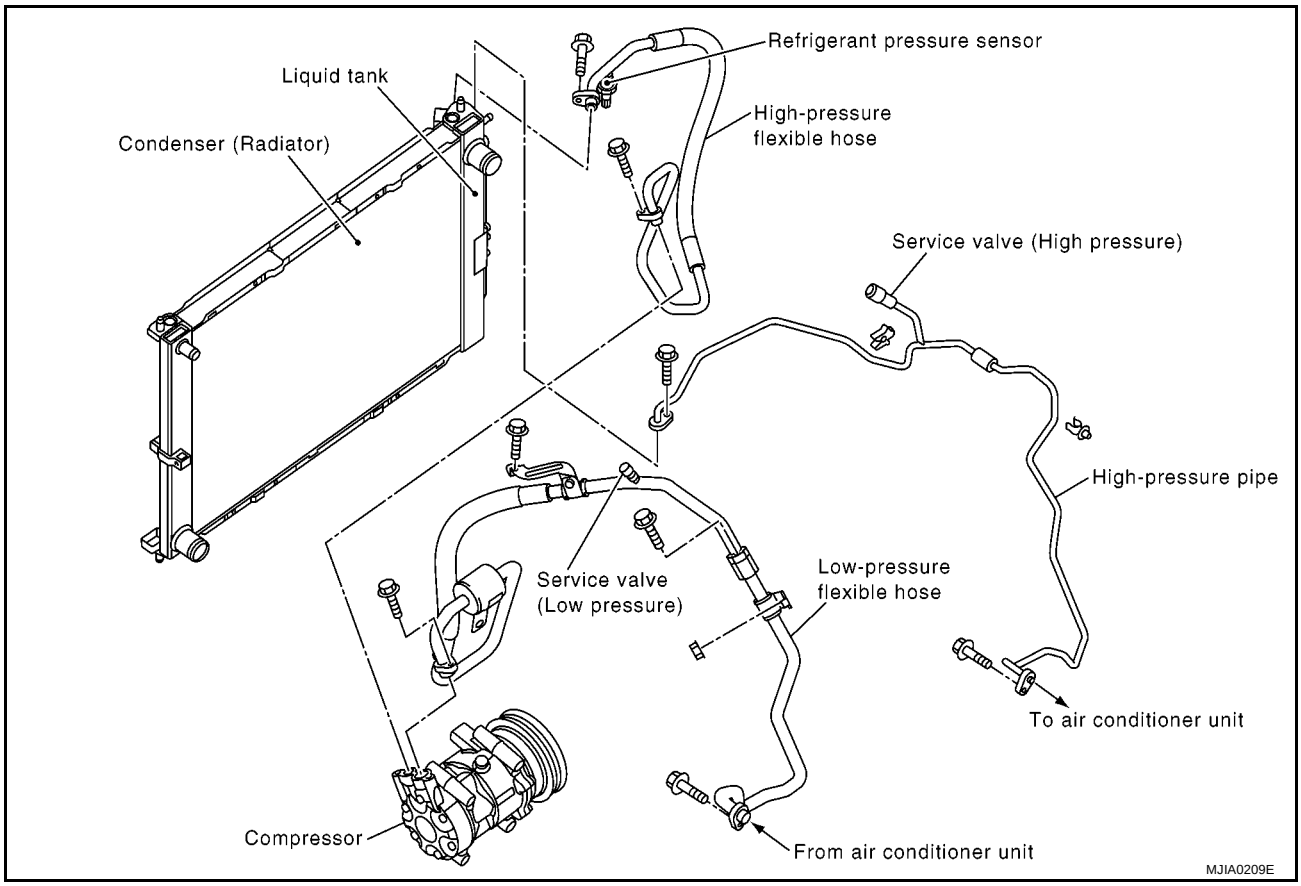
CR ENGINE MODELS

SMA for VIN >SJN**AK12U1255242 EJS002GU



K9K ENGINE MODELS

SMA for VIN >SJN**AK12U1309269



Removal and Installation for Compressor

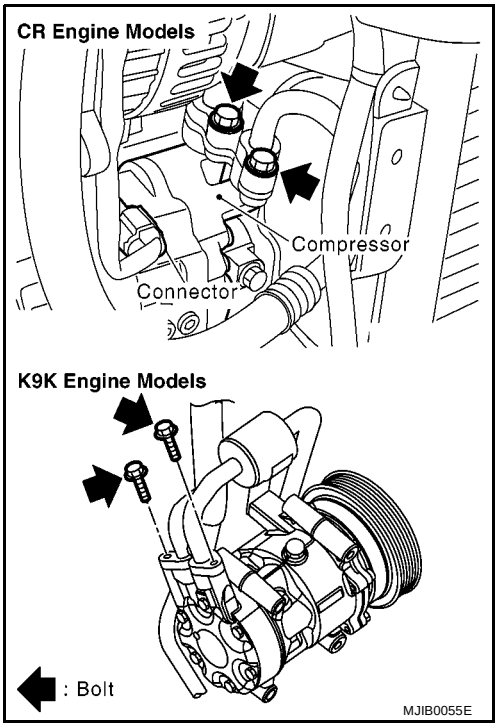
EJS002GV

REMOVAL

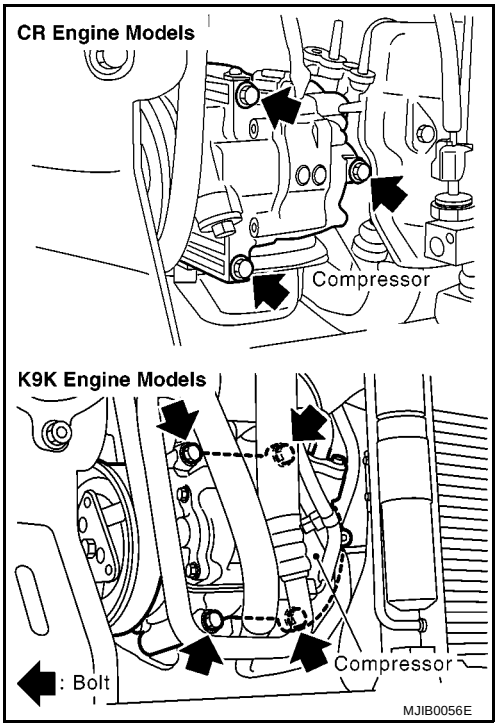
1. Use recovery/recycling recharging equipment [for HFC-134a (R134a)] to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Disconnect compressor connector.
4. Remove the high-pressure and low-pressure flexible hose mounting nuts (CR engine models) or bolts (K9K engine models), and disconnect the compressor.

CAUTION:

- **Cover the compressor high and low-pressure ports with caps to keep the lubricant from spilling.**
- **Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.**



5. Remove the air conditioner compressor belt and alternator belt. Refer to EM-12, "DRIVE BELTS" .
6. Remove compressor mounting bolts.
7. Remove the compressor from under the vehicle.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace O-rings on high-pressure and low-pressure flexible hoses with new ones. Apply compressor oil when installing new O-rings.**
- **After installing the air conditioner compressor alternator belt, adjust the belt tension. Refer to EM-12, "DRIVE BELTS" .**
- **When charging refrigerant, check for refrigerant leaks.**

Compressor mounting bolt

Tightening torque : 16.6 - 23.5 N·m (1.7 - 2.3 kg-m, 13 - 17 ft-lb)

High-pressure flexible hose mounting nuts

Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 6 - 14 ft-lb)

Low-pressure flexible hose mounting nuts

Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 6 - 14ft-lb)

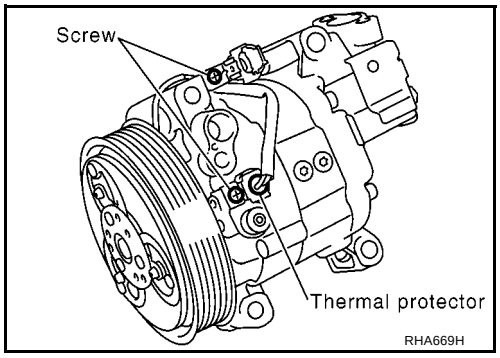
Removal and Installation for Compressor Clutch (CR Engine Models)

EJS002HA

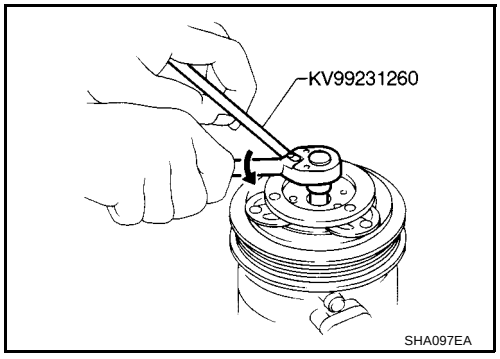
REMOVAL

Overhaul (KC59G Compressor)

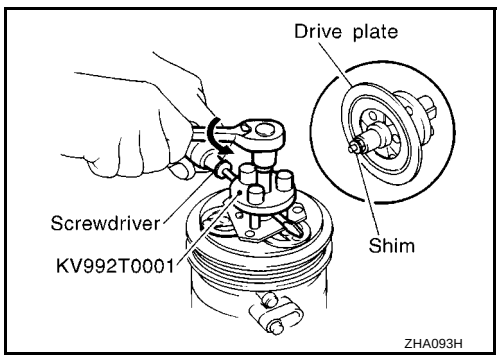
1. Remove the two screws holding the connector bracket, thermal protector to the compressor.



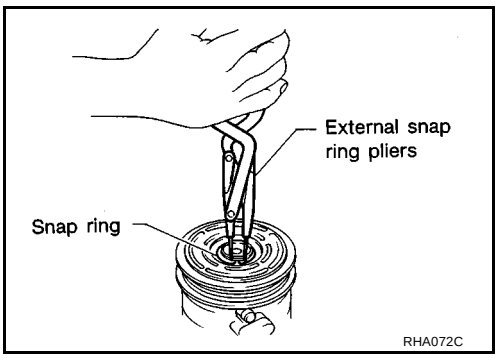
2. When removing center bolt, hold clutch disc with clutch disc wrench.



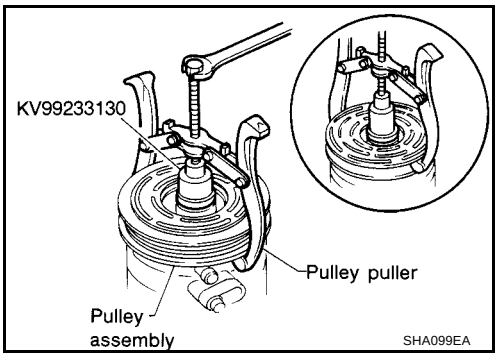
3. Remove the drive plate using the clutch disc puller.
4. Insert holder's three pins into the drive plate. Rotate the holder clockwise to hook it onto the plate.
5. Tighten the center bolt to remove the drive plate.
6. While tightening the center bolt, insert a screwdriver between two of the pins (as shown in the figure) to prevent rotation.
7. After removing the drive plate, remove the shims from either the drive shaft or the drive plate.



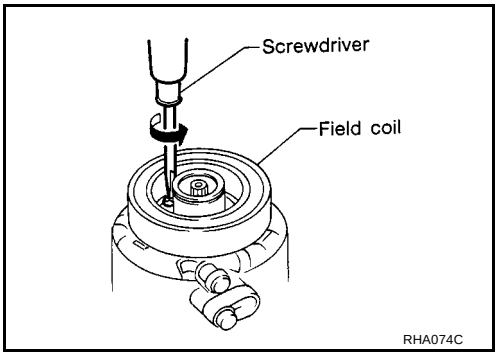
8. Remove the snap ring using external snap ring pliers.



9. Remove the pulley assembly with the puller using a commercially available pulley puller. (Position the center of the puller on the end of the drive shaft)
   For pressed pulleys:
   To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.
   For machine lathed pulleys:
   Align the pulley puller groove with the pulley groove, and then remove the pulley assembly.

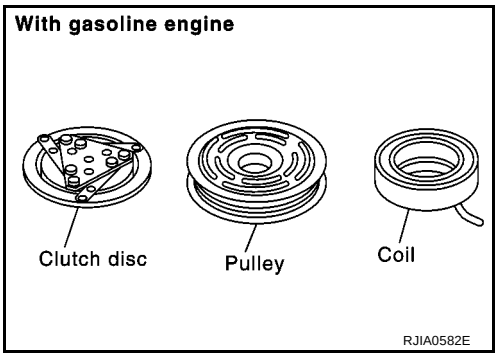


10. Remove the field coil harness clip using a screwdriver.
11. Then remove the three field coil fixing screws and remove the field coil.

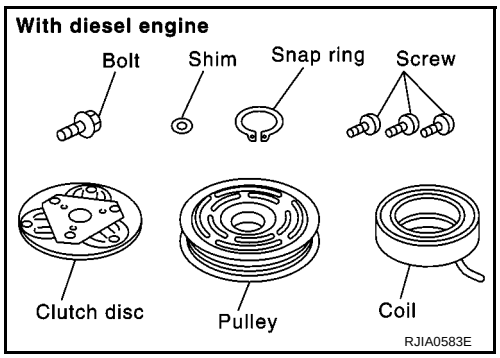


Inspection

Clutch disc
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.



Pulley
Check the appearance of the pulley assembly. If the contact surface of pulley sows signs of excessive grooving, replace clutch disc and pulley. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.



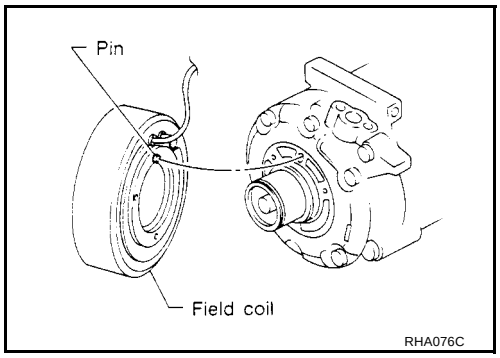
Coil

Check coil for loose connection or cracked insulation.

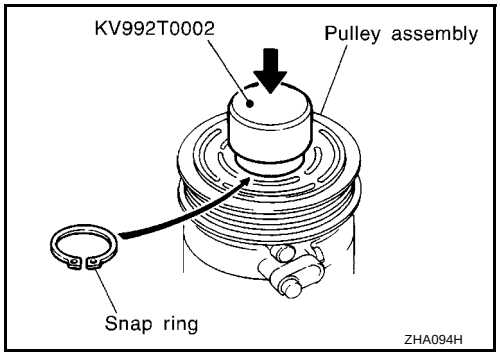
INSTALLATION

KC59G Compressor

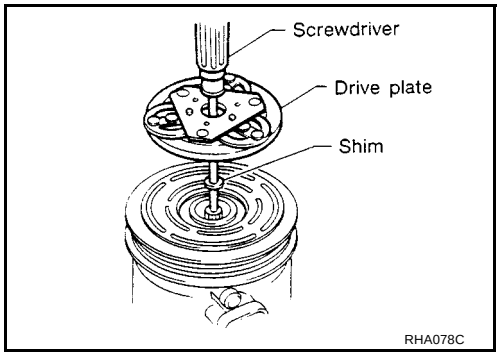
1. Install the field coil.
   Be sure to align the coil's pin with the hole in the compressor's front head.
2. Install the field coil harness clip using a screwdriver.



3. Install the pulley assembly using the installer and a hand press, and then install the snap ring using snap ring pliers.



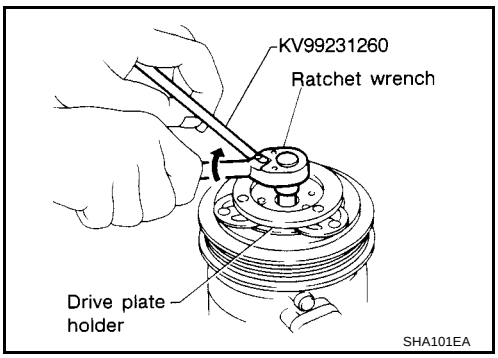
4. Install the drive plate on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



5. Using the holder to prevent clutch disc rotation.

   Tightening torque : 12 - 15 N-m (1.2 - 1.5 kg-m, 9 - 10 ft-lb)

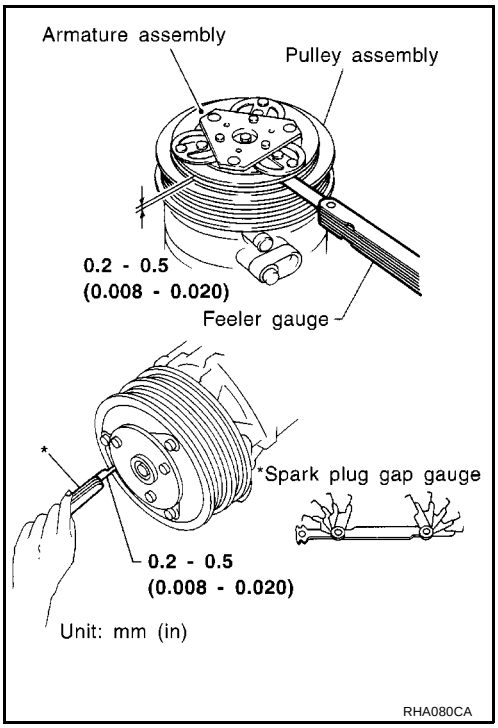
   After tightening the bolt, check that the pulley rotates smoothly.



6. Check clearance around the entire periphery of clutch disc.

   Disc to pulley clearance : 0.2 - 0.5 mm (0.008 - 0.020 in)

   If the specified clearance is not obtained, replace adjusting spacer and readjust.



Break-In Operation

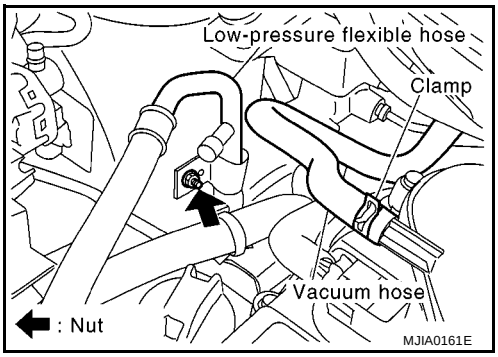
When replacing compressor clutch assembly, always carry out the break-in operation. This is done by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models)

EJS002GW

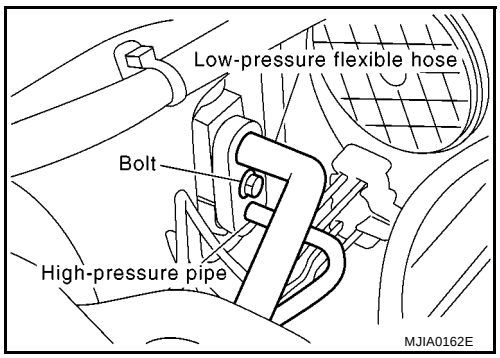
REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove the low-pressure flexible hose bracket mounting nuts.
4. Remove the brake vacuum hose from the air cleaner case.



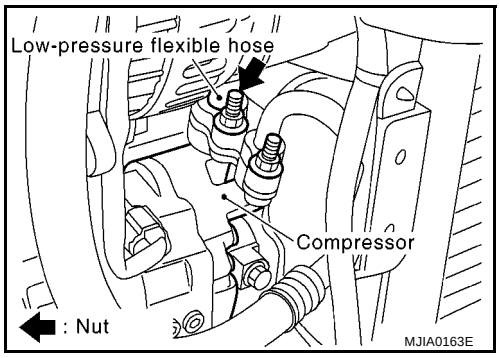
5. Remove the low-pressure flexible hose mounting bolts (air conditioner unit side).

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



6. Remove the low-pressure flexible hose mounting bolts (compressor side) and then remove the low-pressure flexible hose.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the low-pressure flexible hose O-ring with a new one. Apply a coat of compressor lubricant to the O-ring prior to installation.**
- **When charging refrigerant, check for refrigerant leaks.**

Low-pressure flexible hose mounting nuts (compressor side)
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 6 - 14 ft-lb)
Low-pressure flexible hose mounting bolts (evaporator side)
Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)
Low-pressure flexible hose bracket mounting nuts
Tightening torque : 3.82 - 4.51 N·m (0.39 - 0.46 kg-m, 43 - 39 in-lb)

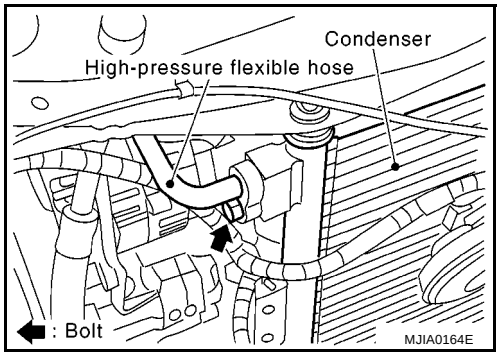
Removal and Installation for High-Pressure Flexible Hose (CR Engine Models)

EJS002GX

REMOVAL

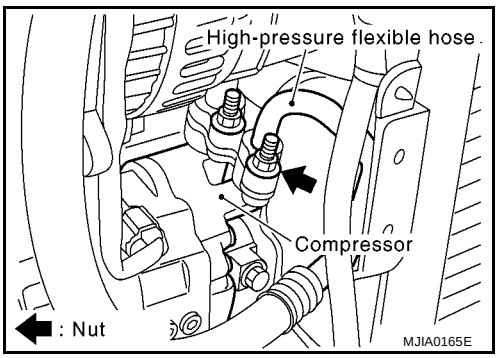
1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove air duct (fresh air intake side). Refer to EM-16, "AIR CLEANER AND AIR DUCT" .
3. Remove the front grille (RH). Refer to EI-8, "FRONT GRILLE" .
4. Remove the high-pressure flexible hose mounting bolts (condenser side).

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



5. Remove the high-pressure flexible hose mounting bolts (compressor side), and then remove the high-pressure flexible hose.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace O-ring on high-pressure flexible hose with a new one. Apply compressor oil when installing new O-rings.**
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure flexible hose mounting bolts and nuts

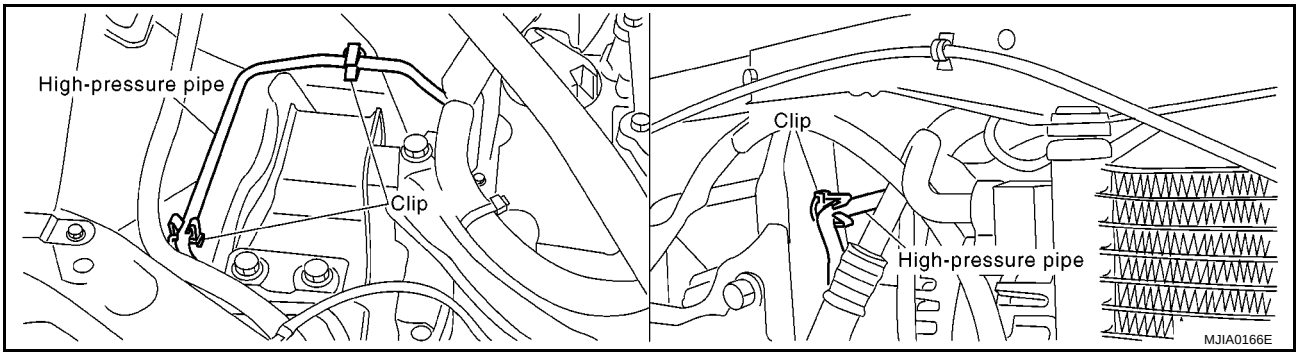
Tightening torque : 7.8 - 19.6 N·m (0.8 - 1.9 kg-m, 6 - 14 ft-lb)

Removal and Installation for High-Pressure Pipe (CR Engine Models)

EJS002GY

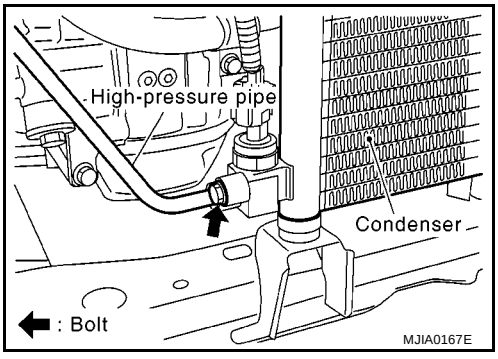
REMOVAL

1. Remove the cowl top and headlamp (RH). Refer to EI-10, "COWL TOP" and halogen headlamp model LT-41, "Removal and Installation" .
2. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
3. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
4. Remove the low-pressure flexible hose. Refer to MTC-67, "Removal and Installation for Low-Pressure Flexible Hose (CR Engine Models)" .
5. Remove the high-pressure pipe clips.



6. Remove the high-pressure pipe mounting bolts, and then remove the high-pressure pipe.

CAUTION:
Seal the pipe connection openings with caps, plastic tape, or something similar to prevent them from being exposed to the atmosphere.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace the O-ring on the high-pressure pipe with new one, and apply compressor lubricant to it before installing.**
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure pipe mounting bolt

Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

|Low-pressure flexible hose and high-pressure pipe mounting bolts (evaporator side)

Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

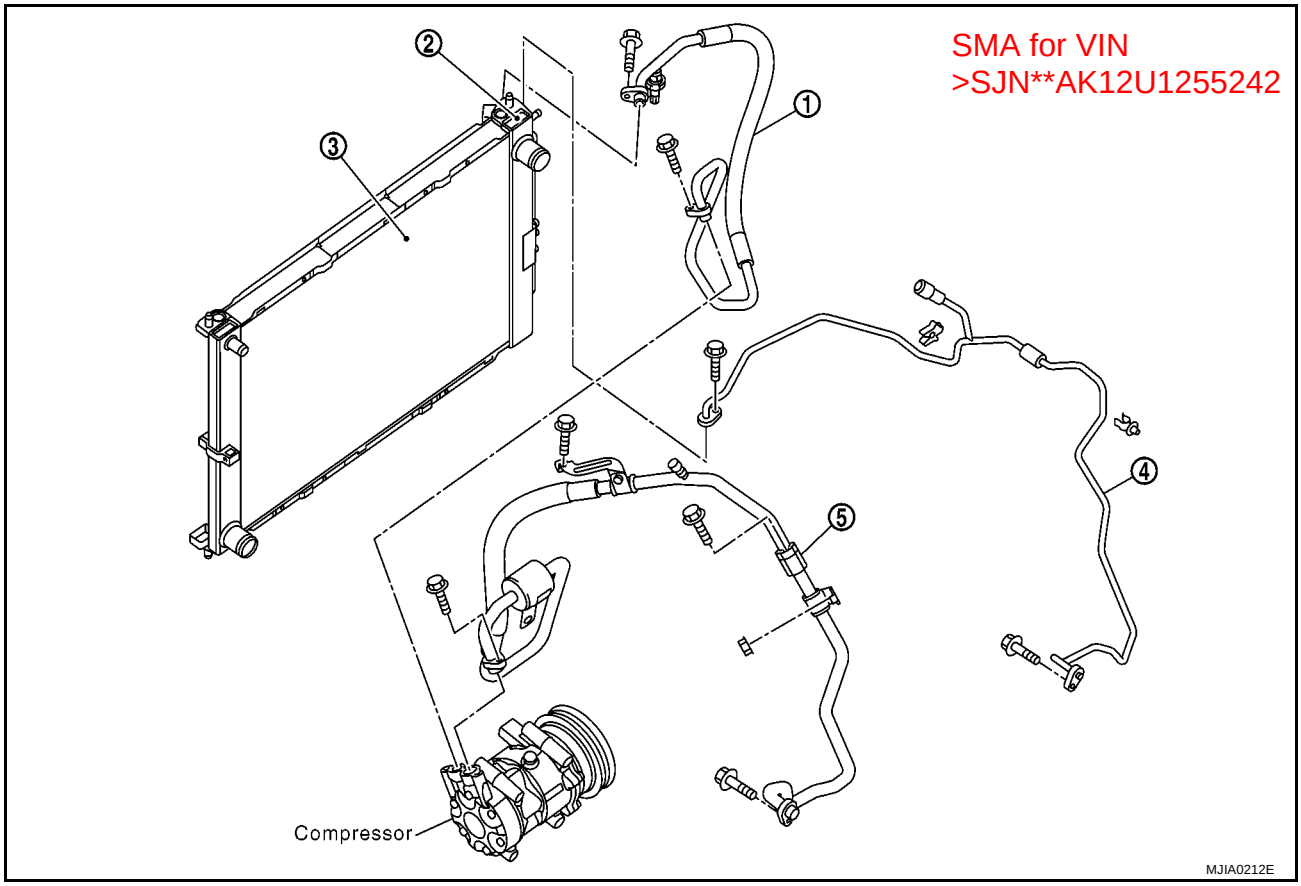
Low-pressure flexible hose mounting nuts (compressor side)

Tightening torque : 7.8 - 19.6 N·m (0.80 - 1.9 kg-m, 6 - 14 ft-lb)

Removal and Installation for Pipe and Hose (K9K Engine Models)

EJS0057L

COMPONENTS



1. High-pressure flexible hose
2. Liquid tank
3. Condenser and radiator assembly
4. High-pressure pipe
5. Low-pressure flexible hose

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the low-pressure flexible hose bracket mounting bolt and nut.
3. Remove the high-pressure pipe and low-pressure flexible hose mounting bolts (air conditioner unit side).

   CAUTION:

   Seal the connecting points of the pipe and hose with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.
4. Remove the low-pressure flexible hose mounting bolt (compressor side) and then remove the low-pressure flexible hose.

CAUTION:
Seal the connecting points of the hose with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

5. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
6. Remove the high-pressure pipe mounting bolt (liquid tank side) and then remove the high-pressure pipe.

CAUTION:
Seal the connecting points of the pipe with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

7. Remove the high-pressure flexible hose mounting bolts and then remove the high-pressure flexible hose.

CAUTION:
Seal the connecting points of the hoses with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

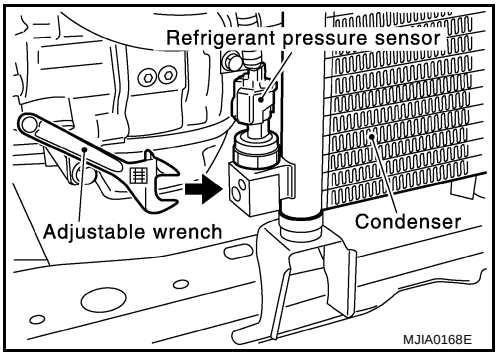
- **Replace the O-rings on the high-pressure pipe, low-pressure flexible hose, and high-pressure flexible hose with new ones, and apply compressor lubricant to O-rings before installing.**
- **When charging refrigerant, check for refrigerant leaks.**

Removal and Installation for Refrigerant Pressure Sensor

EJS002GZ

REMOVAL AND INSTALLATION

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
3. Use a adjustable wrench or other tool to hold the refrigerant pressure sensor mounting block, and then remove the refrigerant pressure sensor from the condenser (CR engine models) or high-pressure flexible hose (K9K engine models).



CAUTION:

- **Be careful when working so as not to damage the condenser core.**
- **When installing refrigerant pressure sensor, apply compressor lubricant to the O-rings.**

Refrigerant-pressure sensor

Tightening torque : 9.8 - 11.7 N·m (1.0 - 1.2 kg-m, 87 - 103 in-lb)

Removal and Installation for Condenser (CR Engine Models)

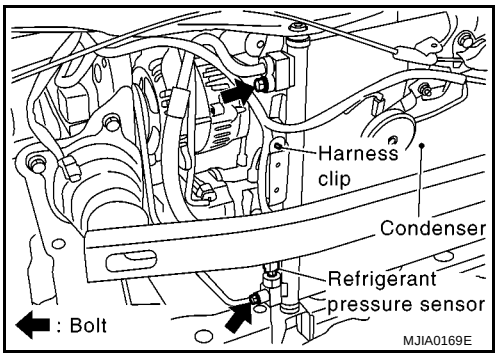
EJS002H0

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
3. Disconnect the high-pressure flexible hose and high-pressure pipe from the condenser.

CAUTION:
Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

4. Disconnect the refrigerant pressure sensor connector, and then remove the harness clip.

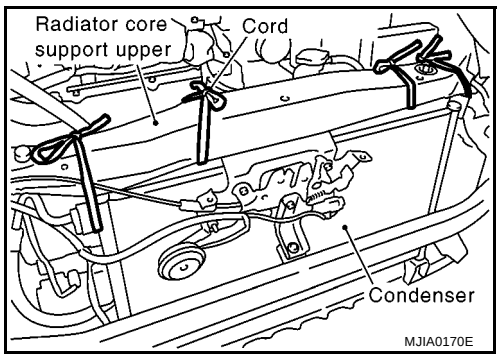


5. Use cord, etc., to hold the condenser and radiator to each radiator core support upper.

   NOTE:
   To prevent the compressor and radiator from being dropped when the radiator core lower support is removed.

6. Remove the mounting bolts, and then remove the radiator core lower support.
7. Remove the condenser from underneath the vehicle.

   CAUTION:
   Do not damage the condenser core.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace O-rings on the high-pressure pipe and high-pressure flexible hose with new ones. Apply compressor lubricant to O-rings when installing them.**
- **When charging refrigerant, check for refrigerant leaks.**

High-pressure flexible hose bolt

Tightening torque : 7.8 - 19.6 N·m (0.80 - 1.9 kg-m, 69 - 173 in -lb)

High-pressure pipe mounting bolt

Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

Radiator core lower support mounting bolts.

Tightening torque : 43.4 - 58.7 N·m (4.5 -5.9 kg-m, 32 - 43 ft-lb)

Removal and Installation for Condenser (K9K Engine Models)

EJS0057M

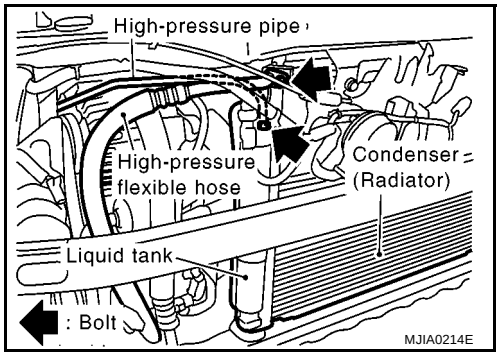
REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the front bumper and air guide (RH). Refer to EI-4, "FRONT BUMPER" .
3. Disconnect the high-pressure flexible hose from the condenser. Disconnect the high-pressure pipe from the liquid tank.

   CAUTION:
   Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

4. Remove the radiator assembly. Refer to CO-34, "RADIATOR" .

   CAUTION:
   Do not damage the radiator and condenser core.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

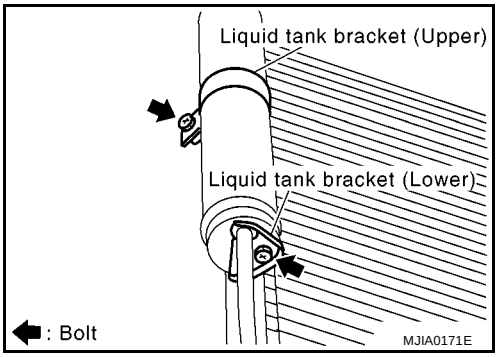
- **Replace O-rings on the high-pressure pipe and high-pressure flexible hose with new ones. Apply compressor lubricant to O-rings when installing them.**
- **When charging refrigerant, check for refrigerant leaks.**

Removal and Installation for Liquid Tank (CR Engine Models)

EJS002H1

REMOVAL

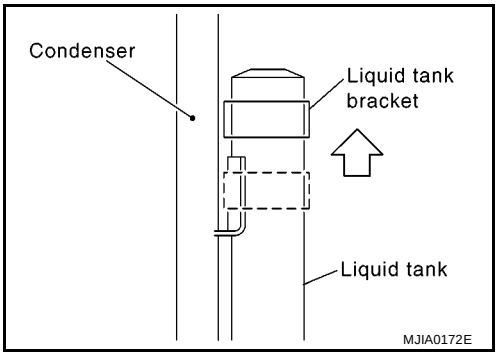
1. Use recovery/recycling recharging equipment [for HFC-134a (R143a)] to discharge refrigerant.
2. Remove condenser. Refer to MTC-71, "Removal and Installation for Condenser (CR Engine Models)" .
3. Clean around the liquid tank to remove foreign material and corrosion.
4. Remove the liquid tank mounting bolts.



5. Lift up the liquid tank bracket, and remove it from the condenser protruding area.
6. Lift up the liquid tank and remove it.

CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

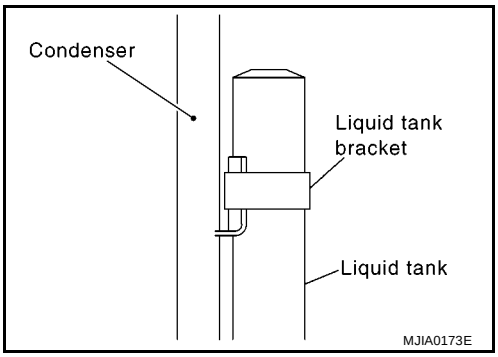


INSTALLATION

Install the liquid tank and liquid tank bracket in the condenser.

CAUTION:

- **Make sure the liquid tank bracket is correctly inserted into the condenser's protruding area (the liquid tank bracket does not move below the center of the liquid tank).**
- **Replace the condenser pipe O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.**



Liquid tank bracket (upper) mounting bolts

Tightening torque : 2.94 - 3.82 N·m (0.30 - 0.38 kg-m, 26 - 33 in-lb)

Liquid tank bracket (lower) mounting bolts

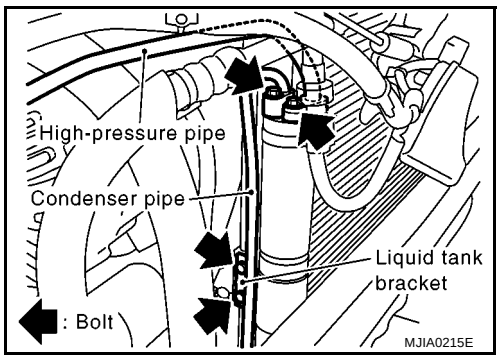
Tightening torque : 5.0 - 6.47 N·m (0.51 - 0.65 kg-m, 45 - 57 in-lb)

Removal and Installation for Liquid Tank (K9K Engine Models)

EJS0057N

REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R143a)] to discharge refrigerant.
2. Clean around the liquid tank to remove foreign material and corrosion.
3. Remove the high-pressure pipe from the liquid tank.
4. Remove the condenser pipe mounting bolt from the liquid tank, and remove pipe from the condenser protruding area.
5. Remove the liquid tank bracket bolts and then remove the liquid tank.



CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

INSTALLATION

Install the liquid tank and liquid tank bracket in the condenser.

CAUTION:

Replace the condenser pipe O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.

Removal and Installation for Evaporator

EJS002H2

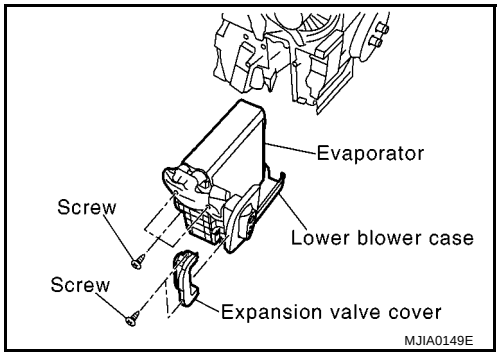
REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Remove the air conditioner unit. Refer to MTC-45, "A/C UNIT ASSEMBLY" .

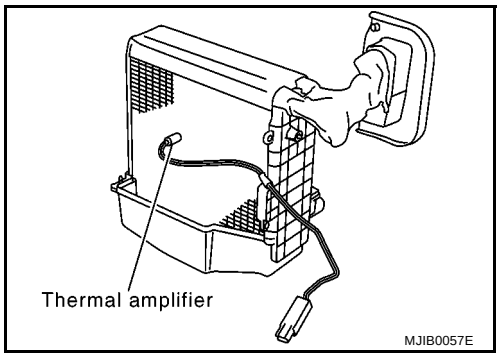
CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

3. Remove the air conditoner filter and foot duct (RH). Refer to MTC-52, "AIR CONDITIONER FILTER" and MTC-60, "FOOT DUCT" .
4. Remove the lower blower case and expansion valve cover.



5. Slide the evaporator and door blower case downward, and remove the thermal amplifier.
6. Remove the evaporator from the lower blower case.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Replace low-pressure flexible hose and high-pressure pipe O-rings with new ones. Apply a coat of compressor lubricant prior to installation.**
- **When installing a new evaporator, install the thermal amplifier thermistor in the same position as the removed thermal amplifier.**
- **When removing and installing the thermal amplifier, do not rotate the thermistor's insertion part.**

Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.

Tightening torque : 2.9 - 5.9 N·m (0.3 - 0.6 kg-m)

Removal and Installation for Expansion Valve

EJS002H3

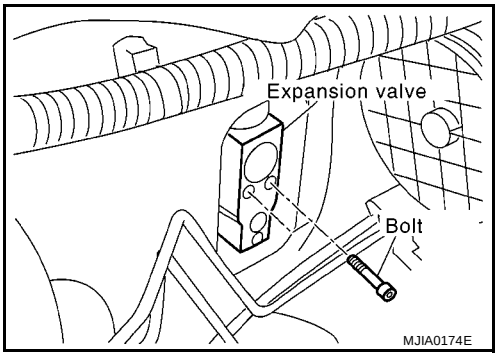
REMOVAL

1. Use recovery/recycling recharging equipment [for HFC-134a (R-134a)] to discharge refrigerant.
2. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.

CAUTION:

Seal the connecting points of the pipes with caps and vinyl tape, etc. to prevent them from being exposed to the atmosphere.

3. Remove the bolts from the expansion valve, and then remove the expansion valve.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

Replace the removed O-rings with new ones. Apply a coat of compressor lubricant to the O-rings prior to installation.

Expansion valve mounting bolts

Tightening torque : 2.9 - 5.0 N·m (0.30 - 0.51 kg-m, 26 - 44 in-lb)

Mounting bolts for the low-pressure flexible hoses and high-pressure pipes.

Tightening torque : 2.9 - 5.9 N·m (0.30 - 0.60 kg-m, 26 - 52 in-lb)

Checking for Refrigerant Leaks

EJS002HJ

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electronic refrigerant leak detector or fluorescent dye leak detector.

If dye is observed, confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.

When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

Checking System for Leaks Using the Fluorescent Leak Detector

EJS002HK

1. Check A/C system for leaks using the UV lamp and safety goggles (J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

NOTE:
Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

Dye Injection

EJS002HL

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (J-41459).
3. Connect the injector tool to the A/C LOW PRESSURE side service fitting.
4. Start engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool J-41459 (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service fitting.

CAUTION:
Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.

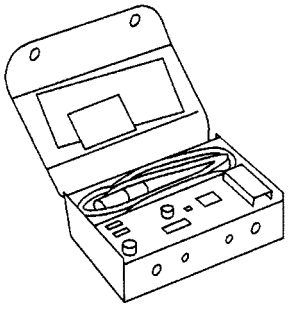
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

Electronic Refrigerant Leak Detector

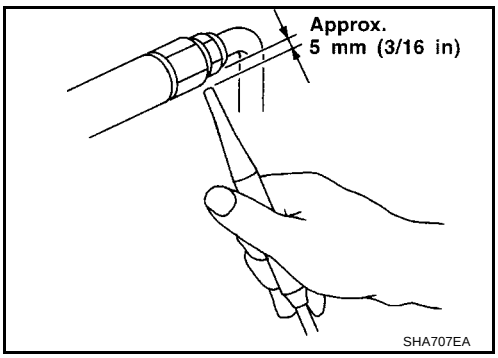
EJS002HM

PRECAUTIONS FOR HANDLING LEAK DETECTOR

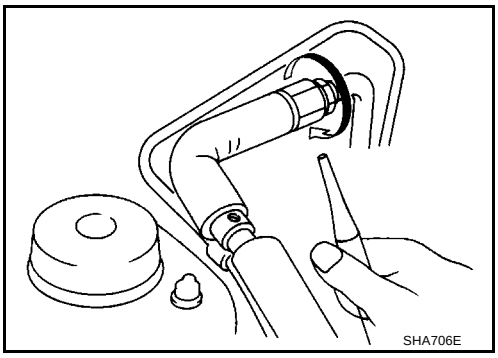
When performing a refrigerant leak check, use an A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.


A/C leak detector SHA705EB

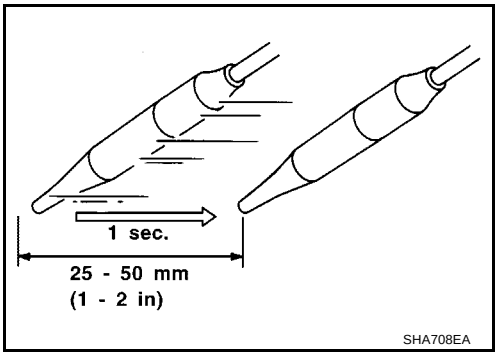
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



2. When testing, circle each fitting completely with probe.



3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine OFF.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2 , 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

NOTE:
At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.54 kg/cm^2 , 50 psi).

4. Conduct the leak test from the high side (compressor discharge a to evaporator inlet g) to the low side (evaporator drain hose h to shaft seal k). Refer to MTC-20, "Component Parts Location" \. Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.
   Compressor
   Check the fitting of high and low pressure hoses, relief valve and shaft seal.
   Liquid tank
   Check the refrigerant pressure sensor or dual pressure switch.
   Service valves
   Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

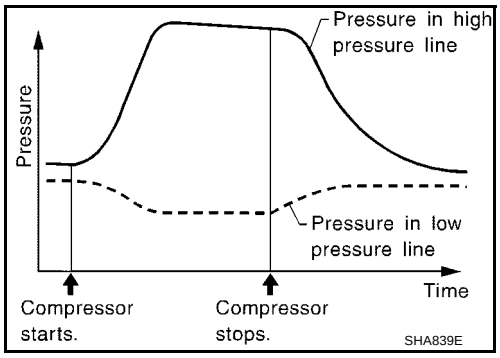
Cooling unit (Evaporator)
With engine OFF, turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer's recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
   If no leaks are found, perform steps 7 - 10.
7. Start engine.
8. Set the heater A/C control as follows;

a. A/C switch: ON
b. Face mode
c. Intake position: Recirculation
d. Max cold temperature
e. Fan speed: High

9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.

Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high pressure side will gradually drop after refrigerant circulation stops and pressure on the low pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.
13. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
14. Conduct A/C performance test to ensure system works properly.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

COMPRESSOR

EJS002H4

Model		CR engine models	K9K engine models
		ZEXEL VALEO CLIMATE CONTROL make KC59G	SD6V12
Type		Vane rotary	Variable volume piston
Displacement cm^3 (cu in)/rev	Max.	80 (4.88)	125 (7.62) max.
	Min.		
Cylinder bore × stroke mm(in)		—	—
Direction of rotation		Clockwise (viewed from drive end)	—
Drive belt		Poly V (4grooves)	—

LUBRICANT

EJS002H5

Model		CR engine models	K9K engine models
		ZEXEL VALEO CLIMATE CONTROL make KC59G	SD6V12
Name		Nissan A/C System Oil Type R	
Part number		KLH00-PAGR0	
Capacity m ℓ (lmp fl oz)	Total in system	80 (2.8)	—
	Compressor (Service part) charging amount	80 (2.8)	—

REFRIGERANT

EJS002H6

Model	CR engine models	K9K engine models
	ZEXEL VALEO CLIMATE CONTROL make KC59G	SD6V12
Type	HFC-134a (R-134a)	
Capacity kg (lb)	0.45 (0.99)	0.55 ± 0.05 (1.21 ± 0.11)

ENGINE IDLING SPEED

EJS002H7

Refer to EC-470, "SERVICE DATA AND SPECIFICATIONS (SDS)" (CR engine models) or EC-K9K-48, “Idle speed adjustment”, “DIESEL INJECTION” (K9K engine models).

BELT TENSION

EJS002H8

Refer to MA-22, "ALTERNATOR AND A/C COMPRESSOR BELT (WITH A/C MODELS)" (CR engine models) or MA-30, "TENTION ADJUSTMENT" (K9K engine models).

SECTION PB
PARKING BRAKE SYSTEM

CONTENTS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 2
NVH Troubleshooting Chart 2
PARKING BRAKE SYSTEM 3
On Board Inspection and Service 3
LEVER STROKE 3
Adjustment 3
Components 4
Removal and Installation 4
REMOVAL 4
INSTALLATION 5
SERVICE DATA AND SPECIFICATIONS (SDS) 6
Parking Brake 6

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EFS002FN

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-28	—	BR-27	BR-28	—	BR-28	—	—	—	NVH in RAX section	NVH in RSU section	NVH in WT section	NVH in WT section	NVH in PS section
Possible cause and SUSPECTED PARTS			Linings - damaged	Linings - uneven wear	Return spring damaged	Drum imbalance	Drum damage	Drum runout	Drum deformation	Drum deflection	Drum rust	AXLE	SUSPENSION	TYRES	ROAD WHEEL	STEERING
Symptom	BRAKE	Noise	X	X	X							X	X	X	X	X
		Shake				X						X	X	X	X	X
		Shimmy, Judder				X	X	X	X	X	X	X	X	X	X	X

X: Applicable

PARKING BRAKE SYSTEM

PFP:36010

On Board Inspection and Service

EFS002FO

LEVER STROKE

- Operate parking brake lever with a force of 196 N (20 kg, 44.1 lb). Check if stroke is within specified number of notches. (Check it by hearing clicks of ratchet.)

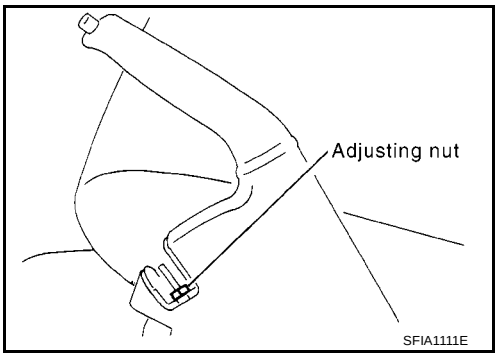
Lever stroke :11-12 notches

Adjustment

EFS002FP

1. Insert a socket wrench into opening of parking brake lever. Rotate adjusting nut to fully loosen cable, then return parking brake lever.
2. Depress the foot brake several times (about 2 or 3 times) and adjust the rear shoe clearance.

   NOTE:
   Be sure to securely depress the foot brake.

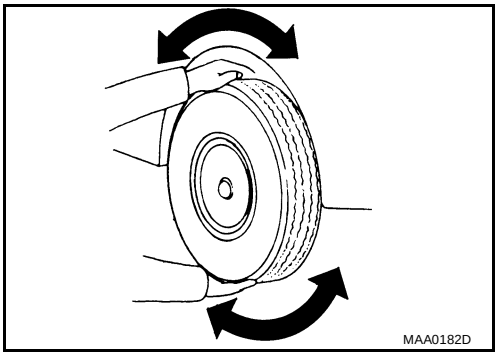


3. Rotate the road wheels to make sure that there is no drag.
4. Use the following procedure to adjust the cable.

a. Pull the lever up to the position where a socket wrench can be inserted.

b. Insert a socket wrench into the opening of the lever, and rotate the adjusting nut to adjust lever stroke.

   NOTE:
   Do not reuse adjusting nut after removing it.

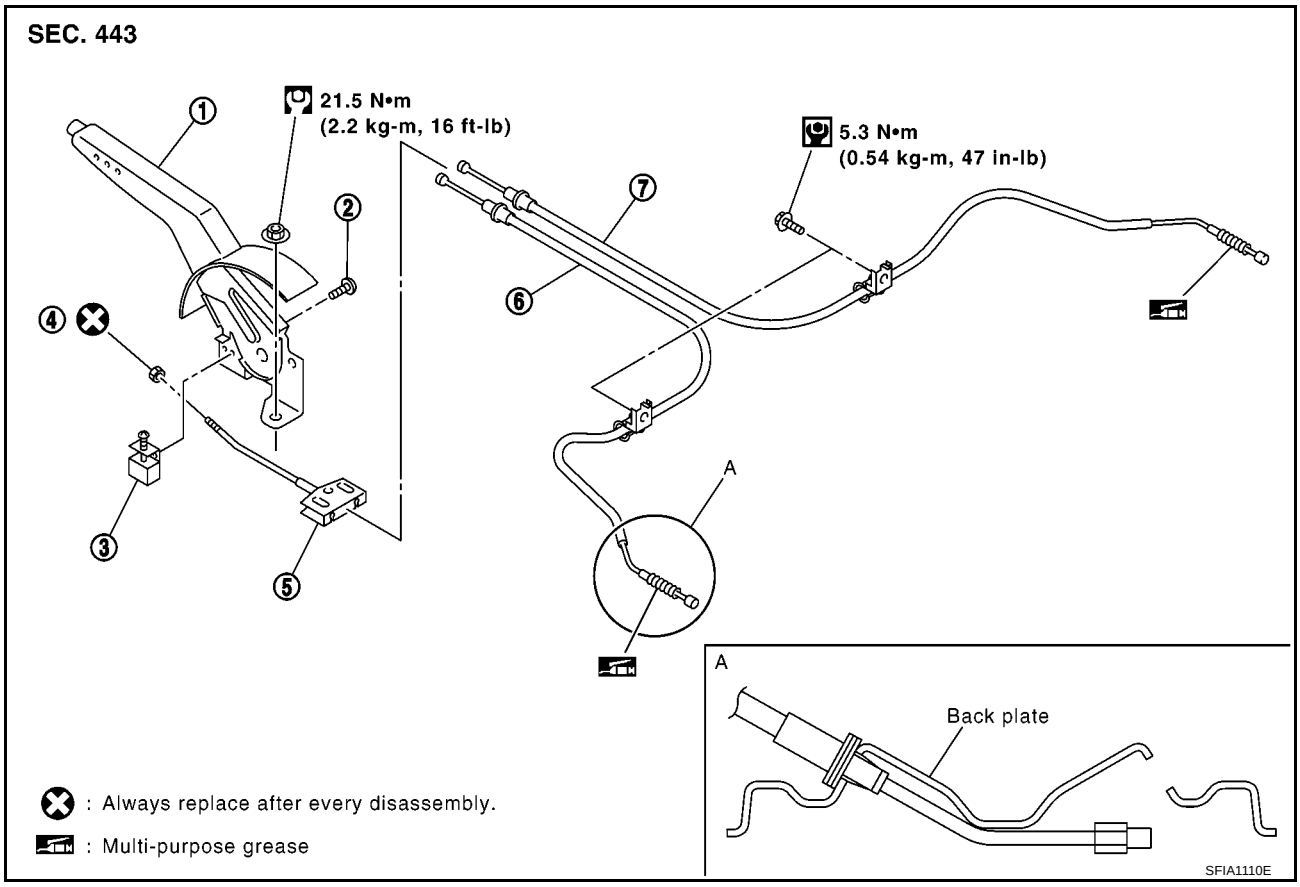


c. After operating the lever 3 to 4 times with a force of 196 N (20 kg, 44.1 lb), make sure that the lever stroke is within the specified number of notches.

d. With the lever completely returned, make sure that there is no drag on the rear brake.

Components

EFS002FQ



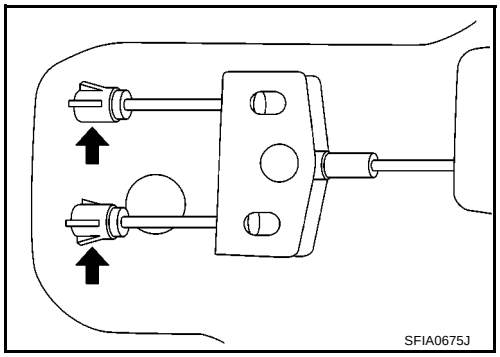
1. Device assembly
2. Screw
3. Warning lamp switch
4. Adjusting nut
5. Front cable
6. Rear left cable
7. Rear right cable

Removal and Installation

EFS002FR

REMOVAL

1. Remove the console box. Refer to IP-9, "REMOVAL AND INSTALLATION OF CONSOLE BOX." .
2. Disconnect warning lamp switch connector.
3. Loosen adjusting nut and separate the rear left and rear right cable.
4. Remove device assembly tightening nuts, and remove device assembly from vehicle.



5. Remove tire from vehicle.
6. Remove rear brake shoe and remove cable from the operating lever. Refer to BR-27, "Components" .
7. Remove the exhaust center tube and heat plate. Refer to EX-3, "EXHAUST SYSTEM" .
8. Disconnect the rear cable mount and remove it from the vehicle.

INSTALLATION

1. Install in the reverse order of removal. Tighten nuts and bolts to the specified torque.
2. Adjust the parking brake. Refer to PB-3, "Adjustment" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Parking Brake

EFS002FS

Control type	Center lever
Lever stroke [operating force 196 N (20 kg, 44.1 lb)]	11 - 12 notches
Full stroke	15 notches
Brake warning lamp stroke	1 notch or less

SECTION PG

POWER SUPPLY, GROUND & CIRCUIT ELEMENTS

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Maintenance Information 3
RHD MODELS 3
LHD MODELS 3
POWER SUPPLY ROUTING 4
Schematic 4
Wiring Diagram — POWER — 5
BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION 5
ACCESSORY POWER SUPPLY — IGNITION SW. IN “ACC” OR “ON” 11
IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START” 12
Fuse 17
Fusible Link 17
Circuit Breaker 17
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) 18
System Description 18
SYSTEMS CONTROLLED BY IPDM E/R 18
FAIL-SAFE FUNCTION 19
IPDM E/R STATUS CONTROL 19
FUNCTION OF IPDM E/R 19
CAN Communication 20
SYSTEM DESCRIPTION 20
CAN Communication Unit 20
TYPE 1/TYPE 2 21
TYPE 3/TYPE 4 24
TYPE 5/TYPE 6 26
TYPE 7/TYPE 8 29
TYPE 9/TYPE 10 31
Function of Detecting Ignition Relay Malfunction 33
CONSULT-II Function (IPDM E/R) 33
CONSULT-II BASIC OPERATION 33
SELF-DIAG RESULTS 34
DATA MONITOR 35
ACTIVE TEST 36
Configuration 36
DESCRIPTION 36
READ CONFIGURATION PROCEDURE 36
WRITE CONFIGURATION PROCEDURE 38
Auto Active Test 42
DESCRIPTION 42
OPERATION PROCEDURE 42
INSPECTION IN AUTO ACTIVE TEST MODE 43
CONCEPT OF AUTO ACTIVE TEST 44
Schematic 46
IPDM E/R Terminal Arrangement 47
Inspection With CONSULT-II (Self-Diagnosis) 48
IPDM E/R Terminal Inspection 49
IPDM E/R Power Supply and Ground Circuit Check 49
Diagnosis of IPDM E/R Integrated Relay 51
Removal and Installation of IPDM E/R 52
REMOVAL 52
INSTALLATION 53
GROUND 54
Ground Distribution 54
MAIN HARNESS 54
ENGINE ROOM HARNESS 58
ENGINE CONTROL HARNESS/CR ENGINE MODELS 61
ENGINE CONTROL HARNESS/K9K ENGINE MODELS 62
BODY HARNESS 63
HARNESS 67
Harness Layout 67
HOW TO READ HARNESS LAYOUTS 67
OUTLINE/CR ENGINE MODELS 68
OUTLINE/K9K ENGINE MODELS 69
MAIN HARNESS/LHD MODELS 70
MAIN HARNESS/RHD MODELS 72
ENGINE ROOM HARNESS/CR ENGINE MODELS 74
ENGINE ROOM HARNESS/K9K ENGINE MODELS 76
ENGINE CONTROL HARNESS/CR ENGINE MODELS 78

ENGINE CONTROL HARNESS/K9K ENGINE MODELS 80
BODY HARNESS 82
ROOM LAMP HARNESS 85
FRONT DOOR HARNESS LH SIDE/LHD MODELS 86
FRONT DOOR HARNESS LH SIDE/RHD MODELS 87
FRONT DOOR HARNESS RH SIDE/LHD MODELS 88
FRONT DOOR HARNESS RH SIDE/RHD MODELS 89
REAR DOOR HARNESS LH 90
REAR DOOR HARNESS RH 91
Wiring Diagram Codes (Cell Codes) 92
ELECTRICAL UNITS LOCATION 95
Electrical Units Location 95
ENGINE COMPARTMENT 95
PASSENGER COMPARTMENT 97
HARNESS CONNECTOR 99
Description 99
HARNESS CONNECTOR (TAB-LOCKING TYPE) 99
HARNESS CONNECTOR (SLIDE-LOCKING TYPE) 100
JOINT CONNECTOR (J/C) 101
Terminal Arrangement 101
ELECTRICAL UNITS 102
Terminal Arrangement 102
SMJ (SUPER MULTIPLE JUNCTION) 103
Terminal Arrangement 103
STANDARDIZED RELAY 104
Description 104
NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS 104
TYPE OF STANDARDIZED RELAYS 104
FUSE BLOCK - JUNCTION BOX (J/B) 106
Terminal Arrangement 106
FUSE AND FUSIBLE LINK BOX 107
Terminal Arrangement 107

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS008IN

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EKS008IP

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

POWER SUPPLY ROUTING

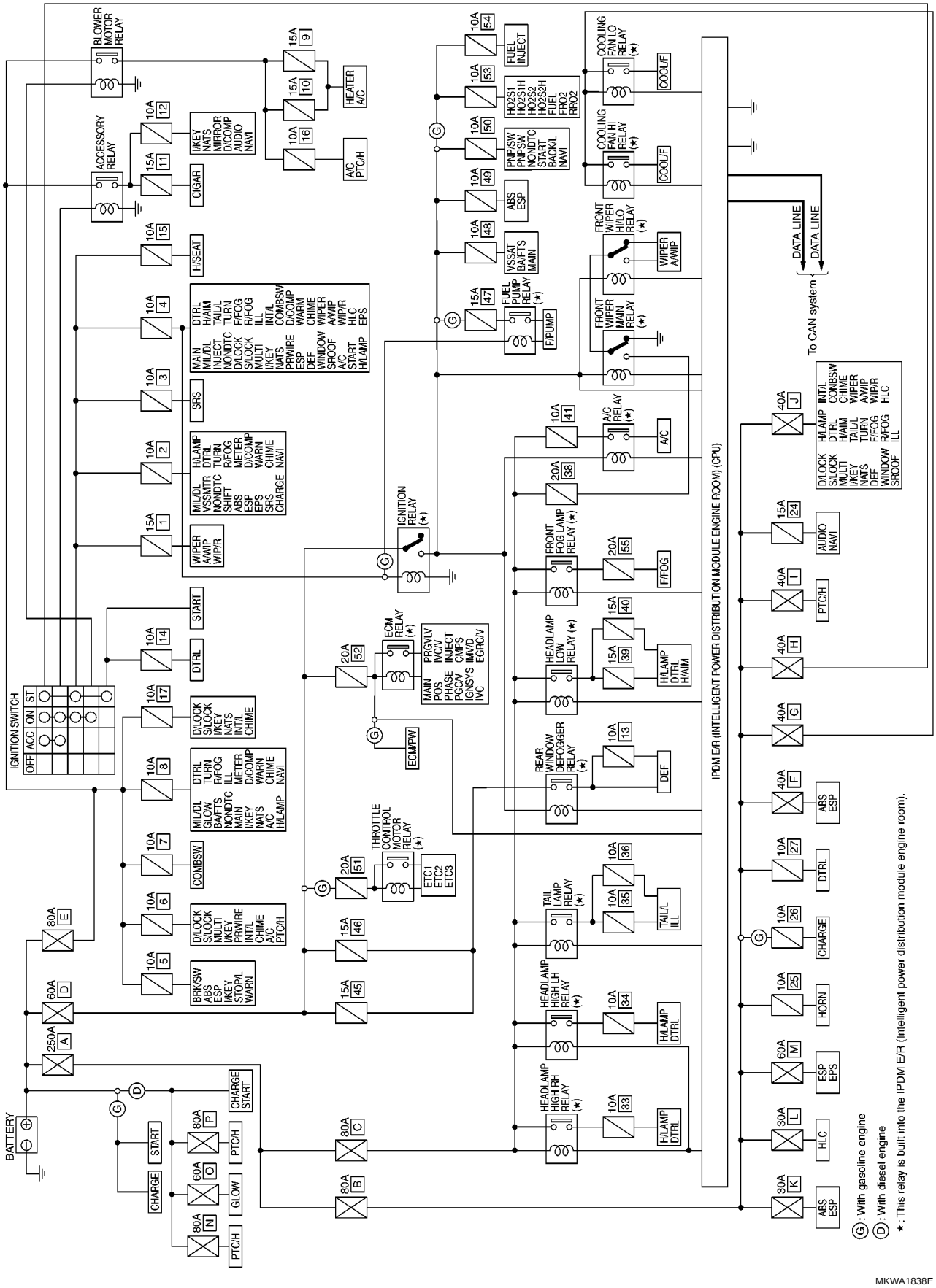
SMA for VIN >SJN**AK12U1288860

PFP:00011

Schematic

SMA for VIN >SJN**AK12U1309269

EKS00795

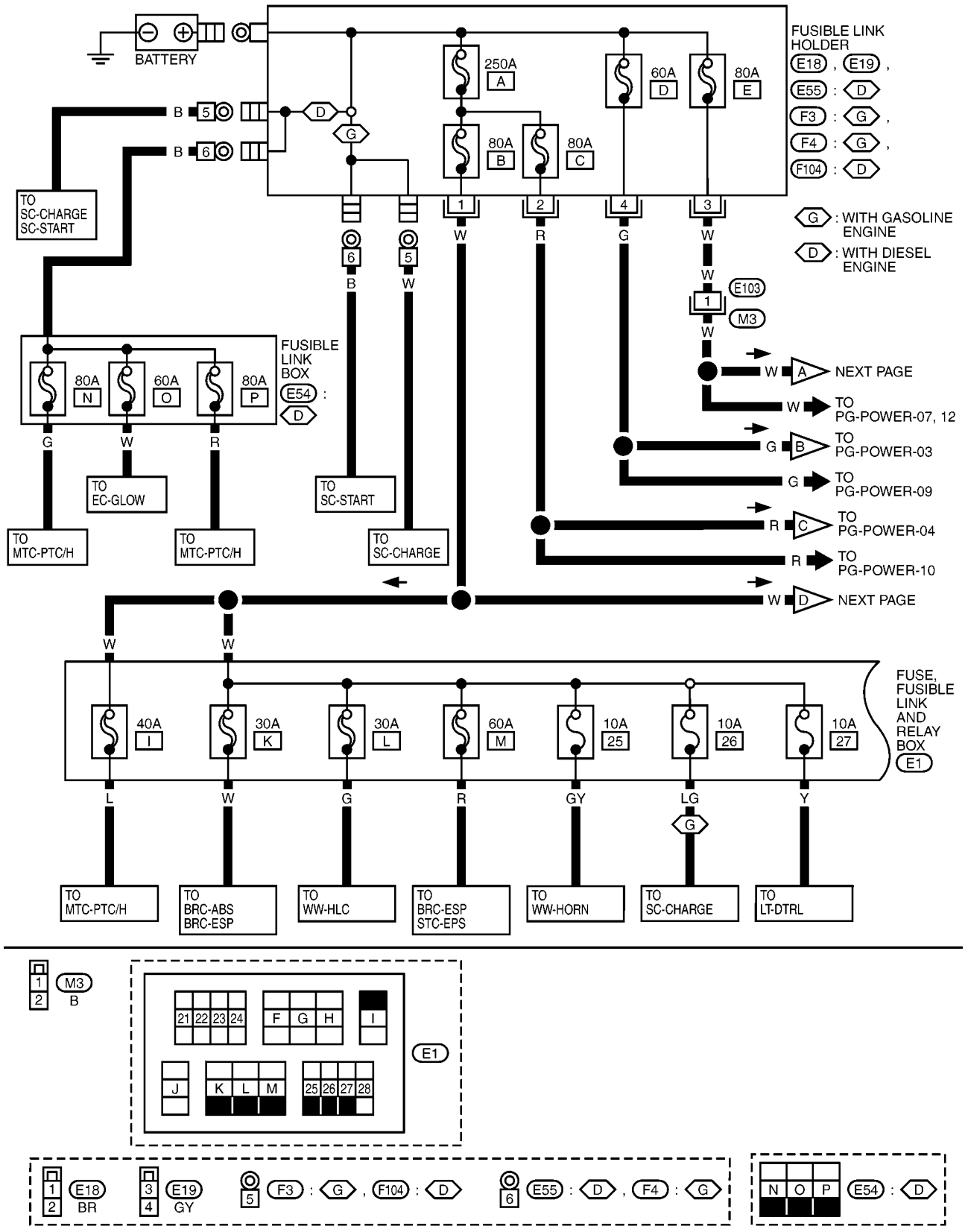


Wiring Diagram — POWER —

EKS00796

BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION

SMA for VIN >SJN**AK12U1288860 SMA for VIN >SJN**AK12U1309269 PG-POWER-01



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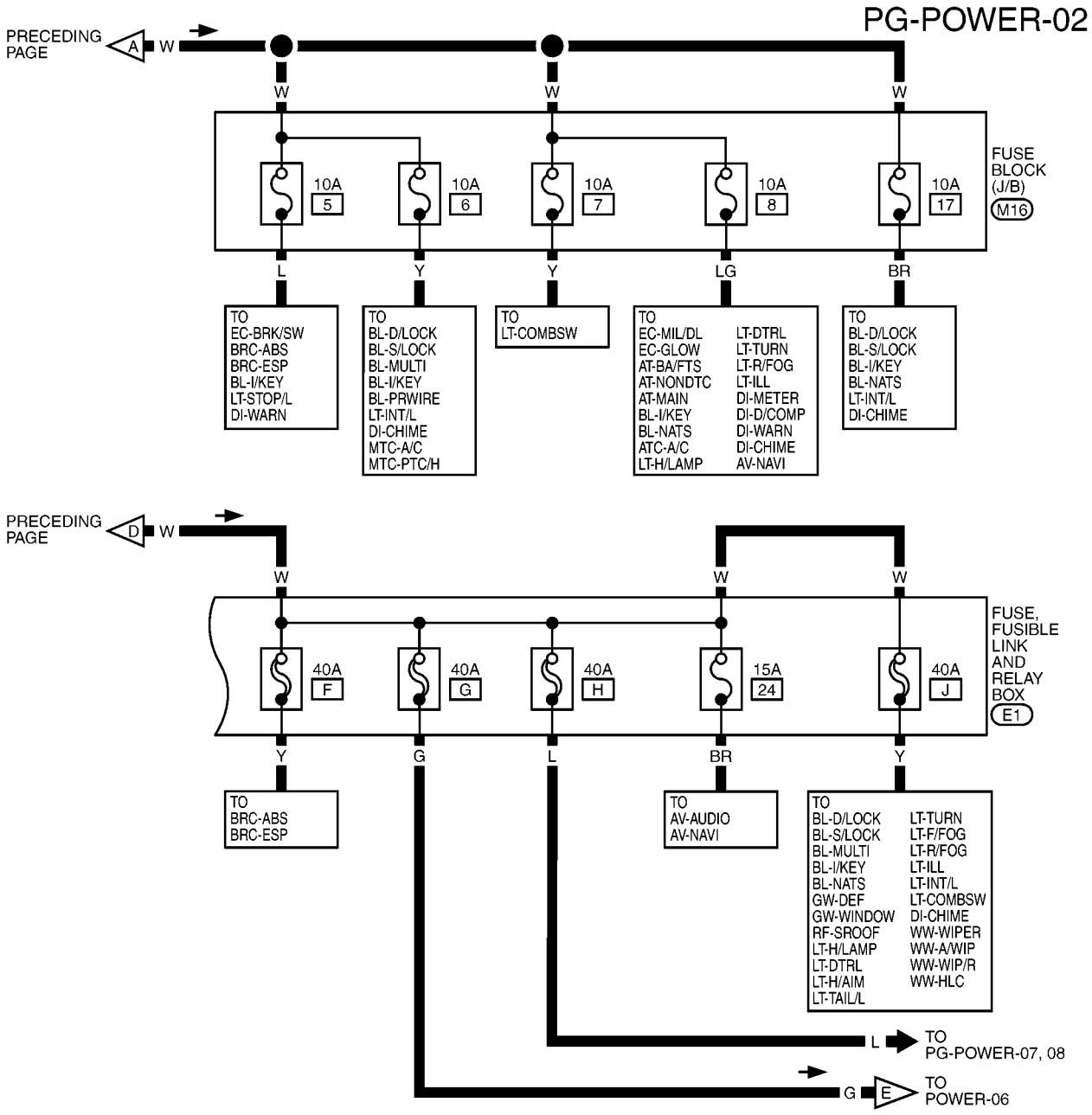
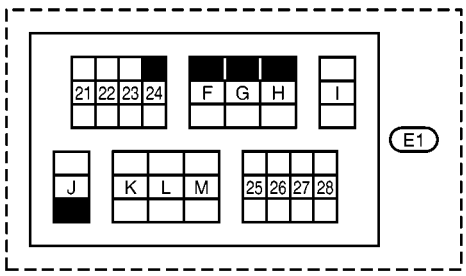




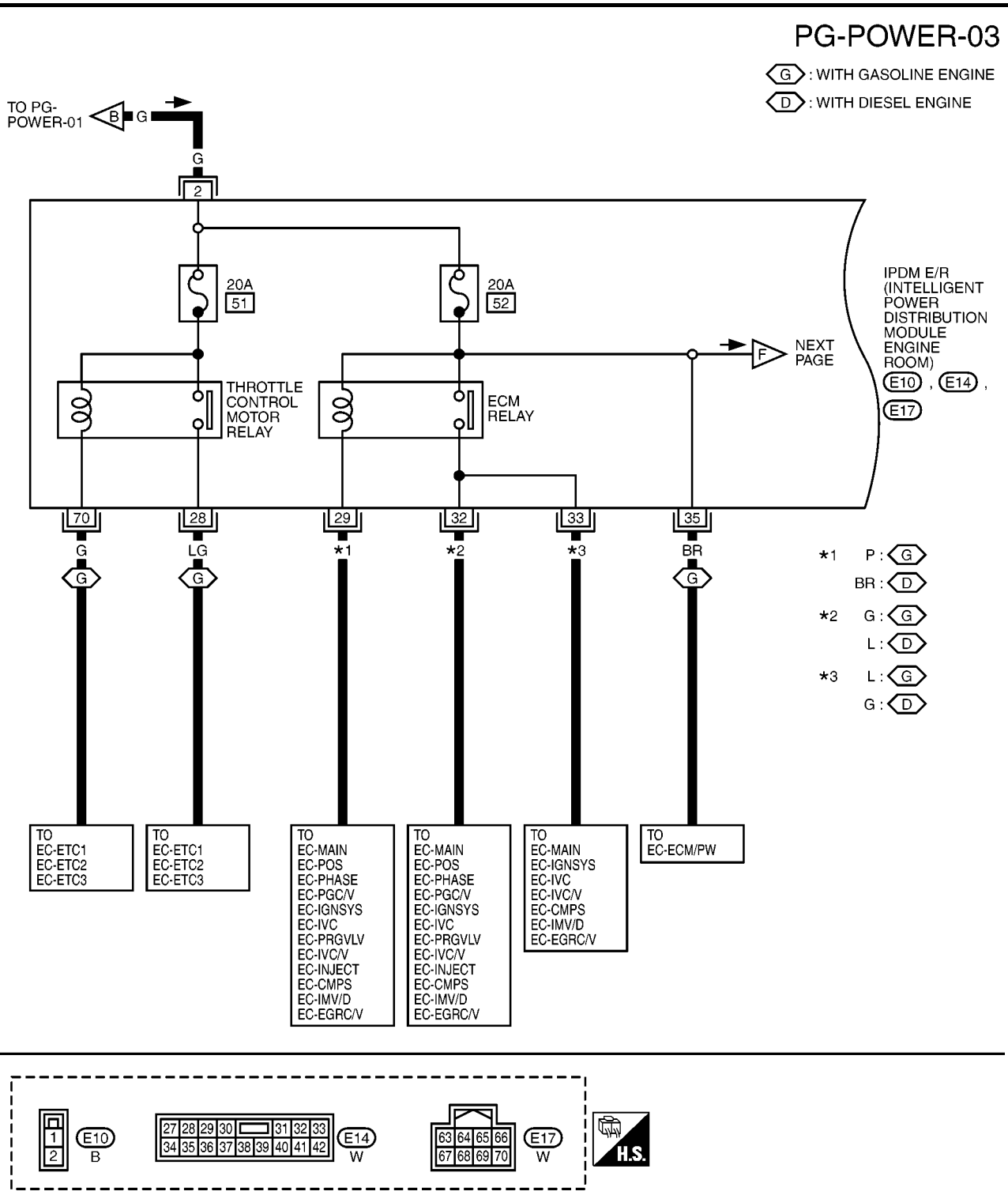
REFER TO THE FOLLOWING.

M16 -FUSE BLOCK-
JUNCTION BOX (J/B)

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

13	14	15	16	17

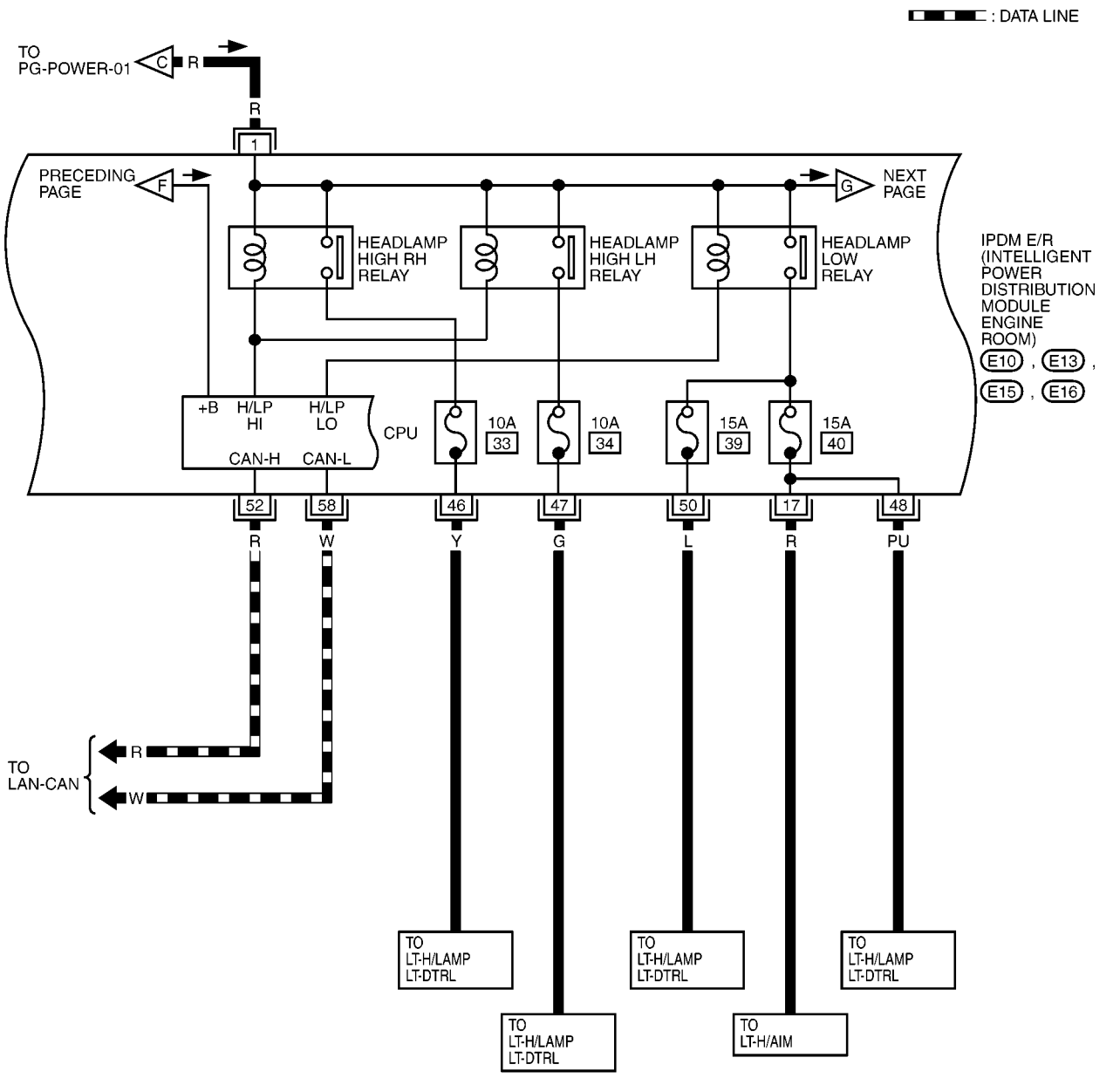
MKWA1840E

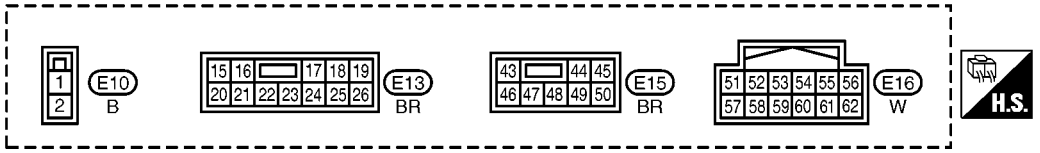

PG-POWER-03
G : WITH GASOLINE ENGINE
D : WITH DIESEL ENGINE
TO PG-POWER-01
B
G
G
2
20A
51
20A
52
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10 , E14 , E17
NEXT PAGE
F
THROTTLE CONTROL MOTOR RELAY
ECM RELAY
70
28
29
32
33
35
G
LG
*1
*2
*3
BR
G
G
G
G
*1 P : G
BR : D
*2 G : G
L : D
*3 L : G
G : D
TO EC-ETC1 EC-ETC2 EC-ETC3
TO EC-ETC1 EC-ETC2 EC-ETC3
TO EC-MAIN EC-POS EC-PHASE EC-PGC/V EC-IGNSYS EC-IVC EC-PRGVLV EC-IVC/V EC-INJECT EC-CMPS EC-IMV/D EC-EGRC/V
TO EC-MAIN EC-POS EC-PHASE EC-PGC/V EC-IGNSYS EC-IVC EC-PRGVLV EC-IVC/V EC-INJECT EC-CMPS EC-IMV/D EC-EGRC/V
TO EC-MAIN EC-IGNSYS EC-IVC EC-IVC/V EC-CMPS EC-IMV/D EC-EGRC/V
TO EC-ECM/PW

1
2
E10
B
27 28 29 30 31 32 33
34 35 36 37 38 39 40 41 42
E14
W
63 64 65 66
67 68 69 70
E17
W
H.S.

MKWA1841E

PG-POWER-04

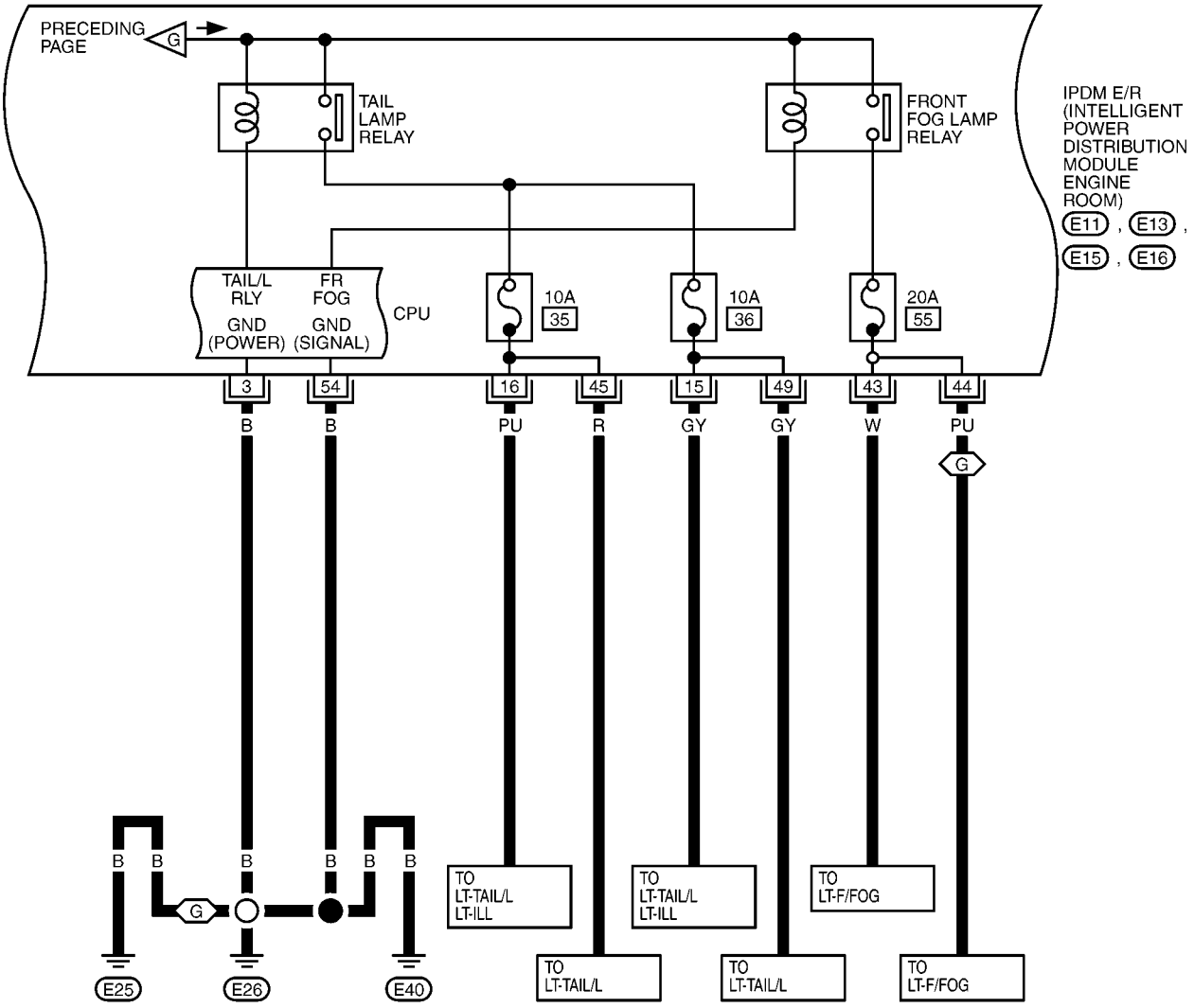


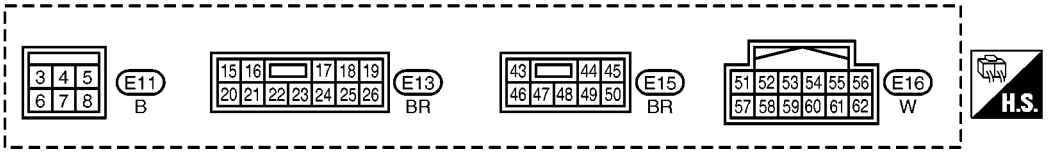


MKWA1506E

PG-POWER-05

G : WITH GASOLINE ENGINE





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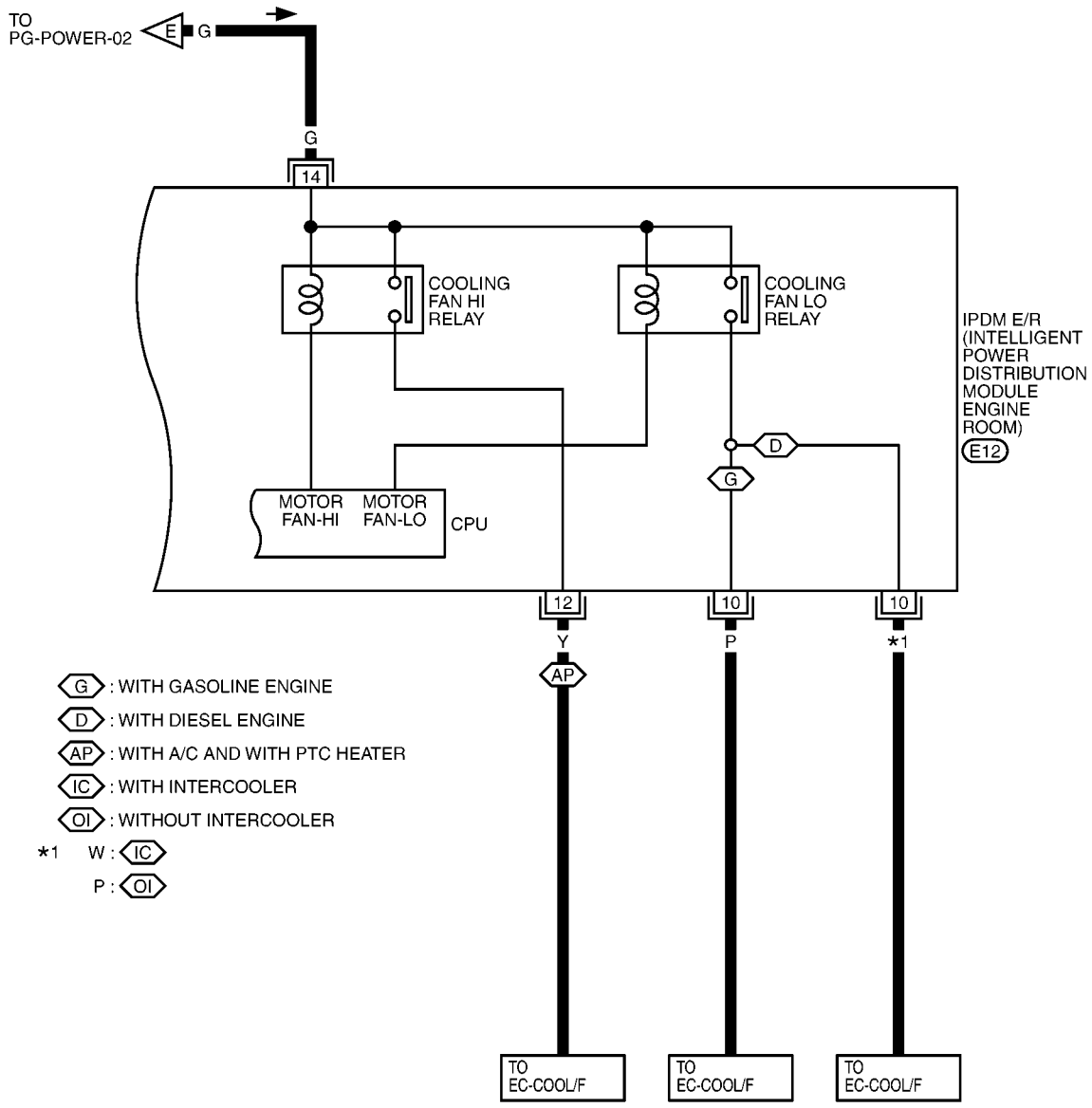
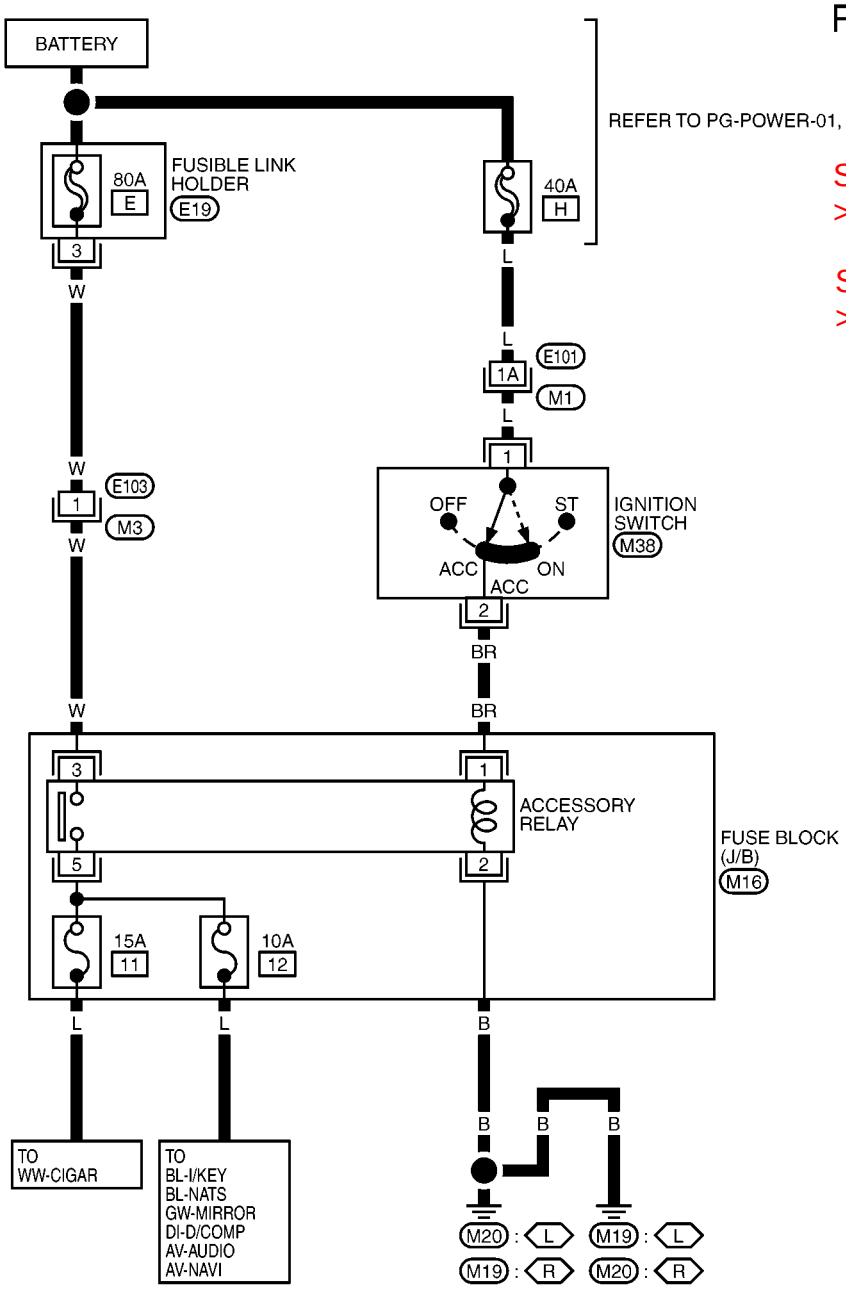

TO
PG-POWER-02
E
G
G
14
COOLING
FAN HI
RELAY
COOLING
FAN LO
RELAY
IPDM E/R
(INTELLIGENT
POWER
DISTRIBUTION
MODULE
ENGINE
ROOM)
E12
D
G
MOTOR
FAN-HI
MOTOR
FAN-LO
CPU
12
10
10
Y
P
*1
AP
G : WITH GASOLINE ENGINE
D : WITH DIESEL ENGINE
AP : WITH A/C AND WITH PTC HEATER
IC : WITH INTERCOOLER
OI : WITHOUT INTERCOOLER
*1 W : IC
P : OI
TO
EC-COOL/F
TO
EC-COOL/F
TO
EC-COOL/F

9 10 11
12 13 14
E12
W
H.S.

MKWA3239E

ACCESSORY POWER SUPPLY — IGNITION SW. IN “ACC” OR “ON”

PG-POWER-07

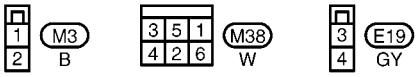


: LHD MODELS

: RHD MODELS

SMA for VIN >SJN**AK12U1288860

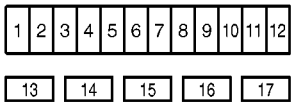
SMA for VIN >SJN**AK12U1309269



REFER TO THE FOLLOWING.

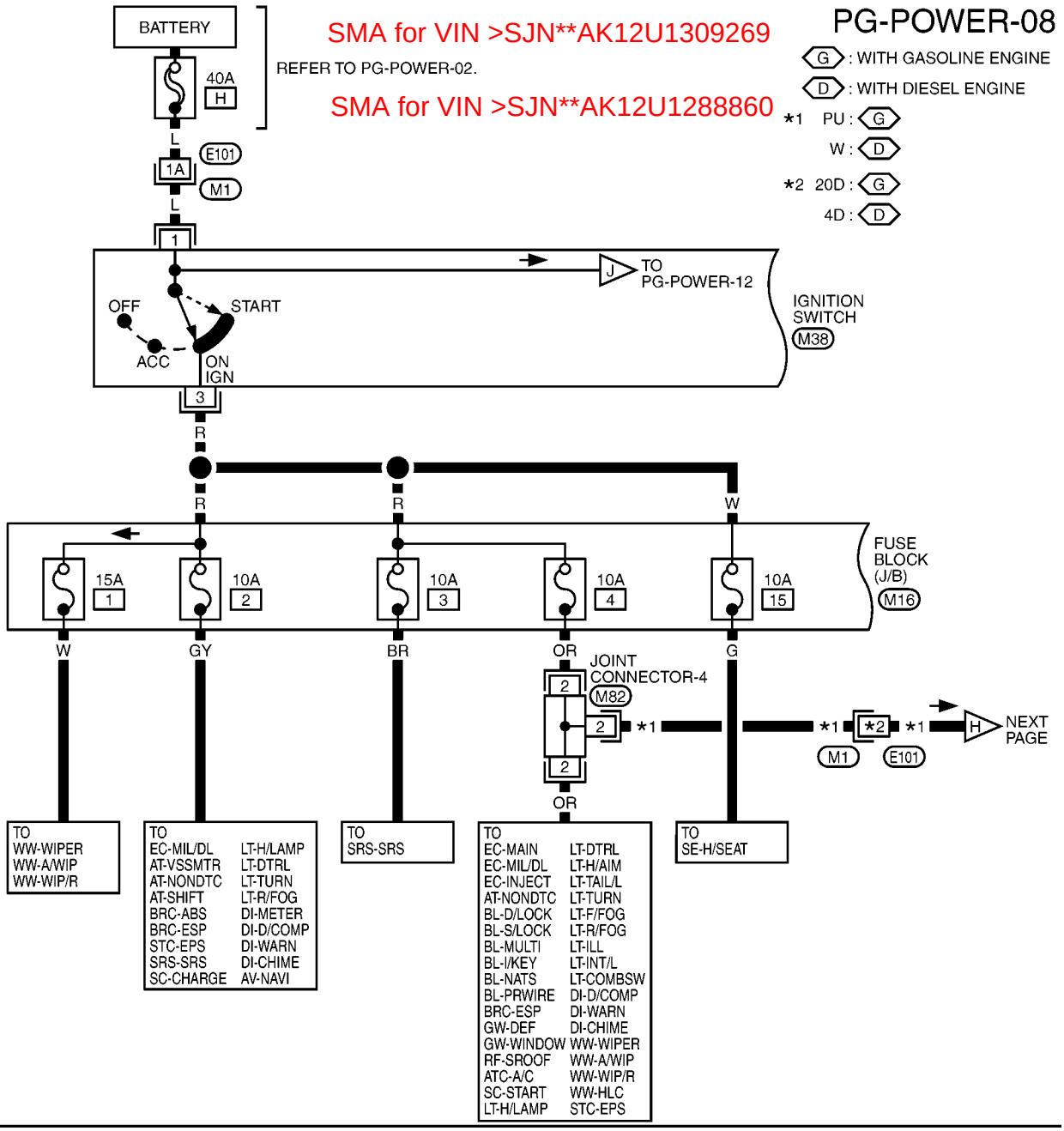
M1 -SUPER MULTIPLE JUNCTION (SMJ)

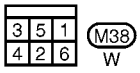
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

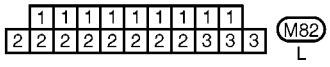


MKWA1508E

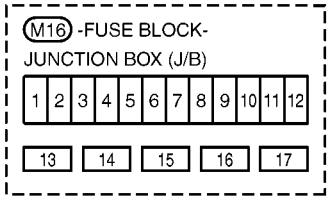
IGNITION POWER SUPPLY — IGNITION SW. IN “ON” AND/OR “START”







REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)



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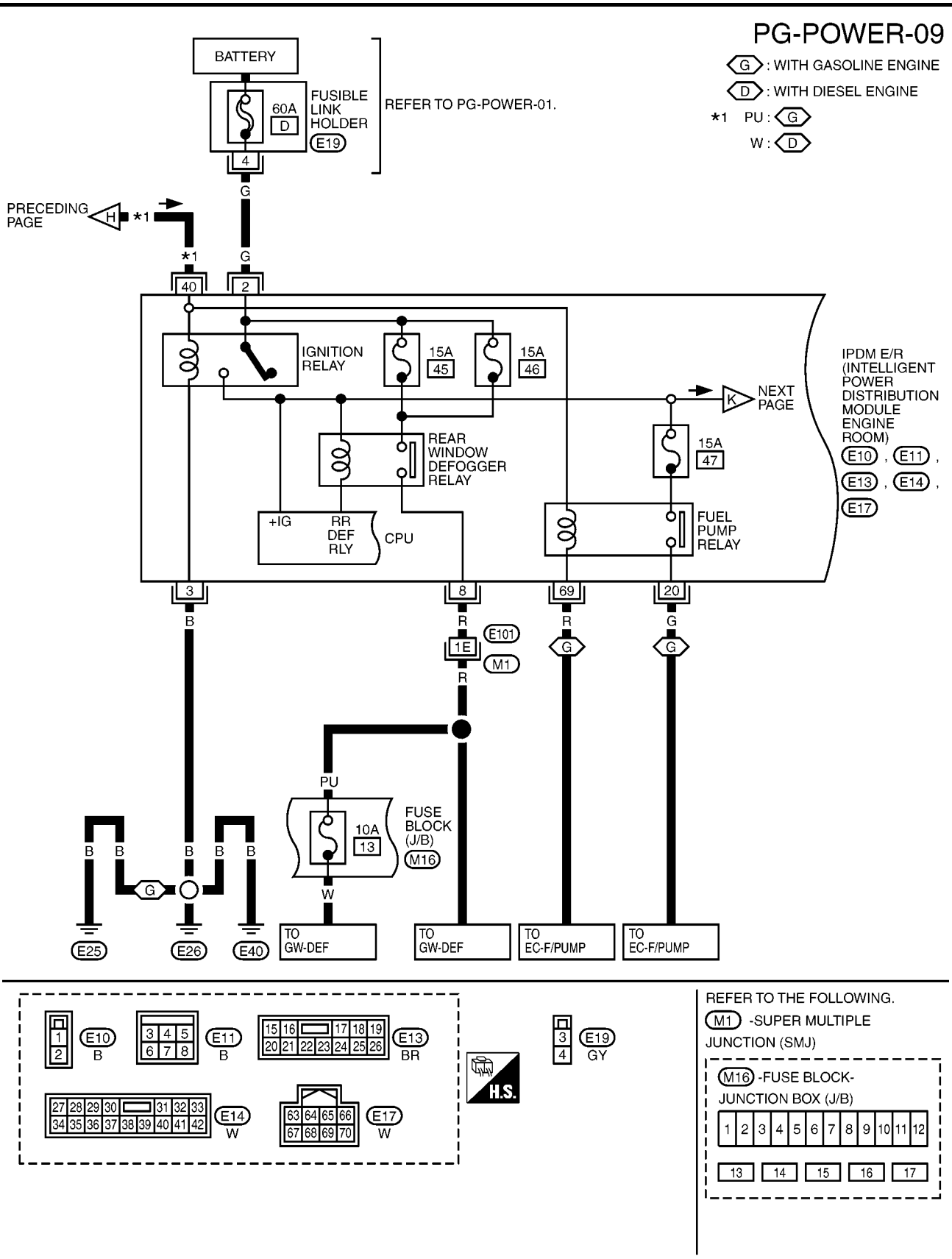
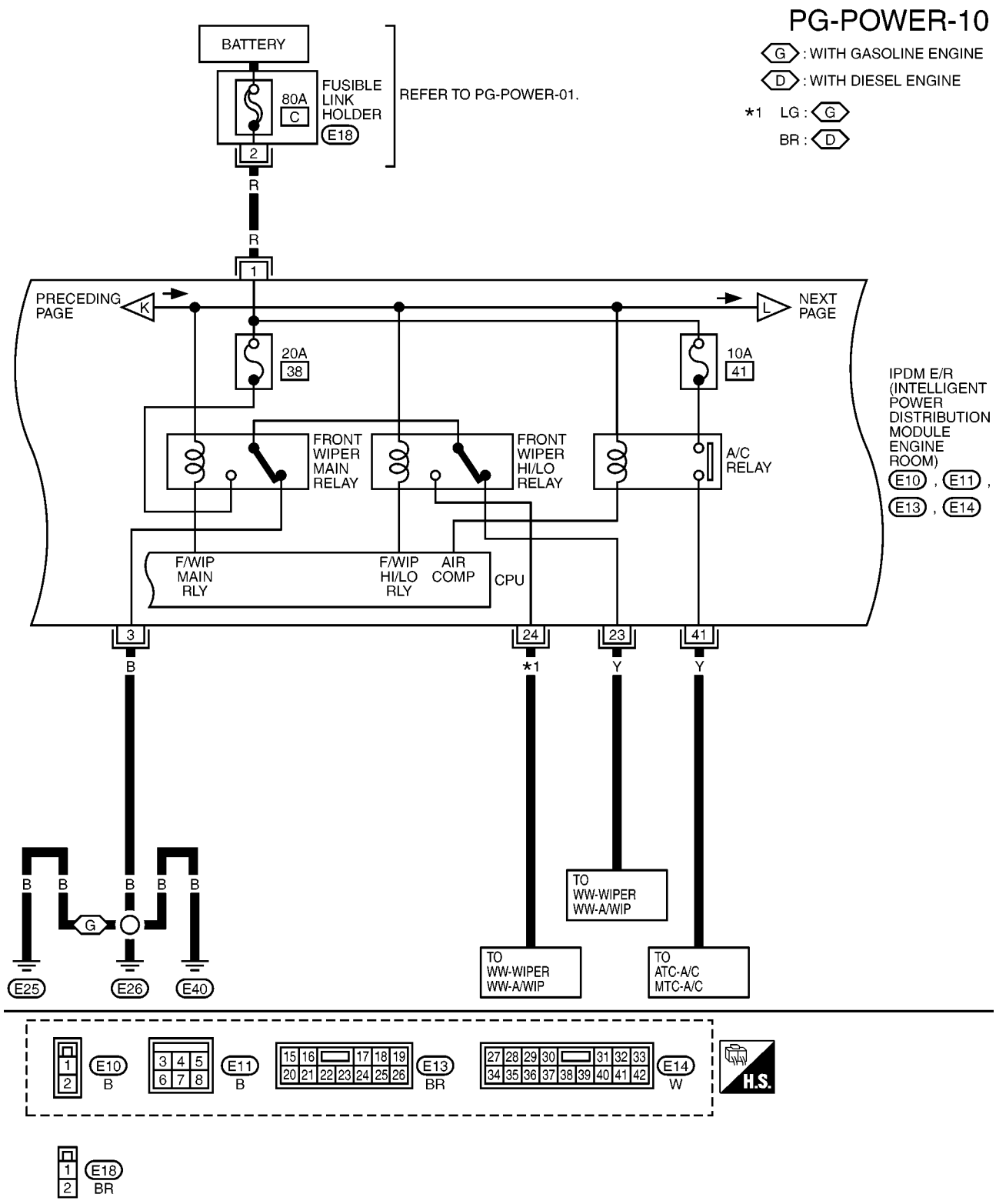

PG-POWER-09
G : WITH GASOLINE ENGINE
D : WITH DIESEL ENGINE
*1 PU : G
W : D
BATTERY
60A
D
FUSIBLE LINK HOLDER
E19
REFER TO PG-POWER-01.
4
G
PRECEDING PAGE
H
*1
*1
G
40
2
IGNITION RELAY
15A
45
15A
46
K
NEXT PAGE
REAR WINDOW DEFOGGER RELAY
15A
47
+IG
RR DEF RLY
CPU
FUEL PUMP RELAY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10 , E11 , E13 , E14 , E17
3
8
69
20
B
R
R
G
G
E101
1E
M1
R
PU
10A
13
FUSE BLOCK (J/B)
M16
W
B B B B B
G
E25
E26
E40
TO GW-DEF
TO GW-DEF
TO EC-F/PUMP
TO EC-F/PUMP
E10
B
E11
B
E13
BR
E14
W
E17
W
H.S.
E19
GY
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

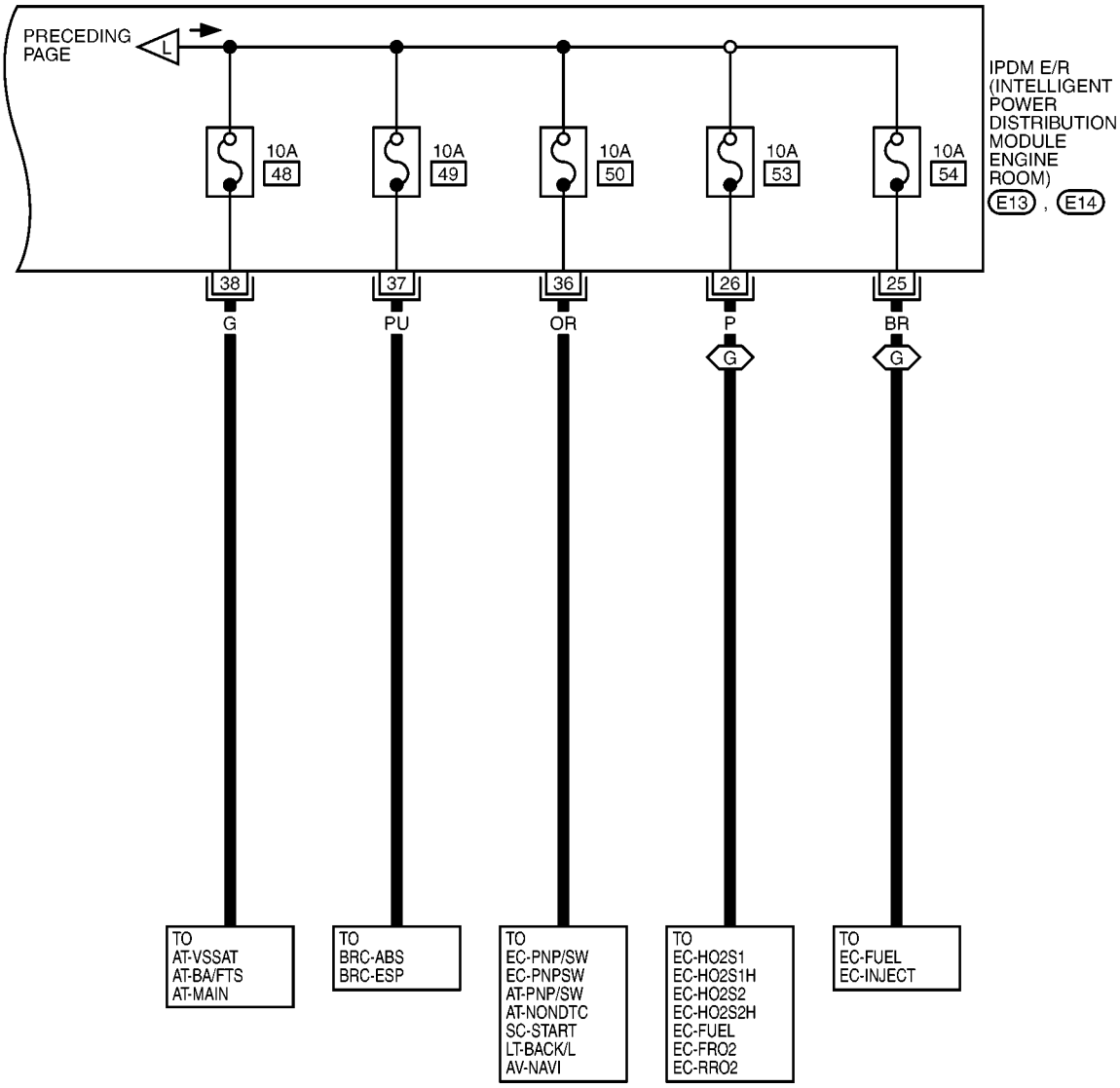
MKWA1510E

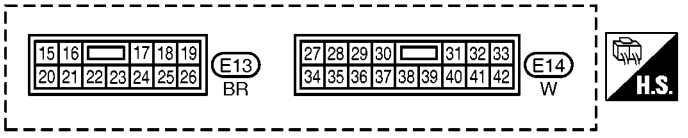

PG-POWER-10
G : WITH GASOLINE ENGINE
D : WITH DIESEL ENGINE
*1 LG : G
BR : D
BATTERY
80A
C
FUSIBLE LINK HOLDER
E18
REFER TO PG-POWER-01.
2
R
R
1
PRECEDING PAGE
K
NEXT PAGE
L
20A
38
10A
41
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E10 , E11 , E13 , E14
FRONT WIPER MAIN RELAY
FRONT WIPER HI/LO RELAY
A/C RELAY
F/WIP MAIN RLY
F/WIP HI/LO RLY
AIR COMP
CPU
3
24
23
41
B
*1
Y
Y
B B B B B
G
E25
E26
E40
TO WW-WIPER WW-A/WIP
TO WW-WIPER WW-A/WIP
TO ATC-A/C MTC-A/C
E10 B
E11 B
E13 BR
E14 W
H.S.
E18 BR

MKWA1511E

PG-POWER-11

G : WITH GASOLINE ENGINE





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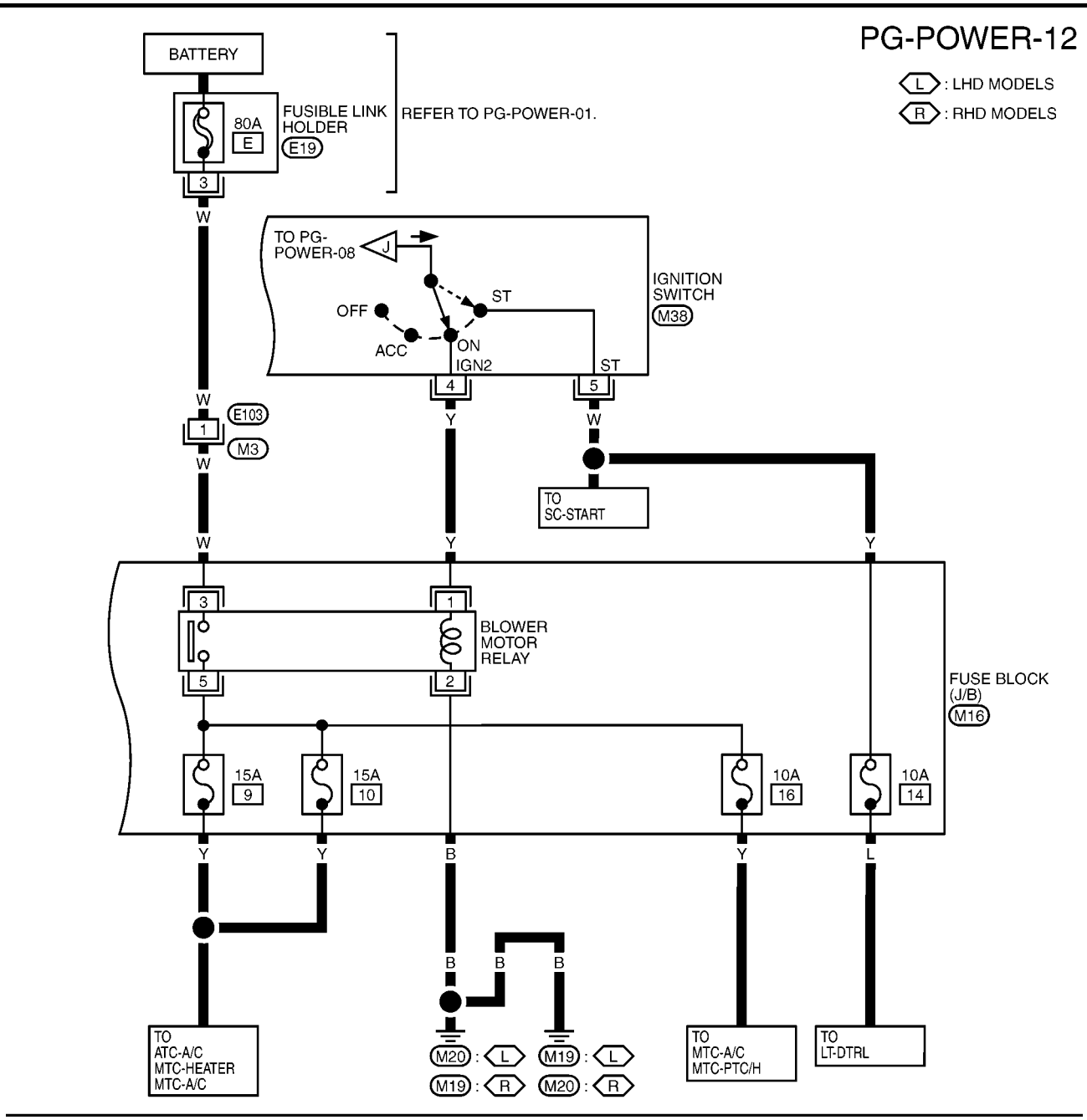
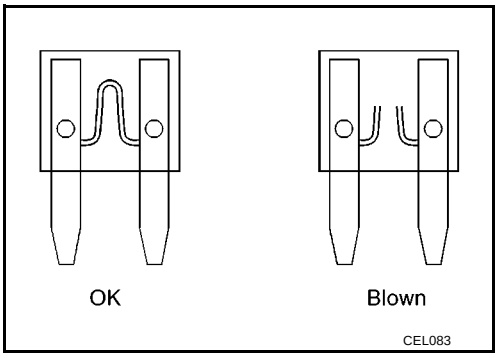

PG-POWER-12
L : LHD MODELS
R : RHD MODELS
BATTERY
80A
E
FUSIBLE LINK HOLDER
E19
REFER TO PG-POWER-01.
3
W
TO PG-POWER-08
J
IGNITION SWITCH
M38
OFF
ACC
ON
IGN2
ST
ST
4
5
W
Y
W
E103
1
M3
W
TO SC-START
W
Y
Y
3
1
5
2
BLOWER MOTOR RELAY
FUSE BLOCK (J/B)
M16
15A
9
15A
10
10A
16
10A
14
Y
Y
B
Y
L
B
B
B
TO ATC-A/C MTC-HEATER MTC-A/C
M20 : L
M19 : R
M19 : L
M20 : R
TO MTC-A/C MTC-PTC/H
TO LT-DTRL
1
2
M3
B
3 5 1
4 2 6
M38
W
3
4
E19
GY
REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)
1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17

MKWA1513E

Fuse

EKS00797

- If fuse is blown, be sure to eliminate cause of incident before installing new fuse.
- Use fuse of specified rating. Never use fuse of more than specified rating.
- Do not partially install fuse; always insert it into fuse holder properly.
- Remove fuse for “ELECTRICAL PARTS (BAT)” if vehicle is not used for a long period of time.



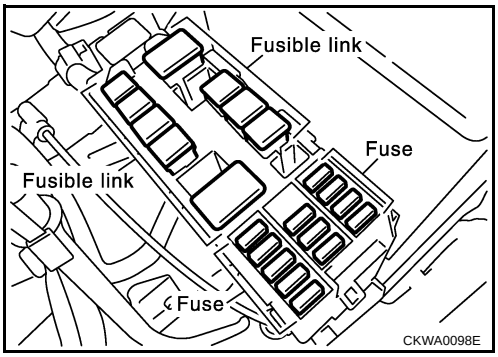
Fusible Link

EKS00798

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.

CAUTION:

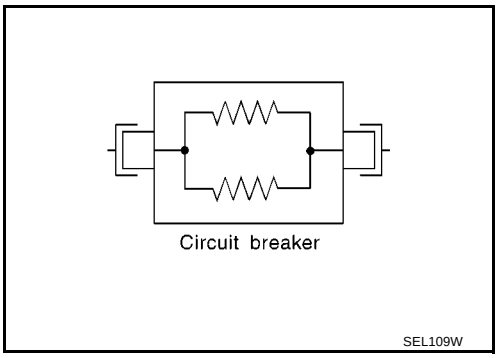
- **If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of incident.**
- **Never wrap outside of fusible link with vinyl tape. Important: Never let fusible link touch any other wiring harness, vinyl or rubber parts.**



Circuit Breaker

EKS00799

The PTC thermistor generates heat in response to current flow. The temperature (and resistance) of the thermistor element varies with current flow. Excessive current flow will cause the element's temperature to rise. When the temperature reaches a specified level, the electrical resistance will rise sharply to control the circuit current. Reduced current flow will cause the element to cool. Resistance falls accordingly and normal circuit current flow is allowed to resume.



IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

PFP:284B7

System Description

EKS0080P

- IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) integrates the relay box and the fuse box which has been conventionally placed in the engine room. It controls the built-in relay with the control circuit in IPDM E/R.
- IPDM E/R integrated control circuit performs ON-OFF control of the relay and transmission of various signals (oil pressure switch, park/neutral position switch, reverse switch) through CAN communication with BCM and ECM.

NOTE:
All IPDM E/R integrated relays can never be removed.

SYSTEMS CONTROLLED BY IPDM E/R

1. Lamp control
   Using the CAN communication line, it receives signals from BCM and controls following lamps:
   - Headlamps (Hi, Lo)
   - Parking lamps, tail lamps and license plate lamp
   - Front fog lamps
2. Front wiper control
   Using the CAN communication line, it receives signals from BCM and controls front wiper.
3. Headlamp washer control
   Using the CAN communication line, it receives signals from BCM and controls headlamp washer.
4. Rear window defogger control
   Using the CAN communication line, it receives signals from BCM and controls rear window defogger.
5. A/C compressor control
   Using the CAN communication line, it receives signals from ECM and controls A/C compressor.
6. Cooling fan control
   Using the CAN communication line, it receives signals from ECM and controls cooling fan.

FAIL-SAFE FUNCTION

- When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. After CAN communication recovers normally, it also returns to normal control.
- Operation of control parts by IPDM E/R during fail-safe mode is as follows:

Controlled parts	Fail-safe mode
Headlamp	With the ignition switch ON, the headlamp (low) is ON. With the ignition switch OFF, the headlamp (low) is OFF.
Parking lamp/ license plate lamp/ tail lamp	With the ignition switch ON, the tail lamp is ON. With the ignition switch OFF, the tail lamp is OFF.
Cooling fan	With the ignition switch ON, the cooling fan HI operates. With the ignition switch OFF, the cooling fan stops.
Front wiper	Until the ignition switch is turned off, the front wiper LO and HI remains in the same status it was in just before fail-safe control was initiated.
Rear window defogger	Rear window defogger is OFF
Front fog lamp	Front fog lamp is OFF
Headlamp washer	Headlamp washer is OFF
A/C compressor	A/C compressor is OFF

IPDM E/R STATUS CONTROL

In order to save power, the IPDM E/R switches status by itself based on each operating condition.

1. CAN communication status
   - CAN communication is normally performed with other control units.
   - Individual unit control by the IPDM E/R is normally performed.
   - When the IPDM E/R is not controlling any load, a sleep request signal is received from the BCM and the mode is switched to sleep waiting status.
2. Sleep waiting status
   - Process to stop CAN communication is activated.
   - All systems controlled by IPDM E/R are stopped. When 1 second has elapsed after CAN communication with other control units is stopped, mode switches to sleep status.
3. Sleep status
   - The IPDM E/R operates in low current consumption mode.
   - CAN communication is not active.
   - When a change in the CAN communication line or ignition switch ON is detected, the mode switches to CAN communication status.

FUNCTION OF IPDM E/R

- Park/neutral position switch signal output function
  The signal (ON/OFF) input from the Park/neutral position is output to ECM.
- Oil pressure switch output function
  The signal (ON/OFF) input from the oil pressure switch is output to the combination meter using the CAN communication line.
- Reverse switch signal output function
  The signal (ON/OFF) input from the reverse switch is output to BCM using the CAN communication line.

CAN Communication

EKS00KKK

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00KKL

Go to CAN system, when selecting your car model from the following table.

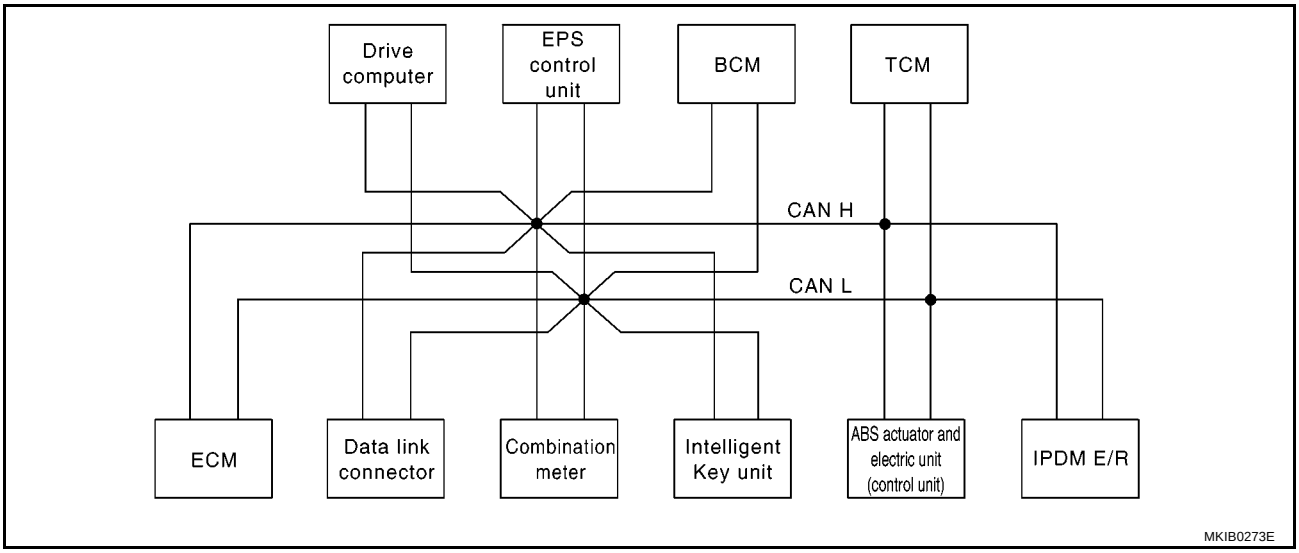
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	PG-21, "TYPE 1/ TYPE 2"				PG-24, "TYPE 3/ TYPE 4"				PG-26, "TYPE 5/ TYPE 6"				PG-29, "TYPE 7/ TYPE 8"				PG-31, "TYPE 9/ TYPE 10"			

×: Applicable

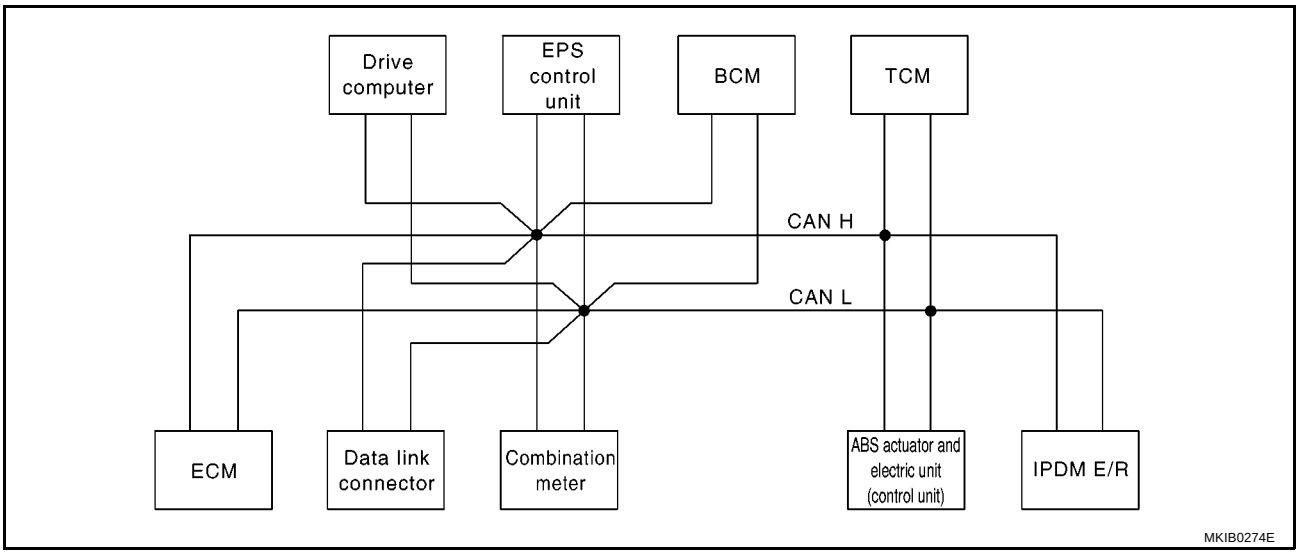
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T							R	

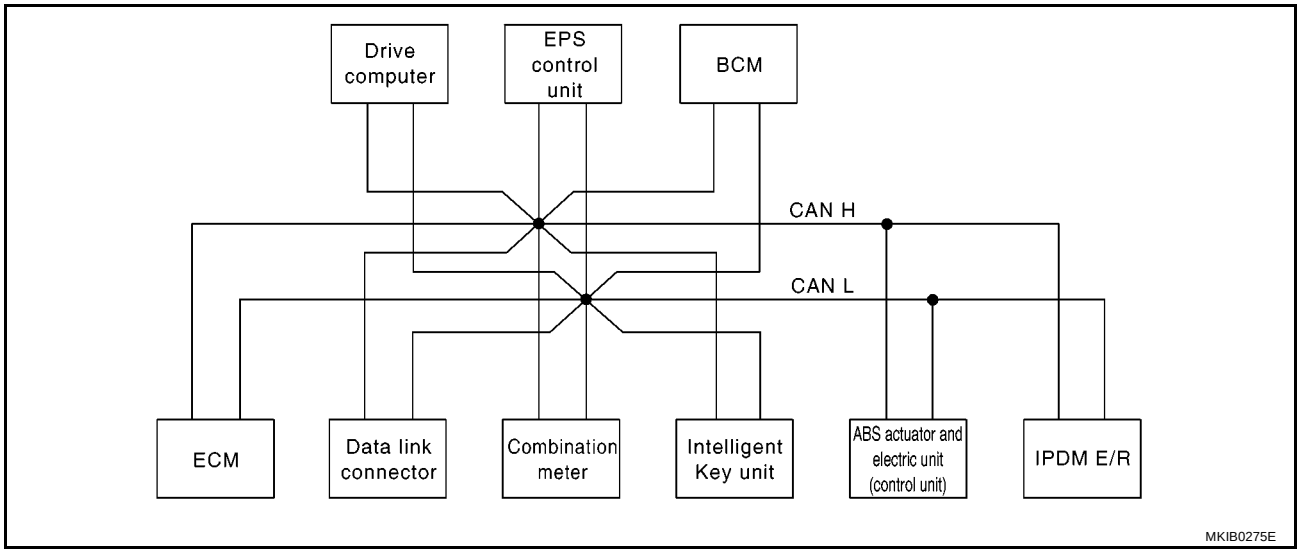
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

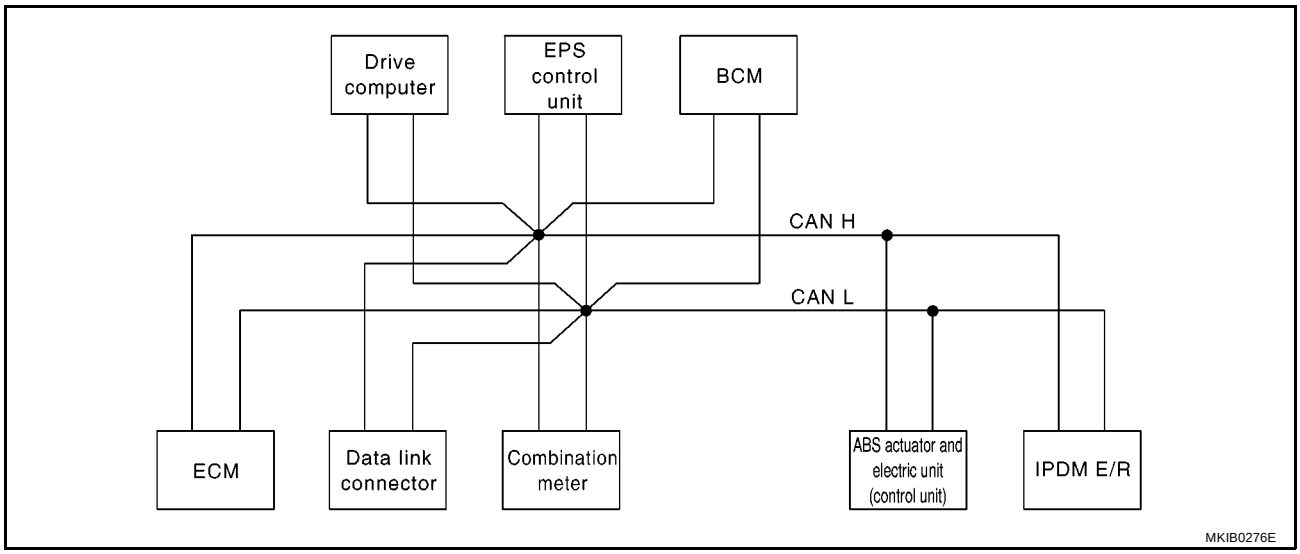
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

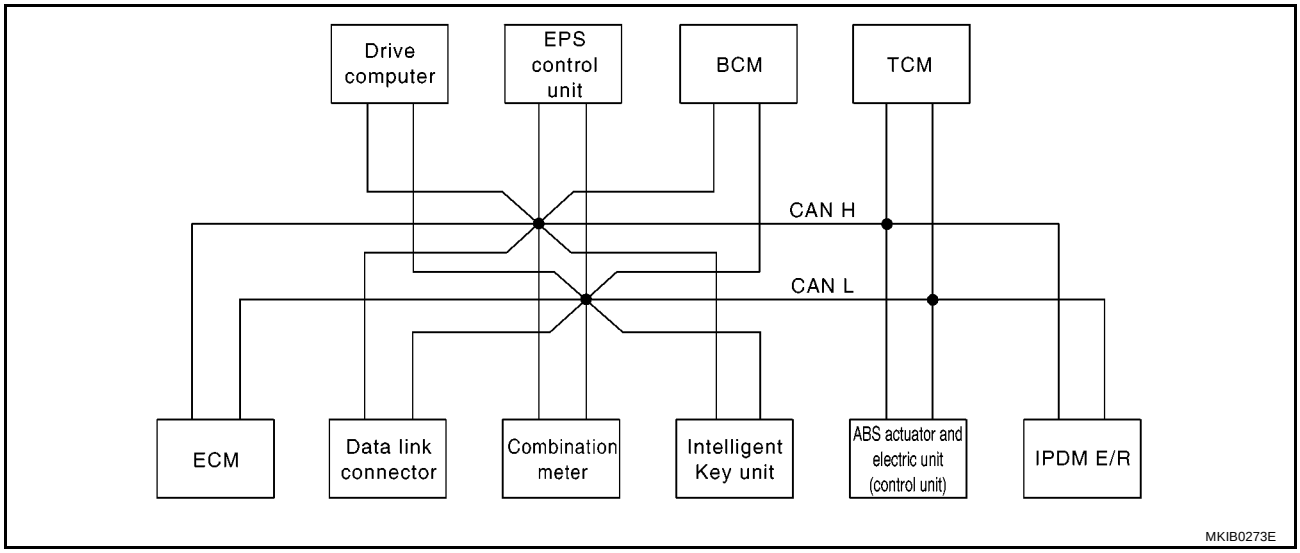
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

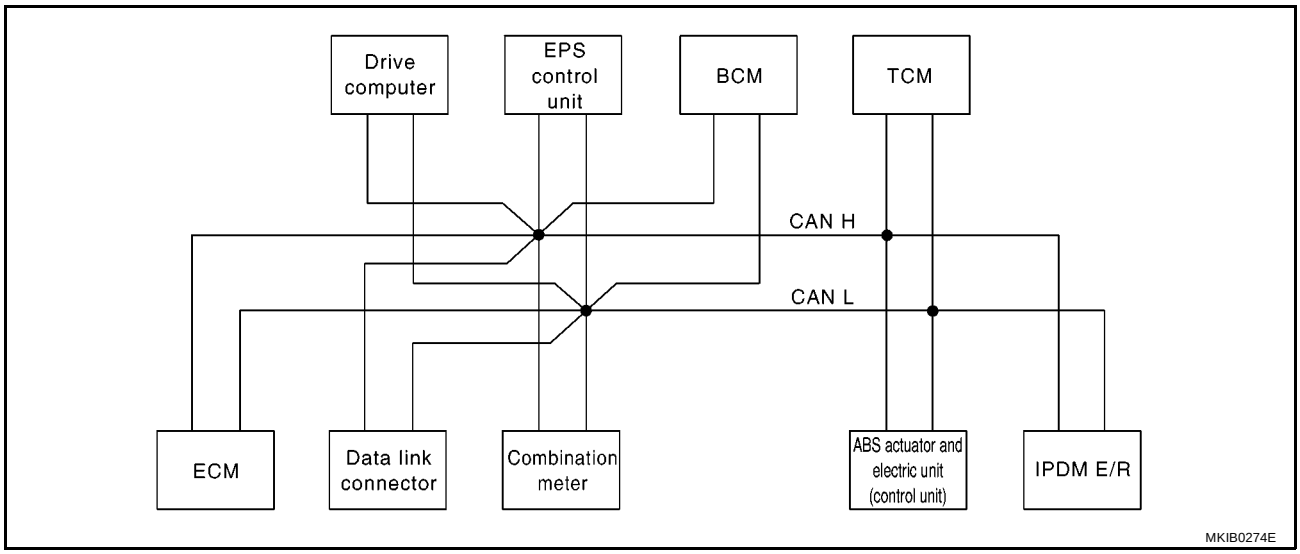
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

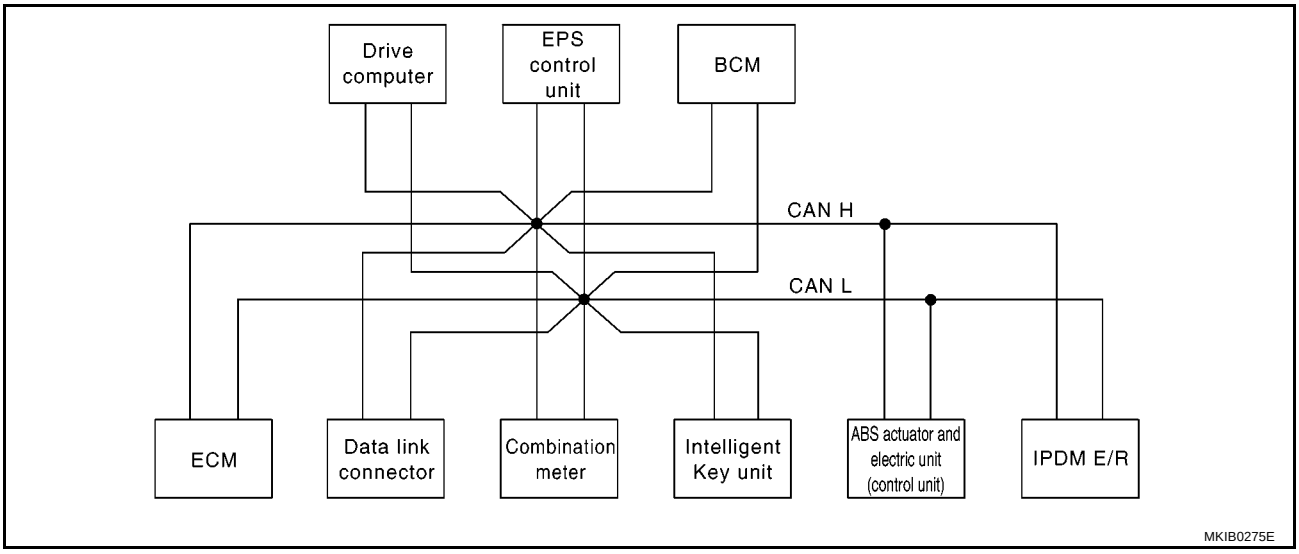
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

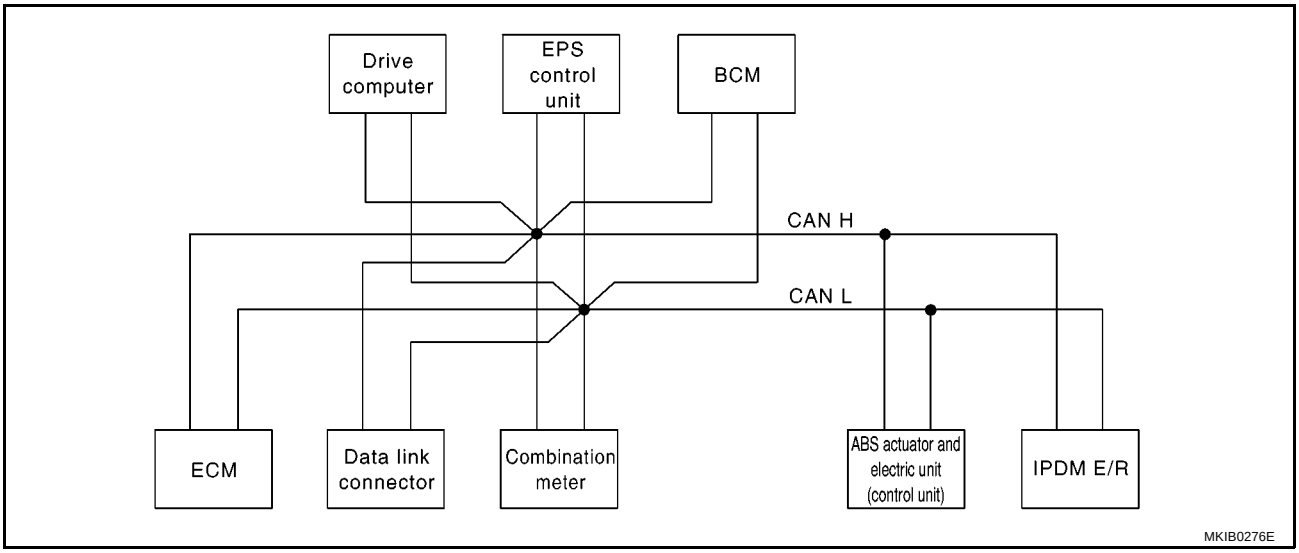
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

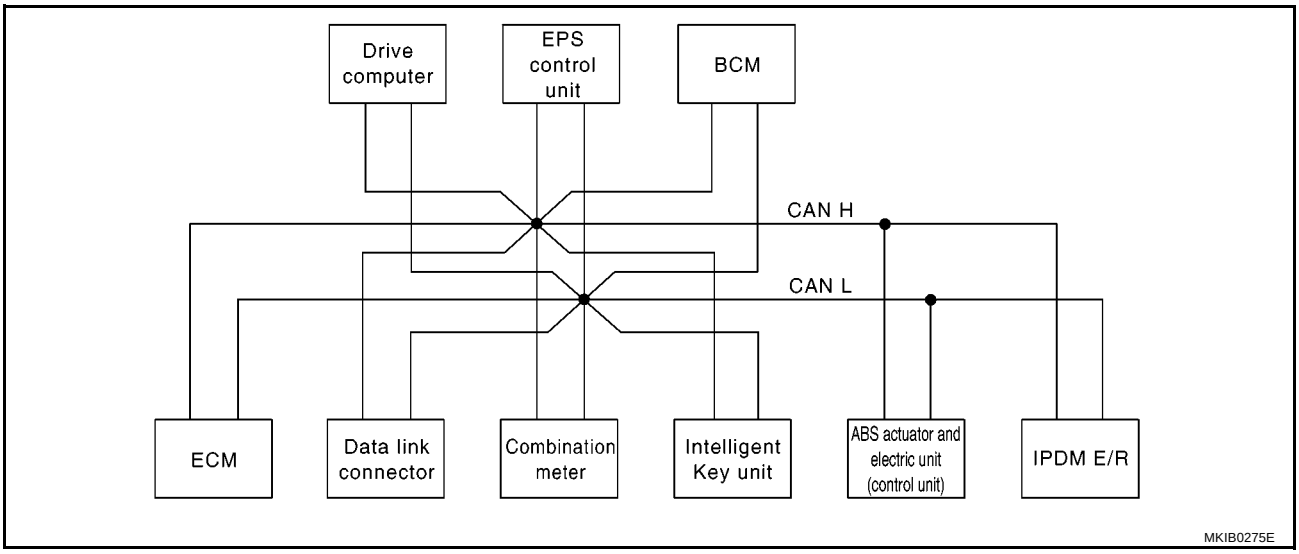
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

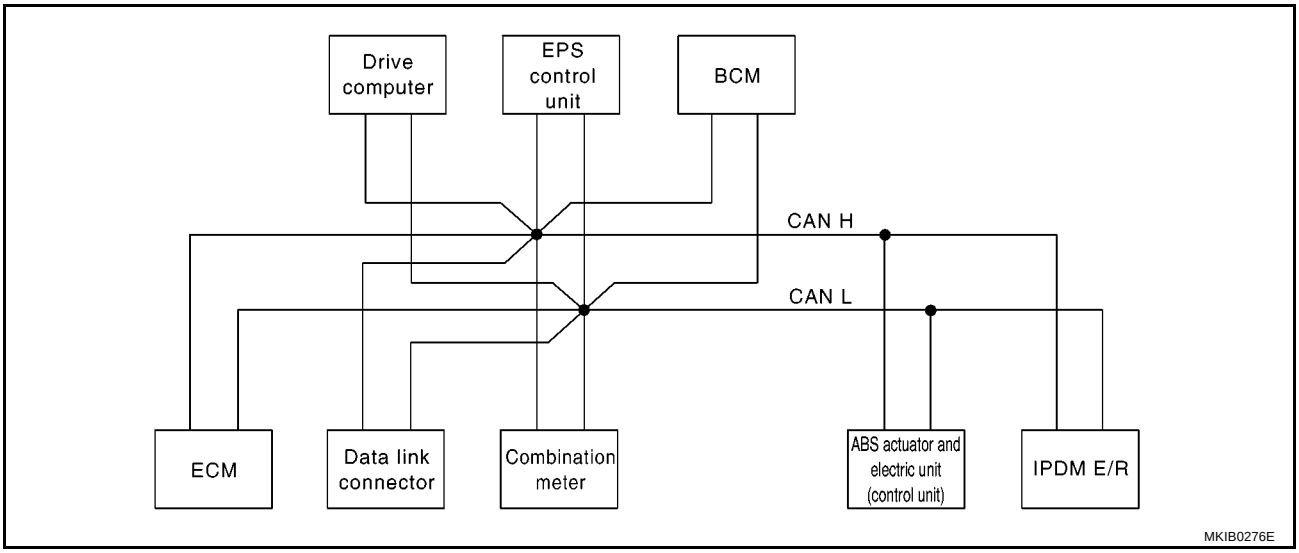
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Function of Detecting Ignition Relay Malfunction

EKS0080R

- When a contact point of the integrated ignition relay is stuck and cannot be turned OFF, the IPDM E/R turns ON tail lamp relay for 10 minutes to indicate IPDM E/R malfunction.

NOTE:
When the ignition switch is turned ON, the tail lamp is off.

CONSULT-II Function (IPDM E/R)

EKS0080S

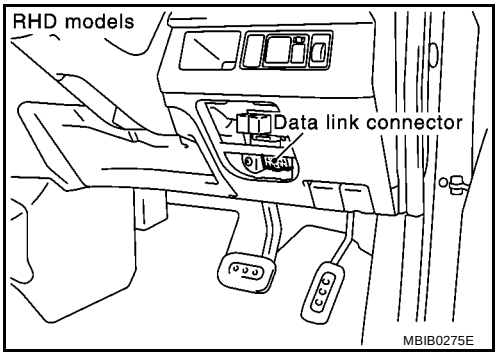
CONSULT-II can display each diagnostic item using the diagnostic modes shown following. Data is recieved and transmitted via the control module communication line.

Inspection Item, Diagnosis Mode	Description
SELF-DIAG RESULTS	The IPDM E/R performs diagnosis of the CAN communication and self-diagnosis.
DATA MONITOR	The input/output data of the IPDM E/R is displayed in real time.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	The IPDM E/R sends a drive signal to electronic components to check their operation.

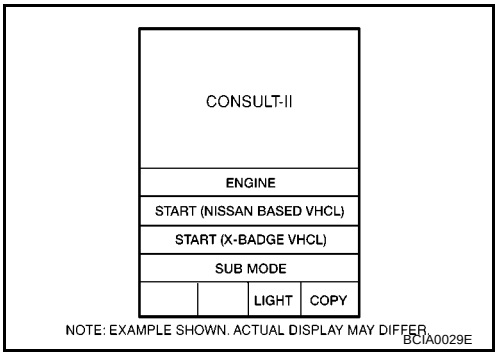
CONSULT-II BASIC OPERATION

1. Turn ignition switch OFF.
2. Connect CONSULT-II CONVERTER and CONSULT-II to data link connector.

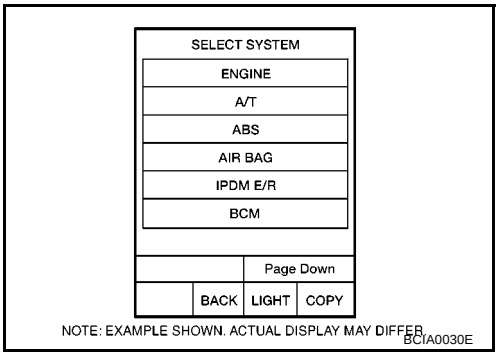
   CAUTION:
   If CONSULT-II is used without connecting CONSULT-II CONVERTER, malfunction may be detected in some control unit performing CAN communication by self-diagnosis.
3. Turn ignition switch ON.



4. Touch “START (NISSAN BASED VHCL)”.

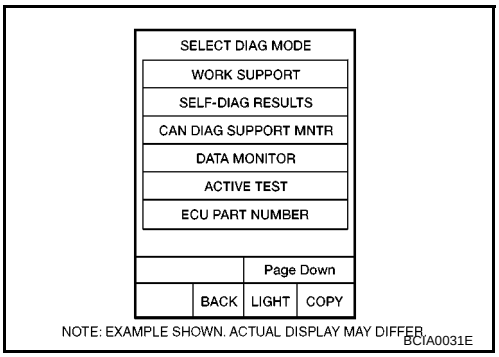


5. Touch “IPDM E/R” on “SELECT SYSTEM” screen.
   - If “IPDM E/R” is not displayed, print “SELECT SYSTEM” screen, then refer to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

6. Select part to be diagnosed on “SELECT DIAG MODE” screen.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0031E

SELF-DIAG RESULTS

Operation Procedure

1. Touch “SELF-DIAG RESULTS” on “SELECT DIAG MODE” screen.
2. Check display content in self-diagnostic results.

Display Item List

Display Items	Malfunction Return Condition	TIME		Possible causes
		CRNT	PAST	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—	—
CAN COMM CIRCUIT	● If CAN communication reception/transmission data has an malfunction, or if any of the control units malfunction, data reception/transmission cannot be confirmed. ● When the data in CAN communication is not received before the specified time	×	×	Any of or several items below have malfunctions. ● CAN CIRC 1 ● CAN CIRC 2 ● CAN CIRC 3 ● CAN1 STAT ● CAN2 STAT ● CAN3 STAT
IGN RELAY ON	When the ignition switch is not ON position, the ignition relay in the IPDM E/R is ON.	×	×	Ignition relay (integrated in IPDM E/R)
IGN RELAY OFF	When the ignition switch is ON position, the ignition relay in the IPDM E/R is OFF.	×	×	Ignition relay (integrated in IPDM E/R)
EEPROM	Malfunction is detected with the integrated EEPROM memory diagnosis.	×	×	IPDM E/R

×:Applicable

NOTE:
The details for display of the period are as follows:

- CRNT: Malfunction currently detected with IPDM E/R.
- PAST: Malfunction detected in the past and memorized with IPDM E/R.

DATA MONITOR

Operation Procedure

1. Touch “DATA MONITOR” on “SELECT MONITOR ITEM ” screen.
2. Touch “ALL SIGNALS”, “MAIN SIGNALS” or “SELECT FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
MAIN SIGNALS	Monitor the predetermined item.
SELECT FROM MENU	Select any item for monitoring.

3. Touch “START”.
4. Touch the required monitoring item on “SELECT ITEM MENU”. In “ALL SIGNALS”, all items are monitored. In “MAIN SIGNALS”, predetermined items are monitored.
5. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

All Items, Main Items, Select Item Menu

Item name	Display or unit	Monitor item selection			Description
		ALL SIGNALS	MAIN SIGNALS	SELECT FROM MENU	
MOTOR FAN REQ	1/2/3/4	×	×	×	Signal status input from ECM
A/C COMP REQ	ON/OFF	×	×	×	Signal status input from ECM
TAIL & CLR REQ	ON/OFF	×	×	×	Signal status input from BCM
HL LO REQ	ON/OFF	×	×	×	Signal status input from BCM
HL HI REQ	ON/OFF	×	×	×	Signal status input from BCM
FR FOG REQ	ON/OFF	×	×	×	Signal status input from BCM
HL WASHER REQ	ON/OFF	×		×	This item cannot be monitored. (No change of display)
FR WIP REQ	OFF/1LO/LO/HI	×	×	×	Signal status input from BCM
WIP AUTO STOP	ON/OFF	×	×	×	Output status of IPDM E/R
WIP PROTECTION	OFF/LS/HS/Block	×		×	Control status of IPDM E/R
ST RLY REQ	ON/OFF	×		×	Status of input signal CAUTION
IGN RLY STATUS	ON/OFF	×	×	×	Ignition relay status monitored with IPDM E/R
RR DEF REQ	ON/OFF	×	×	×	Signal status input from BCM
RR DEF STOP REQ	ON/OFF	×		×	Input signal status
ALT LOAD	%	×		×	This item cannot be monitored. (No change of display)
ALT CRNT	A	×		×	
ALT NO	##	×		×	
BAT VOLT	V	×		×	Value measured with IPDM E/R
ENG COOL TEMP	°C	×		×	Signal status input from ECM
OIL P SW	OPEN/CLOSE	×		×	Signal status input in IPDM E/R
REV SW	OPEN/CLOSE	×		×	Signal status input in IPDM E/R

×:applicable

NOTE:

- Perform monitoring of IPDM E/R data with the ignition switch ON. When the ignition switch is at ACC, the display may not be correct.
- The vehicle without the intelligent key system displays only ON without change.

ACTIVE TEST

Operation Procedure

1. Touch “ACTIVE TEST” on “SELECT DIAG–MODE” screen.
2. Touch item to be tested, and check operation.
3. Touch “START”.
4. Touch “STOP” while testing to stop the operation.

Test item	CONSULT-II screen display	Description
Headlamp (HI, LO) output	HEADLAMP	With a certain operation (OFF, HI ON, LO ON), the headlamp relay (Lo, Hi) can be operated.
Front fog lamp output	FRONT FOG LAMP	With a certain ON-OFF operation, the fog lamp relay can be operated.
Tail lamp output	TAIL LAMP	With a certain ON-OFF operation, the tail lamp relay can be operated.
Rear window defogger output	REAR DEFOGGER	With a certain ON-OFF operation, the rear window defogger relay can be operated.
Front wiper (HI, LO) output	FRONT WIPER	With a certain operation (OFF, HI ON, LO ON), the front wiper relay (Lo, Hi) can be operated.
Cooling fan output	MOTOR FAN	With a certain operation (OFF, Status 1, Status 2, Status 3), the cooling fan can be operated.
Headlamp washer output	HEADLAMP WASHER	With a certain ON-OFF operation, the headlamp washer can be operated.

Configuration

EKS00EJ9

DESCRIPTION

There are two CONFIGURATION functions, as follows.
READ CONFIGURATION is a function for confirming the vehicle configuration written on IPDM E/R.
WRITE CONFIGURATION is a function for writing a vehicle configuration to IPDM E/R.

CAUTION:

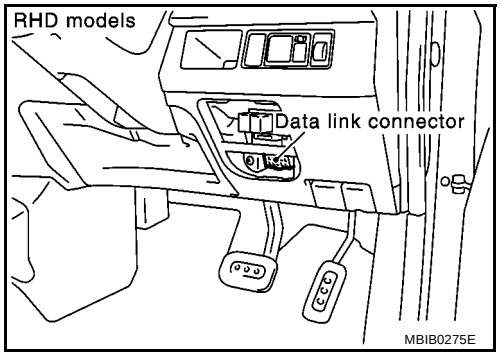
- **When replacing IPDM E/R, completely perform WRITE CONFIGURATION with CONSULT-II.**
- **Orderly complete the procedure of WRITE CONFIGURATION.**
- **If you set incorrect WRITE CONFIGURATION, vehicle operation will not be correct.**
- **Configuration is different by each vehicle model, confirm configuration in each case.**

READ CONFIGURATION PROCEDURE

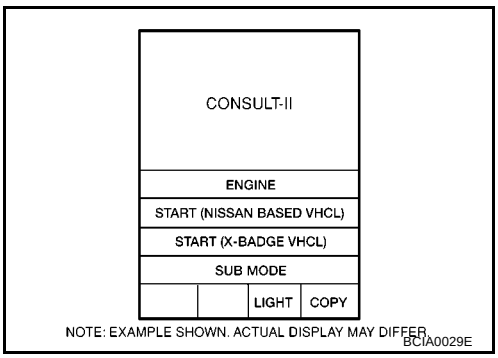
CAUTION:

If CONSULT-II is used with no connection of CONSULT CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

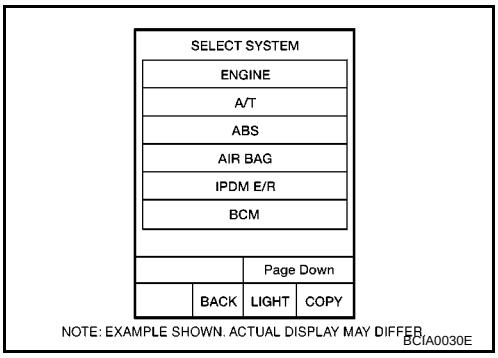
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



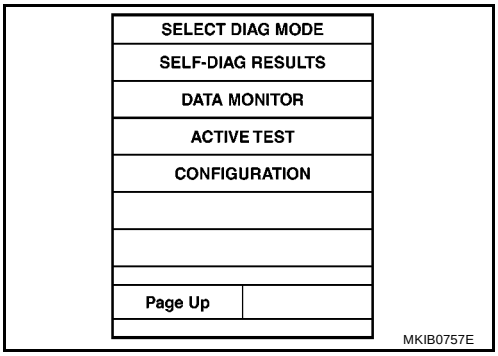
2. Touch “START(NISSAN BASED VHCL)”.



3. Touch “IPDM E/R” on “SELECT SYSTEM” screen.
If “IPDM E/R” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

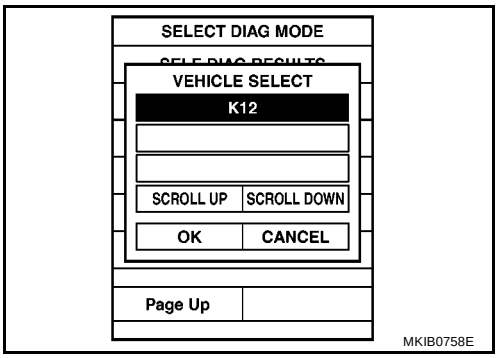


4. Touch “CONFIGURATION” on “SELECT DIAG MODE” screen.

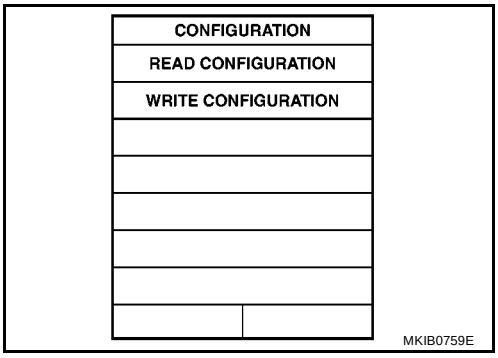


5. Touch “K12”, and “OK” on “VEHICLE SELECT” screen.
For canceling, touch “CANCEL” on “VEHICLE SELECT” screen.

NOTE:
Confirm vehicle model on IDENTICATION PLATE, refer to GI section.



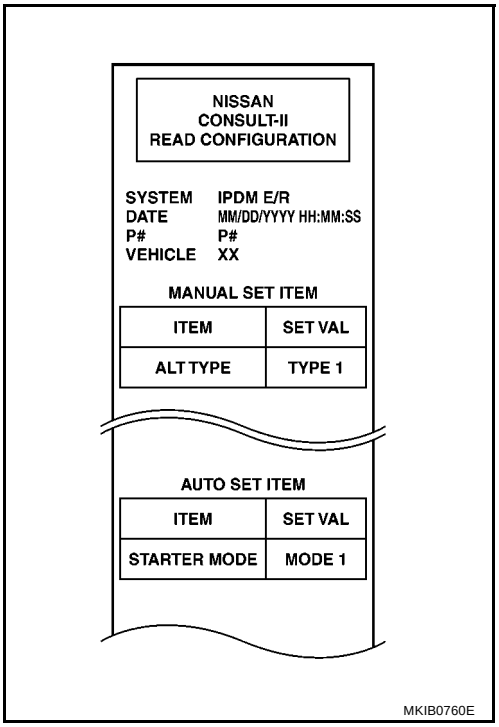
6. Touch “READ CONFIGURATION” on “CONFIGURATION” screen.



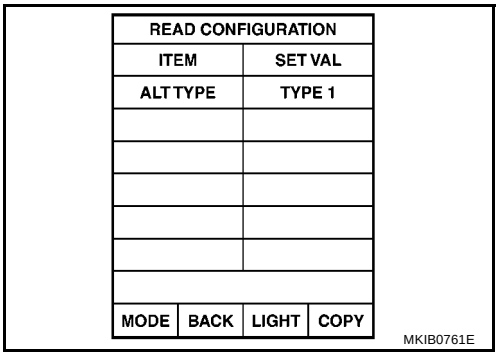
7. Configuration of current IPDM E/R are printed out automatically. Configuration of brand-new IPDM E/R before executing “WRITE CONFIGURATION” is as follows.

MANUAL SET ITEM	
ITEM	SET VAL
ALT TYPE	TYPE 1

AUTO SET ITEM	
STARTER MODE	MODE 1



8. Touch “BACK” on “ READ CONFIGURATION“screen.

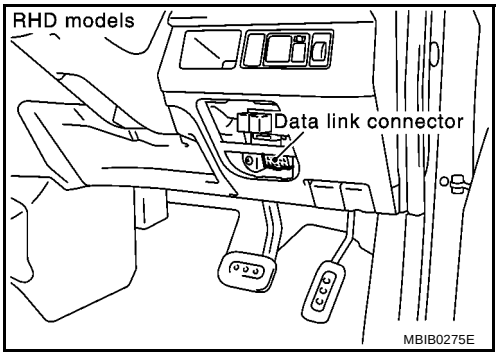


WRITE CONFIGURATION PROCEDURE

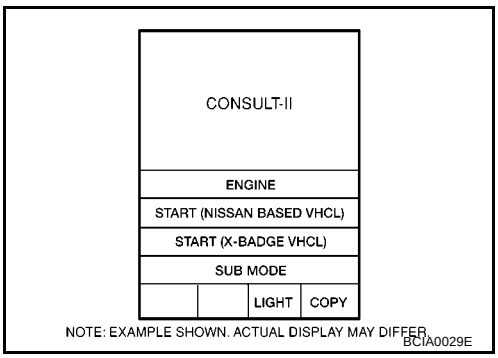
CAUTION:

If CONSULT-II is used with no connection of CONSULT CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

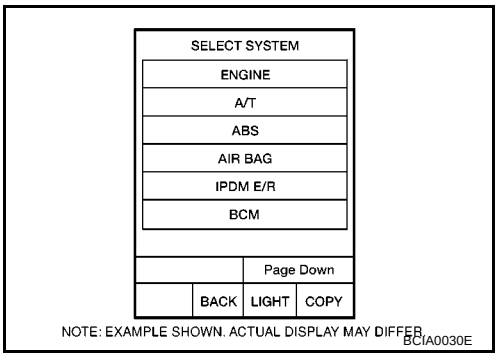
1. With the ignition switch OFF, connect CONSULT-II and CONSULT-II CONVERTER to the data link connector, then turn the ignition switch ON.



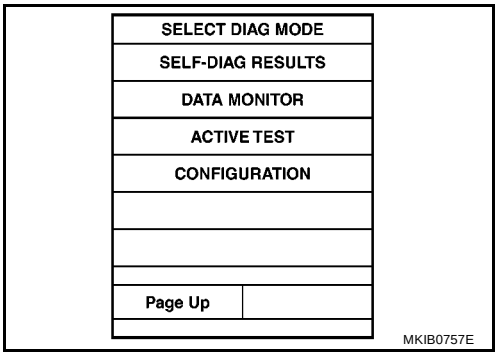
2. Touch “START(NISSAN BASED VHCL)”.



3. Touch “IPDM E/R” on “SELECT SYSTEM” screen.
If “IPDM E/R” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .

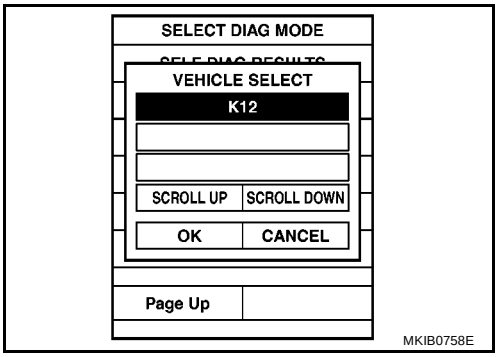


4. Touch “CONFIGURATION” on “SELECT DIAG MODE” screen.

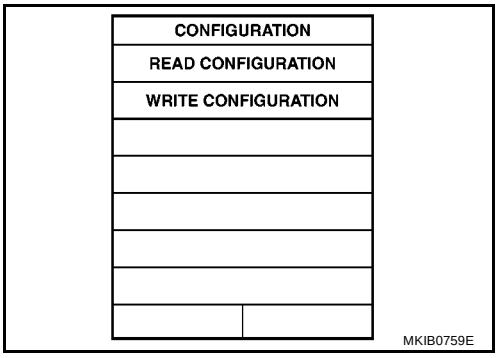


5. Touch “K12”, and “OK” on “VEHICLE SELECT” screen.
For canceling, touch “CANCEL” on “VEHICLE SELECT” screen.

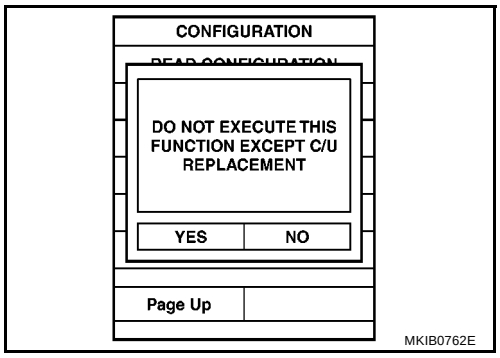
NOTE:
Confirm vehicle model on IDENTICATION PLATE, refer to GI section.



6. Touch “WRITE CONFIGURATION” on “CONFIGURATION“screen.

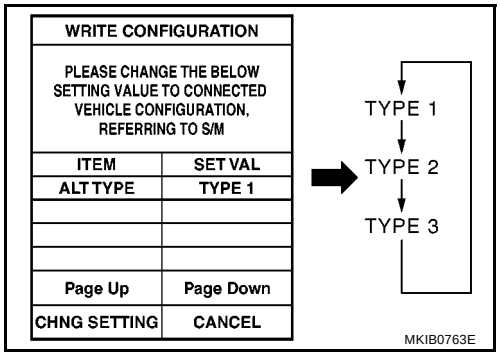


7. Touch “YES”.
   For canceling, touch “NO”.



8. Touch “TYPE 1”, “TYPE 2” or “TYPE 3” on “WRITE CONFIGURATION”screen based on the following ITEM LIST.
   < ITEM LIST>

ITEM	SET VAL	NOTE
Alternator type	TYPE 1	Gasoline engine models
	TYPE 2	PTC heater is not equipped, if 14 digits of the applied model code is marked without “H” or “J”. i.e.:EDHARAFK12EEA “E” …
	TYPR 3	PTC heater is equipped, if 14 digits of the applied model code is marked with “H” or “J”. i.e.:EDHARAFK12EEA “H” …

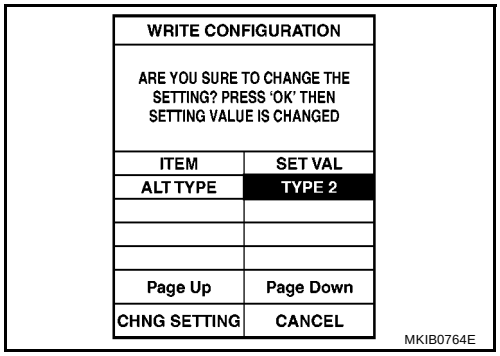


   For canceling, touch “CANCEL”.

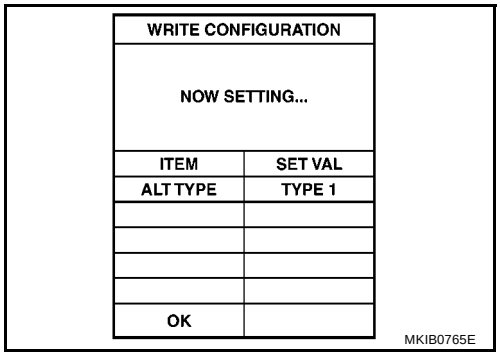
9. Touch “CHNG SETTING” on “WRITE CONFIGURATION“screen.

CAUTION:
Make sure to touch “CHNG SETTING even if the indicated configuration of brand new IPDM E/R is same as the desirable configuration.
If not, configuration which is set automatically by selecting vehicle model can not be memorized.

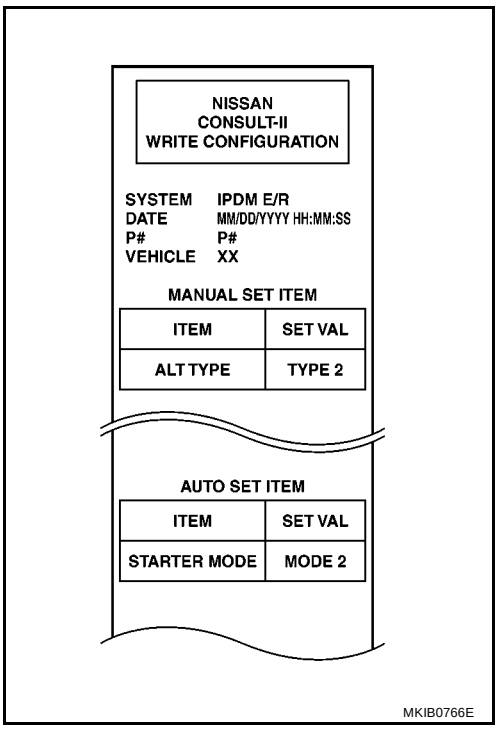
10. Touch “OK” on “WRITE CONFIGURATION”screen.
    When touched “CANCEL”, go to previous screen.



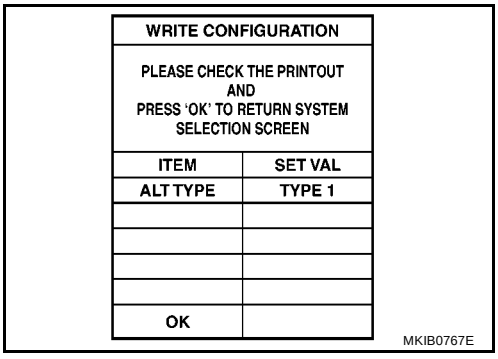
11. Wait until the next screen during setting.



12. WRITE CONFIGURATION results are printed out automatically. Check “WRITE CONFIGURATION” is correctly executed by comparing sheet automatically printed out with desirable configuration.



13. Touch “OK” on “WRITE CONFIGURATION“screen. WRITE CONFIGURATION is completed.



Auto Active Test

EKS0080T

DESCRIPTION

- In the auto active test, the IPDM E/R sends a drive signal to the following systems to check operation.
  - Rear window defogger
  - Front wiper (Low, High)
  - Parking lamps, license lamps, tail lamps
  - Front fog lamp
  - Headlamp (Low, High)
  - Headlamp washer
  - A/C compressor (magnetic clutch)
  - Cooling fan

OPERATION PROCEDURE

1. Close hood, and keep wiper arms off the windshield (to prevent glass damage by wiper operation).

   NOTE:
   When auto active test is performed with hood opened, sprinkle water on windshield beforehand.
2. Turn ignition switch OFF.
3. Turn ignition switch ON, and within 20 seconds, press the driver side door switch 10 times. Then turn ignition switch OFF.

   CAUTION:
   Keep passenger side door closed.
4. Turn ignition switch ON within 10 seconds.
5. When auto active test mode is actuated, oil pressure warning lamp starts blinking.
6. After a series of operations is repeated 3 times, auto active test is completed.

   NOTE:
   When the auto active test mode has to be cancelled halfway, turn ignition switch OFF.

CAUTION:
When the auto active test cannot be started, check the oil pressure switch system **DI-77, "Oil Pressure Warning Lamp Stays Off (Ignition Switch ON)"** **and the** **BL-58, "Check Door Switch"** **.**

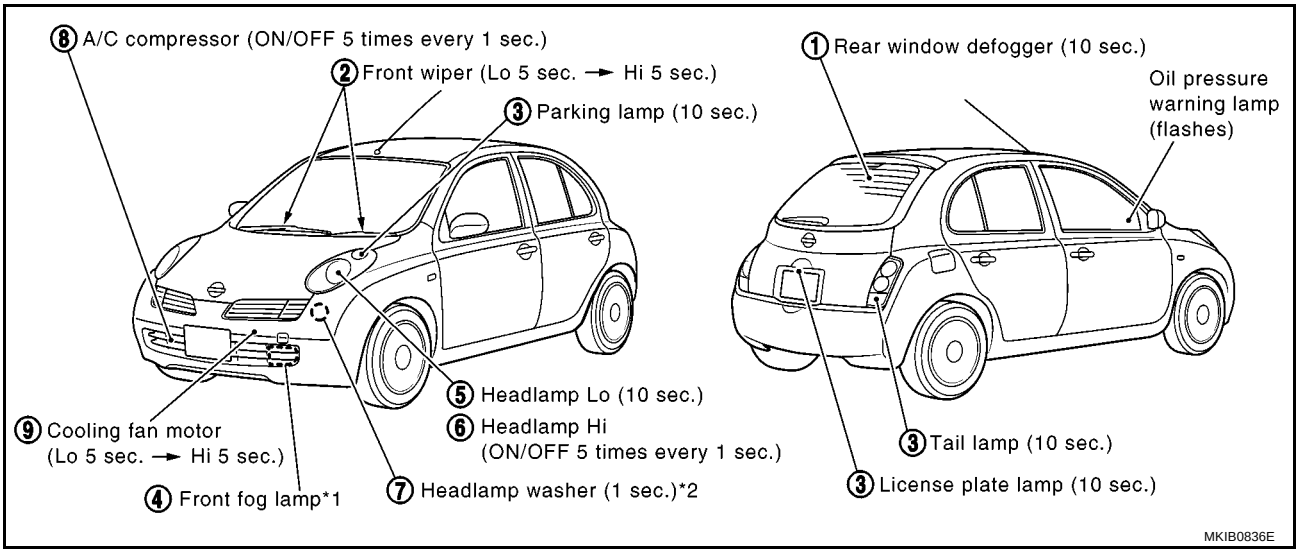
INSPECTION IN AUTO ACTIVE TEST MODE

When the auto active test is started, repeat steps 1 to 9 as below three times.

- Step 1: Rear window defogger is operated for 10 seconds.
- Step 2: Front wiper is operated with low speed for 5 seconds and high speed for 5 seconds.
- Step 3: Parking, license plate, tail lamp are turned on for 10 seconds.
- Step 4: Front fog lamp is turned on for 10 seconds.

  NOTE:
  If the fog lamp is not equipped, this step will be skipped. (In this case, next step will be start after 10 seconds.)
- Step 5: Headlamp (low) is turned on for 10 seconds.
- Step 6: Headlamp (high) is blinked ON and OFF for 5 times.
- Step 7: Headlamp washer is operated for 1 second and it is stopped for 9 seconds.

  NOTE:
  If the headlamp washer is not equipped, this step will be skipped. (In this case, next step will be start after 10 seconds.)
- Step 8: A/C compressor ON and OFF operation is repeated for 5 times.
- Step 9: Cooling fan motor is operated with low speed for 5 seconds and high speed for 5 seconds.



*1: Step 4 will be skipped, if the front fog lamp is not equipped. (In the case, next step will be start after 10 seconds.)
*2: Step 7 will be skipped, if the headlamp washer is not equipped. (In the case, next step will be start after 10 seconds.)

CONCEPT OF AUTO ACTIVE TEST

- IPDM E/R actuates auto active test mode when it receives door switch signal from BCM via CAN communication line. Therefore, when auto active test mode is activated successfully, CAN communication between IPDM E/R and BCM is normal.
- If any systems controlled by IPDM E/R cannot be operated, possible cause can be easily diagnosed using auto active test.

Diagnosis Chart in Auto Active Test Mode

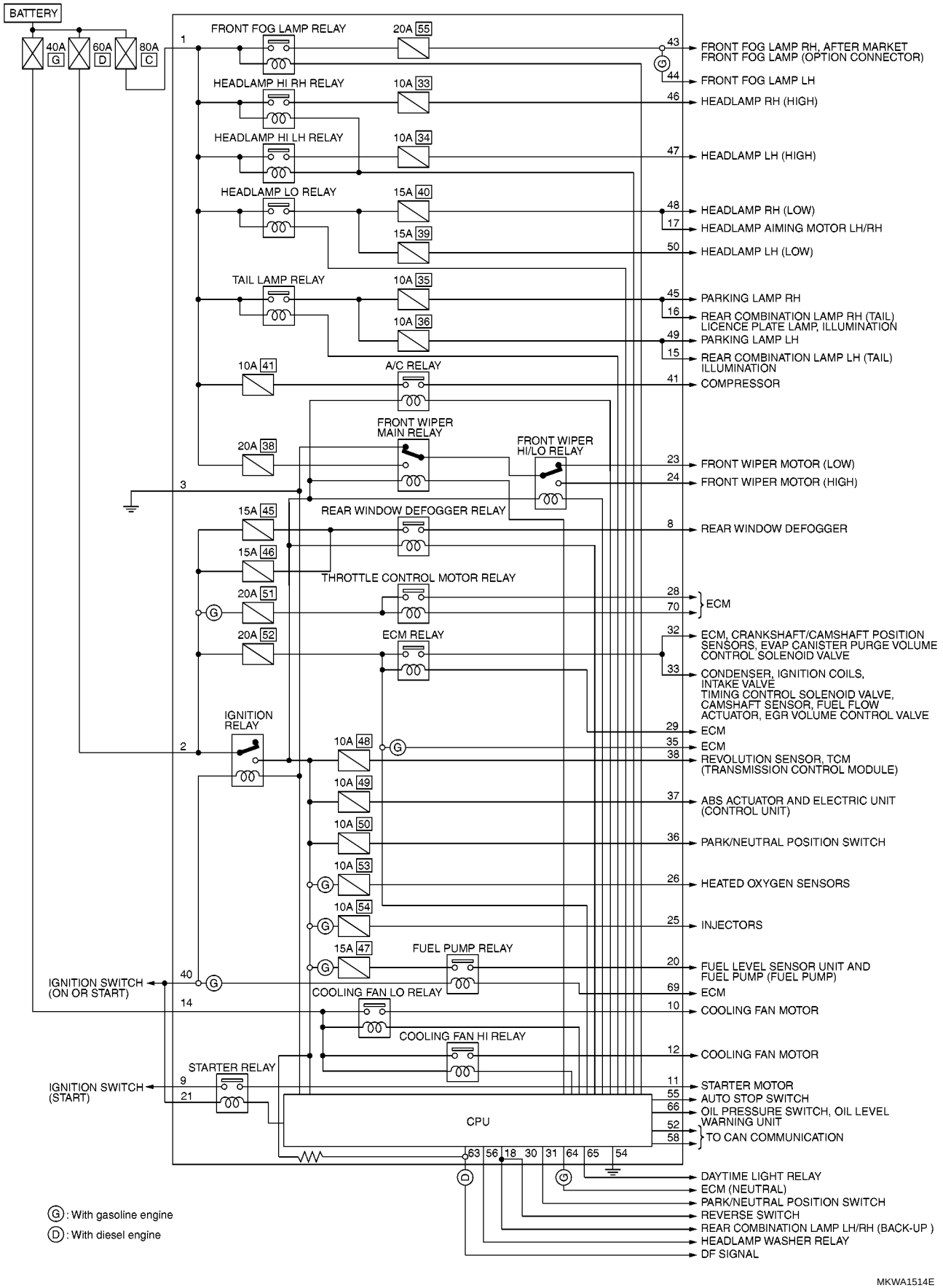
Symptom	Inspection Contents		Possible causes	Reference page
Rear window defogger does not operate.	Perform auto active test. Does rear window defogger operate?	YES	● BCM signal input system	GW-14
		NO	● Harness for open or short between the IPDM E/R and the rear window defogger ● Open circuit of rear window defogger ● IPDM E/R (integrated relay) malfunction (Rear window defogger relay)	
Front wiper does not illuminate.	Perform auto active test. Does the front wiper operate?	YES	● BCM signal input system	WW-5 (without rain sensor) or WW-48 (with rain sensor)
		NO	● Wiper motor malfunction ● Front wiper motor ground.	
Either of parking lamp, license plate lamp and tail lamp does not illuminate.	Perform auto active test. Does parking lamp, license plate lamp and tail lamp illuminate?	YES	● BCM signal input system	LT-152
		NO	● Bulb ● Harness for open or short between IPDM E/R and parking, license plate or tail lamp. ● IPDM E/R (integrated relay) malfunction	
Front fog lamp does not illuminate.	Perform auto active test. Does the front fog lamp illuminate?	YES	● BCM signal input system	LT-74
		NO	● Bulb ● Harness for open or short between IPDM E/R and front fog lamp. ● IPDM E/R (integrated relay) malfunction	
Headlamp (Hi, Lo) does not illuminate.	Perform auto active test. Does headlamp?	YES	● BCM signal input system	LT-6, "HEADLAMP - CONVENTIONAL TYPE-" or LT-42, "HEADLAMP - DAYTIME LIGHT SYSTEM -"
		NO	● Bulb ● Headlamp ground system malfunction ● Open or short in harness or headlamp between IPDM E/R and headlamps ● IPDM E/R (integrated relay) malfunction (headlamp relay)	
Headlamp washer does not operate.	Perform auto active test. Does the Headlamp washer operate?	YES	● BCM signal input system	WW-110
		NO	● Harness for open or short between IPDM E/R and headlamp washer. ● Headlamp washer relay is malfunction.	
The cooling fan is inoperative.	Perform auto active test. Does the cooling fan operate?	YES	● Signal input system of ECM ● CAN communication signal between ECM and IPDM E/R*	EC-352 (with EURO-OBD) or EC-689 (without EURO-OBD)
		NO	● Malfunction of cooling fan ● Harness open or short between the IPDM E/R and the cooling fan. ● IPDM E/R (integrated relay) malfunction	

Symptom	Inspection Contents		Possible causes	Reference page
The A/C compressor is inoperative.	Perform auto active test. Does magnetic clutch operate?	YES	● CAN communication signal between BCM and ECM*. ● CAN communication signal between ECM and IPDM E/R*. ● BCM signal input system ● Signal input system of ECM.	ATC-54
		NO	● Magnetic clutch inoperative. ● Harness for open or short between IPDM E/R and magnetic clutch. ● IPDM E/R (integrated relay) malfunction	
Oil pressure warning lamp does not operate.	Perform auto active test. Does oil pressure warning lamp blink?	YES	● Harness for open or short between IPDM E/R and oil pressure switch. ● Oil pressure switch malfunction	DI-65
		NO	● CAN communication signal between IPDM E/R and combination meter*. ● Combination meter	

*: Perform IPDM E/R self-diagnosis with CONSULT-II. Refer to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)"

Schematic

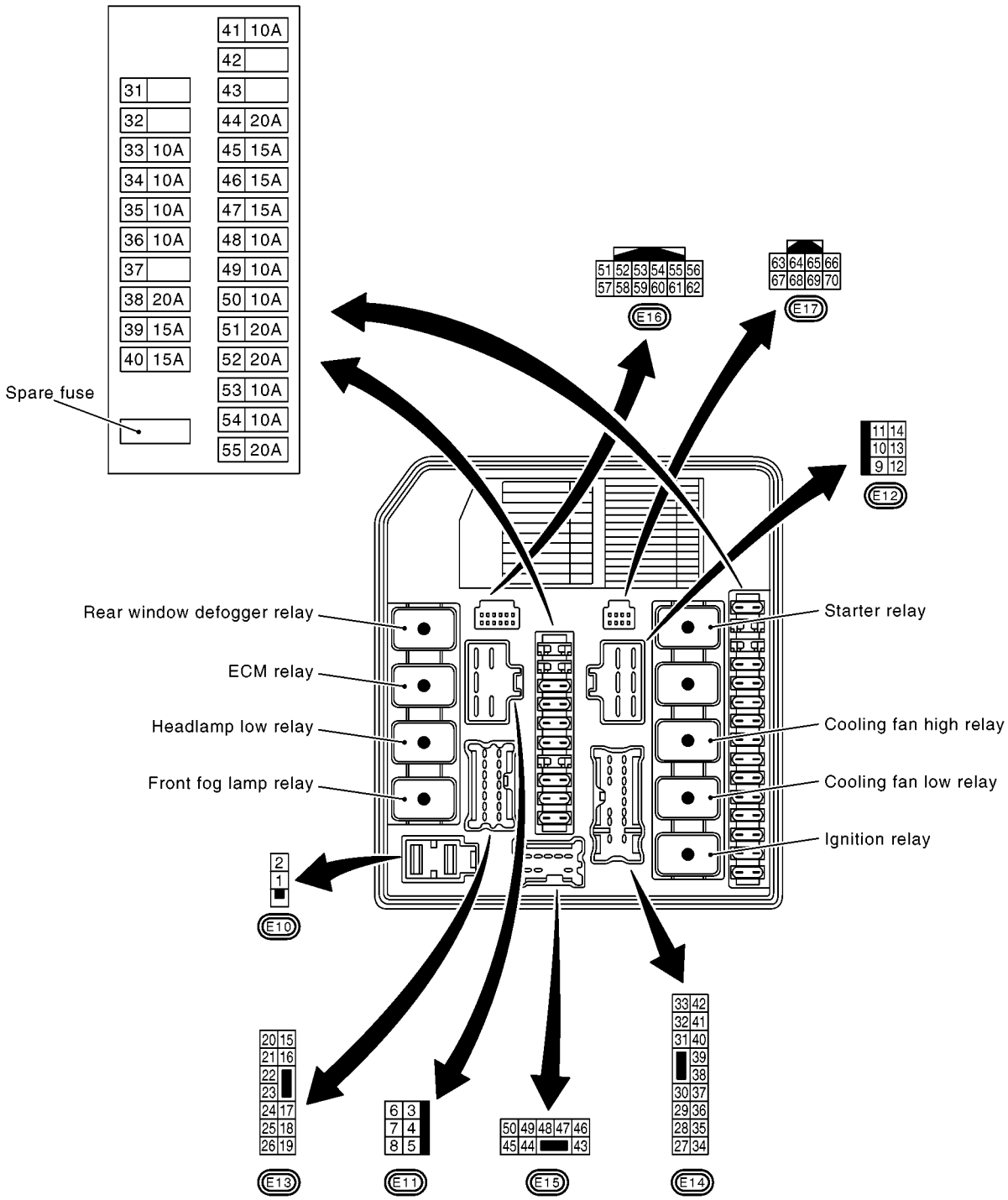
EKS0080U



NOTE:
Refer to each control system for details of connecting parts.

IPDM E/R Terminal Arrangement

EKS0080V



MKWA1370E

Inspection With CONSULT-II (Self-Diagnosis)

EKS0080W

1. CHECK SELF-DIAGNOSTIC RESULT

1. Connect CONSULT-II and select “IPDM E/R” on the Diagnosis System Selection screen.
2. Select “SELF-DIAG RESULTS” on the diagnosis mode selection screen.
3. Check display content in self-diagnostic results.

CONSULT-II display	CONSULT-II display code	TIME		Details of diagnosis result
		CRNT	PAST	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	—	—	—
IGN RELAY ON	B2098	×	×	Ignition relay malfunction (integrated in IPDM E/R)
IGN RELAY OFF	B2099	×	×	Ignition relay malfunction (integrated in IPDM E/R)
EEPROM	B2100	×	×	IPDM E/R malfunction
CAN COMM CIRCUIT	U1000	×	×	Any of or several items below have malfunction. ● TRANSMIT DIAG ● ECM ● BCM/SEC

×: Applicable

CAUTION:

If errors of the CAN communication system and the ignition relay ON or OFF are displayed at the same time after the self-diagnostic result, replace the IPDM E/R and perform the self-diagnosis again.

NOTE:

The details for display of the period are as follows:

- CRNT: Malfunction currently detected with IPDM E/R.
- PAST: Malfunction detected in the past and memorized with IPDM E/R.

Contents displayed

NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.>>INSPECTION END.
CAN COMM CIRCUIT>>LAN-4, "Precautions When Using CONSULT-II".
IGN RELAY ON>>Replace IPDM E/R.
IGN RELAY OFF>>Replace IPDM E/R.
EEPROM>>Replace IPDM E/R.

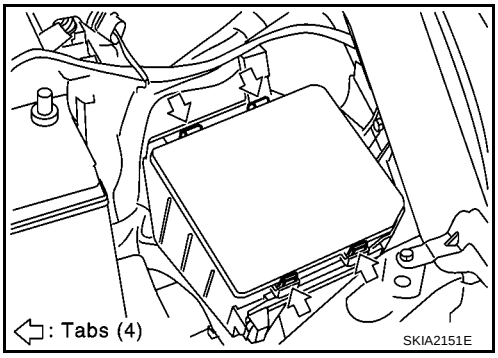
IPDM E/R Terminal Inspection

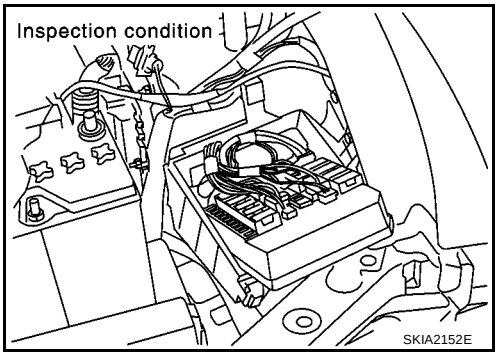
EKS0080X

CAUTION:

This is performed when the IPDM E/R is checked without removing the battery.

1. Remove the headlamp (LH).
2. Remove tabs of the IPDM E/R and place the IPDM E/R with its connector facing upward. Check each terminal.





IPDM E/R Power Supply and Ground Circuit Check

EKS0089R

1. CHECK FUSE AND FUSIBLE LINK

Make sure that the following fusible links or IPDM E/R fuses are not blown.

Terminal No.	Power source	Fuse, fusible link No.
1	Battery	Letter C
2	Battery	Letter D
40	Ignition switch (ON)	80

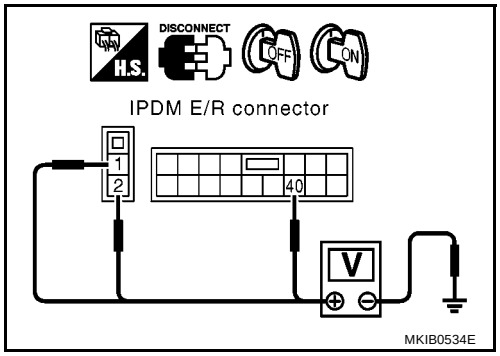
OK or NG

OK >> GO TO 2.
NG >> Replace fuse or fusible link.

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check voltage between IPDM E/R and ground.

Terminals			Ignition switch position		
(+)		(-)	OFF	ACC	ON
Connector	Terminal (Wire color)				
E10	1 (R)	Ground	Battery voltage	Battery voltage	Battery voltage
	2 (G)		Battery voltage	Battery voltage	Battery voltage
E14	40 (PU)		0V	Battery voltage	Battery voltage



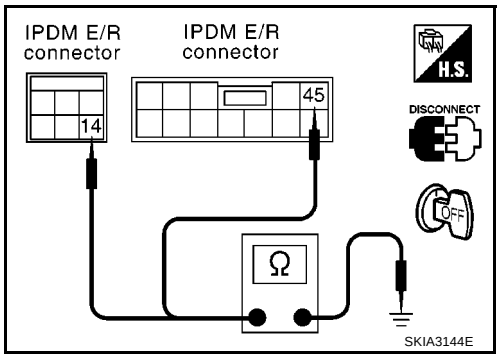
OK or NG

OK >> GO TO 3.
NG >> Check harness between fuse, fusible link and IPDM E/R.

3. CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R harness connectors.
2. Check continuity between IPDM E/R harness connectors E12 terminal 14 (B), E16 terminal 54 (B) and ground.

Continuity should exist.



OK or NG

OK >> INSPECTION END.
NG >> Repair harness for ground circuit.

Diagnosis of IPDM E/R Integrated Relay

EKS0080Z

1. CHECK SYMPTOM

Check the symptom of the malfunction relay.

What is the symptom?

No operation>>GO TO 2.
No stop>> GO TO 4.

2. CHECK RELAY TYPE

Which is the relay with error?

Front fog lamp relay, headlamp relay (Hi, Lo), tail lamp relay, front wiper relay (main, Hi/Lo), rear window defogger relay, A/C relay, starter motor relay, cooling fan relay (1, 2, 3)>>GO TO 5.
Ignition relay>> Go to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)"
ECM relay>>Go to EC-125, "POWER SUPPLY CIRCUIT FOR ECM" (CR engine models with EURO-OBD), EC-567, "POWER SUPPLY CIRCUIT FOR ECM" (CR engine models without EURO-OBD) or EC-K9K-237, “Wiring diagram — Main power supply and ground circuit”, “DIESEL INJECTION” (K9K engine models).
Throttle motor relay>>Go to EC-305, "DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY" (CR engine models with EURO-OBD) or EC-673, "DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY" (CR engine models without EURO-OBD).
Fuel pump relay>>Go to EC-450, "FUEL PUMP CIRCUIT" (CR engine models with EURO-OBD) or EC-826, "FUEL PUMP CIRCUIT" (CR engine models without EURO-OBD).

3. CHECK RELAY

Send an operation signal to the relay using a diagnosis tool. Check the voltage at the input and output terminals of inoperative relays according to the table below or check for continuity between input and output terminals. Refer to PG-36, "ACTIVE TEST" or PG-42, "Auto Active Test" .

Relay name	IPDM E/R terminal number		Voltage [V]	Diagnosis tool	
	Input side	Output side		CONSULT-II ACTIVE TEST	Auto ACTIVE TEST
Front fog lamp relay	1	43, 44	Battery voltage	×	×
Headlamp Hi relay		46, 47		×	×
Headlamp Lo relay		48, 50		×	×
Tail lamp relay		15, 16, 45, 49		×	×
Front wiper main relay		23		×	×
Front wiper HI/LO relay		24		×	×
A/C relay		41			×
Rear windows defogger relay	2	8		×	×
Cooling fan Lo relay 1	14	10		×	×
Cooling fan Hi relay 2		12		×	×

×: Applicable

OK or NG

OK >> Check the control unit that controls the inoperative relay. (system)
NG >> Replace the IPDM E/R. (malfunction of relay)

4. CHECK RELAY TYPE

Which is the relay with error?

Front fog lamp relay, headlamp relay (Hi, Lo), tail lamp relay, front wiper relay (main, Hi/Lo), rear window defogger relay, A/C relay, starter motor relay, cooling fan relay (1, 2, 3)>>GO TO 5.
Ignition relay>> Go to PG-48, "Inspection With CONSULT-II (Self-Diagnosis)"
ECM relay>>Go to EC-125, "POWER SUPPLY CIRCUIT FOR ECM" (CR engine models with EURO-OBD), EC-567, "POWER SUPPLY CIRCUIT FOR ECM" (CR engine models without EURO-OBD) or EC-K9K-237, “Wiring diagram — Main power supply and ground circuit”, “DIESEL INJECTION” (K9K engine models).
Throttle motor relay>>Go to EC-305, "DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY" (CR engine models with EURO-OBD) or EC-673, "DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY" (CR engine models without EURO-OBD).
Fuel pump relay>>Go to EC-450, "FUEL PUMP CIRCUIT" (CR engine models with EURO-OBD) or EC-826, "FUEL PUMP CIRCUIT" (CR engine models without EURO-OBD).

5. CHECK INPUT SIGNAL

Check the control signal status of the relay on the IPDM E/R that receives from each control unit with the data monitor of CONSULT-II. Refer to PG-35, "DATA MONITOR" .

What is the data monitor result?

Other than OFF>>Check the control unit that controls the relay (system) not deactivated.
OFF >> Replace the IPDM E/R. (error of relay ON)

Removal and Installation of IPDM E/R

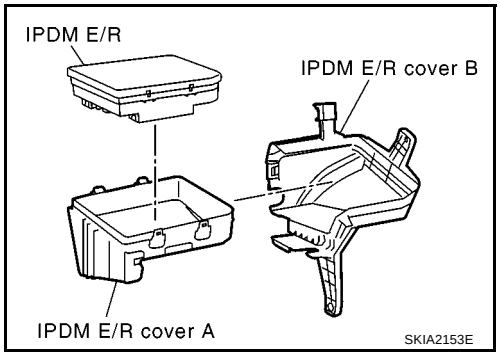
EKS0087Q

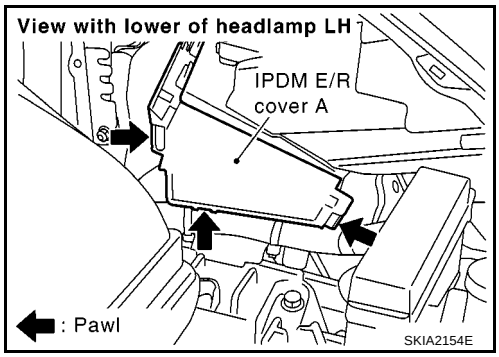
CAUTION:
Always replace with new* IPDM E/R when the IPDM E/R replacement is required.
***: New one means virgin control unit that has never been energized on-board.**

REMOVAL

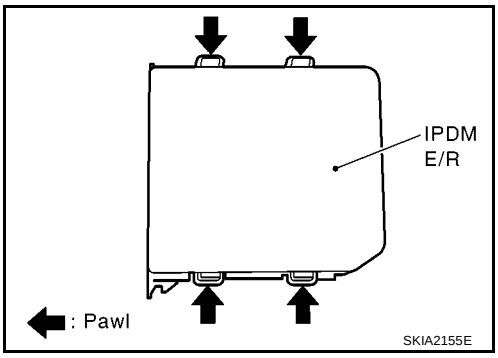
NOTE:
If possible, before removing IPDM E/R, retrieve current IPDM E/R configuration to use for reference when configuring brand-new IPDM E/R after installation. Refer to PG-36, "Configuration" .

1. Remove battery. Refer to SC-14, "Removal and Installation" in SC section.
2. Pull out IPDM E/R cover A from IPDM cover B.





3. Disconnect harness connector from IPDM E/R.
4. Remove IPDM E/R from IPDM E/R cover A.



INSTALLATION

- Install in the reverse order of removal.

NOTE:
When replacing IPDM E/R, it must be configured. Refer to PG-36, "Configuration" .

GROUND

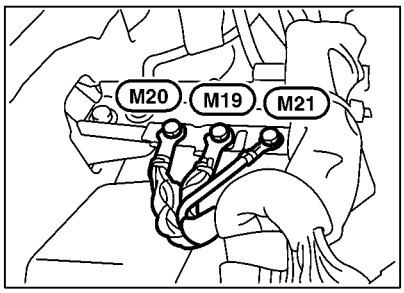
PFP:00011

Ground Distribution

EKS0079A

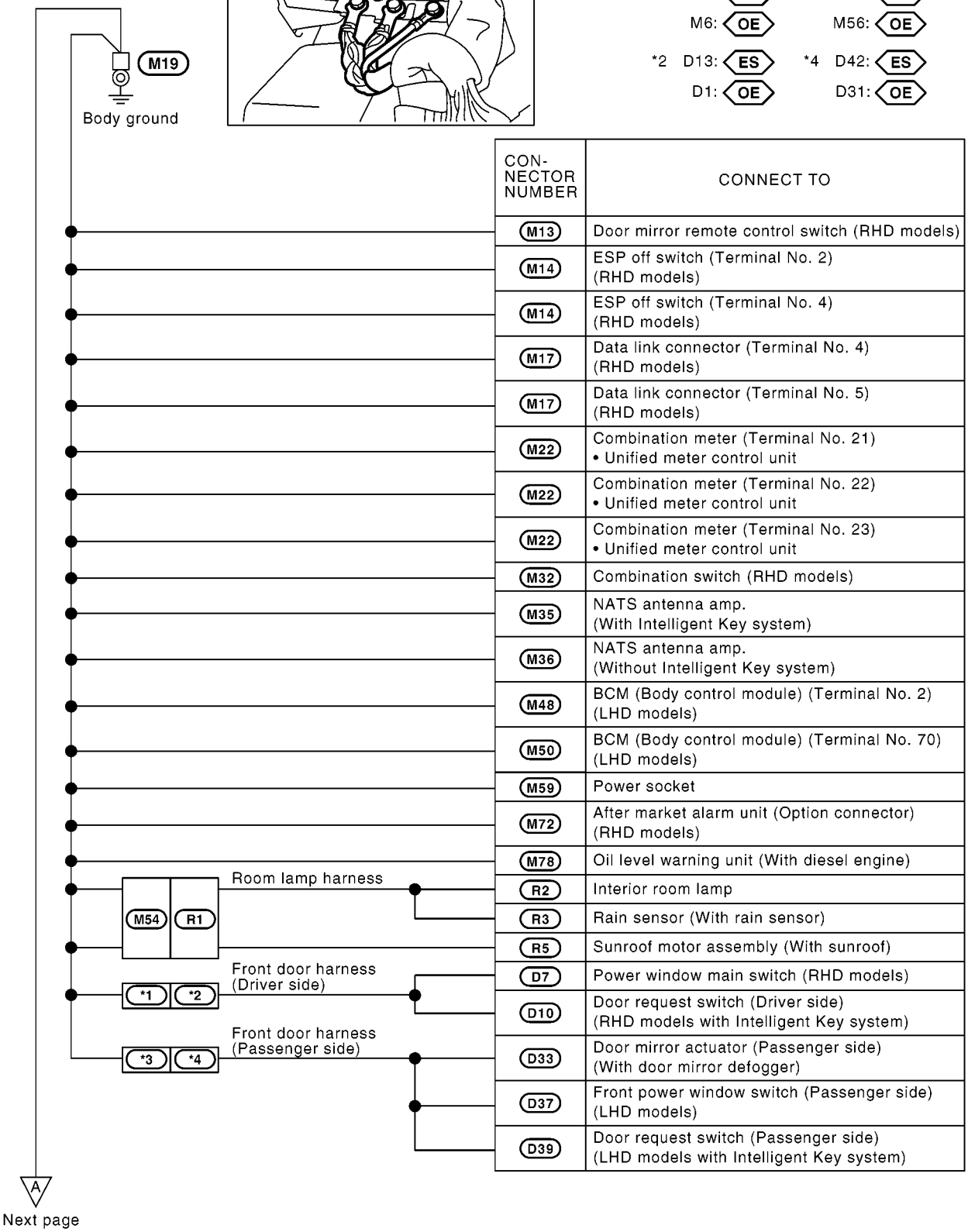
MAIN HARNESS

SMA for VIN >SJN**AK12U1309269



ES : With ESP
OE : Without ESP

*1 M87: ES / M6: OE
*2 D13: ES / D1: OE
*3 M84: ES / M56: OE
*4 D42: ES / D31: OE



CON-NECTOR NUMBER	CONNECT TO
M13	Door mirror remote control switch (RHD models)
M14	ESP off switch (Terminal No. 2) (RHD models)
M14	ESP off switch (Terminal No. 4) (RHD models)
M17	Data link connector (Terminal No. 4) (RHD models)
M17	Data link connector (Terminal No. 5) (RHD models)
M22	Combination meter (Terminal No. 21) • Unified meter control unit
M22	Combination meter (Terminal No. 22) • Unified meter control unit
M22	Combination meter (Terminal No. 23) • Unified meter control unit
M32	Combination switch (RHD models)
M35	NATS antenna amp. (With Intelligent Key system)
M36	NATS antenna amp. (Without Intelligent Key system)
M48	BCM (Body control module) (Terminal No. 2) (LHD models)
M50	BCM (Body control module) (Terminal No. 70) (LHD models)
M59	Power socket
M72	After market alarm unit (Option connector) (RHD models)
M78	Oil level warning unit (With diesel engine)
R2	Interior room lamp
R3	Rain sensor (With rain sensor)
R5	Sunroof motor assembly (With sunroof)
D7	Power window main switch (RHD models)
D10	Door request switch (Driver side) (RHD models with Intelligent Key system)
D33	Door mirror actuator (Passenger side) (With door mirror defogger)
D37	Front power window switch (Passenger side) (LHD models)
D39	Door request switch (Passenger side) (LHD models with Intelligent Key system)

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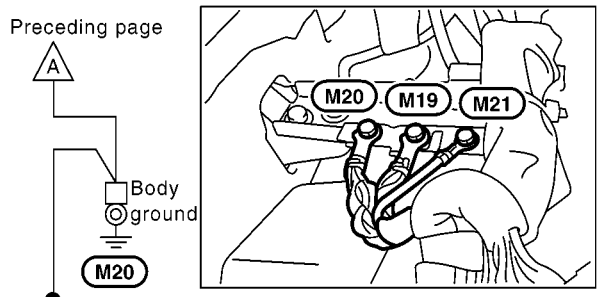
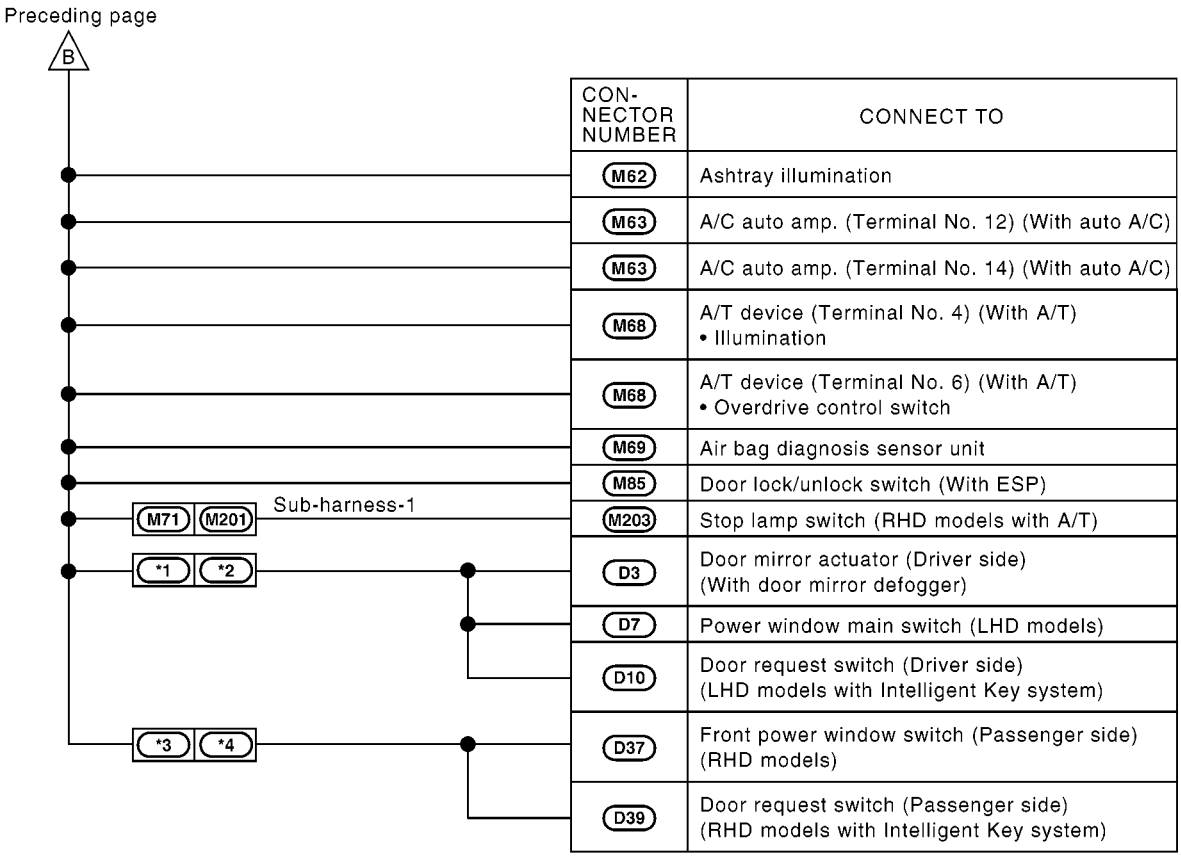


CON-NECTOR NUMBER	CONNECT TO
M11	Headlamp aiming switch (Terminal No. 2)
M11	Headlamp aiming switch (Terminal No. 4)
M12	Headlamp washer switch (Terminal No. 2) (With headlamp washer)
M12	Headlamp washer switch (Terminal No. 4) (With headlamp washer)
M13	Door mirror remote control switch (LHD models)
M14	ESP off switch (Terminal No. 2) (LHD models)
M14	ESP off switch (Terminal No. 4) (LHD models)
M17	Data link connector (Terminal No. 4) (LHD models)
M17	Data link connector (Terminal No. 5) (LHD models)
M28	Drive computer
M32	Combination switch (LHD models)
M37	Clutch interlock switch (With M/T and Intelligent Key system)
M42	Fan control amp. (With auto A/C)
M45	Thermal control amplifier (With manual A/C)
M48	BCM (Body control module) (Terminal No. 2) (RHD models)
M50	BCM (Body control module) (Terminal No. 70) (RHD models)
M51	Intelligent Key unit (With Intelligent Key system)
M58	Heater control panel (Terminal No. 6) (Without auto A/C)
M58	Heater control panel (Terminal No. 7) (Without auto A/C)
M58	Heater control panel (Terminal No. 10) (Without auto A/C)
M61	Hazard switch (Terminal No. 1)
M61	Hazard switch (Terminal No. 4)

B
Next page

MKWA1846E



CON-NECTOR NUMBER	CONNECT TO
M62	Ashtray illumination
M63	A/C auto amp. (Terminal No. 12) (With auto A/C)
M63	A/C auto amp. (Terminal No. 14) (With auto A/C)
M68	A/T device (Terminal No. 4) (With A/T) • Illumination
M68	A/T device (Terminal No. 6) (With A/T) • Overdrive control switch
M69	Air bag diagnosis sensor unit
M85	Door lock/unlock switch (With ESP)
M203	Stop lamp switch (RHD models with A/T)
D3	Door mirror actuator (Driver side) (With door mirror defogger)
D7	Power window main switch (LHD models)
D10	Door request switch (Driver side) (LHD models with Intelligent Key system)
D37	Front power window switch (Passenger side) (RHD models)
D39	Door request switch (Passenger side) (RHD models with Intelligent Key system)

ES : With ESP
OE : Without ESP

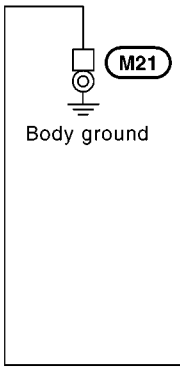
*1 M87: ES
M6: OE

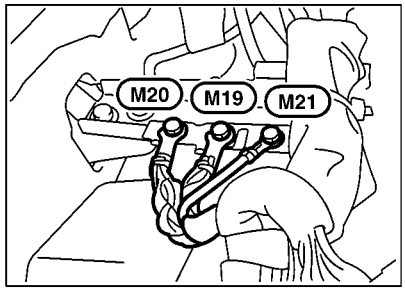
*2 D13: ES
D1: OE

*3 M84: ES
M56: OE

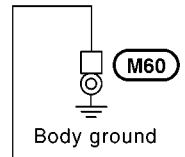
*4 D42: ES
D31: OE

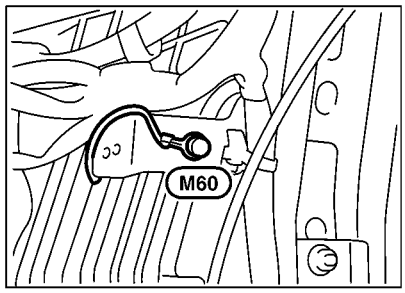
MKWA1847E





CON-NECTOR NUMBER	CONNECT TO
M24	EPS control unit



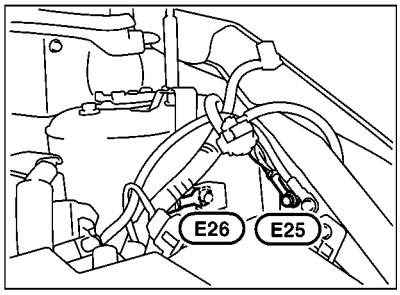


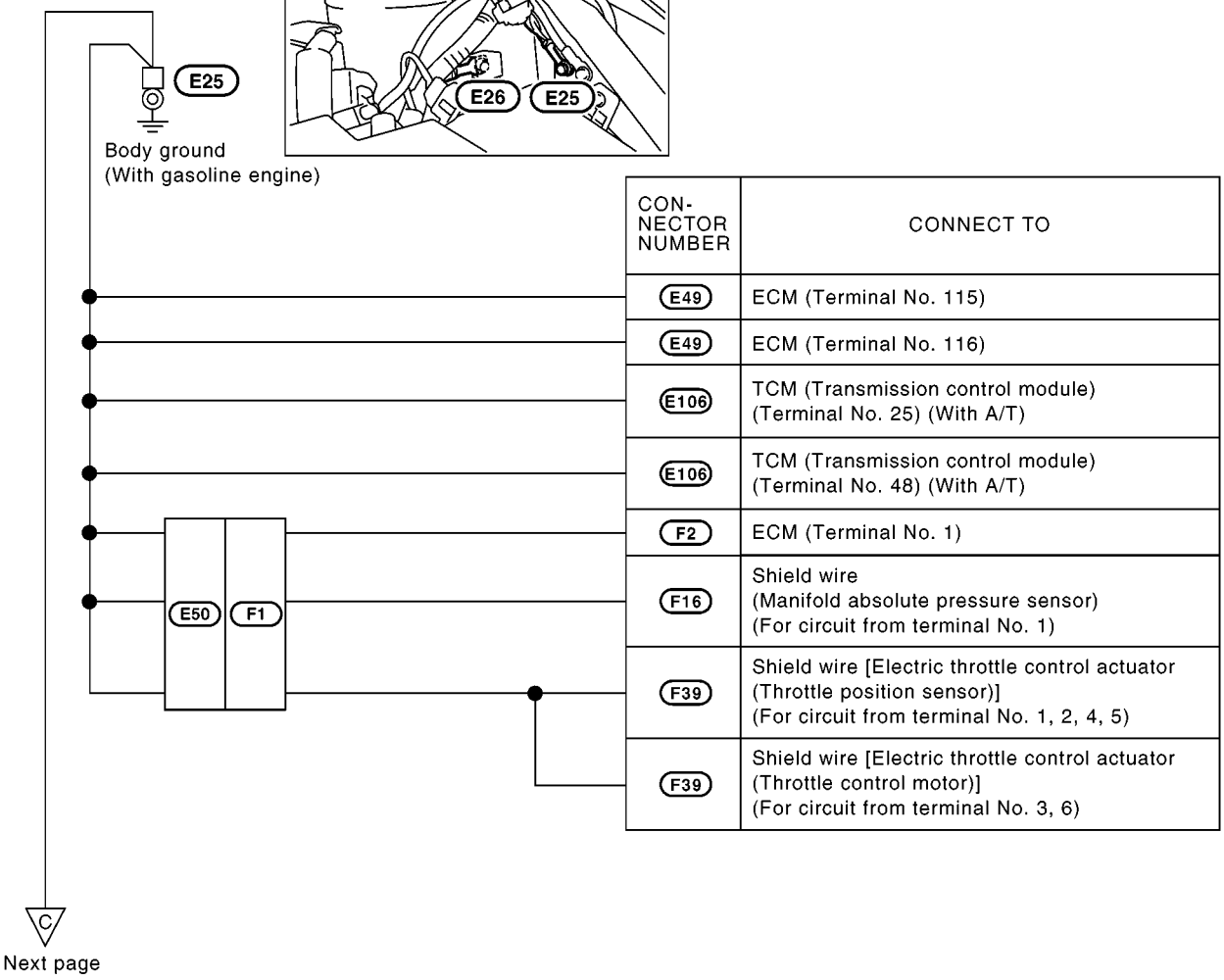
CON-NECTOR NUMBER	CONNECT TO
M27	Audio unit (Terminal No. 38) (With audio unit)
M27	Audio and NAVI control unit (Terminal No. 38) (With NAVI control unit)

MKWA1315E

ENGINE ROOM HARNESS

SMA for VIN >SJN**AK12U1309269





CON-NECTOR NUMBER	CONNECT TO
E49	ECM (Terminal No. 115)
E49	ECM (Terminal No. 116)
E106	TCM (Transmission control module) (Terminal No. 25) (With A/T)
E106	TCM (Transmission control module) (Terminal No. 48) (With A/T)
F2	ECM (Terminal No. 1)
F16	Shield wire (Manifold absolute pressure sensor) (For circuit from terminal No. 1)
F39	Shield wire [Electric throttle control actuator (Throttle position sensor)] (For circuit from terminal No. 1, 2, 4, 5)
F39	Shield wire [Electric throttle control actuator (Throttle control motor)] (For circuit from terminal No. 3, 6)

MKWA1497E

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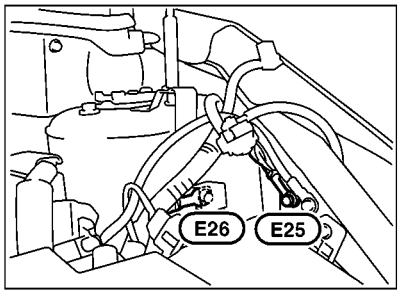

E26

Body ground

CON-NECTOR NUMBER	CONNECT TO
E2	Daytime light relay (With daytime light system)
E3	Cooling fan motor (Gasoline engine with A/C)
E3	Cooling fan motor-1 (Diesel engine with A/C and with PTC heater)
E4	Cooling fan motor (Gasoline engine without A/C)
E4	Cooling fan motor-2 (Diesel engine without A/C)
E8	Front turn signal lamp LH
E11	IPDM E/R (Intelligent power distribution module engine room) (Terminal No. 3)
E16	IPDM E/R (Intelligent power distribution module engine room) (Terminal No. 54)
E20	Headlamp aiming motor LH
E24	Side turn signal lamp LH
E34	Front fog lamp RH (With front fog lamp)
E37	Parking lamp RH
E42	Headlamp RH (Without daytime light system)
E43	Brake fluid level switch
E63	Cooling fan motor-2 (With PTC heater)
E109	Stop lamp switch (LHD models with A/T)
F129	Compressor (With diesel engine)

Engine control harness
(With diesel engine)

E60 F101

D
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MKWA1498E

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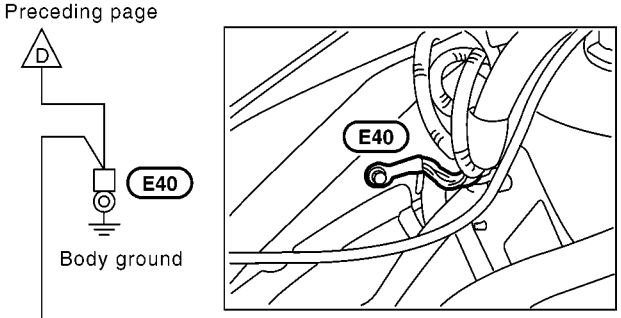
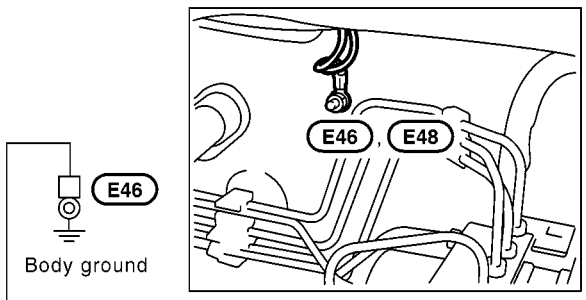
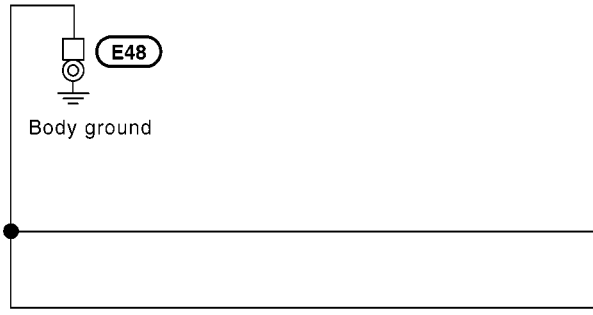


CON-NECTOR NUMBER	CONNECT TO
E7	Front fog lamp LH (With front fog lamp)
E21	Headlamp LH
E22	Parking lamp LH
E27	Shield wire (Crash zone sensor) (For circuit from terminal No. 1, 2)
E30	Horn
E32	Front turn signal lamp RH
E33	Headlamp washer motor (With headlamp washer)
E35	Side turn signal lamp RH
E39	Headlamp aiming motor RH
E44	Front wiper motor



CON-NECTOR NUMBER	CONNECT TO
E45	ABS actuator and electric unit (Control unit) (Terminal No. 1) (Without ESP)
E45	ABS actuator and electric unit (Control unit) (Terminal No. 4) (Without ESP)

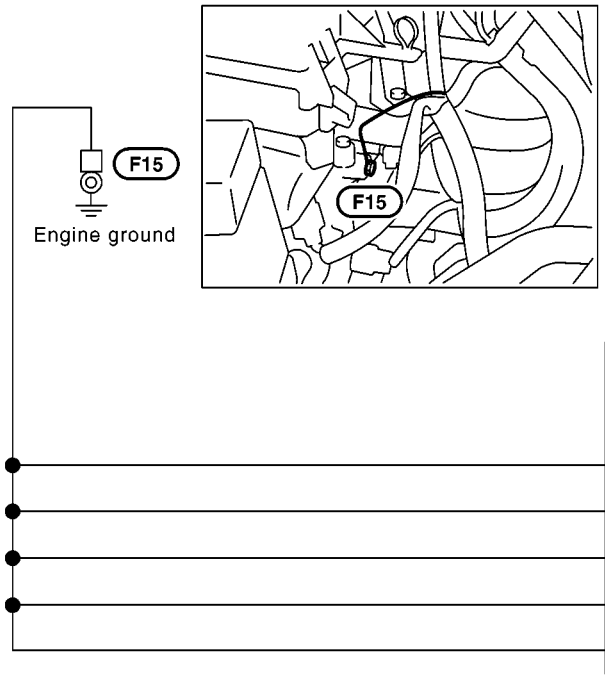


CON-NECTOR NUMBER	CONNECT TO
E47	ABS actuator and electric unit (Control unit) (Terminal No. 1) (With ESP)
E47	ABS actuator and electric unit (Control unit) (Terminal No. 4) (With ESP)

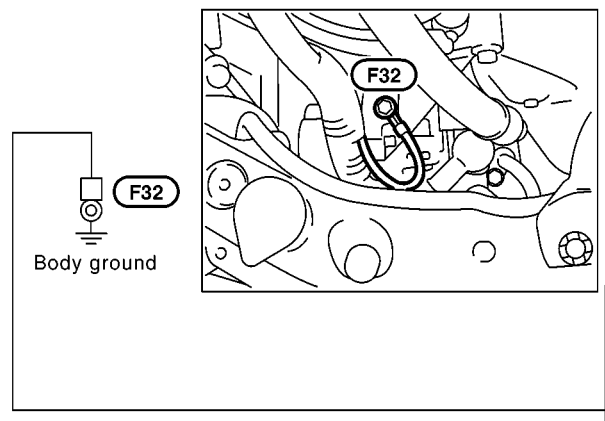
MKWA1848E

ENGINE CONTROL HARNESS/CR ENGINE MODELS

SMA for VIN >SJN**AK12U1309269



CON-NECTOR NUMBER	CONNECT TO
F26	Condenser
F33	Ignition coil No. 1 (With power transistor)
F34	Ignition coil No. 2 (With power transistor)
F35	Ignition coil No. 3 (With power transistor)
F36	Ignition coil No. 4 (With power transistor)

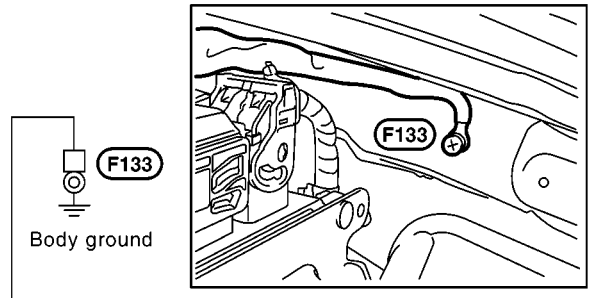


CON-NECTOR NUMBER	CONNECT TO
F31	Alternator (E)

MKWA1319E

ENGINE CONTROL HARNESS/K9K ENGINE MODELS

SMA for VIN >SJN**AK12U1309269

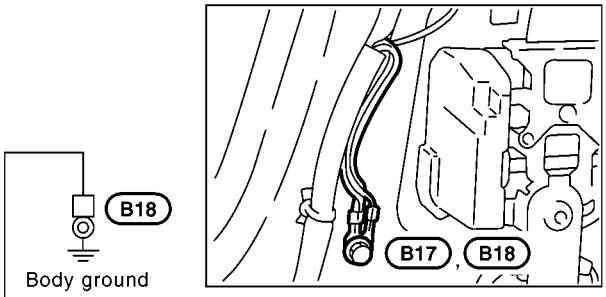


CON-NECTOR NUMBER	CONNECT TO
F134	ECM (Terminal No. 111)
F134	ECM (Terminal No. 112)

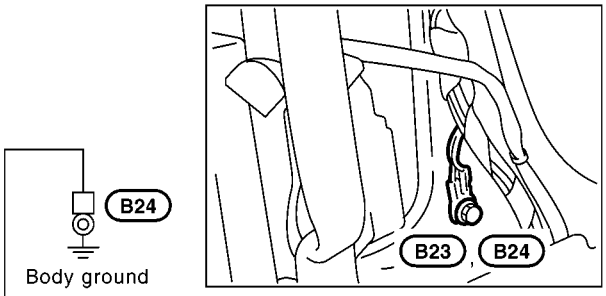
MKWA1500E

BODY HARNESS

SMA for VIN >SJN**AK12U1309269

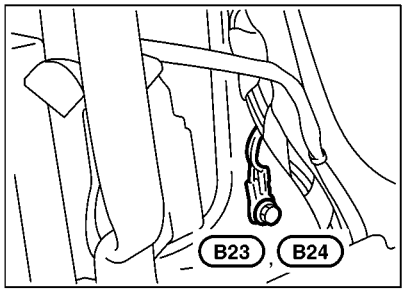


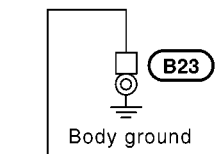
CON-NECTOR NUMBER	CONNECT TO
B13	Shield wire [RH side air bag (Satellite) sensor] (For circuit from terminal No. 1, 2)



CON-NECTOR NUMBER	CONNECT TO
B19	Shield wire [LH side air bag (Satellite) sensor] (For circuit from terminal No. 1, 2)

MKWA1320E



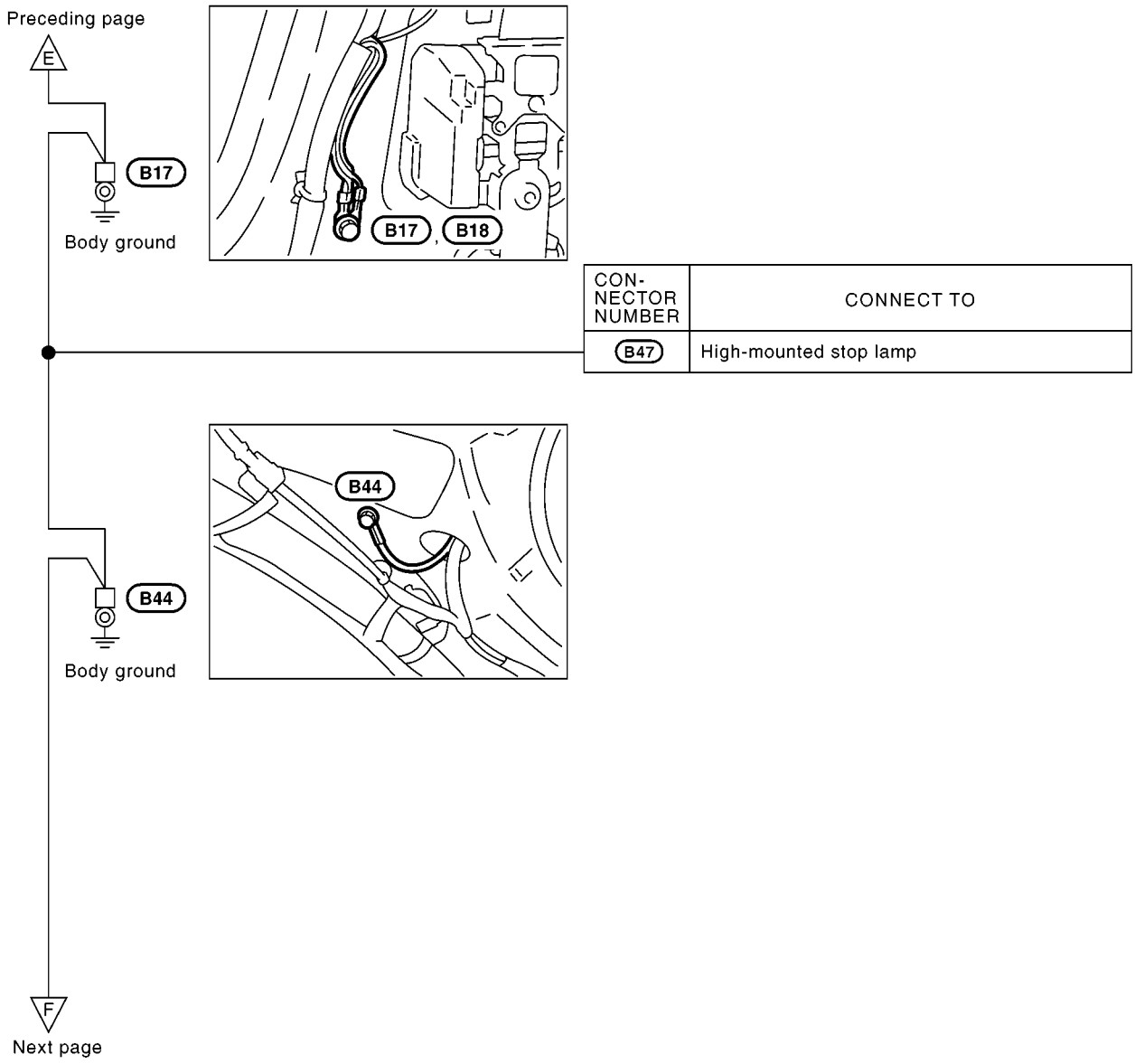


CON-NECTOR NUMBER	CONNECT TO
B5	Seat belt buckle switch RH
B6	Heated seat RH (With heated seat)
B10	Seat belt buckle switch LH
B11	Heated seat LH (With heated seat)
B28	Fuel level sensor unit and fuel pump (With gasoline engine) • Fuel pump
B36	Rear combination lamp RH
B37	Rear combination lamp LH
B38	License plate lamp
B56	Heated seat switch RH (Terminal No. 4) (With heated seat)
B56	Heated seat switch RH (Terminal No. 6) (With heated seat)
B57	Heated seat switch LH (Terminal No. 4) (With heated seat)
B57	Heated seat switch LH (Terminal No. 6) (With heated seat)
B58	Door lock/unlock switch (Without ESP)

E

Next page

MKWA1849E


Preceding page
E
B17
Body ground
B17
B18
CON-
NECTOR
NUMBER
CONNECT TO
B47
High-mounted stop lamp
B44
B44
Body ground
F
Next page

MKWA1322E

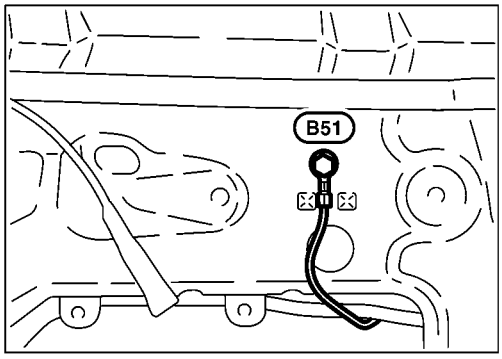
Preceding page

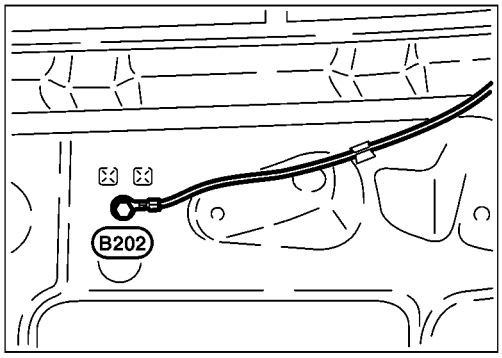
F

CON-NECTOR NUMBER	CONNECT TO
B52	External back door release switch
B53	Rear wiper motor
B54	Door request switch (Back door) (With Intelligent Key system)
B55	Back door release actuator (Terminal No. 2) • Back door switch
B55	Back door release actuator (Terminal No. 4) • Release motor

B51

Body ground





B202

Body ground

CON-NECTOR NUMBER	CONNECT TO
B201	Rear window defogger

MKWA1323E

HARNESS

PFP:00011

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

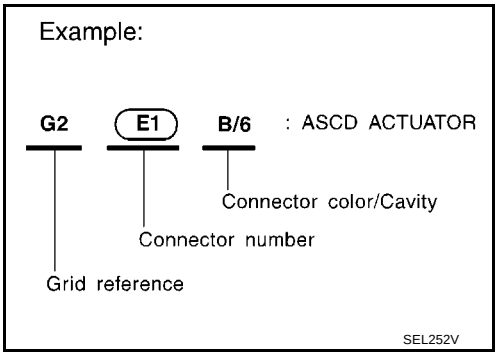
Harness Layout

EKS0079B

HOW TO READ HARNESS LAYOUTS

The following Harness Layouts use a map style grid to help locate connectors on the drawings:

- Main Harness
- Engine Room Harness (Engine Compartment)
- Body Harness
- Body No.2 Harness



To use the grid reference

1. Find the desired connector number on the connector list.
2. Find the grid reference.
3. On the drawing, find the crossing of the grid reference letter column and number row.
4. Find the connector number in the crossing zone.
5. Follow the line (if used) to the connector.

SMA for VIN >SJN**AK12U1337130

CONNECTOR SYMBOL

Main symbols of connector (in Harness Layout) are indicated in the below.

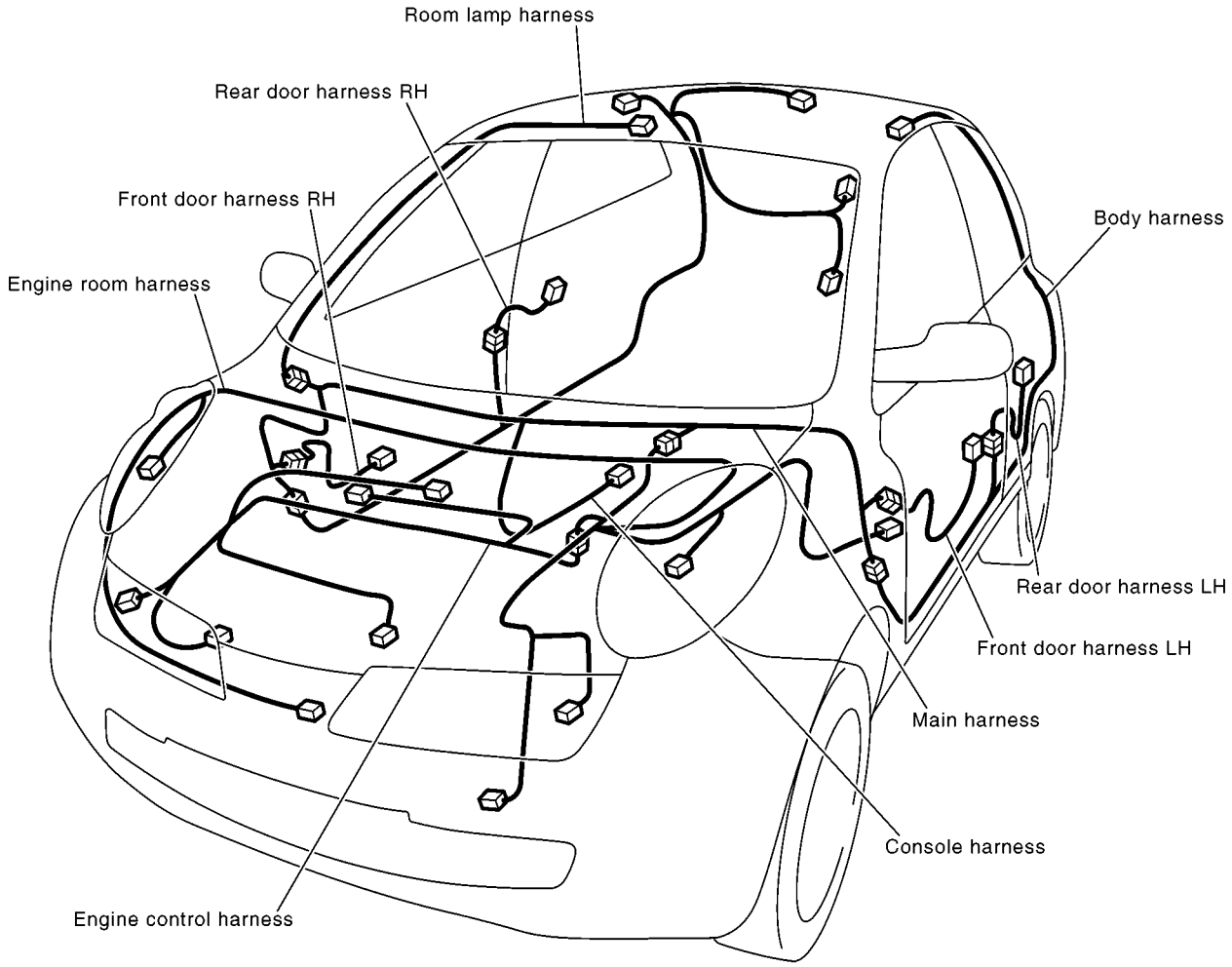
Connector type	Water proof type		Standard type	
	Male	Female	Male	Female
• Cavity: Less than 4 • Relay connector				
• Cavity: From 5 to 8				
• Cavity: More than 9	—	—		
• Ground terminal etc.	—			

SKIA0404E

OUTLINE/CR ENGINE MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1337130

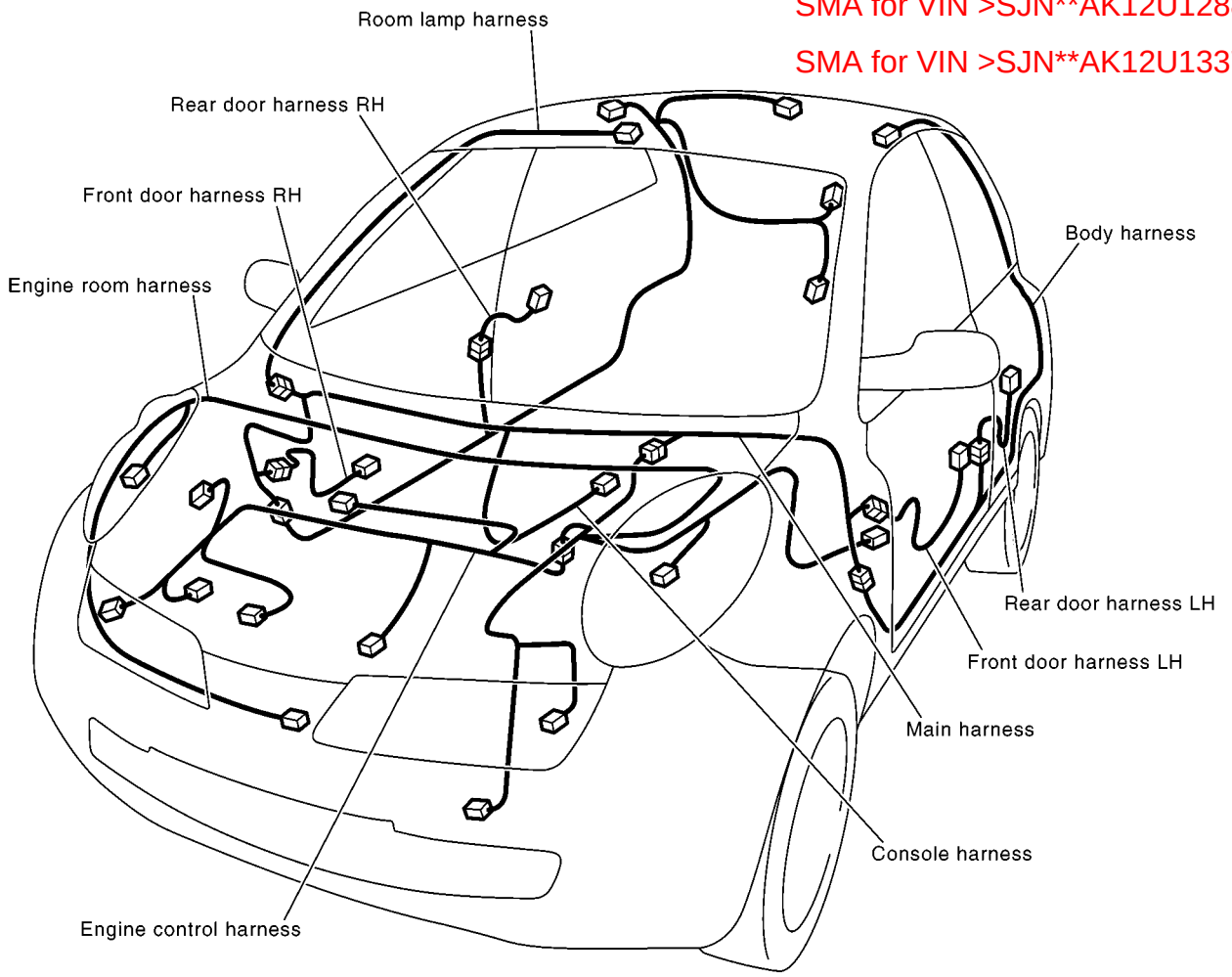


MKWA1354E

OUTLINE/K9K ENGINE MODELS

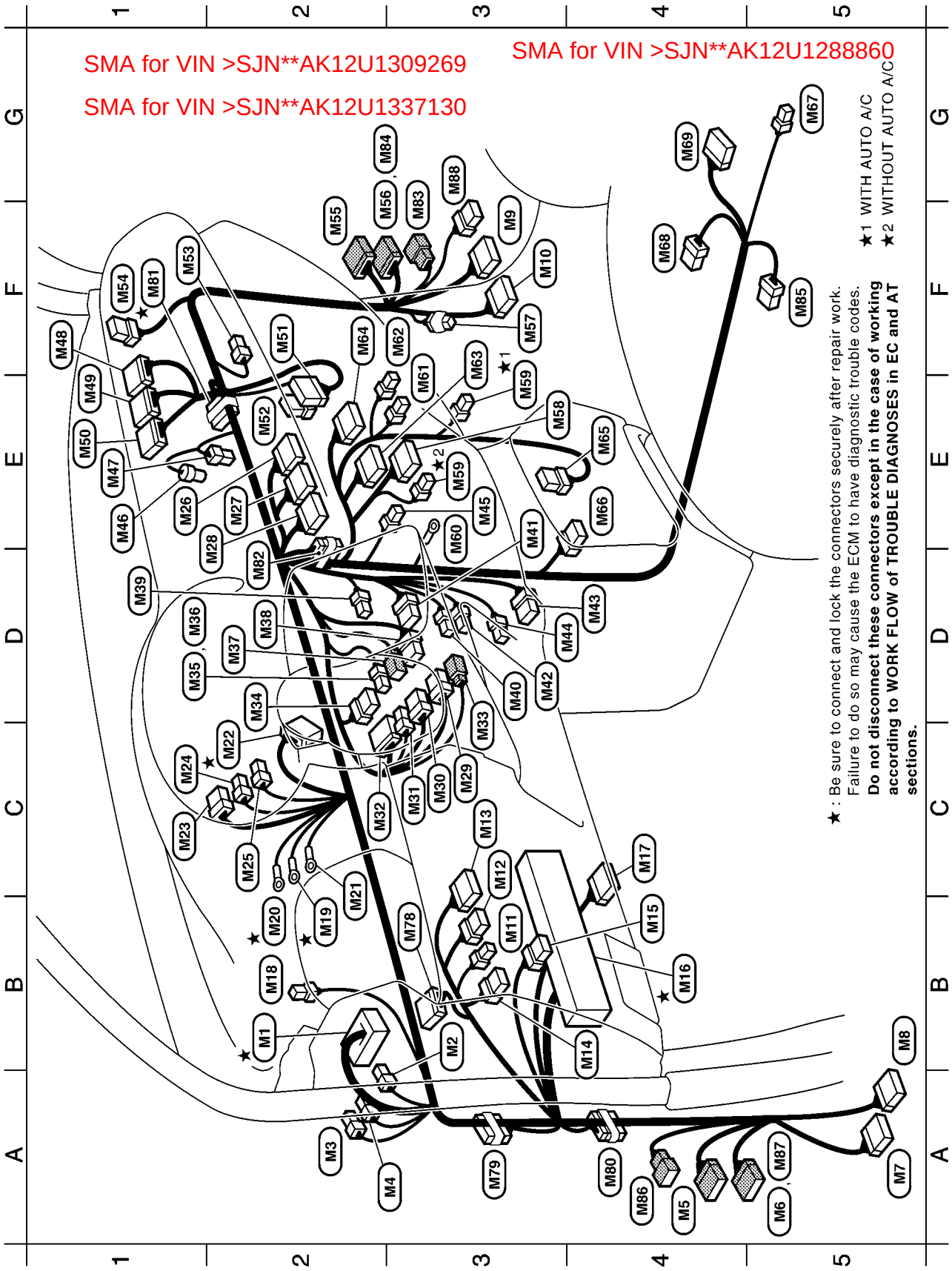
SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1337130



MKWA1490E

MAIN HARNESS/LHD MODELS



MKWA1852E

B2 ★	M1	SMJ	:	To E101
B3	M2	Y/4	:	To E102 (Without ESP)
A2	M3	B/2	:	To E103
A3	M4	W/2	:	To E104 (With headlamp washer without ESP)
A4	M5	W/12	:	To D2 (Without ESP)
A5	M6	W/10	:	To D1 (Without ESP)
A5	M7	W/12	:	To B4
B5	M8	W/10	:	To B3 (Without ESP)
F3	M9	W/24	:	To B2
F3	M10	W/10	:	To B1 (Without ESP)
B3	M11	W/4	:	Headlamp aiming switch
C3	M12	GY/8	:	Headlamp washer switch (With headlamp washer)
C3	M13	W/10	:	Door mirror remote control switch
B4	M14	GY/6	:	ESP off switch
B4	M15	W/5	:	Headlamp washer relay (With headlamp washer without ESP)
B4 ★	M16	–	:	Fuse block (J/B)
C4	M17	W/16	:	Data link connector
B2	M18	W/2	:	Sunload sensor (With auto A/C)
B2 ★	M19	–	:	Body ground
B2 ★	M20	–	:	Body ground
C2	M21	–	:	Body ground
C2 ★	M22	W/40	:	Combination meter
C1	M23	W/6	:	EPS control unit
C1	M24	W/1	:	EPS control unit
C2	M25	B/1	:	EPS control unit
E1	M26	–/20	:	Audio unit or NAVI control unit
E2	M27	B/16	:	Audio unit or NAVI control unit
E2	M28	W/12	:	Drive computer (With drive computer)
C3	M29	GY/8	:	Combination switch (Spiral cable) (Steering switch)
C3	M30	Y/6	:	Combination switch (Spiral cable) (Air bag)
C3	M31	W/4	:	Steering lock unit (With Intelligent Key system)
C2	M32	W/16	:	Combination switch
C3	M33	W/2	:	Key switch (Without Intelligent Key system)
D2	M34	GY/6	:	Key switch and ignition knob switch (With Intelligent Key system)
D2	M35	GY/4	:	NATS antenna amp. (With Intelligent Key system)
D2	M36	–/4	:	NATS antenna amp. (Without Intelligent Key system)
D2	M37	BR/2	:	Clutch interlock switch (With M/T and Intelligent Key system)
D2	M38	W/6	:	Ignition switch
D1	M39	W/2	:	In-vehicle sensor (With auto A/C)
D3	M40	W/4	:	Fan resistor (Without auto A/C)
E3	M41	G/6	:	Fan control amp. (With auto A/C)
D3	M42	G/2	:	Fan control amp. (With auto A/C)
D4	M43	B/6	:	Intake door motor (With auto A/C)
D4	M44	W/3	:	Intake sensor (With auto A/C)
E3	M45	W/3	:	Thermal control amplifier (With manual A/C)
E1	M46	B/2	:	Blower motor (Without A/C)
E1	M47	–/2	:	Blower motor (With A/C)
F1	M48	W/40	:	BCM (Body control module)
E1	M49	W/24	:	BCM (Body control module)
E1	M50	B/15	:	BCM (Body control module)
F2	M51	W/40	:	Intelligent Key unit (With Intelligent Key system)
E2	M52	W/5	:	Door lock/unlock relay (With Intelligent Key system)
F1	M53	Y/2	:	Front passenger air bag module
F1	M54	W/8	:	To R1
F2	M55	W/12	:	To D32 (Without ESP)
F2	M56	W/10	:	To D31 (Without ESP)
F3	M57	W/1	:	Towbar kit
E3	M58	W/15	:	Heater control panel (Without auto A/C)
E3	M59	B/2	:	Power socket
E3	M60	–	:	Body ground
E3	M61	W/4	:	Hazard switch
F3	M62	W/2	:	Ashtray illumination
F3	M63	B/18	:	A/C auto amp. (With auto A/C)
F2	M64	W/18	:	A/C auto amp. (With auto A/C)
E4	M65	B/6	:	Mode door motor (With auto A/C)
E4	M66	B/6	:	Air mix door motor (With auto A/C)
G5	M67	B/1	:	Parking brake switch
F4	M68	W/6	:	A/T device (With A/T)
G4	M69	Y/20	:	Air bag diagnosis sensor unit
B3	M78	W/12	:	Oil level warning unit (With diesel engine)
A3	M79	W/20	:	Joint connector-1
A4	M80	W/20	:	Joint connector-2
F1 ★	M81	L/20	:	Joint connector-3
D2	M82	L/20	:	Joint connector-4
G3	M83	GY/6	:	To D41 (With ESP)
G2	M84	W/12	:	To D42 (With ESP)
F5	M85	W/6	:	Door lock/unlock switch (With ESP)
A4	M86	GY/6	:	To D12 (With ESP)
A5	M87	W/12	:	To D13 (With ESP)
G3	M88	W/6	:	To B60 (With ESP)

★ : Be sure to connect and lock the connectors securely after repair work.
Failure to do so may cause the ECM to have diagnostic trouble codes.
Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

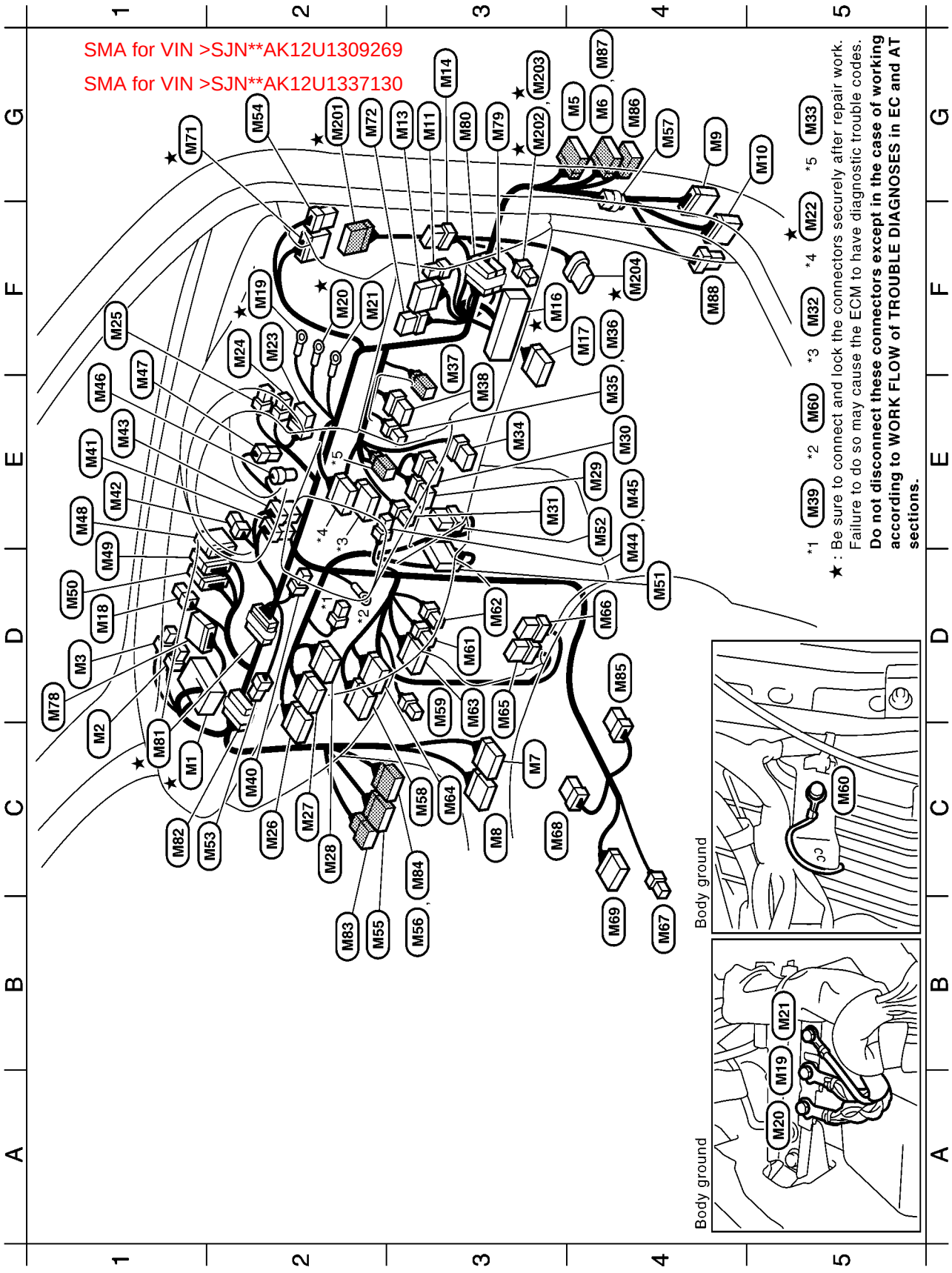
MKWA1853E

MAIN HARNESS/RHD MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



MKWA1854E

C1 ★	M1	SMJ	:	To E101
C1	M2	Y/4	:	To E102 (Without ESP)
D1	M3	B/2	:	To E103
G4	M5	W/12	:	To D2 (Without ESP)
G4	M6	W/10	:	To D1 (Without ESP)
C3	M7	W/12	:	To B4
C3	M8	W/10	:	To B3 (Without ESP)
G4	M9	W/24	:	To B2
G5	M10	W/10	:	To B1
G3	M11	W/4	:	Headlamp aiming switch
G3	M13	W/10	:	Door mirror remote control switch
G3	M14	GY/6	:	ESP off switch
F3 ★	M16	–	:	Fuse block (J/B)
F4	M17	W/16	:	Data link connector
D1	M18	W/2	:	Sunload sensor (With auto A/C)
F2 ★	M19	–	:	Body ground
F2 ★	M20	–	:	Body ground
F2	M21	–	:	Body ground
F5 ★	M22	W/40	:	Combination meter
F2	M23	W/6	:	EPS control unit
F2	M24	W/1	:	EPS control unit
F1	M25	B/1	:	EPS control unit
C2	M26	–/20	:	Audio unit or NAVI control unit
C2	M27	B/16	:	Audio unit or NAVI control unit
C2	M28	W/12	:	Drive computer (With drive computer)
E4	M29	GY/8	:	Combination switch (Spiral cable) (Steering switch)
E4	M30	Y/6	:	Combination switch (Spiral cable) (Air bag)
E3	M31	W/4	:	Steering lock unit (With Intelligent Key system)
F5	M32	W/16	:	Combination switch
G5	M33	W/2	:	Key switch (Without Intelligent Key system)
E3	M34	GY/6	:	Key switch and ignition knob switch (With Intelligent Key system)
E4	M35	GY/4	:	NATS antenna amp. (With Intelligent Key system)
F4	M36	–/4	:	NATS antenna amp. (Without Intelligent Key system)
F3	M37	BR/2	:	Clutch interlock switch (With M/T and Intelligent Key system)
E3	M38	W/6	:	Ignition switch
E5	M39	W/2	:	In-vehicle sensor (With auto A/C)
C2	M40	W/4	:	Fan resistor (Without auto A/C)
E1	M41	G/6	:	Fan control amp. (With auto A/C)
E1	M42	G/2	:	Fan control amp. (With auto A/C)
E1	M43	B/6	:	Intake door motor (With auto A/C)
D4	M44	W/3	:	Intake sensor (With auto A/C)
E4	M45	W/3	:	Thermal control amplifier (With manual A/C)
E1	M46	B/2	:	Blower motor (Without A/C)
F1	M47	–/2	:	Blower motor (With A/C)
E1	M48	W/40	:	BCM (Body control module)
D1	M49	W/24	:	BCM (Body control module)
D1	M50	B/15	:	BCM (Body control module)
D4	M51	W/40	:	Intelligent Key unit (With Intelligent Key system)
E4	M52	W/5	:	Door lock/unlock relay (With Intelligent Key system)
C2	M53	Y/2	:	Front passenger air bag module
G2	M54	W/8	:	To R1
B2	M55	W/12	:	To D32 (Without ESP)
B3	M56	W/10	:	To D31 (Without ESP)
G4	M57	W/1	:	Towbar kit
C3	M58	W/15	:	Heater control panel (Without auto A/C)
D3	M59	B/2	:	Power socket
E5	M60	–	:	Body ground
D3	M61	W/4	:	Hazard switch
D3	M62	W/2	:	Ashtray illumination
D3	M63	B/18	:	A/C auto amp. (With auto A/C)
C3	M64	W/18	:	A/C auto amp. (With auto A/C)
D3	M65	B/6	:	Mode door motor (With auto A/C)
D4	M66	B/6	:	Air mix door motor (With auto A/C)
B4	M67	B/1	:	Parking brake switch
C3	M68	W/6	:	A/T device (With A/T)
B4	M69	Y/20	:	Air bag diagnosis sensor unit
G1 ★	M71	W/10	:	To M201
G2	M72	W/6	:	After market alarm unit (Option connector)
D1	M78	W/12	:	Oil level warning unit (With diesel engine)
G3	M79	W/20	:	Joint connector-1
G3	M80	W/20	:	Joint connector-2
C1 ★	M81	L/20	:	Joint connector-3
C1	M82	L/20	:	Joint connector-4
B2	M83	GY/6	:	To D41 (With ESP)
C3	M84	W/12	:	To D42 (With ESP)
D4	M85	W/6	:	Door lock/unlock switch (With ESP)
G4	M86	GY/6	:	To D12 (With ESP)
G4	M87	W/12	:	To D13 (With ESP)
F4	M88	W/6	:	To B60 (With ESP)

Sub-harness 1

G2 ★	M201	W/10	:	To M71
G3 ★	M202	B/2	:	Stop lamp switch (With M/T)
G3 ★	M203	W/4	:	Stop lamp switch (With A/T)
F4 ★	M204	B/6	:	Accelerator pedal position sensor

★ : Be sure to connect and lock the connectors securely after repair work.
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Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

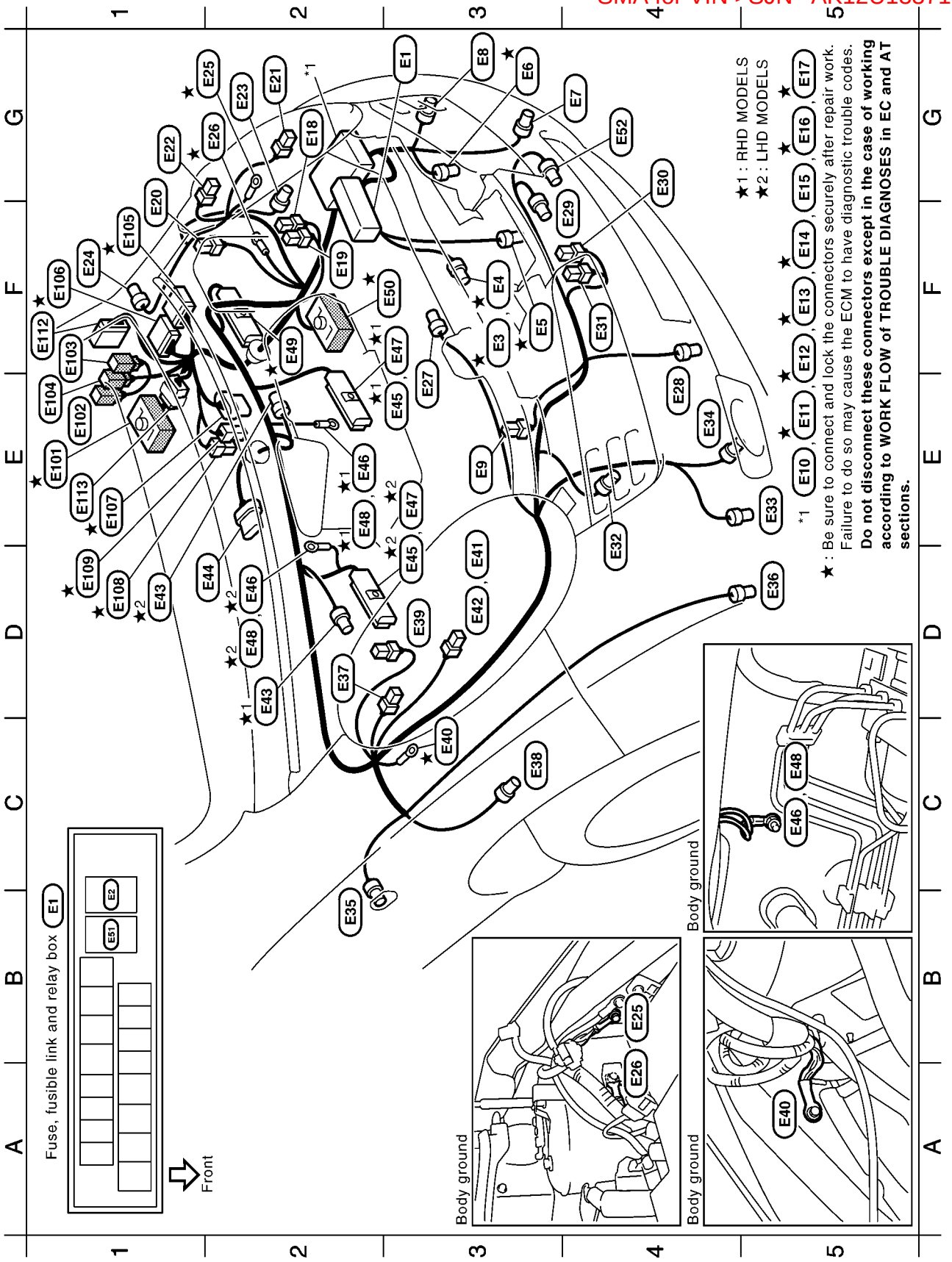
MKWA1855E

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1288860

ENGINE ROOM HARNESS/CR ENGINE MODELS

SMA for VIN >SJN**AK12U1337130



MKWA1856E

G3	E1	–	:	Fuse, fusible link and relay box
B1	E2	W/5	:	Daytime light relay (With daytime light system)
F3 ★	E3	B/2	:	Cooling fan motor (With A/C)
F3 ★	E4	–/2	:	Cooling fan motor (Without A/C)
F3 ★	E5	B/2	:	Resistor (With A/C)
G3 ★	E6	GY/2	:	Dropping resistor (With A/T)
G4	E7	B/2	:	Front fog lamp LH (With front fog lamp)
G3	E8	GY/2	:	Front turn signal lamp LH
E3	E9	B/1	:	After market alarm unit (Hood switch) (RHD models)
E5	E10	B/2	:	IPDM E/R (Intelligent power distribution module engine room)
E5 ★	E11	B/6	:	IPDM E/R (Intelligent power distribution module engine room)
F5 ★	E12	W/6	:	IPDM E/R (Intelligent power distribution module engine room)
F5 ★	E13	BR/12	:	IPDM E/R (Intelligent power distribution module engine room)
F5 ★	E14	W/16	:	IPDM E/R (Intelligent power distribution module engine room)
G5	E15	BR/8	:	IPDM E/R (Intelligent power distribution module engine room)
G5 ★	E16	W/12	:	IPDM E/R (Intelligent power distribution module engine room)
G5 ★	E17	W/8	:	IPDM E/R (Intelligent power distribution module engine room)
G2	E18	BR/2	:	Fusible link holder
F2	E19	GY/2	:	Fusible link holder
F1	E20	B/3	:	Headlamp aiming motor LH
G2	E21	B/3	:	Headlamp LH
G1	E22	B/2	:	Parking lamp LH
G2	E23	B/2	:	Front wheel sensor LH
F1	E24	W/2	:	Side turn signal lamp LH
G2 ★	E25	–	:	Body ground
G2 ★	E26	–	:	Body ground
E3	E27	Y/2	:	Crash zone sensor
E4	E28	B/3	:	Refrigerant pressure sensor (With A/C)
F4	E29	B/2	:	Ambient sensor (With A/C)
G4	E30	B/1	:	Horn (–)
F4	E31	B/1	:	Horn (+)
D4	E32	GY/2	:	Front turn signal lamp RH
E5	E33	–/2	:	Headlamp washer motor (With headlamp washer)
E4	E34	B/2	:	Front fog lamp RH (With front fog lamp)
B2	E35	–/2	:	Side turn signal lamp RH
D5	E36	B/2	:	Washer motor
D2	E37	B/2	:	Parking lamp RH
C3	E38	B/2	:	Front wheel sensor RH
D3	E39	B/3	:	Headlamp aiming motor RH
C3 ★	E40	–	:	Body ground
D3	E41	B/3	:	Headlamp RH (With daytime light system)
D3	E42	B/3	:	Headlamp RH (Without daytime light system)
D1, D2	E43	GY/2	:	Brake fluid level switch
D2	E44	GY/6	:	Front wiper motor
D3, E3	E45	B/26	:	ABS actuator and electric unit (Control unit) (Without ESP)
D2, E2	E46	–	:	Body ground (Without ESP)
E3, F3	E47	SMJ	:	ABS actuator and electric unit (Control unit) (With ESP)
D2, E2	E48	–	:	Body ground (With ESP)
F2 ★	E49	SMJ	:	ECM
F2 ★	E50	SMJ	:	To F1
B1	E51	W/3	:	Horn relay
G4	E52	B/2	:	Outside air temperature sensor (With drive computer)
E1 ★	E101	SMJ	:	To M1
E1	E102	Y/4	:	To M2 (Without ESP)
F1	E103	B/2	:	To M3
E1	E104	W/2	:	To M4 (With headlamp washer and without ESP)
F1 ★	E105	W/24	:	TCM (With A/T)
F1 ★	E106	GY/24	:	TCM (With A/T)
E1 ★	E107	B/6	:	Accelerator pedal position sensor (LHD models)
D1 ★	E108	B/2	:	Stop lamp switch (LHD models with M/T)
D1 ★	E109	W/4	:	Stop lamp switch (LHD models with A/T)
F1	E112	W/16	:	To B59 (With ESP)
E1	E113	W/5	:	Headlamp washer relay (With headlamp washer and with ESP)

★ : Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes.

Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

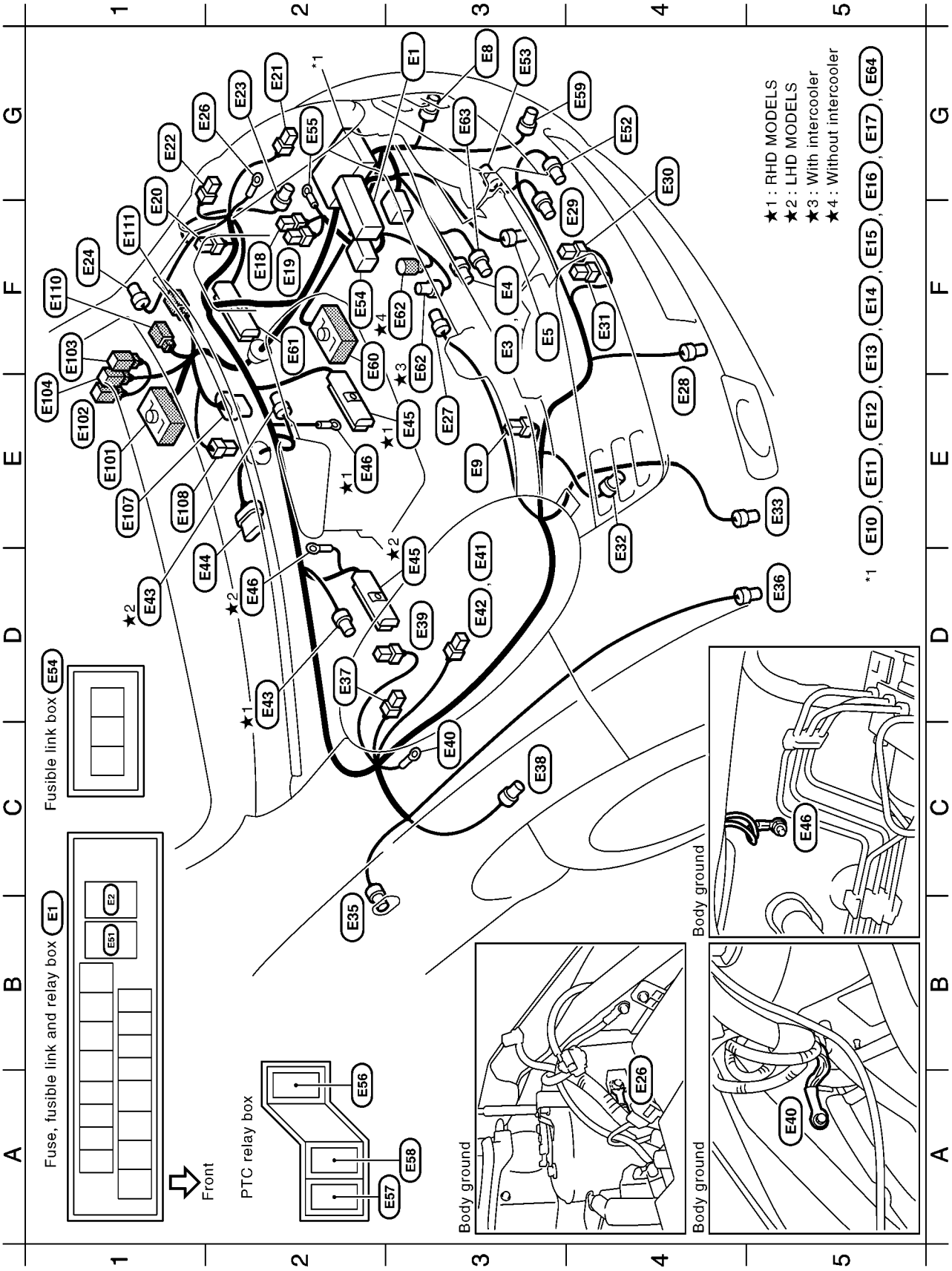
MKWA1857E

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1288860

ENGINE ROOM HARNESS/K9K ENGINE MODELS

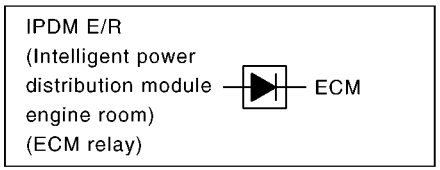
SMA for VIN >SJN**AK12U1337130



MKWA3240E

G3	E1	–	:	Fuse, fusible link and relay box
B1	E2	W/5	:	Daytime light relay (With daytime light system)
F3	E3	B/2	:	Cooling fan motor-1 (With A/C and with PTC heater)
F3	E4	–/2	:	Cooling fan motor-2 (Without A/C)
F3	E5	B/2	:	Resistor (With A/C and with PTC heater)
G3	E8	GY/2	:	Front turn signal lamp LH
E3	E9	B/1	:	After market alarm unit (Hood switch) (RHD models)
E5	E10	B/2	:	IPDM E/R (Intelligent power distribution module engine room)
E5	E11	B/6	:	IPDM E/R (Intelligent power distribution module engine room)
F5	E12	W/6	:	IPDM E/R (Intelligent power distribution module engine room)
F5	E13	BR/12	:	IPDM E/R (Intelligent power distribution module engine room)
F5	E14	W/16	:	IPDM E/R (Intelligent power distribution module engine room)
G5	E15	BR/8	:	IPDM E/R (Intelligent power distribution module engine room)
G5	E16	W/12	:	IPDM E/R (Intelligent power distribution module engine room)
G5	E17	W/8	:	IPDM E/R (Intelligent power distribution module engine room)
F2	E18	BR/2	:	Fusible link holder
F2	E19	GY/2	:	Fusible link holder
F1	E20	B/3	:	Headlamp aiming motor LH
G2	E21	B/3	:	Headlamp LH
G1	E22	B/2	:	Parking lamp LH
G2	E23	B/2	:	Front wheel sensor LH
F1	E24	W/2	:	Side turn signal lamp LH
G1	E26	–	:	Body ground
E3	E27	Y/2	:	Crash zone sensor
E4	E28	B/3	:	Refrigerant pressure sensor (With A/C)
F4	E29	B/2	:	Ambient sensor (With auto A/C)
G4	E30	B/1	:	Horn (–)
F4	E31	B/1	:	Horn (+)
D4	E32	GY/2	:	Front turn signal lamp RH
E5	E33	–/2	:	Headlamp washer motor (With headlamp washer)
B2	E35	W/2	:	Side turn signal lamp RH
D5	E36	B/2	:	Washer motor
D2	E37	B/2	:	Parking lamp RH
C3	E38	B/2	:	Front wheel sensor RH
D3	E39	B/3	:	Headlamp aiming motor RH
C3	E40	–	:	Body ground
D3	E41	B/3	:	Headlamp RH (With daytime light system)
D3	E42	B/3	:	Headlamp RH (Without daytime light system)
C2, D1	E43	GY/2	:	Brake fluid level switch
D2	E44	GY/6	:	Front wiper motor
D3, E3	E45	B/26	:	ABS actuator and electric unit (Control unit)
D2, E2	E46	–	:	Body ground
B1	E51	W/3	:	Horn relay
G4	E52	B/2	:	Outside air temperature sensor
G3	E53	B/2	:	Outside air temperature sensor (With PTC heater)
F2	E54	–	:	Fusible link box
G2	E55	–	:	Fusible link holder
A2	E56	–/4	:	PTC heater relay 1 (With PTC heater)
A3	E57	–/4	:	PTC heater relay 2 (With PTC heater)
A3	E58	–/4	:	PTC heater relay 3 (With PTC heater)
G4	E59	GY/1	:	After market front fog lamp (Option connector)
F2	E60	SMJ	:	To F101
F2	E61	SMJ	:	ECM
F3	E62	GY/1	:	To F103
G3	E63	–/2	:	Cooling fan motor-2 (With PTC heater)
G5	E64	W/2	:	Diode
E1	E101	SMJ	:	To M1
E1	E102	Y/4	:	To M2
F1	E103	B/2	:	To M3
E1	E104	W/2	:	To M4 (With headlamp washer)
E1	E107	B/6	:	Accelerator pedal position sensor (LHD models)
E1	E108	B/2	:	Stop lamp switch (LHD models)
F1	E110	B/1	:	PTC heater
F1	E111	B/2	:	PTC heater

Diode E64



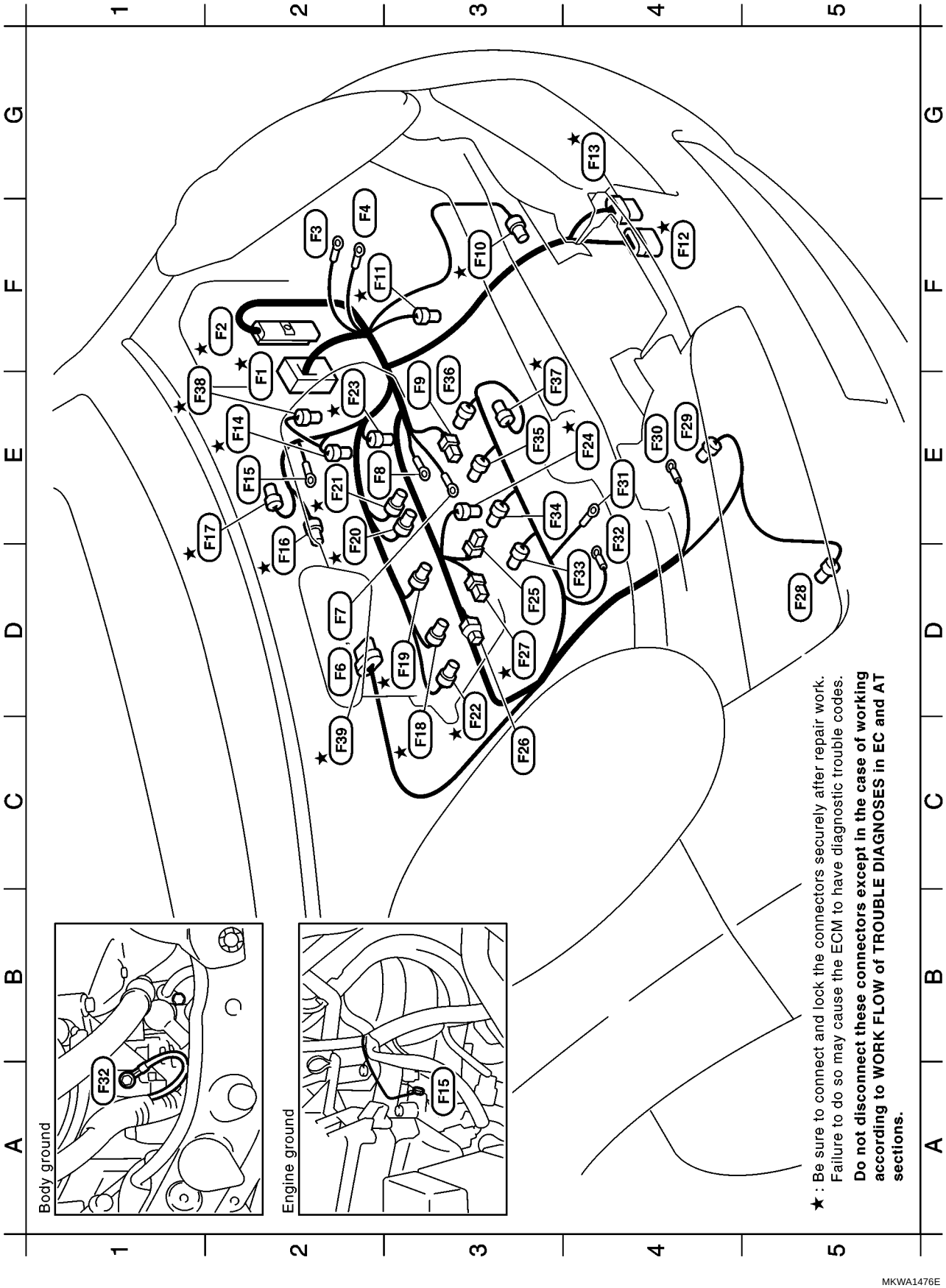
MKWA1859E

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1288860

ENGINE CONTROL HARNESS/CR ENGINE MODELS

SMA for VIN >SJN**AK12U1337130



MKWA1476E

E2	★F1	SMJ	:	To E50
F2	★F2	SMJ	:	ECM
F2	F3	–	:	Fusible link holder
F2	F4	–	:	Fusible link holder
D2	F6	–	:	Starter motor (Except for cold area)
D2	F7	–	:	Starter motor (For cold area)
E2	F8	–	:	Starter motor (Except for cold area)
E3	F9	B/1	:	Starter motor (For cold area)
F3	★F10	G/3	:	Park/neutral position switch (With M/T)
F2	★F11	BR/3	:	Revolution sensor (With A/T)
F4	★F12	B/10	:	Park/neutral position switch (With A/T)
G4	★F13	B/8	:	Terminal cord assembly (With A/T)
E2	★F14	B/3	:	Camshaft position sensor
E2	F15	–	:	Engine ground
D2	★F16	GY/4	:	Manifold absolute pressure sensor
E2	★F17	L/2	:	EVAP canister purge volume control solenoid valve
C3	★F18	GY/2	:	Injector No. 1
D3	★F19	GY/2	:	Injector No. 2
D2	★F20	GY/2	:	Injector No. 3
E2	★F21	GY/2	:	Injector No. 4
D3	★F22	G/2	:	Intake valve timing control solenoid valve
E2	★F23	GY/2	:	Engine coolant temperature sensor
E4	★F24	G/4	:	Heated oxygen sensor 2
D3	F25	B/1	:	Oil pressure switch
C3	F26	W/2	:	Condenser
D3	★F27	B/2	:	Knock sensor
D5	F28	B/1	:	Compressor (With A/C)
E4	F29	GY/2	:	Alternator
E4	F30	–	:	Alternator
E4	F31	–	:	Alternator (E)
D4	F32	–	:	Body ground
D4	F33	GY/3	:	Ignition coil No. 1
E3	F34	GY/3	:	Ignition coil No. 2
E3	F35	GY/3	:	Ignition coil No. 3
E3	F36	GY/3	:	Ignition coil No. 4
E3	★F37	G/4	:	Heated oxygen sensor 1
E2	★F38	G/3	:	Crankshaft position sensor
C2	★F39	B/6	:	Electric throttle control actuator

★ : Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes.

Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

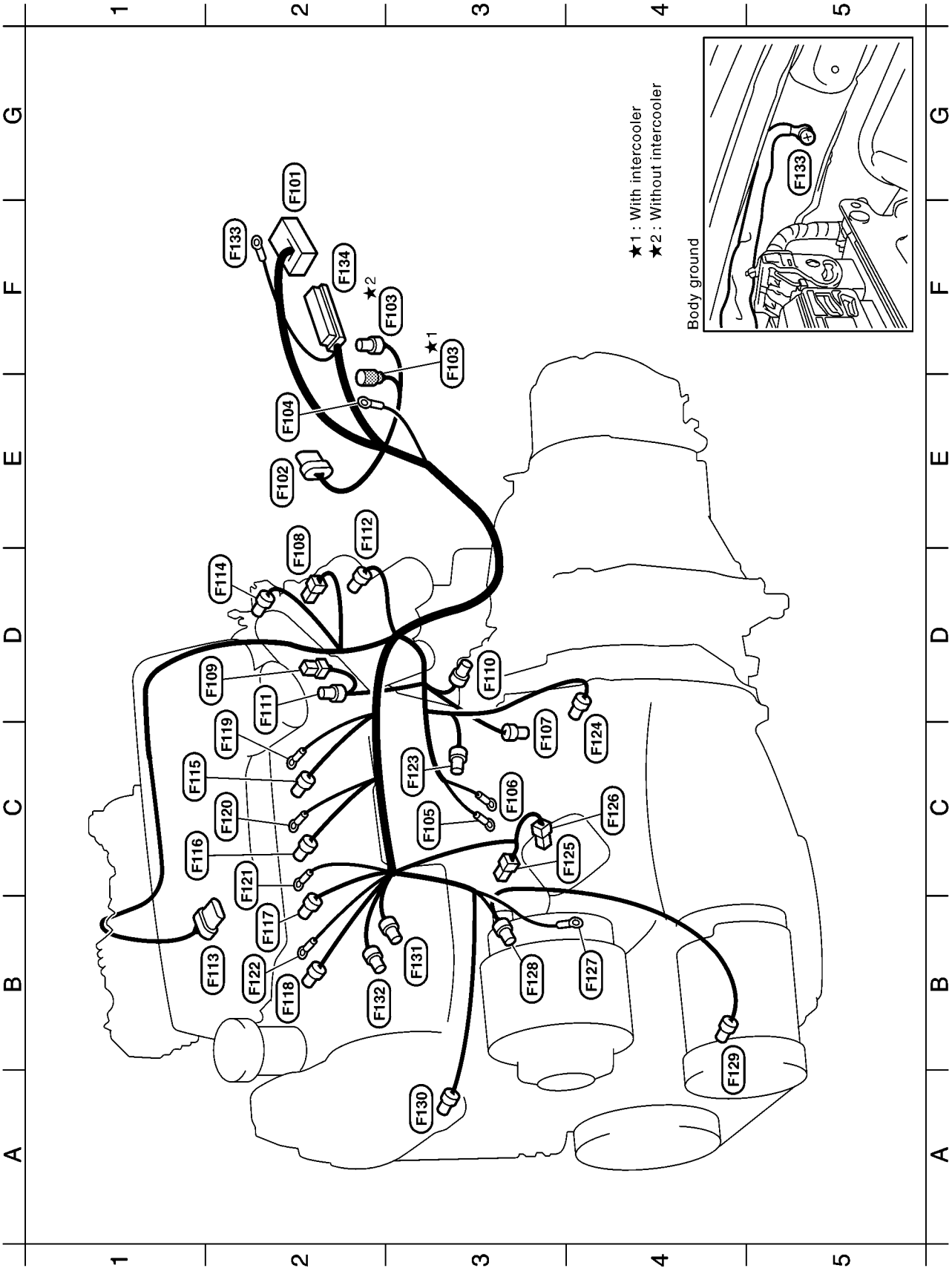
MKWA1860E

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1288860

ENGINE CONTROL HARNESS/K9K ENGINE MODELS

SMA for VIN >SJN**AK12U1337130

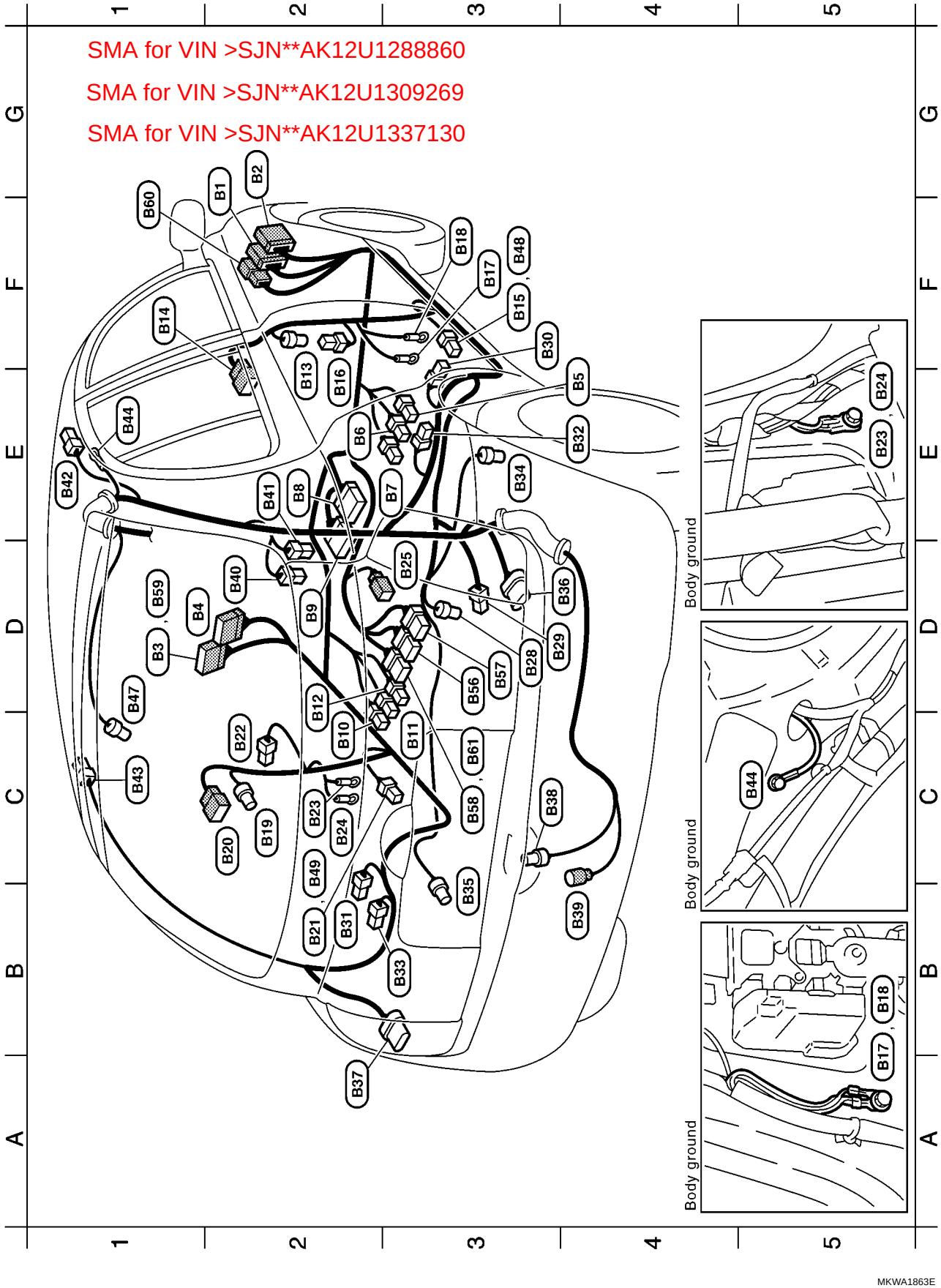


MKWA3241E

G2	F101	SMJ	: To E60
E2	F102	B/8	: Glow relay
F3	F103	GY/1	: To E62
E2	F104	–	: Fusible link holder
C3	F105	–	: Starter motor
C3	F106	–	: Starter motor
C3	F107	G/3	: Park/neutral position switch
D2	F108	–/2	: Charge air temperature sensor (Without intercooler)
D2	F109	–/2	: Intake air temperature sensor
D3	F110	B/2	: Crankshaft position sensor (POS)
D2	F111	–/4	: Engine coolant temperature sensor
E2	F112	–/4	: Charge air pressure sensor (With intercooler)
B2	F113	–/6	: EGR volume control solenoid valve
D2	F114	–/3	: Charge air pressure sensor (Without intercooler)
C2	F115	–/2	: Fuel injector No. 1
C2	F116	–/2	: Fuel injector No. 2
B2	F117	–/2	: Fuel injector No. 3
B2	F118	–/2	: Fuel injector No. 4
C2	F119	B/1	: Glow plug No. 1
C2	F120	B/1	: Glow plug No. 2
C2	F121	B/1	: Glow plug No. 3
B2	F122	B/1	: Glow plug No. 4
C3	F123	B/3	: Common rail fuel pressure sensor
C4	F124	W/1	: Oil pressure switch
C3	F125	B/2	: Knock sensor (Accelometer)
C4	F126	B/2	: Oil level sensor
B4	F127	–	: Alternator (B)
B3	F128	B/2	: Alternator (S), (L)
B4	F129	GY/2	: Compressor (With A/C)
A3	F130	B/3	: Camshaft sensor
B3	F131	BR/2	: Fuel flow actuator
B2	F132	G/2	: Fuel temperature sensor
F2	F133	–	: Body ground
F2	F134	SMJ	: ECM

MKWA1862E

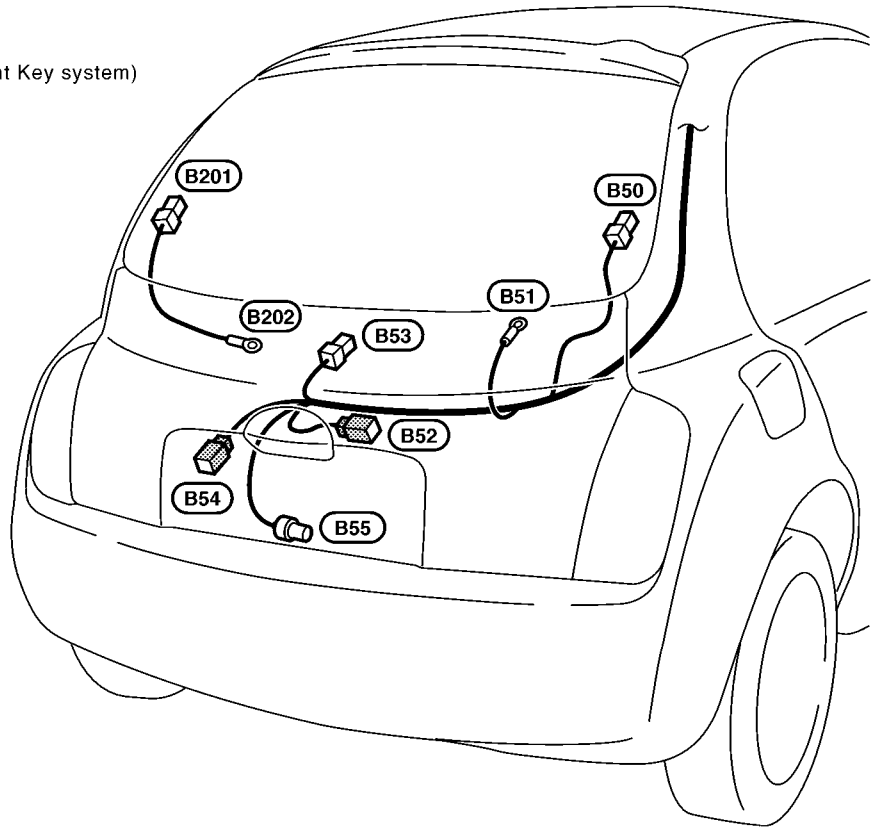
BODY HARNESS



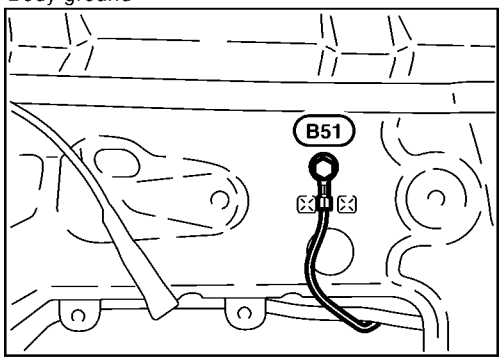
G2	B1	W/10	: To M10	D2	B40	B/1	: Luggage room lamp (+)
G2	B2	W/24	: To M9	E2	B41	B/1	: Luggage room lamp
D1	B3	W/10	: To M8	E1	B42	Y/2	: RH side curtain air bag module (With curtain air bag)
D2	B4	W/12	: To M7	C1	B43	Y/2	: LH side curtain air bag module (With curtain air bag)
E4	B5	W/2	: Seat belt buckle switch RH	E1	B44	–	: Body ground
E2	B6	W/3	: Heated seat RH (With heated seat)	C1	B47	B/2	: High-mounted stop lamp
E3	B7	BR/2	: Front RH side air bag module	F3	B48	Y/2	: Front RH seat belt pre-tensioner (With 3 doors)
E2	B8	Y/12	: Air bag diagnosis sensor unit	B2	B49	Y/2	: Front LH seat belt pre-tensioner (With 3 doors)
D2	B9	Y/12	: Air bag diagnosis sensor unit	D3	B56	BR/6	: Heated seat switch RH (With heated seat)
C2	B10	W/2	: Seat belt buckle switch LH	D3	B57	W/6	: Heated seat switch LH (With heated seat)
C3	B11	W/3	: Heated seat LH (With heated seat)	C3	B58	W/6	: Door lock/unlock switch (Without ESP)
D2	B12	BR/2	: Front LH side air bag module	D1	B59	W/16	: To E112
F2	B13	Y/2	: RH side air bag (satellite) sensor	F1	B60	W/6	: To M88
F1	B14	W/6	: To D81	C3	B61	B/6	: Yaw rate/side G sensor (With ESP)
F3	B15	B/2	: Front RH seat belt pre-tensioner (With 5 doors)				
E2	B16	W/3	: Front door switch RH				
F3	B17	–	: Body ground				
F3	B18	–	: Body ground				
C2	B19	Y/2	: LH side air bag (satellite) sensor				
C2	B20	W/6	: To D61				
B2	B21	B/2	: Front LH seat belt pre-tensioner (With 5 doors)				
C2	B22	W/3	: Front door switch LH				
C2	B23	–	: Body ground				
C2	B24	–	: Body ground				
D3	B25	GY/2	: Inside key antenna (Center console) (With Intelligent Key system)				
D3	B28	GY/4	: Fuel level sensor unit and fuel pump				
D3	B29	BR/2	: Inside key antenna (Luggage room) (With Intelligent Key system)				
F3	B30	W/1	: Rear door switch RH (With 5 doors)				
B2	B31	W/1	: Rear door switch LH (With 5 doors)				
E4	B32	BR/2	: Rear door speaker RH (3 doors with 6 speakers)				
B3	B33	BR/2	: Rear door speaker LH (3 doors with 6 speakers)				
E3	B34	B/2	: Rear wheel sensor RH				
B3	B35	B/2	: Rear wheel sensor LH				
D4	B36	B/6	: Rear combination lamp RH				
A2	B37	B/6	: Rear combination lamp LH				
C3	B38	B/2	: License plate lamp				
B4	B39	GY/2	: Outside antenna (Back door) (With Intelligent Key system)				

MKWA1864E

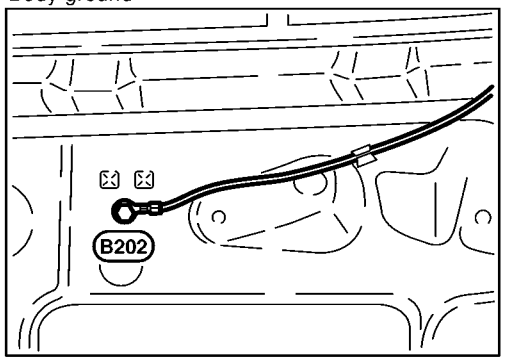
B50	B/1	:	Rear window defogger (+)
B51	–	:	Body ground
B52	W/2	:	External back door release switch
B53	W/3	:	Rear wiper motor
B54	BR/2	:	Door request switch (Back door) (With Intelligent Key system)
B55	W/4	:	Back door release actuator
B201	B/1	:	Rear window defogger (–)
B202	–	:	Body ground



Body ground



Body ground



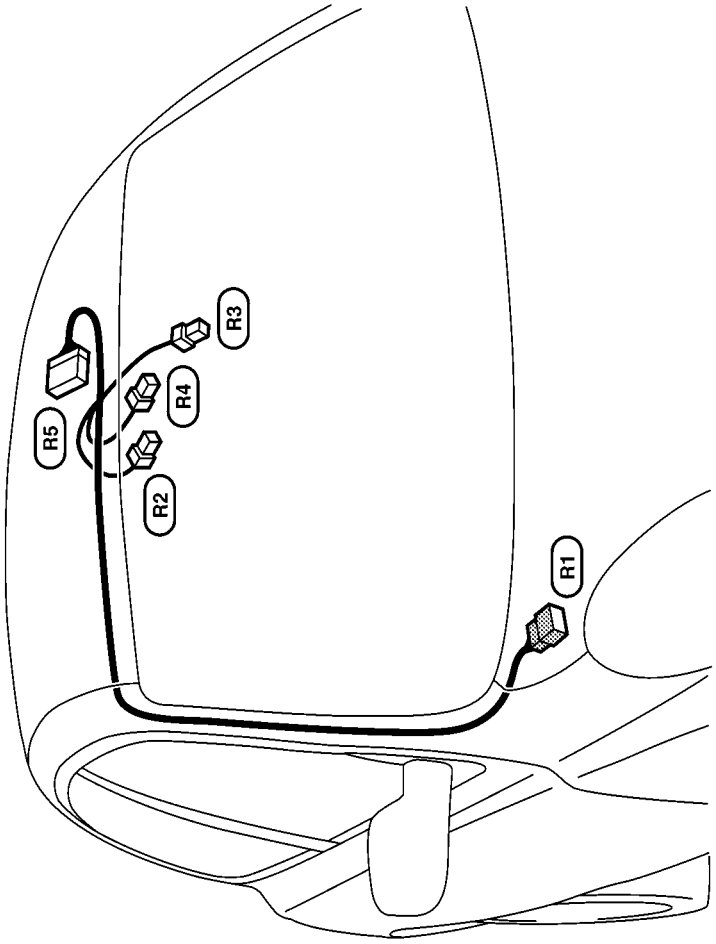
MKWA1482E

ROOM LAMP HARNESS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



R1 W/8 : To M54
R2 W/3 : Interior room lamp
R3 B/3 : Rain sensor (With rain sensor)
R4 W/4 : Sunroof switch (With sunroof)
R5 GY/10 : Sunroof motor assembly (With sunroof)

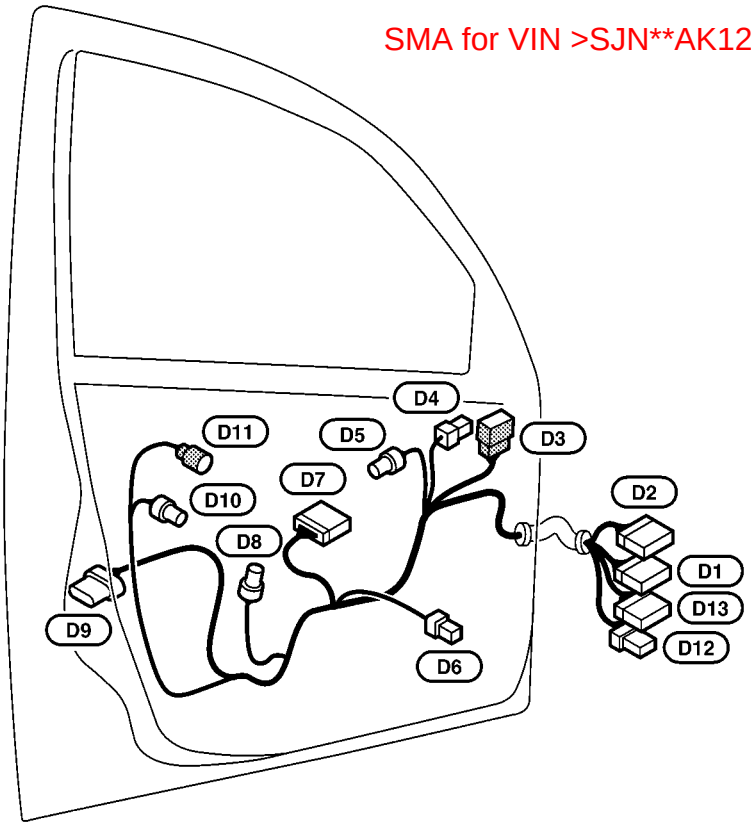
MKWA1483E

FRONT DOOR HARNESS LH SIDE/LHD MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D1	W/10	:	To M6 (Without ESP)
D2	W/12	:	To M5 (Without ESP)
D3	GY/6	:	Door mirror actuator (Driver side)
D4	BR/2	:	Tweeter LH (With 6 speakers)
D5	GY/2	:	Front power window motor (Driver side)
D6	W/2	:	Front door speaker LH
D7	W/16	:	Power window main switch
D8	BR/2	:	Intelligent Key warning buzzer (With Intelligent Key system)
D9	B/6	:	Door lock actuator (Driver side)
D10	GY/2	:	Door request switch (Driver side) (With Intelligent Key system)
D11	W/2	:	Outside antenna (Driver side) (With Intelligent Key system)
D12	GY/6	:	To M86 (With ESP)
D13	W/12	:	To M87 (With ESP)

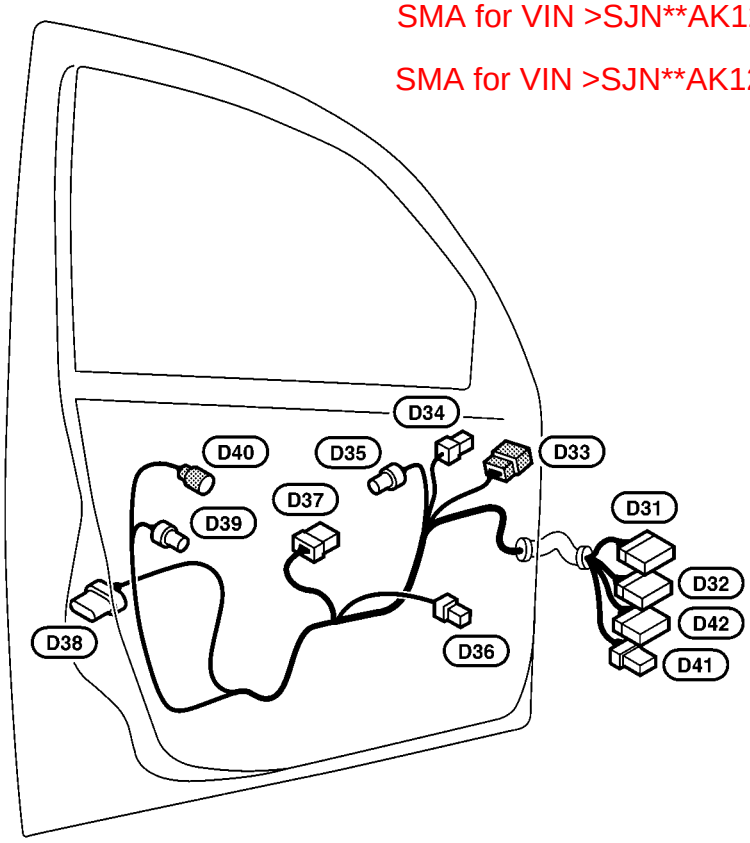
MKWA1865E

FRONT DOOR HARNESS LH SIDE/RHD MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D31	W/10	:	To M56 (Without ESP)
D32	W/12	:	To M55 (Without ESP)
D33	GY/6	:	Door mirror actuator (Passenger side)
D34	BR/2	:	Tweeter LH (With 6 speakers)
D35	GY/2	:	Front power window motor (Passenger side)
D36	W/2	:	Front door speaker LH
D37	W/8	:	Front power window switch (Passenger side)
D38	B/6	:	Door lock actuator (Passenger side)
D39	GY/2	:	Door request switch (Passenger side) (With Intelligent Key system)
D40	W/2	:	Outside antenna (Passenger side) (With Intelligent Key system)
D41	GY/6	:	To M83 (With ESP)
D42	W/12	:	To M84 (With ESP)

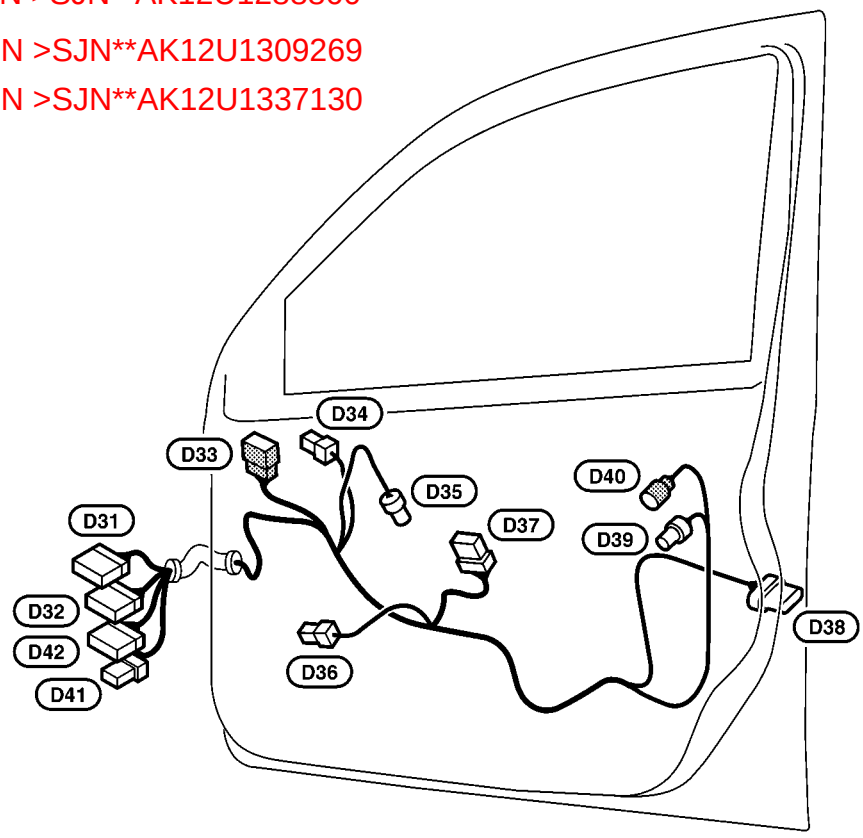
MKWA1866E

FRONT DOOR HARNESS RH SIDE/LHD MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D31	W/10	:	To M56 (Without ESP)
D32	W/12	:	To M55 (Without ESP)
D33	GY/6	:	Door mirror actuator (Passenger side)
D34	BR/2	:	Tweeter RH (With 6 speakers)
D35	GY/2	:	Front power window motor (Passenger side)
D36	W/2	:	Front door speaker RH
D37	W/8	:	Front power window switch (Passenger side)
D38	B/6	:	Door lock actuator (Passenger side)
D39	GY/2	:	Door request switch (Passenger side) (With Intelligent Key system)
D40	W/2	:	Outside antenna (Passenger side) (With Intelligent Key system)
D41	GY/6	:	To M83 (With ESP)
D42	W/12	:	To M84 (With ESP)

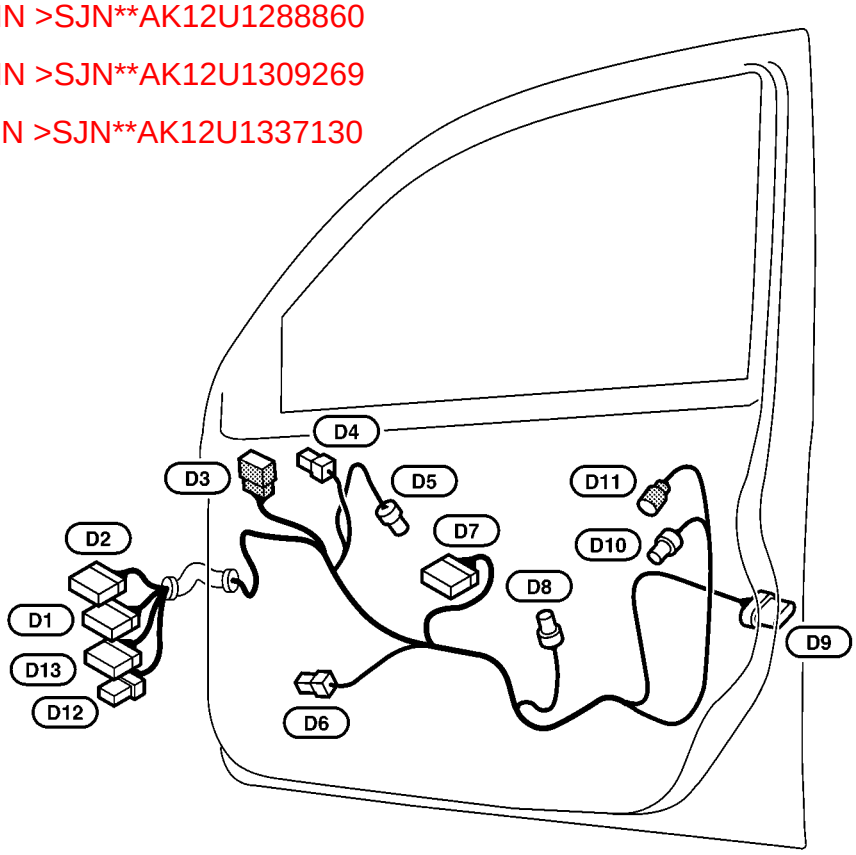
MKWA1867E

FRONT DOOR HARNESS RH SIDE/RHD MODELS

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D1	W/10	:	To M6 (Without ESP)
D2	W/12	:	To M5 (Without ESP)
D3	GY/6	:	Door mirror actuator (Driver side)
D4	BR/2	:	Tweeter RH (With 6 speakers)
D5	GY/2	:	Front power window motor (Driver side)
D6	W/2	:	Front door speaker RH
D7	W/16	:	Power window main switch
D8	BR/2	:	Intelligent Key warning buzzer (With Intelligent Key system)
D9	B/6	:	Door lock actuator (Driver side)
D10	GY/2	:	Door request switch (Driver side) (With Intelligent Key system)
D11	W/2	:	Outside antenna (Driver side) (With Intelligent Key system)
D12	GY/6	:	To M86 (With ESP)
D13	W/12	:	To M87 (With ESP)

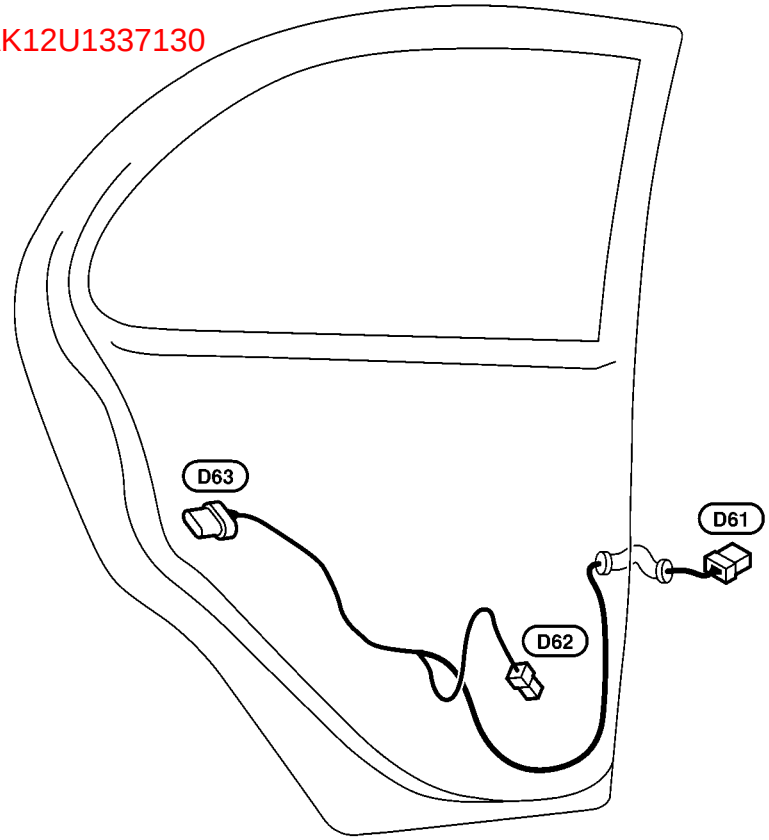
MKWA1868E

REAR DOOR HARNESS LH

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D61	W/6	:	To B20
D62	W/2	:	Rear door speaker LH (With 6 speakers)
D63	B/6	:	Rear door lock actuator LH

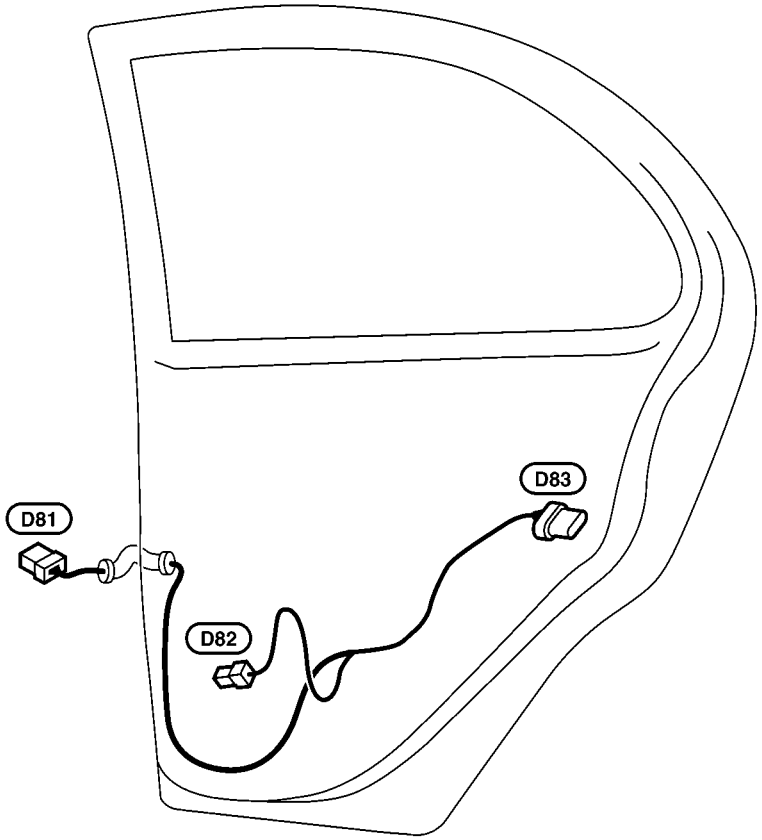
MKWA1488E

REAR DOOR HARNESS RH

SMA for VIN >SJN**AK12U1288860

SMA for VIN >SJN**AK12U1309269

SMA for VIN >SJN**AK12U1337130



D81	W/6	:	To B14
D82	W/2	:	Rear door speaker RH (With 6 speakers)
D83	B/6	:	Rear door lock actuator RH

MKWA1489E

Wiring Diagram Codes (Cell Codes)

EKS0079C

Use the chart below to find out what each wiring diagram code stands for.
Refer to the wiring diagram code in the alphabetical index to find the location (page number) of each wiring diagram.

Code	Section	Wiring Diagram Name
1STSIG	AT	A/T 1ST Gear Function
2NDSIG	AT	A/T 2ND Gear Function
3RDSIG	AT	A/T 3RD Gear Function
4THSIG	AT	A/T 4TH Gear Function
A/C	ATC	Auto Air Conditioner
A/C	MTC	Manual Air Conditioner
A/WIP	WW	Front Wiper and Washer System (With Rain Sensor)
ABS	BRC	Anti-lock Brake System
AP/SEN	EC	Manifold Absolute Pressure Sensor
APPS	EC	Accelerator Pedal Position Sensor
APPS1	EC	Accelerator Pedal Position Sensor 1
APPS2	EC	Accelerator Pedal Position Sensor 2
APPS3	EC	Accelerator Pedal Position Sensor
AUDIO	AV	Audio
BA/FTS	AT	A/T Fluid Temperature Sensor and TCM Power Source
BACK/L	LT	Back-up Lamp
BRK/SW	EC	Brake Switch
BTS	EC	Turbocharger Air Temperature Sensor
CAN	AT	CAN Communication Line
CAN	EC	CAN Communication Line
CAN	LAN	CAN System
CHARGE	SC	Charging System
CHIME	DI	Warning Chime
CIGAR	WW	Power Socket
CKPS	EC	Crankshaft Position Sensor
CMPS	EC	Crankshaft Position Sensor
COMBSW	LT	Combination Switch
COOL/F	EC	Cooling System
CRFPS	EC	Common Rail Fuel Pressure Sensor
D/COMP	DI	Drive Computer
D/LOCK	BL	Power Door Lock
DEF	GW	Rear Window Defogger
DTRL	LT	Headlamp - With Daytime Light System
ECM/PW	EC	ECM Power Supply
ECTS	EC	Engine Coolant Temperature Sensor
EGRC/V	EC	EGR Control System
ENGSS	AT	Engine Speed Signal
EPS	STC	Electric Power Steering System
ESP	BRC	Electronic Stability Program System
ETC1	EC	Electrical Throttle Control Function
ETC2	EC	Electrical Throttle Control Motor Relay

Code	Section	Wiring Diagram Name
ETC3	EC	Electrical Throttle Control Motor
F/FOG	LT	Front Fog Lamp
F/PUMP	EC	Fuel Pump
FRO2	EC	Heated Oxygen Sensor 1
FTS	AT	A/T Fluid Temperature Sensor
FTS	EC	Fuel Temperature Sensor
FUEL	EC	Fuel Injection System Function
GLOW	EC	Glow Control System
H/AIM	LT	Headlamp Aiming Control System
H/LAMP	LT	Headlamp
H/SEAT	SE	Heated Seat
HEATER	MTC	Heater
HLC	WW	Headlamp Washer
HO2S1	EC	Heated Oxygen Sensor 1
HO2S1H	EC	Heated Oxygen Sensor 1 Heater
HO2S2	EC	Heated Oxygen Sensor 2
HO2S2H	EC	Heated Oxygen Sensor 2 Heater
HORN	WW	Horn
I/KEY	BL	Intelligent Key System
IATS	EC	Intake Air Temperature Sensor
IATSEN	EC	Intake Air Temperature Sensor
IGNSYS	EC	Ignition Signal
ILL	LT	Illumination
IMV/D	EC	Fuel Flow Actuator
INJECT	EC	Injector
INT/L	LT	Interior and Luggage Room Lamps
IVC	EC	Intake Valve Timing Control Solenoid Valve
IVC/V	EC	Intake Valve Timing Control Solenoid Valve
KS	EC	Knock Sensor
LPSV	AT	Line Pressure Solenoid Valve
MAIN	AT	Main Power Supply and Ground Circuit
MAIN	EC	Main Power Supply and Ground Circuit
METER	DI	Combination Meters
MIL/DL	EC	Malfunction Indicator, Data Link Connector for CONSULT-II
MIRROR	GW	Door Mirror
MULTI	BL	Multi-remote Control System
NATS	BL	NATS (Nissan Anti-Theft System)
NAVI	AV	Audio and Navigation System
NONDTC	AT	NON-detective Items
OVRCSV	AT	Overrun Clutch Solenoid Valve
PGC/V	EC	EVAP Canister Purge Volume Control Solenoid Valve
PHASE	EC	Camshaft Position Sensor (PHASE)
PNP/SW	AT	Park/Neutral Position (PNP) Switch
PNP/SW	EC	Park/Neutral Position (PNP) Switch

Code	Section	Wiring Diagram Name
PNPSW	EC	Park/Neutral Position (PNP) Switch
POS	EC	Crankshaft Position Sensor (POS)
POWER	PG	Power Supply Routing Circuit
PRGVLV	EC	EVAP Canister Purge Volume Control Solenoid Valve
PRWIRE	BL	After Market Alarm - Prewire
PTC/H	MTC	PTC Heater
R/FOG	LT	Rear Fog Lamp
RP/SEN	EC	Refrigerant Pressure Sensor
RRO2	EC	Heated Oxygen Sensor 2
S/LOCK	BL	Power Door Lock-Super Lock
SEN/PW	EC	Electric Throttle Control Actuator (Throttle Position Sensor)
SHIFT	AT	A/T Shift Lock System
SROOF	RF	Sunroof
SRS	SRS	Supplemental Restraint System
SSV/A	AT	Shift Solenoid Valve A
SSV/B	AT	Shift Solenoid Valve B
START	SC	Starting System
STOP/L	LT	Stop Lamp
TAIL/L	LT	Parking, License Plate and Tail Lamps
TCBST	EC	TC Boost Pressure Sensor
TCV	AT	Torque Converter Clutch Solenoid Valve
TPS	AT	Throttle Position Sensor
TPS1	EC	Electric Throttle Control Actuator (Throttle Position Sensor 1)
TPS2	EC	Electric Throttle Control Actuator (Throttle Position Sensor 2)
TPS3	EC	Electric Throttle Control Actuator (Throttle Position Sensor 3)
TURN	LT	Turn Signal and Hazard Warning Lamps
VSSAT	AT	Vehicle Speed Sensor A/T (Revolution Senor)
VSSMTR	AT	Vehicle Speed Sensor MTR
WARN	DI	Warning Lamps
WINDOW	GW	Power Window System
WIP/R	WW	Rear Wiper and Washer System
WIPER	WW	Front Wiper and Washer System

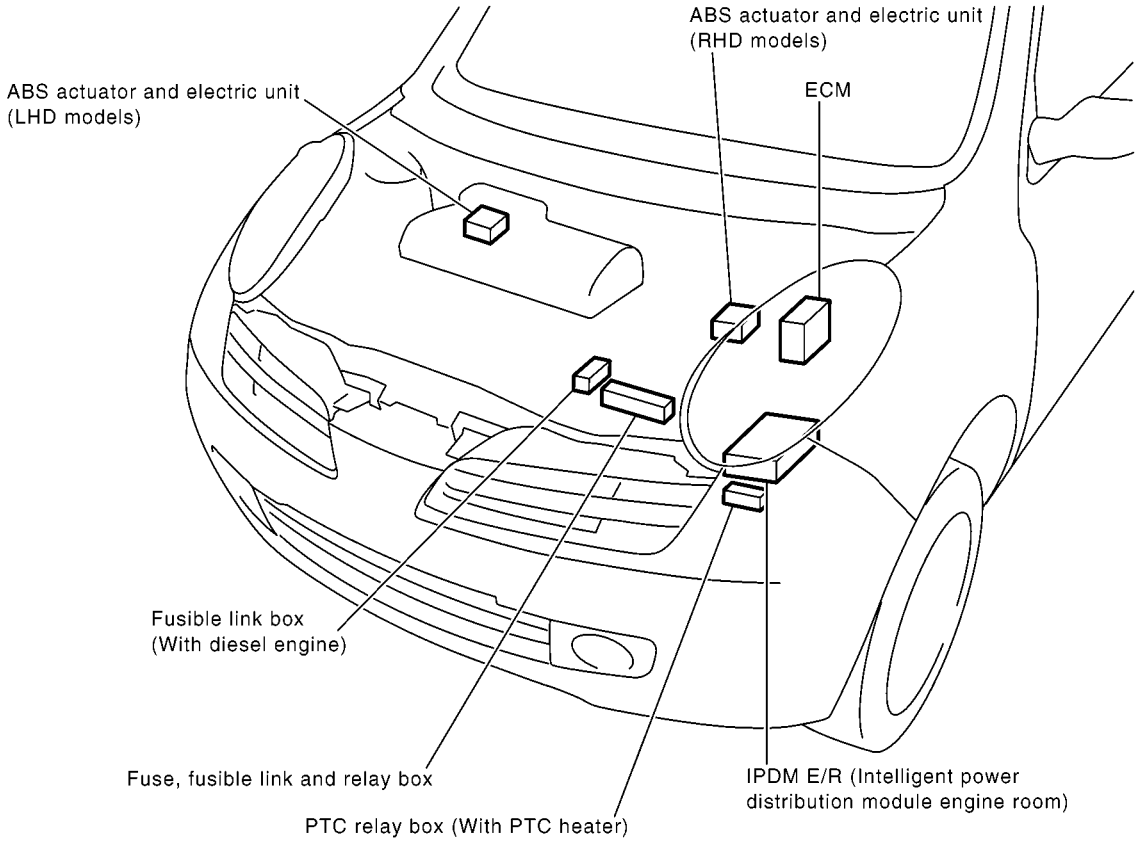
ELECTRICAL UNITS LOCATION

PFP:25230

Electrical Units Location

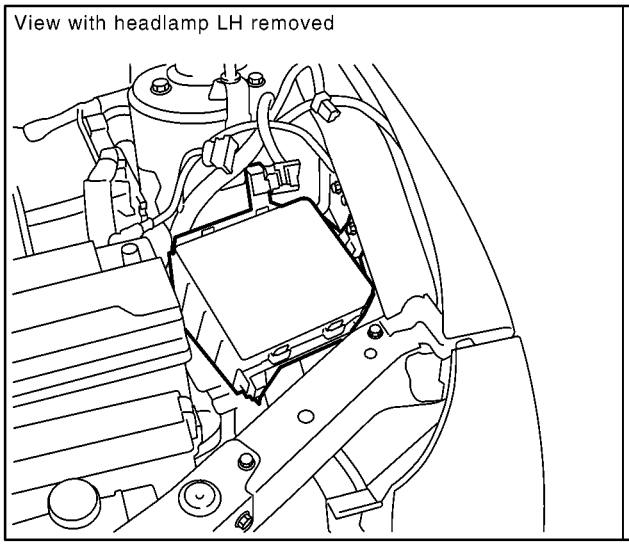
EKS0079D

ENGINE COMPARTMENT

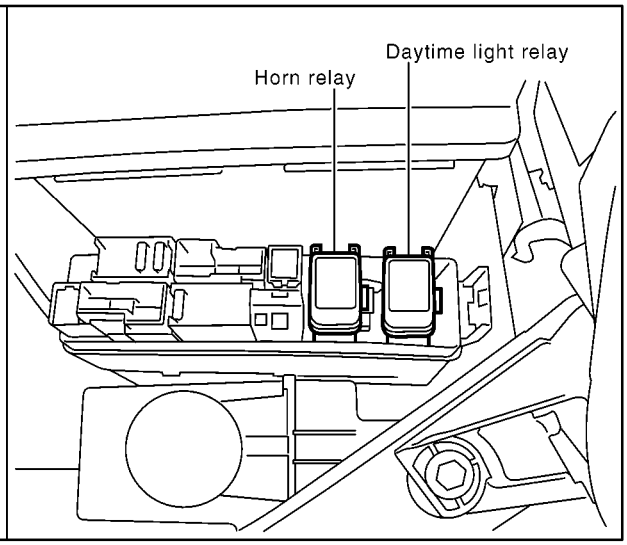


IPDM E/R (Intelligent power distribution module engine room)

View with headlamp LH removed

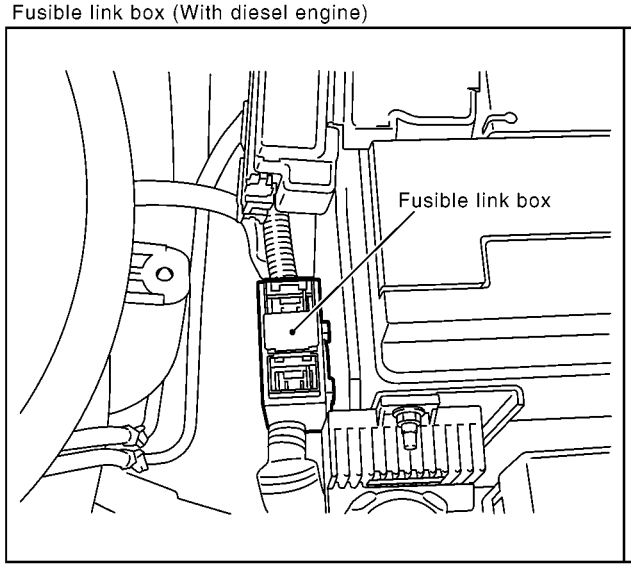


Fuse, fusible link and relay box

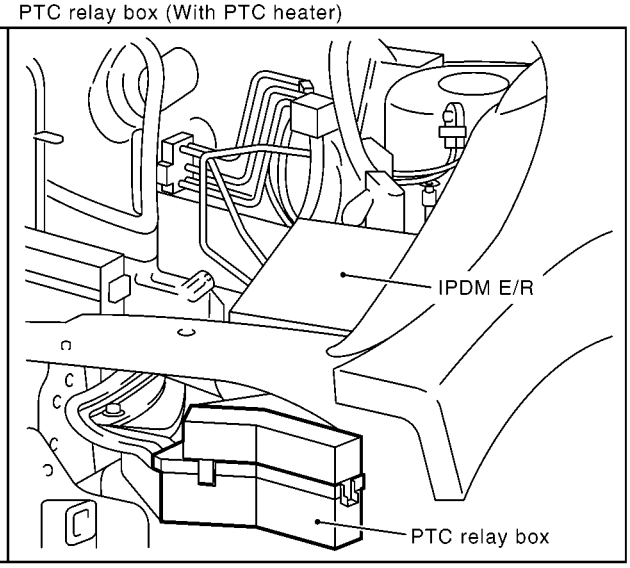


MKWA1869E

Fusible link box (With diesel engine)

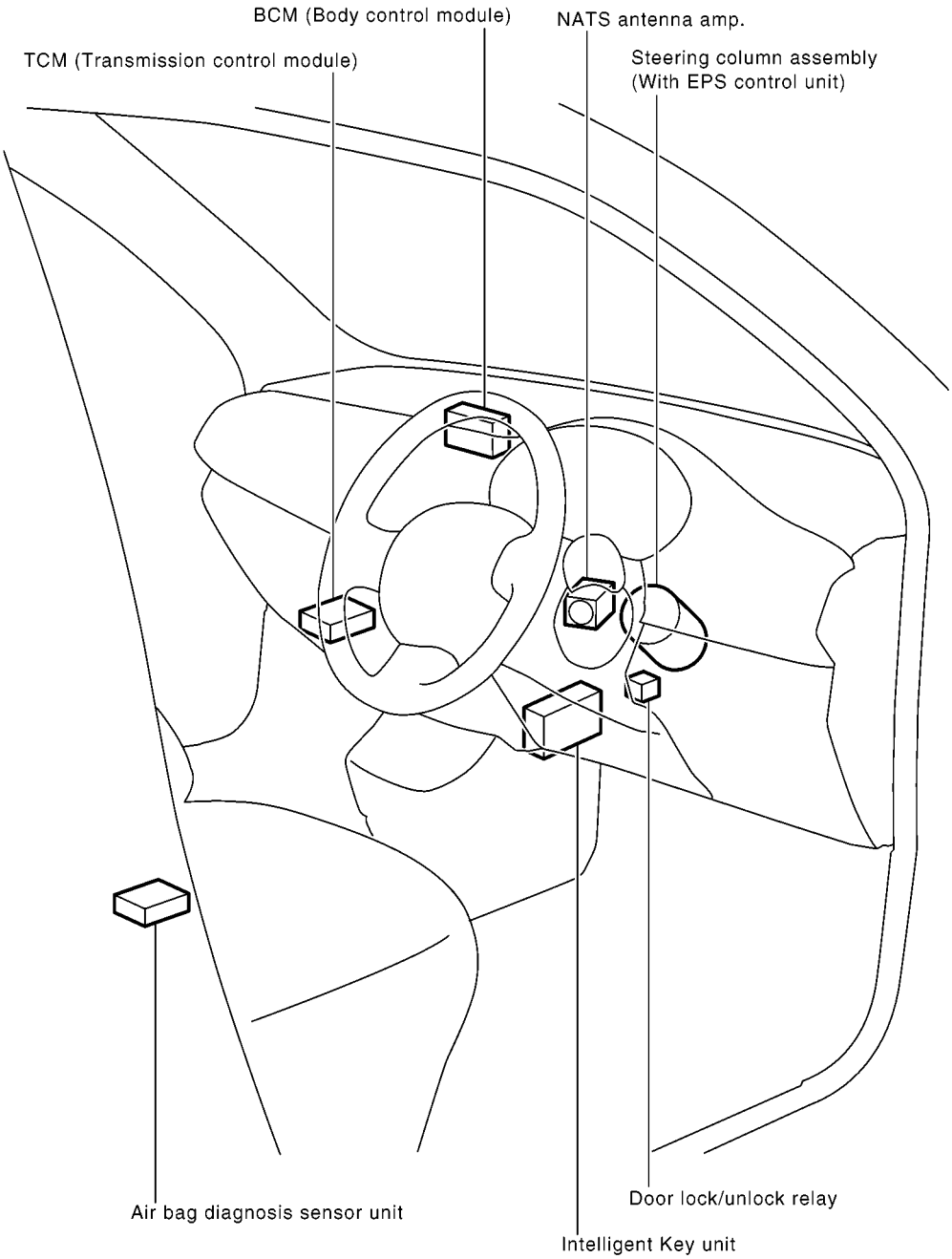


PTC relay box (With PTC heater)



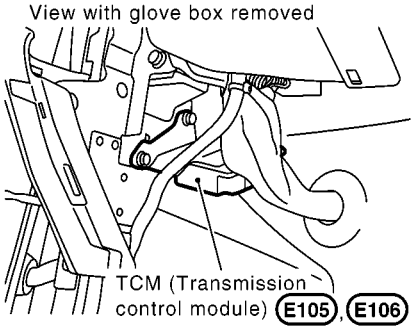
MKWA1870E

PASSENGER COMPARTMENT



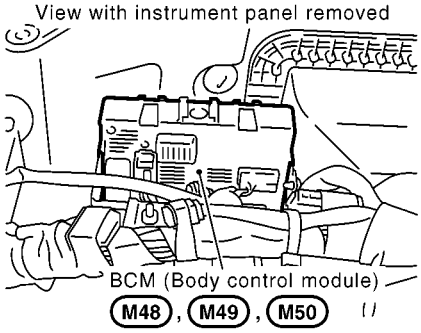
MKWA1871E

View with glove box removed



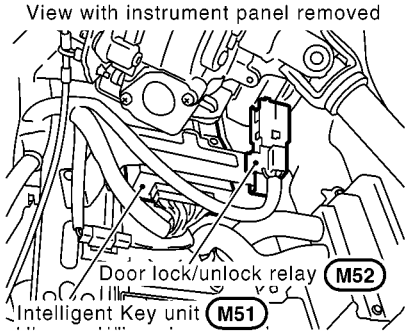
TCM (Transmission control module) E105, E106

View with instrument panel removed



BCM (Body control module) M48, M49, M50

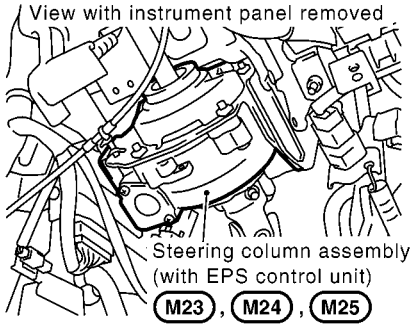
View with instrument panel removed



Door lock/unlock relay M52

Intelligent Key unit M51

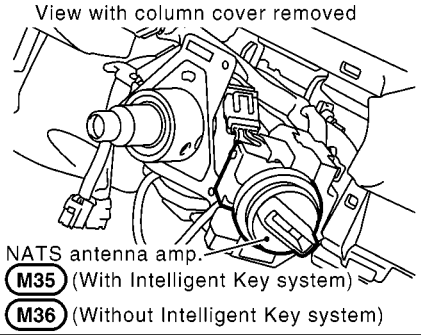
View with instrument panel removed



Steering column assembly (with EPS control unit)

M23, M24, M25

View with column cover removed

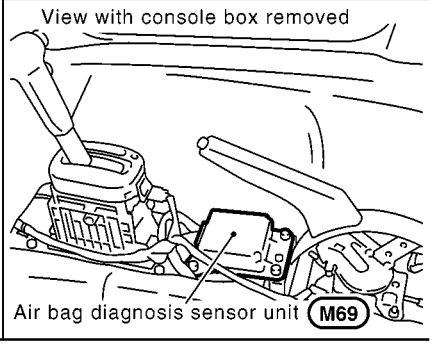


NATS antenna amp.

M35 (With Intelligent Key system)

M36 (Without Intelligent Key system)

View with console box removed



Air bag diagnosis sensor unit M69

MKWA1872E

HARNESS CONNECTOR

PFP:00011

Description

EKS0079E

HARNESS CONNECTOR (TAB-LOCKING TYPE)

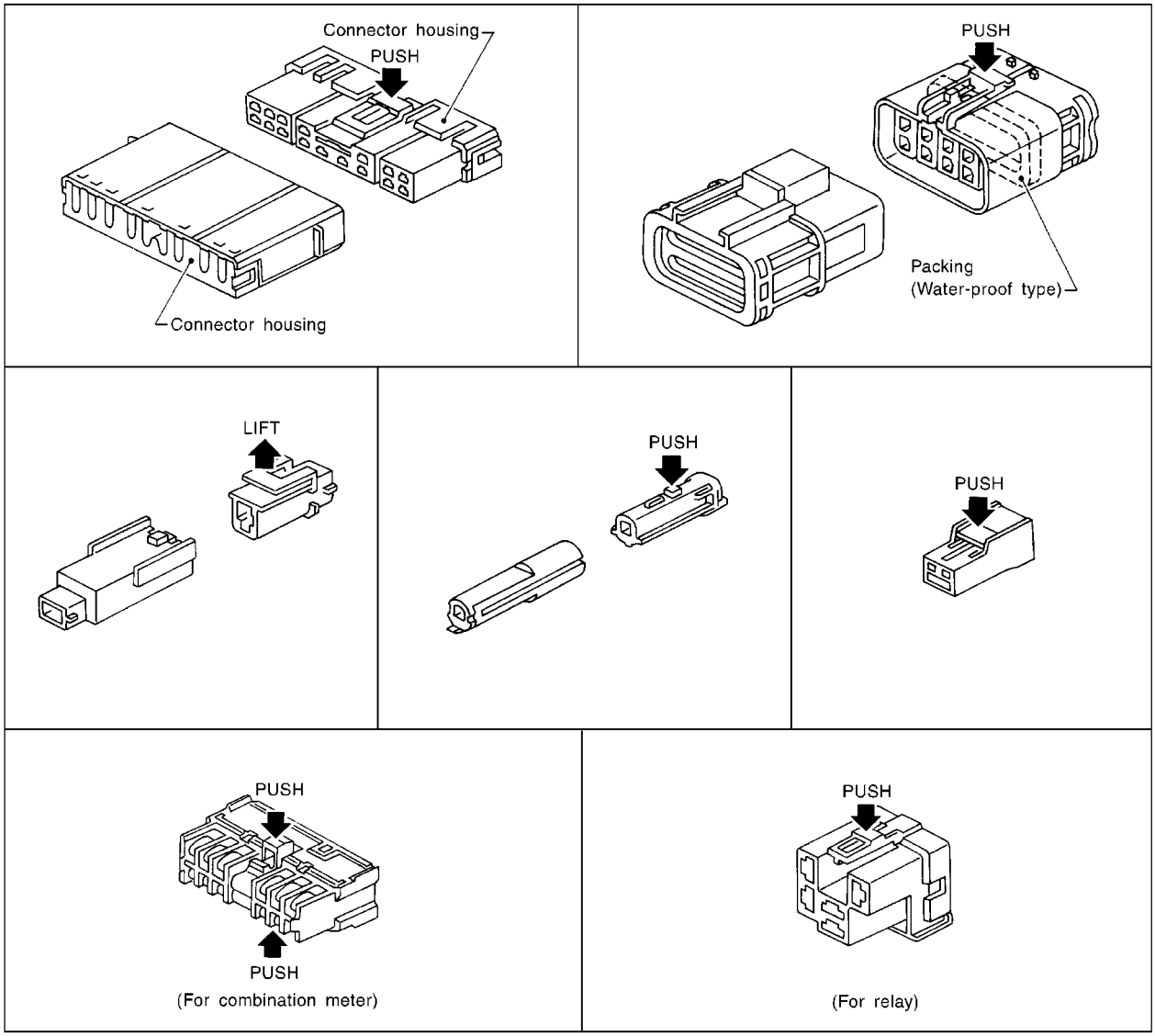
- The tab-locking type connectors help prevent accidental looseness or disconnection.
- The tab-locking type connectors are disconnected by pushing or lifting the locking tab(s). Refer to the illustration below.

Refer to the next page for description of the slide-locking type connector.

CAUTION:

Do not pull the harness or wires when disconnecting the connector.

[Example]



SEL769DA

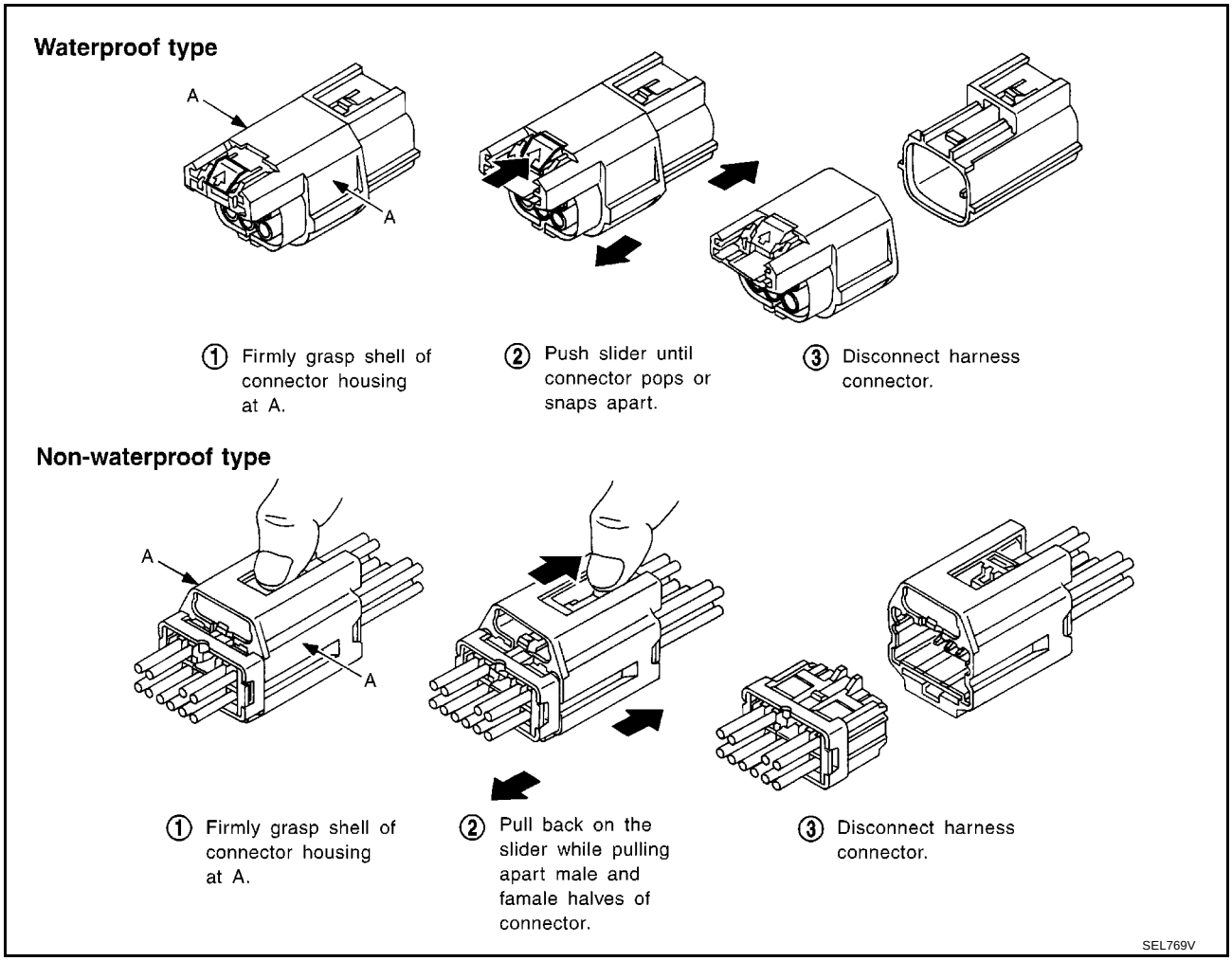
HARNESS CONNECTOR (SLIDE-LOCKING TYPE)

- A new style slide-locking type connector is used on certain systems and components, especially those related to OBD.
- The slide-locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide-locking type connectors are disconnected by pushing or pulling the slider. Refer to the illustration below.

CAUTION:

- **Do not pull the harness or wires when disconnecting the connector.**
- **Be careful not to damage the connector support bracket when disconnecting the connector.**

[Example]

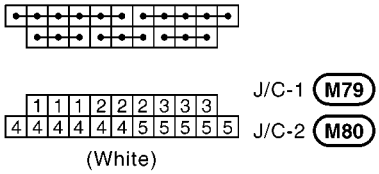


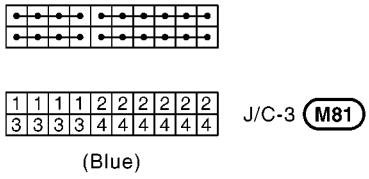
JOINT CONNECTOR (J/C)

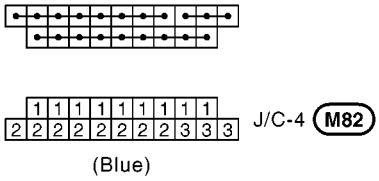
PFP:B4341

Terminal Arrangement

EKS00EOL







MKWA1519E

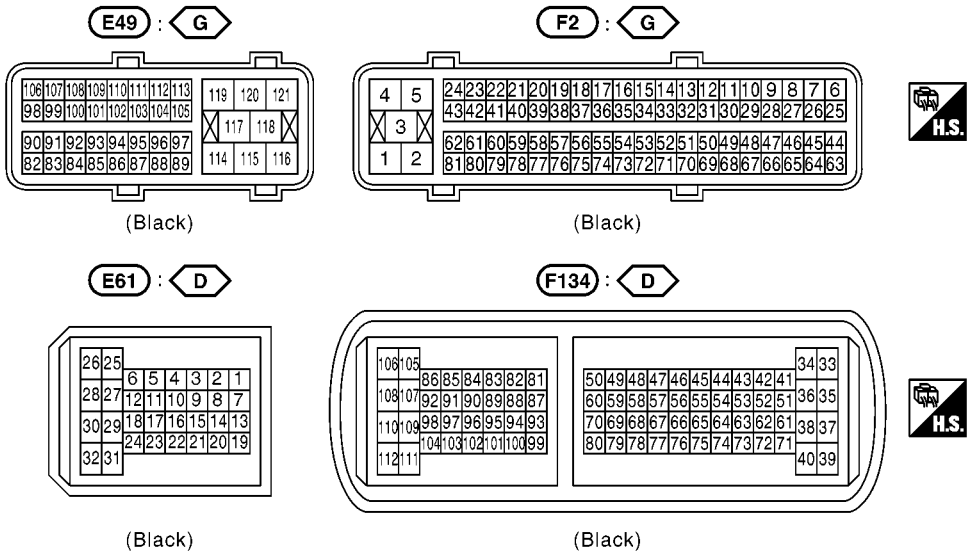
ELECTRICAL UNITS

PFP:00011

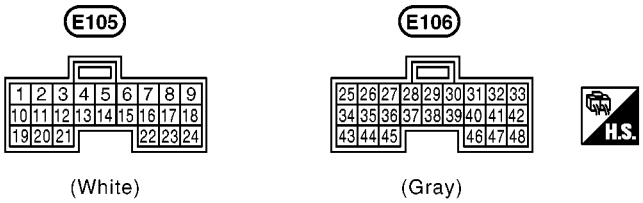
Terminal Arrangement

EKS0079F

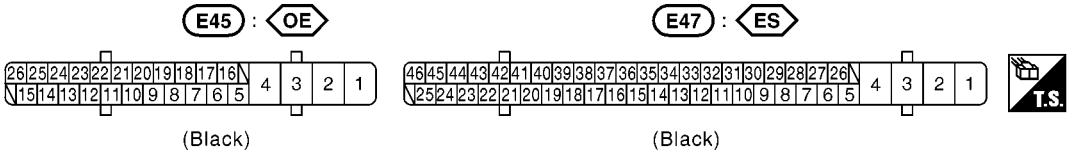
ECM



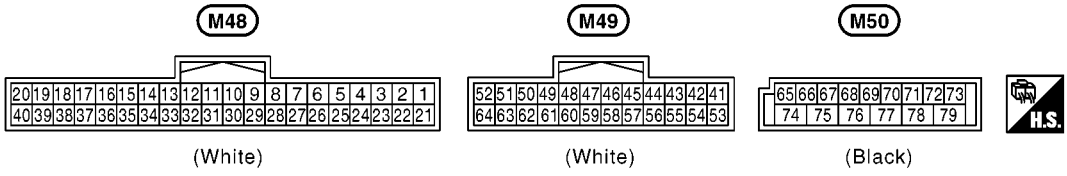
TCM (TRANSMISSION CONTROL MODULE)



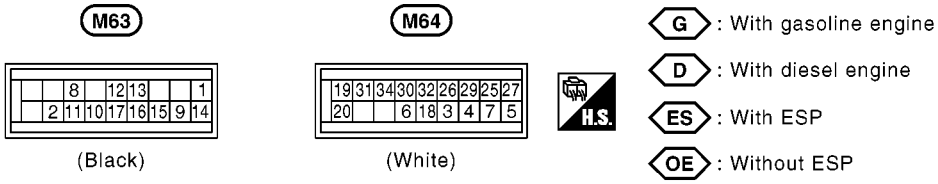
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)



BCM (BODY CONTROL MODULE)



A/C AUTO AMP.



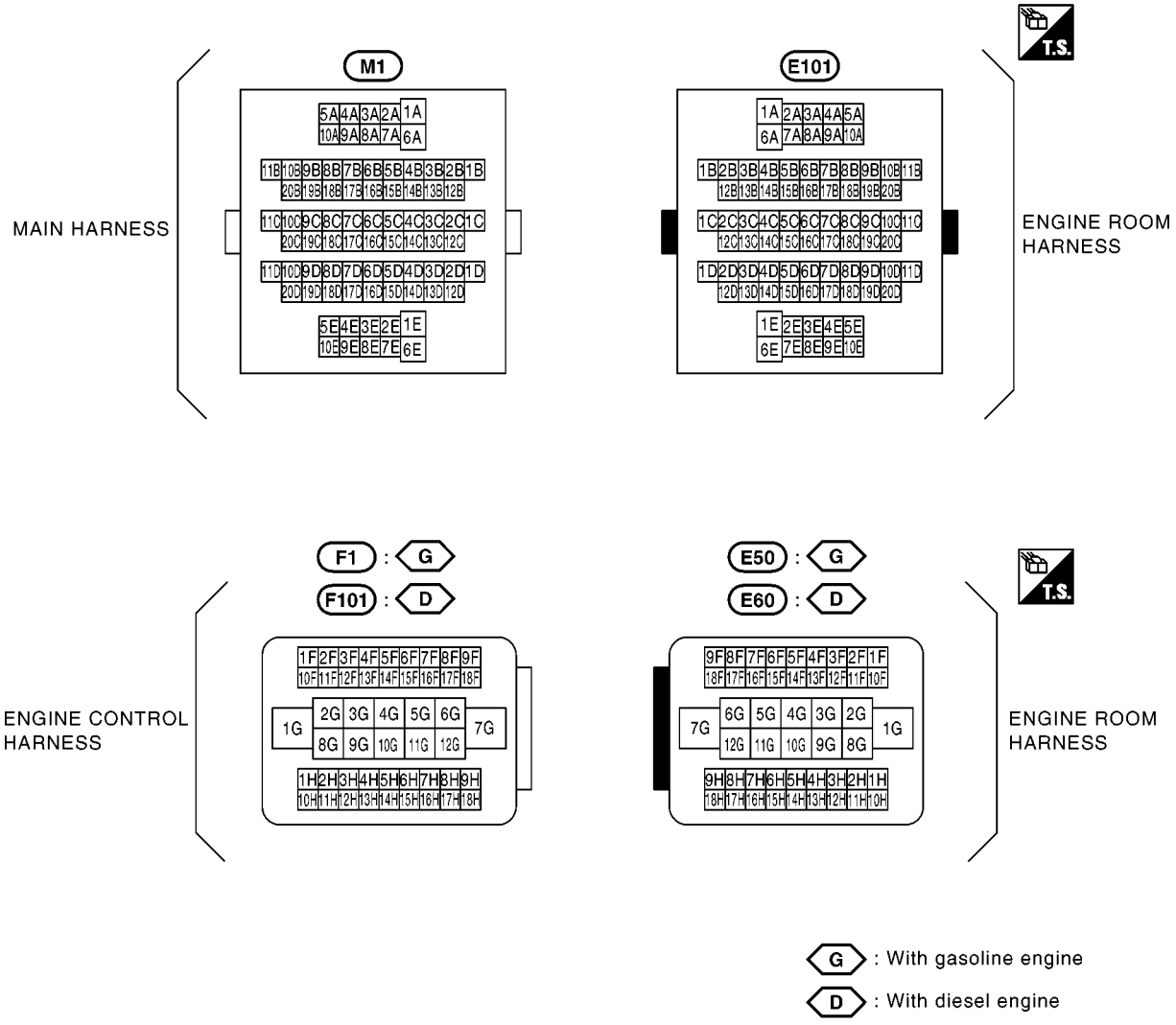
MKWA1873E

SMJ (SUPER MULTIPLE JUNCTION)

PFP:B4341

Terminal Arrangement

EKS007XZ



MKWA1515E

STANDARDIZED RELAY

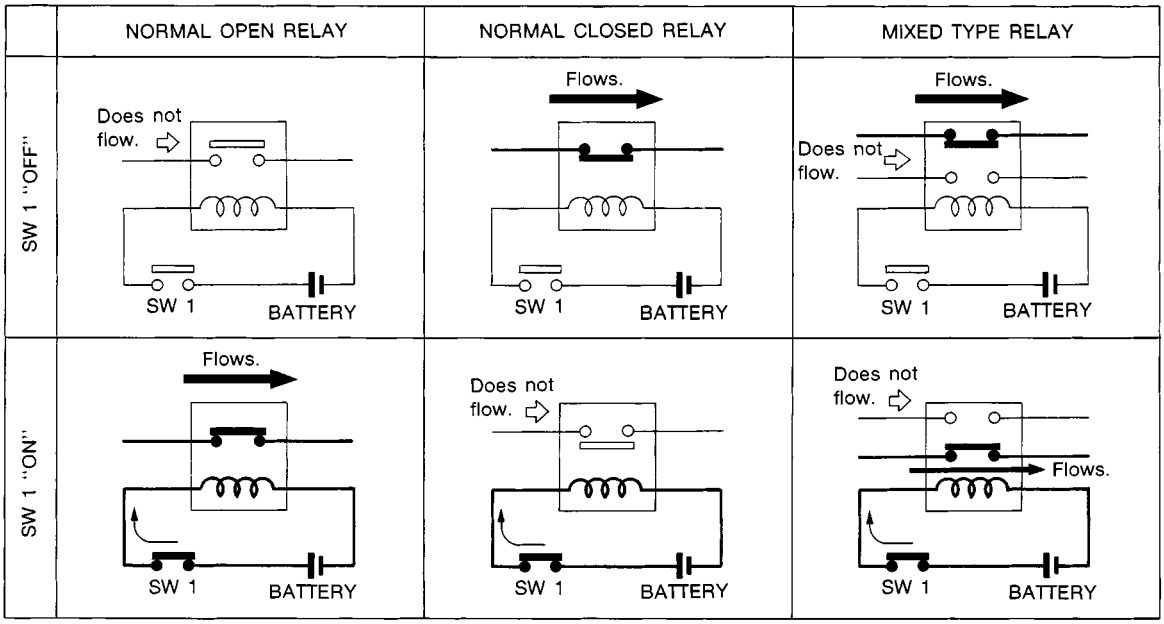
PFP:00011

Description

EKS0079G

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

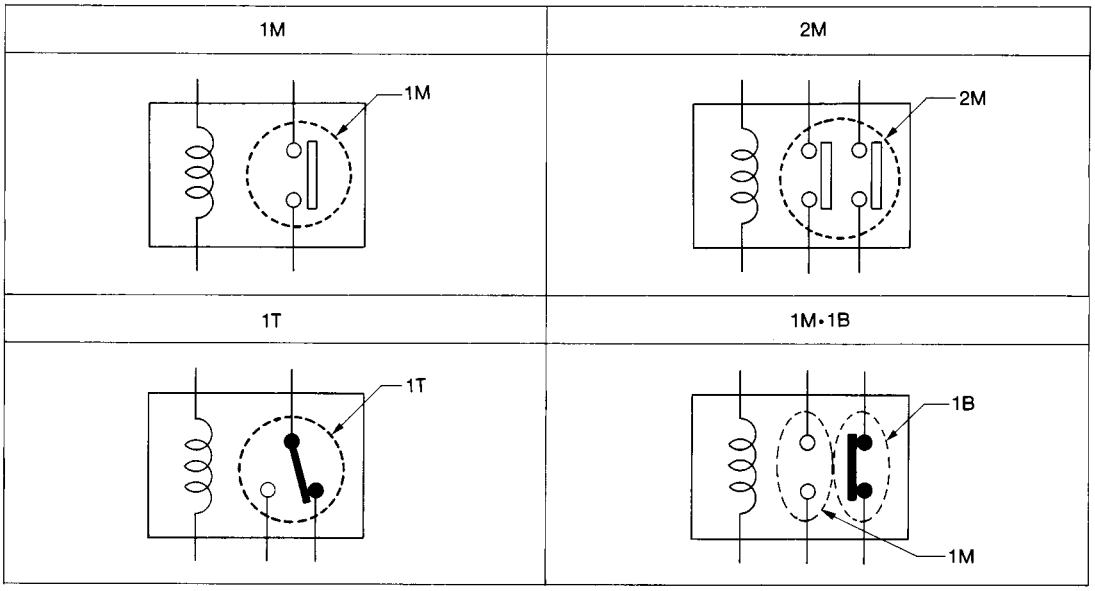
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



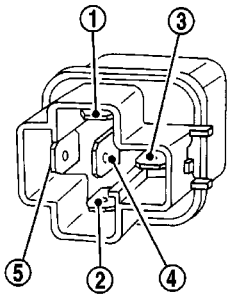
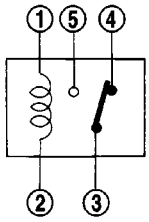
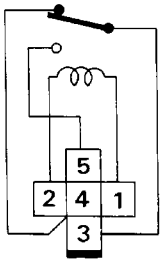
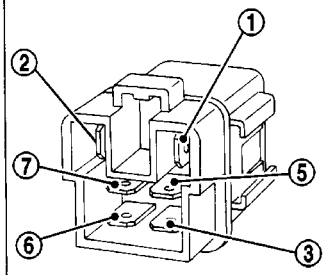
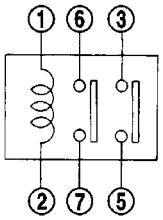
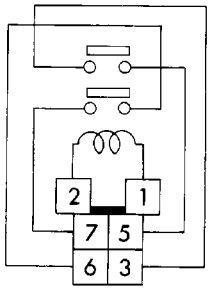
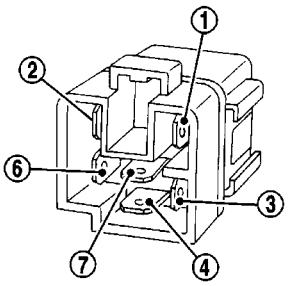
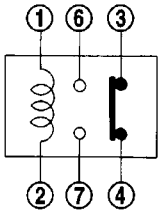
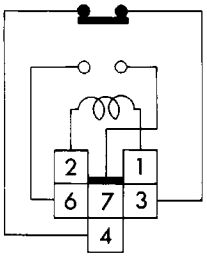
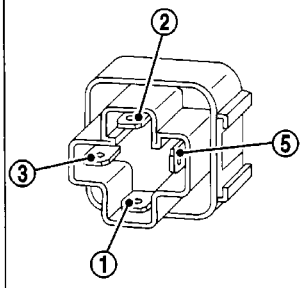
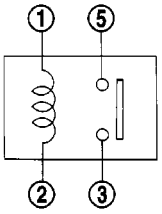
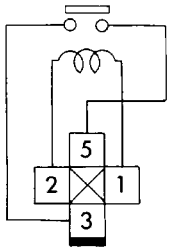
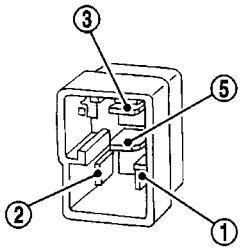
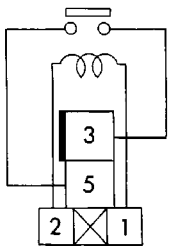
SEL881H

TYPE OF STANDARDIZED RELAYS

1M ..... 1 Make
2M ..... 2 Make
1T ..... 1 Transfer
1M·1B ..... 1 Make 1 Break



SEL882H

Type	Outer view	Circuit	Connector symbol and connection	Case color
1T				BLACK
2M				BROWN
1M•1B				GRAY
1M				BLUE
				

The arrangement of terminal numbers on the actual relays may differ from those shown above.

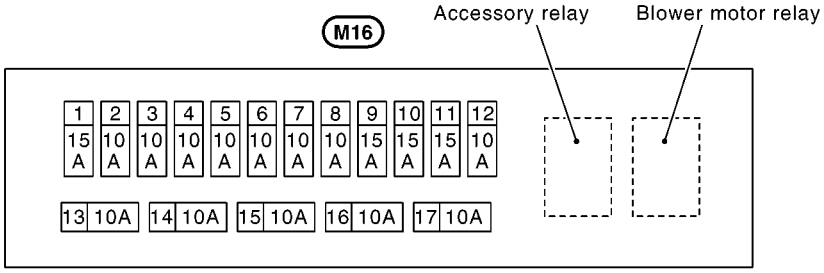
SEL188W

FUSE BLOCK - JUNCTION BOX (J/B)

PFP:24350

Terminal Arrangement

EKS0079H



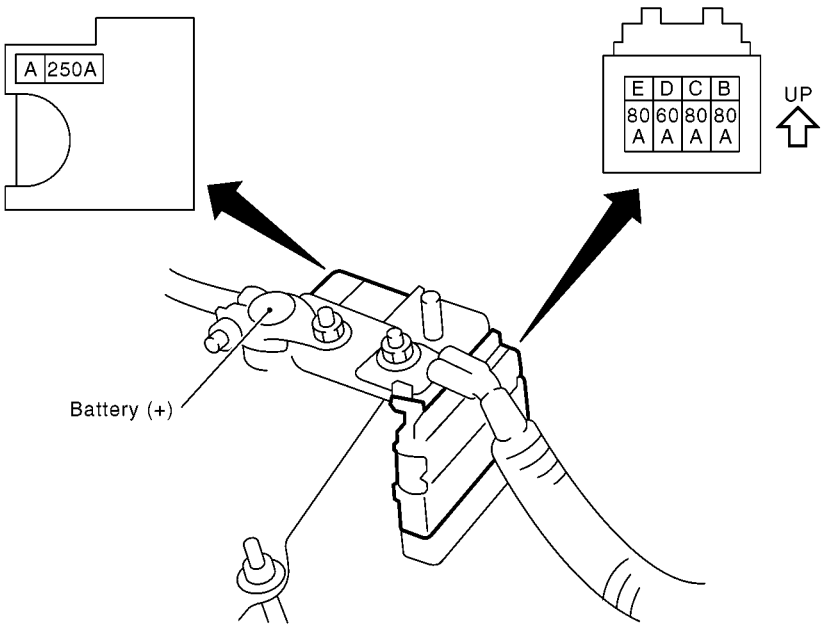
MKWA1516E

FUSE AND FUSIBLE LINK BOX

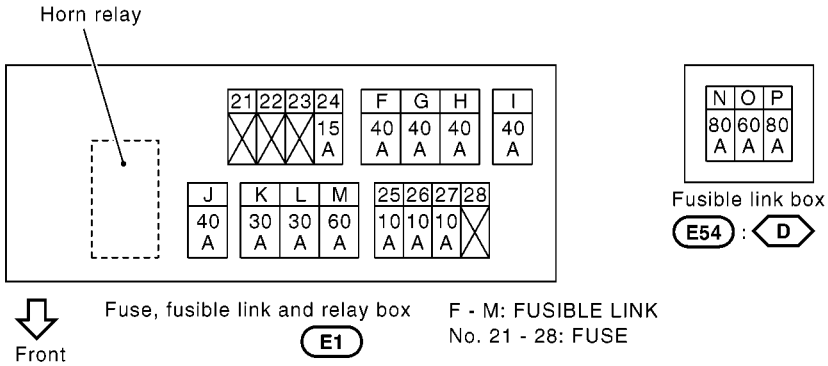
PFP:24381

Terminal Arrangement

EKS0079I



Fusible link holder E18, E19, F3 : G, F4 : G, F104 : D, E55 : D



G : With gasoline engine

D : With diesel engine

MKWA1874E

SECTION PS
POWER STEERING SYSTEM

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Caution: 2
PREPARATION 3
Special Service Tools 3
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 4
NVH Trouble Shooting Chart 4
STEERING WHEEL 5
On Board Inspection and Service 5
PLAY INSPECTION 5
NEUTRAL POSITION INSPECTION 5
STEERING TORQUE INSPECTION 5
STEERING ANGLE INSPECTION 5
Removal and Installation 6
STEERING COLUMN 7
Removal and Installation 7
REMOVAL OF STEERING COLUMN ASSEMBLY 7
INSPECTION AFTER REMOVAL OF STEERING COLUMN ASSEMBLY 8
INSTALLATION OF STEERING COLUMN ASSEMBLY 8
CHECK AFTER STEERING COLUMN ASSEMBLY INSTALLATION 8
POWER STEERING GEAR AND LINKAGE 9
Removal and Installation 9
REMOVAL 9
INSTALLATION 9
Disassembly and Assembly 10
COMPONENT PARTS LOCATION (R24T TYPE) 10
DISASSEMBLY 10
INSPECTION AFTER DISASSEMBLY 10
ASSEMBLY 11
SERVICE DATA AND SPECIFICATIONS (SDS) 13
Wheel 13
Steering Angle 13
Steering Column 13
Steering Linkage 13
Tightening Torque 14

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EGS001B3

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Caution:

EGS000J1

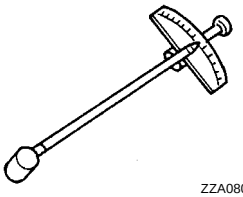
- Always follow the warnings and the cautions below in disassembly procedures:
  - Work in a clean, dust-free place. No dustproof device is necessary.
  - Clean the outside of the unit before disassembly.
  - Clean the parts to be disassembled. Care must be taken not to allow any dirt or other foreign materials to enter or come in contact with the parts.
  - Assemble the disassembled parts properly, following the order shown in the manual. If work has been suspended in the middle of assembly, place a clean cover over the parts to prevent them from being contaminated.
  - Use paper towels when removing dirt and other foreign materials. Cloth shop towels can leave lint on the cleaned parts that might affect the operation of the parts.
  - Clean disassembled parts with kerosene (except rubber parts), and then dry them thoroughly with an air blower or paper towels.

PREPARATION

PFP:00002

Special Service Tools

EGS000J2

Description		Application
Preload gauge ST3127S000	 ZZA0806D	● Checking steering torque ● Pinion gear rotating torque measurement for steering gear

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Trouble Shooting Chart

EGS000J3

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			PS-9	PS-9	PS-9	PS-5	–	PS-7	–	PS-7	PS-7	PS-9	NVH in FAX, RAX, FSU, RSU section	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in BR section
Possible cause and SUSPECTED PARTS			Tie-rod ball joint tensile force	Tie-rod ball joint sliding torque	Tie-rod ball joint end play	Steering wheel play	Improper steering wheel	Improper installation or looseness or tilt lock lever	Mounting rubber deterioration	Steering column deformation or damage	Improper installation or looseness of steering column	Steering linkage looseness	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES
Symptom	STEERING	Noise	×	×	×	×							×	×	×	×	×
		Shake					×	×	×				×	×	×	×	×
		Vibration					×	×	×	×	×		×	×		×	
		Shimmy					×	×	×			×	×	×	×		×
		Judder							×			×	×	×	×		×

×: Applicable

STEERING WHEEL

PFP:48430

On Board Inspection and Service

EGS000J4

PLAY INSPECTION

1. Turn steering wheel to the straight-ahead position. Start engine and lightly turn steering wheel clockwise and counterclockwise until the front wheels start moving. Measure the travel to the starting point on the circumference of steering wheel. If play is outside the specified range, check steering gear assembly, front suspension, axles, and steering column for proper installation.

   Steering wheel play inspection standard : 0 - 35 mm (0 - 1.38 in)

2. Check steering wheel for vertical, horizontal, or axial play.

   Steering wheel axial end play : 0 mm (0 in)

- Lift vehicle and check steering gear nuts and bolts for looseness.

  Tightening torque : 85 - 103 N·m (8.7 - 10.5 kg-m, 63 - 75 ft-lb)

NEUTRAL POSITION INSPECTION

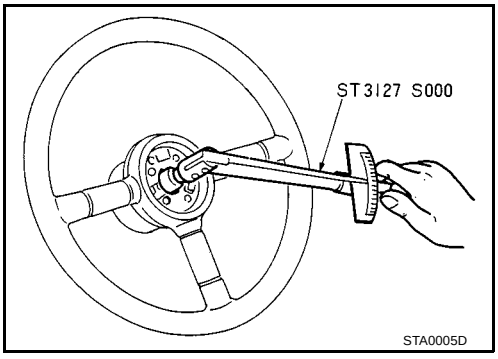
- After wheel alignment inspection, perform neutral position inspection. Refer to FSU-6, "Wheel Alignment" .
- Set vehicle to the straight-ahead position and confirm steering wheel is in the neutral position.
- If it is not in the neutral position, loosen lock nut on tie-rod. Then adjust until the amount of left and right becomes equal.

STEERING TORQUE INSPECTION

1. Stop vehicle on a dry flat paved road and apply parking brake.
2. Remove air bag module. Refer to SRS-36, "DRIVER AIR BAG MODULE" .
3. Start engine and use a preload gauge (SST) to check steering wheel torque.

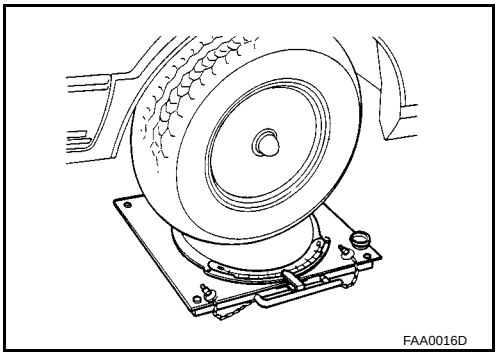
   Steering torque : 1.8 - 5.6 N·m (0.18 - 0.57 kg-m, 16 - 49 in-lb) or less

4. When torque is outside the standard, check steering column and steering gear. If any non-standard condition is detected, replace if necessary.



STEERING ANGLE INSPECTION

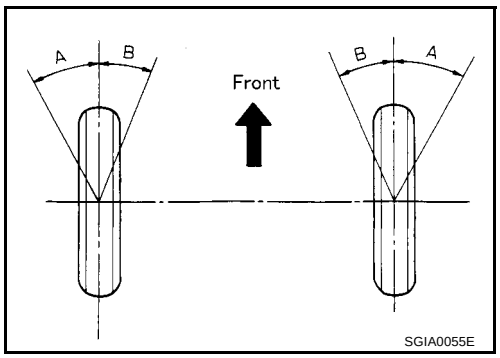
- After toe-in inspection, check the steering angle. Place the front wheels on turning radius gauges and the rear wheels on stands so that the vehicle can be level. Check the maximum inner and outer wheel steering angles for LH and RH road wheels.



- With the engine at idle, turn steering wheel from stop to stop and measure the steering angles.

  Inner wheel : 44° +1° -3°

  Outer wheel : 36° +1° -3°



- Steering angles are not adjustable. If any of the steering angles is different from the specified value, check steering gear, column and front suspension components for wear or damage. If any non-standard condition exists, replace if necessary.

Removal and Installation

EGS000J5

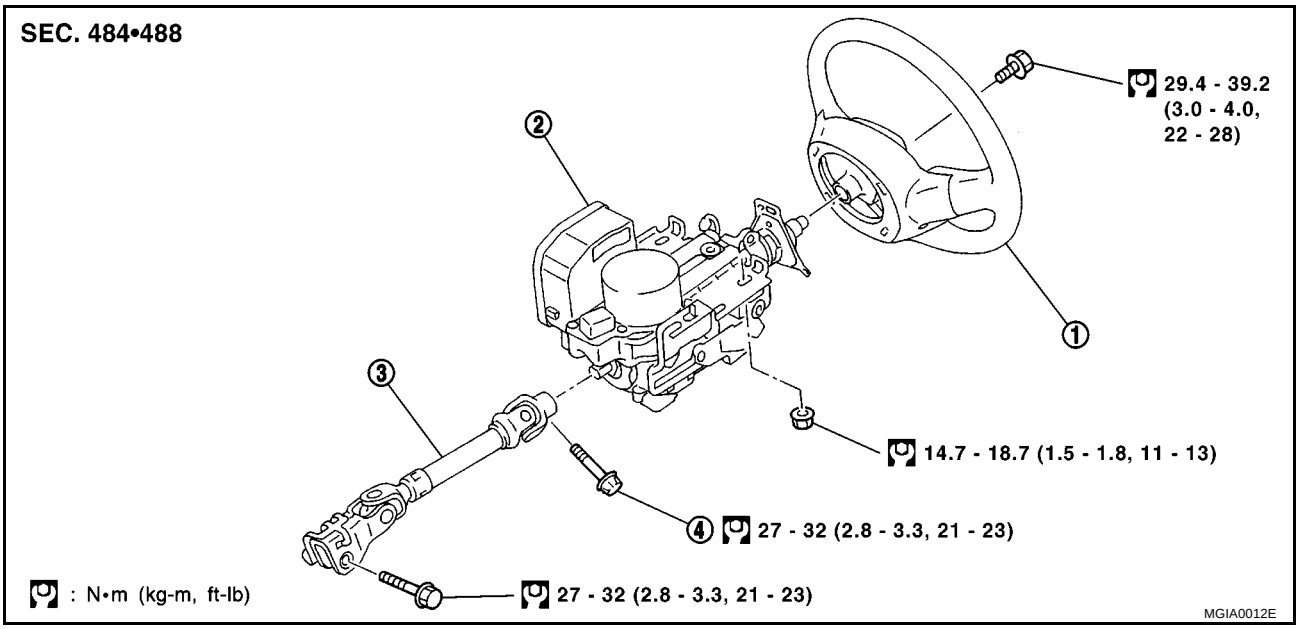
Refer to SRS-36, "DRIVER AIR BAG MODULE" and SRS-38, "SPIRAL CABLE" .

STEERING COLUMN

PFP:48810

Removal and Installation

EGS000J6



1. Steering wheel
2. Steering column assembly (with EPS control unit, motor, reduction gear, sensor)
3. Intermediate shaft
4. Torx bolt (E10)

CAUTION:

- **Care must be taken not to give axial impact to the steering column assembly during removal and installation.**
- **When steering wheel is turned repeatedly with the vehicle stopped, care must be taken because motor and control unit may get too hot.**
- **Steering column assembly is heavy (approximately 10 kg). Care must be taken when removing column from vehicle.**
- **Steering column assembly cannot be disassembled. If any non-standard condition exists, replace column assembly as a unit.**

REMOVAL OF STEERING COLUMN ASSEMBLY

1. Remove driver air bag module. Refer to SRS-36, "DRIVER AIR BAG MODULE" .
2. Remove steering wheel and spiral cable. Refer to SRS-38, "SPIRAL CABLE" .
3. Remove column cover and instrument panel & pad. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
4. Remove front wiper and washer switch and light and turn signal lamp switch. Refer to SRS-38, "Removal and Installation" in “Light and Turn Signal Switch”, and SRS-38, "Removal and Installation" .
5. Disconnect all the clamps and harness connectors from steering column assembly.
6. Remove intermediate shaft mounting bolt on steering gear, and disconnect the shaft from steering gear.
7. Remove nut on steering column assembly, and make sure steering column moves freely.
8. Remove harness connector of electric power steering.
9. Remove steering column assembly from vehicle.
10. Remove intermediate shaft mounting bolt (torx bolt E10), and disconnect the shaft from steering column.

CAUTION:

Be sure not to rotate column shaft by 360° or more. (Doing this causes error in steering angle value memorized in electric power steering.)

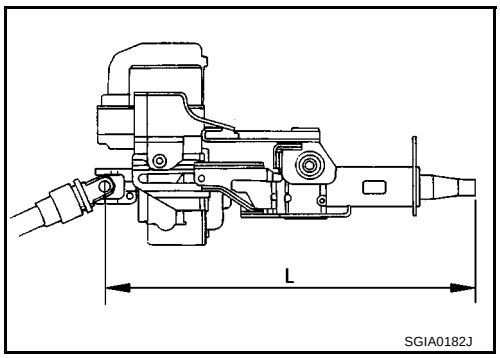
INSPECTION AFTER REMOVAL OF STEERING COLUMN ASSEMBLY

- Check each part of column assembly and intermediate shaft for damage or other malfunctions. If any non-standard condition exists, replace if necessary.
- If vehicle has been involved in a minor collision, measure length L as shown. If outside the standard, replace steering column assembly.

  Length L : 429±2 mm (16.9±0.1 in)

- Using preload gauge, measure steering column rotating torque. If outside the standard, replace steering column assembly.

  Rotating torque : 0 - 2.1 N·m (0 - 0.21 kg-m, 0 - 18 in-lb)

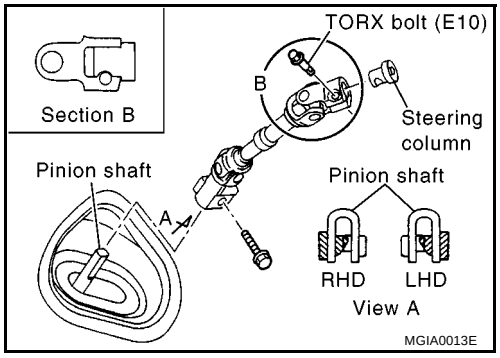


INSTALLATION OF STEERING COLUMN ASSEMBLY

Note the following, and install in the reverse order of removal. Tighten bolts and nuts to the specified torque.

- Connect intermediate shaft to steering column, and tighten torx bolt (E10) to the specified torque. Connect pinion shaft to yoke of intermediate shaft, and tighten bolt to the specified torque.

  CAUTION:
  - **When tightening bolts, tighten them by hand first, and make sure there is no feeling of sticking or galling before final tightening.**
  - **Insert bolts in the proper direction. (Do not insert them from the other side.)**
  - **When connecting intermediate shaft and steering column, make sure the bolt is securely fit into the groove of steering column before final tightening.**
  - **Tighten bolts at connecting pinion shaft and intermediate shaft side. Make sure there is no space between pinion shaft and yoke, and between pinion shaft and cam nut.**



CHECK AFTER STEERING COLUMN ASSEMBLY INSTALLATION

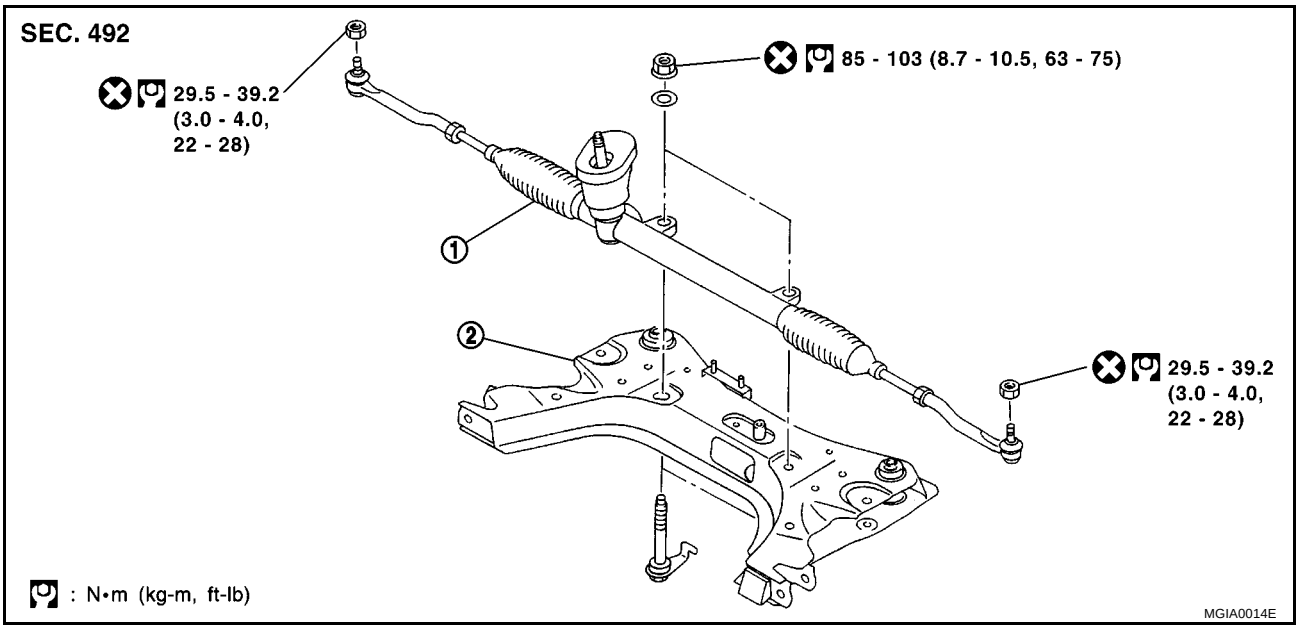
- Using CONSULT-II, check steering angle. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .
- Rotating steering wheel, check for decentered condition, binding, noise or excessive steering effort.

POWER STEERING GEAR AND LINKAGE

PFP:49001

Removal and Installation

EGS000J7

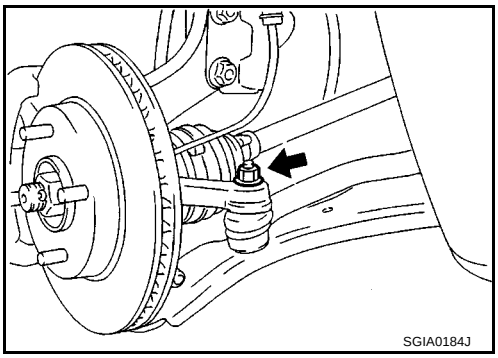


1. Steering gear assembly
2. Suspension member

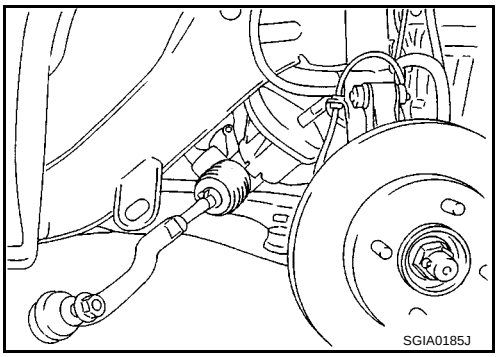
REMOVAL

1. Lift vehicle and remove tires.
2. Activate key lock of steering column.
3. Remove intermediate shaft mounting bolt on steering gear, and disconnect the shaft.
4. Remove tie-rod from steering knuckle. If tie-rod could not be removed easily, use ball joint remover (commercial service tool).

   CAUTION:
   To avoid damage to threads and sudden disconnection of ball joint remover (commercial service tool), temporarily tighten lock nut.
5. Remove the exhaust front tube (CR engine models). Refer to EX-3, "EXHAUST SYSTEM" .



6. Remove steering gear mounting nuts and bolts, and remove the steering gear through the right side of vehicle.
   (Remove from left side for LHD models and right side for RHD models.)



INSTALLATION

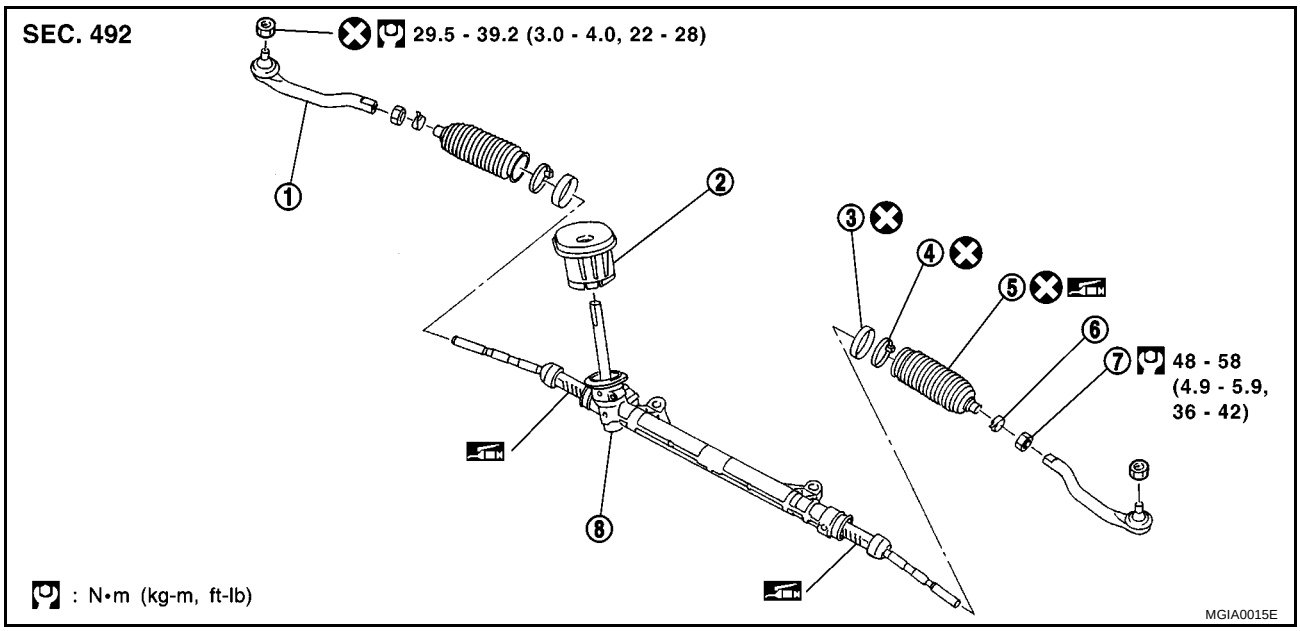
Note the following, and install in the reverse order of removal. Tighten bolts and nuts to the specified torque.

- Refer to PS-7, "Removal and Installation" .

Disassembly and Assembly

EGS000J8

COMPONENT PARTS LOCATION (R24T TYPE)



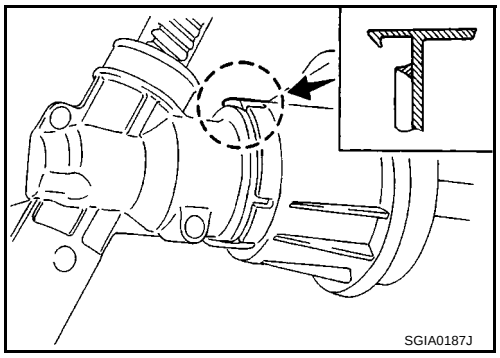
1. Outer socket
2. Bulkhead sealing
3. Seal ring
4. Strap
5. Dust boot
6. Spring clip
7. Lock nut
8. Steering gear assembly

DISASSEMBLY

1. Disengage the tab of bulkhead seal, and remove it from steering gear.
2. Loosen lock nut of tie-rod outer socket, and remove it from steering gear.
3. Remove spring clip and strap (cutting off), and remove dust boot and seal ring.

CAUTION:

When removing dust boot, be careful not to damage inner socket and gear housing assembly.



INSPECTION AFTER DISASSEMBLY

Rack

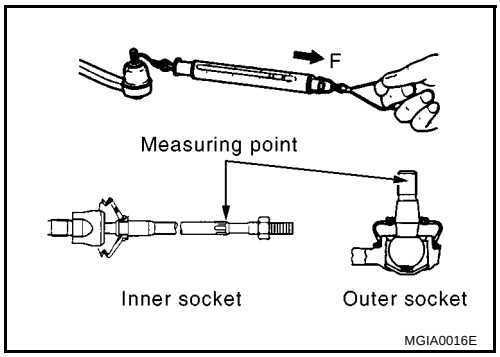
Check rack gear, and, if any damage or wear, replace steering gear assembly.

Bulkhead Sealing

In case of broken tab, or torn sealing in bulkhead seal, replace the damaged part.

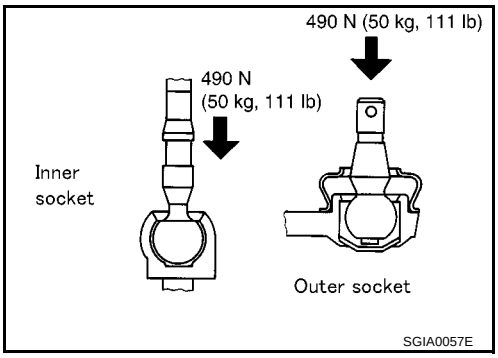
Tie-Rod Ball Joint

1. Tensile force
   - Hook a spring balance onto the point shown in the figure and pull the balance. Make sure the balance reads the specified value when ball stud and the inner socket start to move. If it is outside the standard, replace both outer socket and steering gear assembly.



	Outer socket	Inner socket
Measuring point of spring balance	Edge of stud bolt	Measuring point
Tensile force N·m (kg-m, in-lb)	0.3 - 2.9 (0.03 - 0.29, 3 - 25)	0.5 - 5.0 (0.05 - 0.51, 5 - 44)
Spring balance measurement N (kg, lb)	5 - 54 (0.51 - 5.5, 1.1 - 12.1)	4 - 43 (0.41 - 4.4, 0.9 - 9.7)

2. Axial end play
   - Apply 490 N (50 kg, 110 lb) of load to the ball stud axially and use a dial gauge to measure the amount of movement the stud makes. Make sure the reading is within the range specified. If outside the standard, replace outer socket and steering assembly.

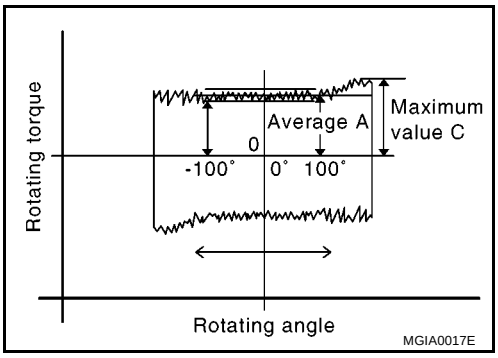


Outer socket	No Free Play
Inner socket	No Free Play

3. Using preload gauge (SST), measure rotating torque of pinion gear. If the measurement is outside of the specified range, replace steering gear.

Rotating torque of pinion gear

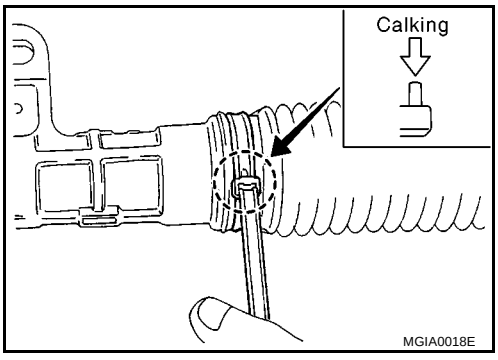
Around neutral position (Within ±100°) Average A	: 1.3 N·m (0.13 kg-m, 11 in-lb)
Other than the above: Maximum value C	: 1.6 N·m (0.16 kg-m, 14 in-lb)



ASSEMBLY

Note the following, and assemble in the reverse order of disassembly

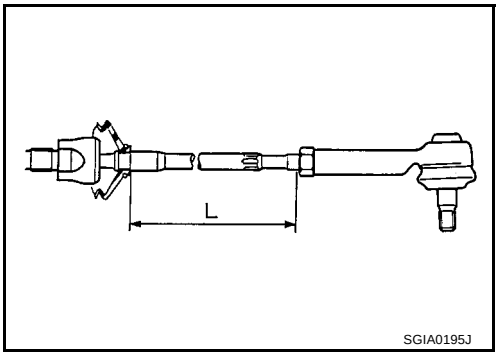
- Apply multi-purpose grease to the sliding part of rack.
- Securely fix dust boot and seal ring with strap. Caulk the strap, and cut the excess of strap off.
- Engage the tab of bulkhead seal to steering gear.



- Install lock nut and the outer socket to the inner socket and tighten lock nut until the length of the tie-rod is within the standard (length before toe-in adjustment.)

  Length of tie-rod (L) : 62.6 mm (2.46 in)

  CAUTION:
  Perform toe-in adjustment after this procedure. Length achieved after toe-in adjustment is not necessarily the value given here.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel

EGS000J9

Steering wheel axial end play	0 mm (0 in)
Steering wheel free play	0 - 35 mm (0 - 138 in)

Steering Angle

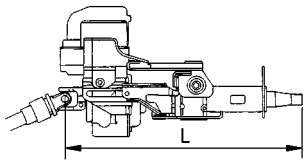
EGS000JA

Inner wheel	44° +1° -3°
Outer wheel	36° +1° -3°

Steering Column

EGS000JB

Steering column length L	429±2 mm (16.9±0.1 in)

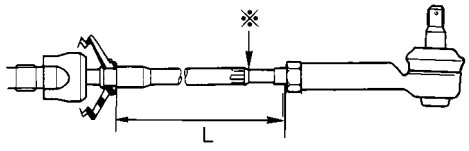


SGIA0207J

Steering Linkage

EGS000JC

Steering gear type		R24T
Tie-rod ball joint outer socket	Tensile force	0.3 - 2.9 N·m (0.03 - 0.29 kg-m, 3 - 25 in-lb)
	Spring balance measurement (Upper edge of stud bolt)	5 - 54 N (0.51 - 5.5 kg, 1.1 - 12.1 lb)
	Axial end play	No Free Play
Tie-rod ball joint inner socket	Tensile force	0.5 - 5.0 N·m (0.05 - 0.51 kg-m, 5 - 44 in-lb)
	Spring Balance measurement (measured at * mark)	4 - 43 N (0.41 - 4.4 kg, 0.9 - 9.7 lb)
	Axial end play	No Free Play
Tie-rod length L		62.6mm (2.46 in)



STC1006D

Tightening Torque

EGS000JD

Unit: N·m (kg-m, ft-lb)

Steering wheel bolt	29.4 - 39.2 (3.0 - 4.0, 22 - 28)
Steering column to intermediate shaft to Steering gear	27 - 32 (2.8 - 3.3, 21 - 23)
Steering gear to Suspension member	85 - 103 (8.7 - 10.5, 63 - 75)
Outer socket to Steering knuckle	29.5 - 39. 2 (23.0 - 4.0, 22 - 28)
Tie-rod outer socket lock nut	48 - 58 (4.9 - 5.9, 36 - 42)

SECTION RAX
REAR AXLE

CONTENTS

PRECAUTIONS 2
Caution 2
Precautions for Brake System 2
PREPARATION 3
Special Service Tools 3
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 4
NVH Troubleshooting Chart 4
WHEEL HUB 5
On-Vehicle Inspection 5
REAR WHEEL BEARING 5
Removal and Installation 5
REMOVAL 5
INSTALLATION 6
Disassembly and Assembly 6
DISASSEMBLY 6
INSPECTION AFTER DISASSEMBLY 7
ASSEMBLY 7
INSPECTION AFTER ASSEMBLY 7
SERVICE DATA AND SPECIFICATIONS (SDS) 8
Wheel Bearing 8
Tightening Torque 8

PRECAUTIONS

PFP:00001

Caution

EDS00128

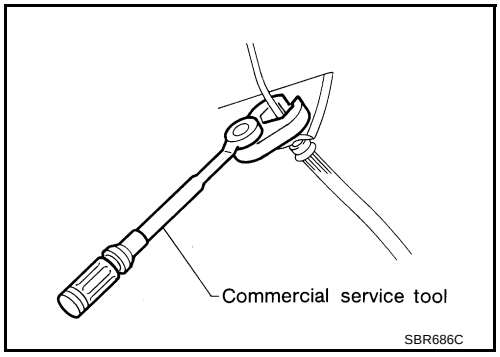
Observe the following precautions when disassembling and servicing drive shaft.

- Perform work in a location which is as dust-free and dirt-free as possible.
- Before disassembling and servicing, clean the outside of parts.
- The disassembly and service location must be clean. Care must be taken to prevent parts from becoming dirty and to prevent the entry of foreign objects.
- Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.
- Paper shop cloths must be used. Fabric shop cloths must not be used because of the danger of lint adhering to parts.
- Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.

Precautions for Brake System

EDS00129

- When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
  *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- Use flare nut wrench when removing or installing brake tubes.
- After installing removed suspension parts, check wheel alignment and adjust if necessary.
- Always torque brake lines when installing.

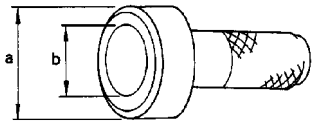
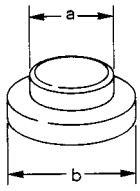
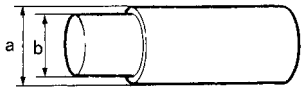


PREPARATION

PFP:00002

Special Service Tools

EDS0012A

Description	Application
Drift ST30720000 a: 77 mm (3.03 in) dia. b: 55 mm (2.17 in) dia.  ZZA0701D	Installing hub cap
Drift ST33022000 a: 56 mm (2.20 in) dia. b: 110 mm (4.33 in) dia.  ZZA0881D	● Installing wheel bearing ● Installing ABS sensor rotor
Drift ST33710000 a: 30 mm (1.18 in) dia. b: 23 mm (0.91 in) dia.  ZZA1234D	Removing wheel bearing

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EDS0012B

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

			Refer to RAX-5, "REAR WHEEL BEARING"	—	Refer to RAX-5, "REAR WHEEL BEARING"	NVH in FAX and FSU sections.	NVH in WT section.	NVH in WT section.	NVH in FAX section.	NVH in BR section.	NVH in PS section.
Reference page											
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Parts interference	Wheel bearing damage	FRONT AXLE AND FRONT SUSPENSION	TIRES	ROAD WEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	REAR AXLE	Noise	×	×		×	×	×	×	×	×
		Shake	×	×		×	×	×	×	×	×
		Vibration	×	×		×	×		×		×
		Shimmy	×	×		×	×	×		×	×
		Judder	×			×	×	×		×	×
		Poor quality ride or handling	×	×	×	×	×	×			

×: Applicable

WHEEL HUB

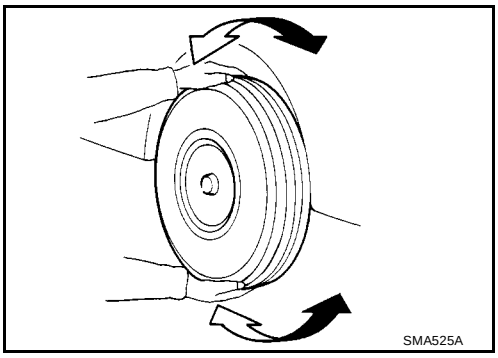
PFP:43202

On-Vehicle Inspection

EDS0012C

Check rear axle for unusual play, cracking, excessive wear, or other damage.

- Turn rear wheels (left/right) and check the play.



REAR WHEEL BEARING

With the vehicle raised, inspect the following:

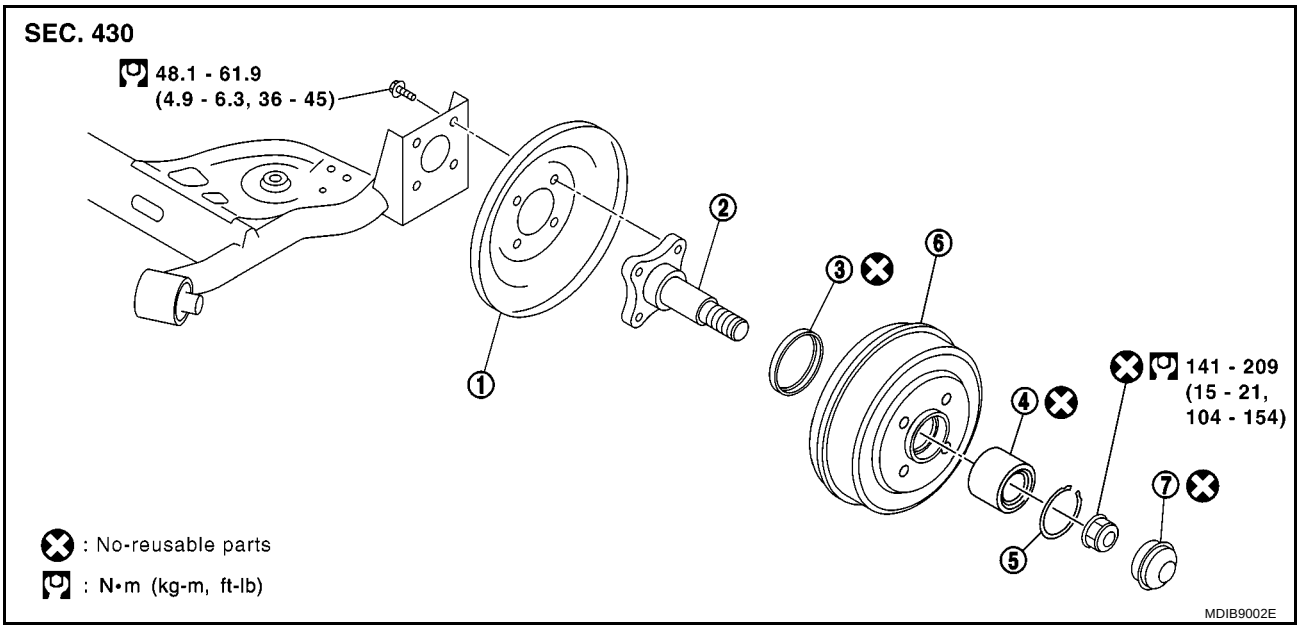
- Manually move the wheel hub in axial direction to check wheel bearing for excessive play.

Axial end play : 0.05 mm (0.0020 in)

- Check for unusual noise by rotating wheel. If there are any non-standard conditions, replace the wheel bearing.
- If outside the standard or any other non-standard condition is found, replace wheel bearing assembly.

Removal and Installation

EDS0012D



1. Back plate
2. Spindle
3. ABS sensor rotor
4. Wheel bearing
5. Snap rings
6. Brake drum
7. Hub cap

REMOVAL

1. Lift up the vehicle and remove tire from the vehicle. Release parking brake.
2. With hub cap pliers (commercial service tool), remove hub cap from brake drum (wheel hub)
3. Remove lock nut and separate brake drum from spindle.
4. Remove ABS sensor rotor from back plate part. Refer to BRC-44, "WHEEL SENSORS" .
5. Loosen self-locking nut and separate parking brake rear cable from rear brake. Refer to PB-3, "PARKING BRAKE SYSTEM" .

6. Separate brake tube from wheel cylinder. Refer to BR-11, "Removal and Installation of Front Brake Piping and Brake Hose" .

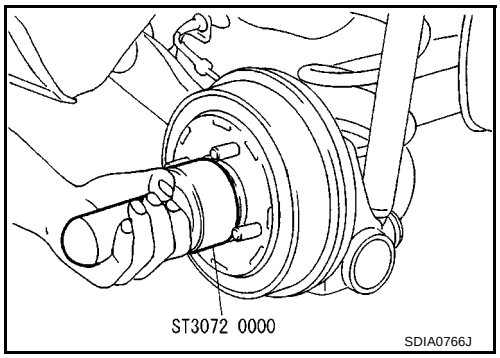
   CAUTION:
   - **Avoid smearing brake fluid on coated surfaces while removing brake tube.**
   - **Never depress brake pedal while removing brake tube and brake drum.**

7. Remove spindle mounting bolt. Separate back plate assembly and spindle from rear suspension trailing arm.

INSTALLATION

- For each tightening torque, refer to RAX-5, "REAR WHEEL BEARING" and tighten in the reverse order of removal.
- For mounting of brake tube and tightening torque, refer to BR-11, "Removal and Installation of Front Brake Piping and Brake Hose" .
- For mounting parking brake and tightening torque, refer to PB-3, "PARKING BRAKE SYSTEM" .
- For mounting ABS wheel sensor and tightening torque, refer to BRC-44, "WHEEL SENSORS" .
- Using a drift (SST), mount hub cap on brake drum (wheel hub).

  CAUTION:
  Do not reuse hub cap.
- Refill with new brake fluid and bleed air. Refer to BR-9, "BRAKE FLUID" .

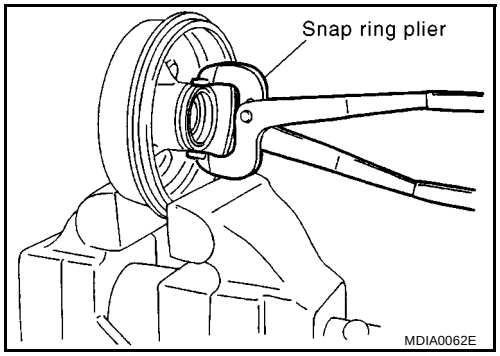


Disassembly and Assembly

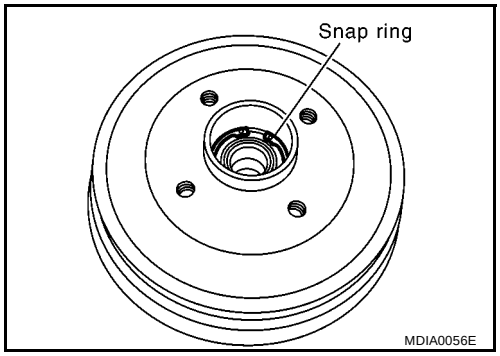
EDS0012E

DISASSEMBLY

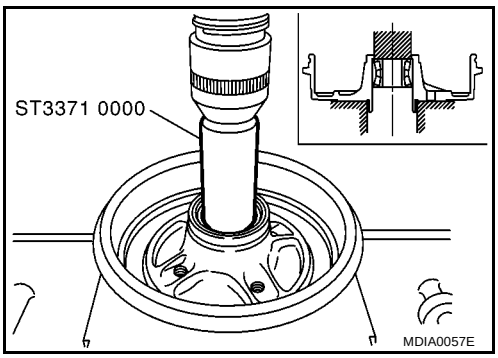
1. Using snap ring pliers (commercial service tool), remove sensor rotor



2. Remove snap ring.



3. Press the wheel bearing out with a drift (SST) to remove.

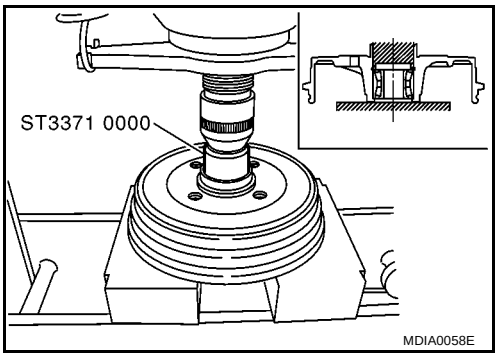


INSPECTION AFTER DISASSEMBLY

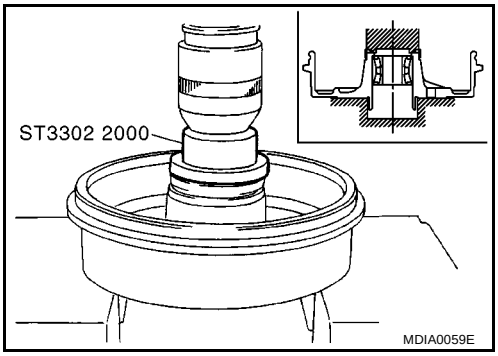
- Check trailing arm for deformed parts, cracks, or any other damage. Replace if necessary.
- Check snap ring for wear or cracks. Replace if necessary.

ASSEMBLY

1. Press-fit the wheel hub with a drift (SST).
   NOTE:
   Final press-loading guideline [50,000 N (5,100 kg, 11,240 lb)]
2. Install snap ring.



3. Press-fit the sensor rotor on the brake drum with a drift (SST).



INSPECTION AFTER ASSEMBLY

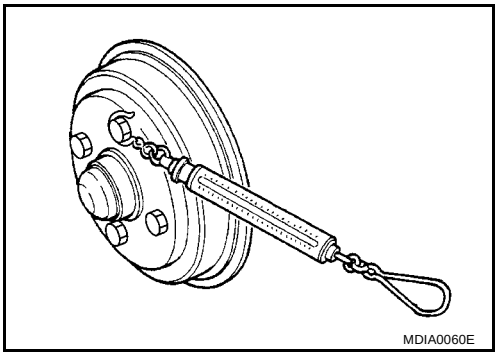
1. After installing brake drum on spindle, tighten lock nut to the standard torque.

   Tightening torque : 141 - 209 N·m (15 - 21 kg-m, 104 - 154 ft-lb)

2. Rotate the wheel hub in both directions ten times each to check for smooth movement.
3. At a rotating speed of 10 ± 2 rpm, place a spring balance on hub bolt to measure torque.

   Rotating torque : 0.20 - 0.95 N·m (0.02 - 0.09 kg-m)

   Spring balance measurement : 4 - 19 N (0.41 - 1.94 kg)

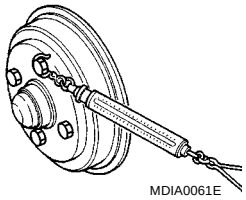


SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Bearing

EDS0012F

Axial end play	0.05 mm (0.0020 in)	
Rotating torque	0.20 - 0.95 N·m (0.02 - 0.09 kg-m)	
Spring balance measurement	4 - 19 N (0.41 - 1.94 kg)	
Installation location of spring scale	Hub bolt position	 MDIA0061E

Tightening Torque

EDS0012G

Hub lock nut	141 - 209 N·m (15 - 21 kg-m, 104 - 154 ft-lb)

SECTION RF
ROOF

CONTENTS

SUNROOF 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Precautions 2
System Description 2
RESUMING OPERATION 2
Component Parts Location 3
Wiring Diagram — SROOF — 4
Terminal and Reference Value for Sunroof Switch.... 5
Sunroof Lid Weatherstrip Inspection 5
Link and Wire Assembly Inspection 5
Fitting Adjustment 5
LONGITUDINAL/LATERAL CLEARANCE ADJUSTMENT 5
SURFACE MISMATCH ADJUSTMENT 6
Removal and Installation 7
SUNROOF UNIT 8
GLASS LID 9
SUNROOF MOTOR 9

SUNROOF

PFP:91210

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004QU

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions

EIS004NM

- If sunroof motor operation sound is noted but sunroof does not operate, replace motor assembly with glass lid fully closed.
- If sunroof (glass lid and motor) does not operate when using sunroof switch then remove the front cover of the luggage compartment, and rotate motor gear box drive shaft with the emergency handle (in the tool box).

System Description

EIS004NN

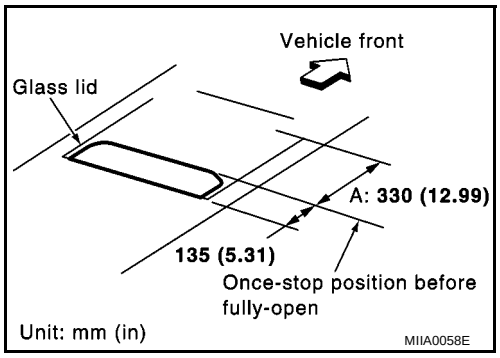
- Operating sunroof switch allows glass lid open/close, and tilt UP and DOWN.
- When sunroof switch is pressed firmly toward the OPEN side, glass lid automatically opens and automatic operation is stopped at a point 135 mm (5.31 in) to the fully closed position.

  NOTE:
  After the emergency handle is used to rotate the motor drive shaft, sunroof switch operation may not correspond to actual glass lid movement. When this happens, conduct resuming operation to restore normal operation.

RESUMING OPERATION

- If actual glass lid operation does not correspond to expected operation, operate sunroof switch to slide glass lid toward area A in the figure. This should result in resumption of normal operation.

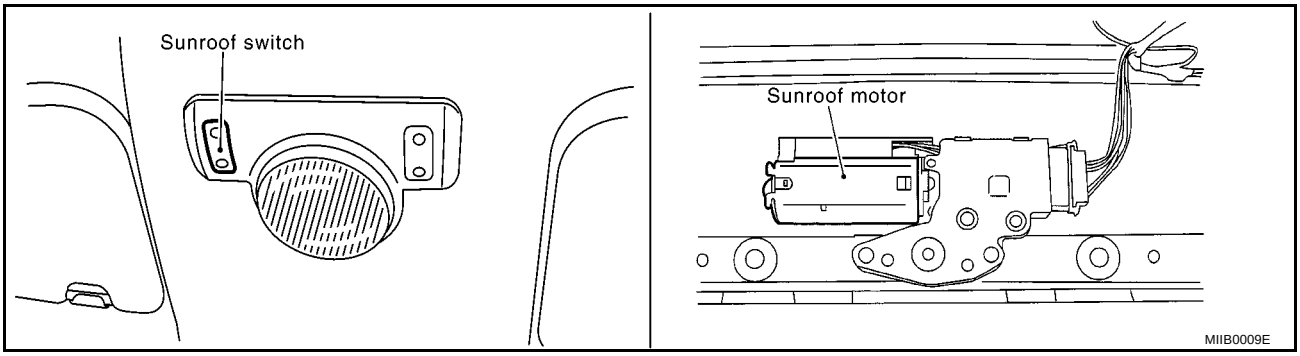
  CAUTION:
  Before normal operation is resumed, expected sunroof switch operation and actual glass lid movement may not correspond. Make sure that neither head nor hands protrude from sunroof and conduct resuming operation.



Component Parts Location

SMA for VIN >SJN**AK12U1202682

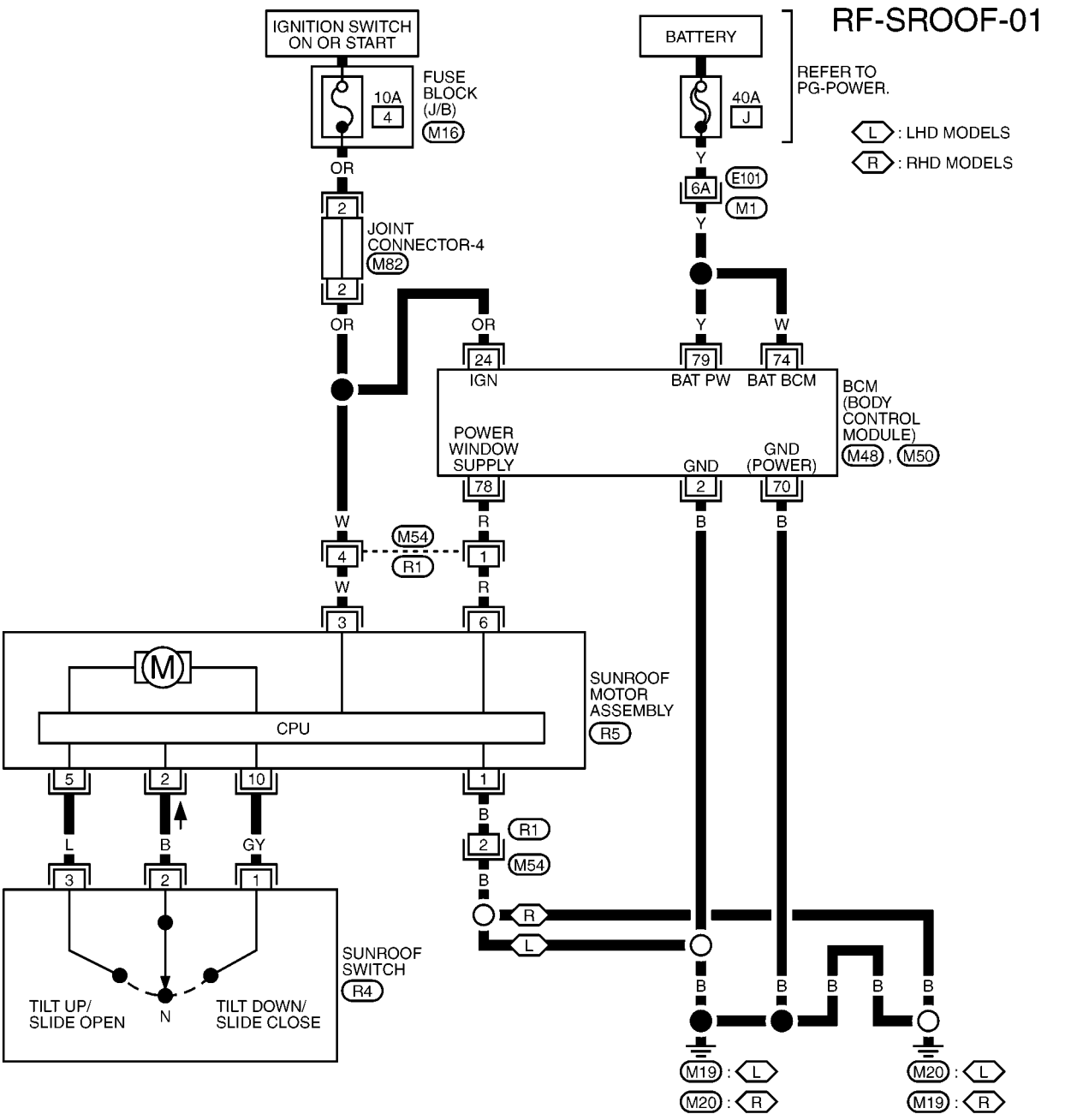
EIS004NO

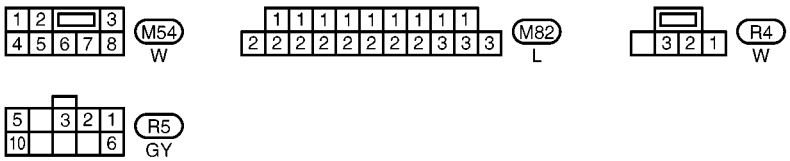


Wiring Diagram — SROOF —

SMA for VIN >SJN**AK12U1202682

EIS004NP





REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)
M48 , M50 -ELECTRICAL UNITS

MIWA0343E

Terminal and Reference Value for Sunroof Switch

SMA for VIN >SJN**AK12U1202682 EIS004NQ

TERMINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE
1	GY	Sunroof tilt DOWN or CLOSE signal	Sunroof switch tilt DOWN or CLOSE operation	Approx. 0 → Approx. 12
2	B	IGN power supply	—	Battery voltage
3	L	Sunroof tilt UP or OPEN signal	Sunroof switch tilt UP or OPEN operation	Approx. 0 → Approx. 12

Sunroof Lid Weatherstrip Inspection

EIS004NR

If there is water leakage around glass lid, close glass lid and flush with water to determine whether it is from damaged parts or a gap.

1. Remove glass lid assembly.
2. Visually check weatherstrip for damage, deterioration, or deformation. If excess wear or damage is detected, replace glass lid assembly.

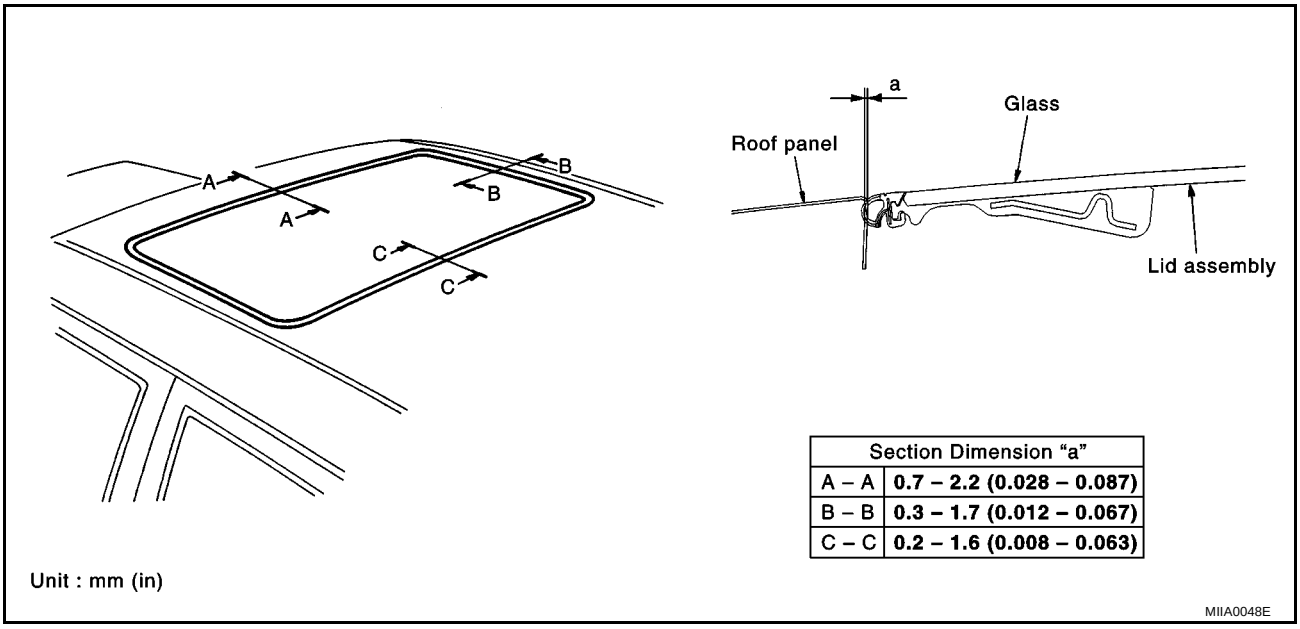
Link and Wire Assembly Inspection

EIS004NS

1. If the link coating peels off to show the base material and an abnormal noise is heard, replace it.
2. Visually confirm the wire and rail groove are properly greased. If necessary, apply body grease.

Fitting Adjustment

EIS004NT



Section Dimension "a"	
A – A	0.7 – 2.2 (0.028 – 0.087)
B – B	0.3 – 1.7 (0.012 – 0.067)
C – C	0.2 – 1.6 (0.008 – 0.063)

Unit : mm (in)

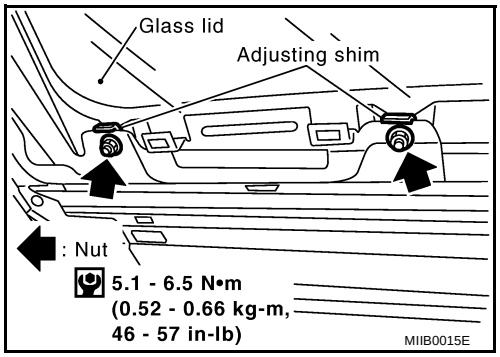
MIIA0048E

LONGITUDINAL/LATERAL CLEARANCE ADJUSTMENT

1. Tilt up glass lid to remove side trim upper and lower.
2. After loosening glass lid mounting bolts (Torx bolt: T25, 3 each on left/right), tilt down glass lid.
3. Adjust glass lid according to sections A–A, B–B, C–C as shown in the figure.
4. After adjusting glass lid, tighten nuts to the specified torque.
5. Tilt glass lid 4 to 5 times to check that it smoothly goes up and down.

SURFACE MISMATCH ADJUSTMENT

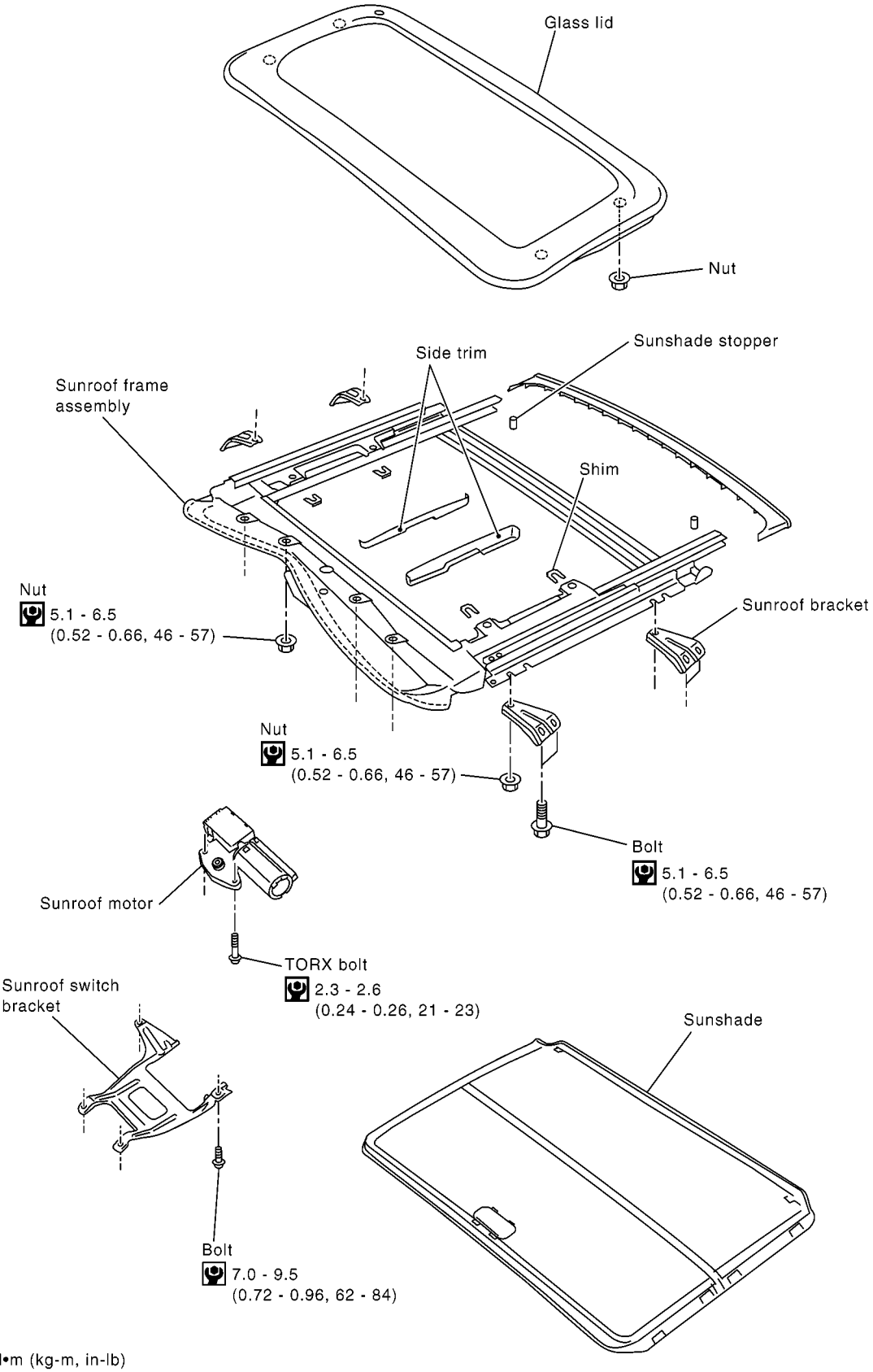
1. Adjust surface height of glass lid and roof panel to 0±1.5 mm (0±0.059 in) by altering the number of shims between glass lid and link assembly. (Standard: 2, max: 4)
2. After fitting adjustment, use a hose to flush the entire surface of the roof with water to check for leaks.



Removal and Installation

EIS004NU

SEC. 736



: N•m (kg-m, in-lb)

MIIB0665E

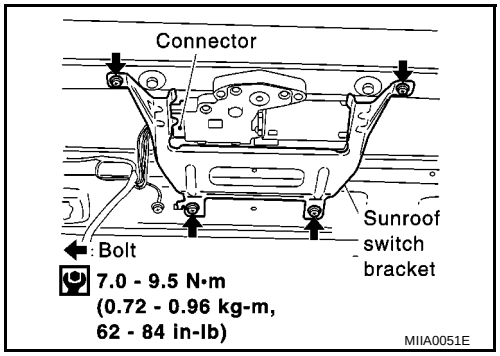
SUNROOF UNIT

Removal

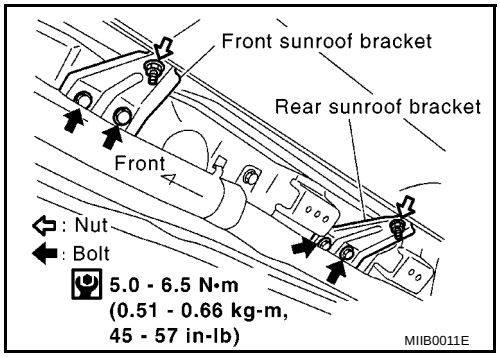
CAUTION:

- **Removal and installation of sunroof unit must be performed by 2 persons.**
- **When taking sunroof unit out, use shop cloths to protect seats and trim from damage.**
- **After installing sunroof unit and glass lid, be sure to carry out the leak test to confirm there is no more leakage.**

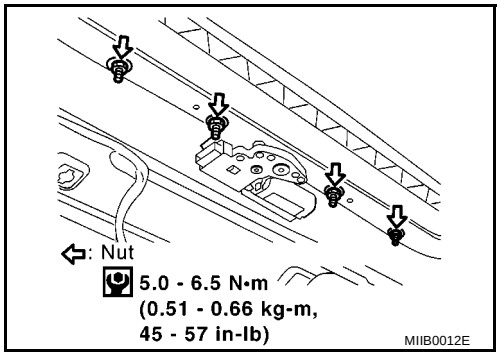
1. Remove headlining. Refer to EI-24, "HEADLINER" .
2. Disconnect drain hoses (4).
3. Disconnect interior lamp harness.
4. Remove sunroof switch bracket mounting bolt.
5. Remove sunroof motor assembly.



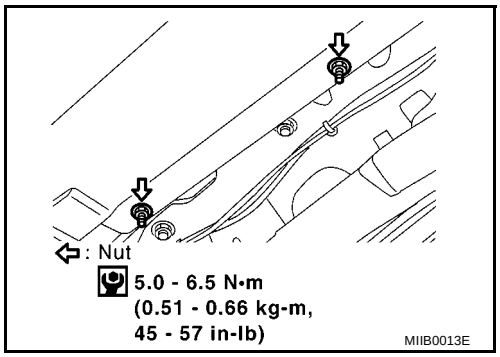
6. Remove both unit-side and body-side front sunroof bracket mounting bolts and nuts.
7. Remove both unit-side and body-side rear sunroof bracket mounting bolts.



8. Remove mounting nuts on the front end.

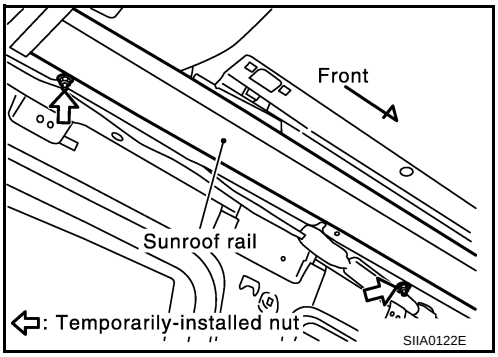


9. Remove mounting nuts on the side rails, and remove sunroof unit from the roof panel.
10. Remove the sunroof unit out of the passenger compartment while being careful not to damage the seats and trim.



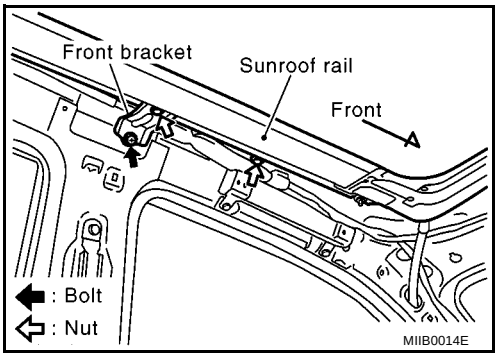
Installation

1. After bringing sunroof unit into the passenger compartment, tighten mounting nuts on the side rails (2 each on left/right). Start from the one at the front reference point.
2. Tighten mounting nuts (4) on the front end.



3. Align the front sunroof bracket to lower face of the rail and roof side mounting face, and tighten bolts. Then tighten bolts on the roof side.
4. Align the center and rear sunroof brackets to lower face of the rail and roof side mounting face, and tighten bolts. Then tighten bolts on the roof side.

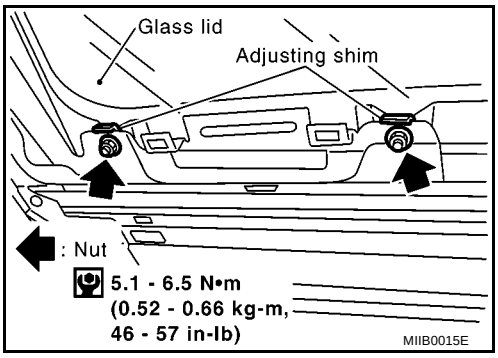
   NOTE:
   Install the sunroof bracket evenly so that the roof surface has no distortion.
5. Tighten bolts on motor bracket.
6. Connect the interior lamp harness.



GLASS LID

Removal

1. Tilt up glass lid.
2. Remove side trim.
3. Remove installation from glass lid.
4. Remove glass lid.



Installation

1. Tighten nuts on glass lid diagonally.
2. After installation, adjust the fit. Refer to RF-5, "Fitting Adjustment" .

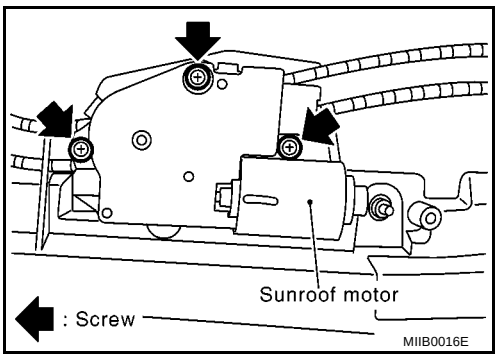
SUNROOF MOTOR

Removal

1. Remove motor mounting bolts (Torx bolt: T25).
2. Remove the harness connector, and remove the sunroof motor.

NOTE:

- Remove the sunroof motor when the sunroof is in the fully-closed position.
- Never rotate the removed motor as a single unit.



Installation

1. Move motor laterally little by little until the gear is completely engaged onto the wire on sunroof unit and the mounting surface becomes parallel. Then secure motor with screws and nuts.
2. Connect harness connector to motor, and perform initial operation for initialization.
   - To initialize, hold Tilt UP switch for approximately 10 seconds with sunroof tilted up. If this is not properly done, Tilt DOWN operation will not be performed normally.
3. After installation, check that sunroof operates normally.

   NOTE:
   Before installing motor, be sure to place the link and wire assembly in the symmetrical and fully closed position.

SECTION RSU
REAR SUSPENSION

CONTENTS

PRECAUTIONS 2
Cautions 2
Precautions for Brake System 2
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 3
NVH Troubleshooting Chart 3
REAR SUSPENSION ASSEMBLY 4
Components 4
On-Vehicle Inspection and Service 4
Wheel Alignment 5
DESCRIPTION 5
PRELIMINARY INSPECTION 5
CAMBER 5
TOE-IN 5
SHOCK ABSORBER 6
Removal and Installation 6
REMOVAL 6
INSPECTION AFTER REMOVAL 6
INSTALLATION 7
COIL SPRING 8
Removal and Installation 8
REMOVAL 8
INSPECTION AFTER REMOVAL 8
INSTALLATION 8
REAR SUSPENSION BEAM 9
Removal and Installation 9
REMOVAL 9
INSPECTION AFTER REMOVAL 9
INSTALLATION 9
SERVICE DATA AND SPECIFICATIONS (SDS) 10
Wheel Alignment 10
Tightening Torque 10

PRECAUTIONS

PFP:00001

Cautions

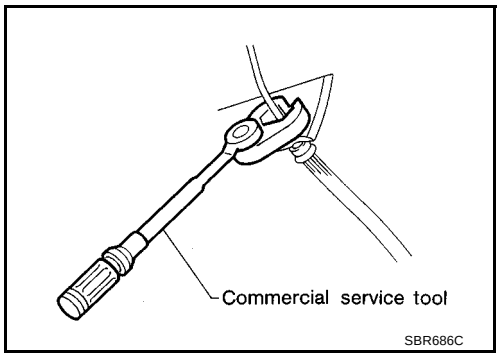
EES000ZL

- Final tightening of bushings must be carried out under unladen condition with tires on the ground. Oil will shorten life of bushings. Be sure to wipe off any spilled oil.
- “Unladen condition” means that fuel, coolant and lubricant are full and ready for drive. However, spare tire, jack, and hand tools should be unloaded.
- After installing the removed suspension parts, always check wheel alignment and adjust if necessary.
- Replace the caulking nut with a new one. Install a new nut without wiping the oil off before tightening.

Precautions for Brake System

EES000ZM

- When installing rubber parts, final tightening must be carried out under unladen condition* with tires on ground.
  *: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- Use flare nut wrench when removing or installing brake tubes.
- After installing removed suspension parts, check wheel alignment and adjust if necessary.
- Always torque brake lines when installing.



NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EES000ZN

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

			Reference page	Refer to RSU-4, "Components"	Refer to RSU-6, "SHOCK ABSORBER"	—	—	—	Refer to RSU-4, "Components"	Refer to RSU-5, "Wheel Alignment"	NVH in FAX and FSU sections.	NVH in WT section.	NVH in WT section.	NVH in FAX section.	NVH in BR section.	NVH in PS section.
			Possible cause and SUSPECTED PARTS	Improper installation, looseness	Shock absorber deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	FRONT AXLE AND FRONT SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	REAR SUSPENSION	Noise		×	×	×	×	×	×		×	×	×	×	×	×
		Shake		×	×	×	×		×		×	×	×	×	×	×
		Vibration		×	×	×	×	×			×	×		×		×
		Shimmy		×	×	×	×			×	×	×	×		×	×
		Judder		×	×	×					×	×	×		×	×
		Poor quality ride or handling		×	×	×	×	×		×	×	×	×			

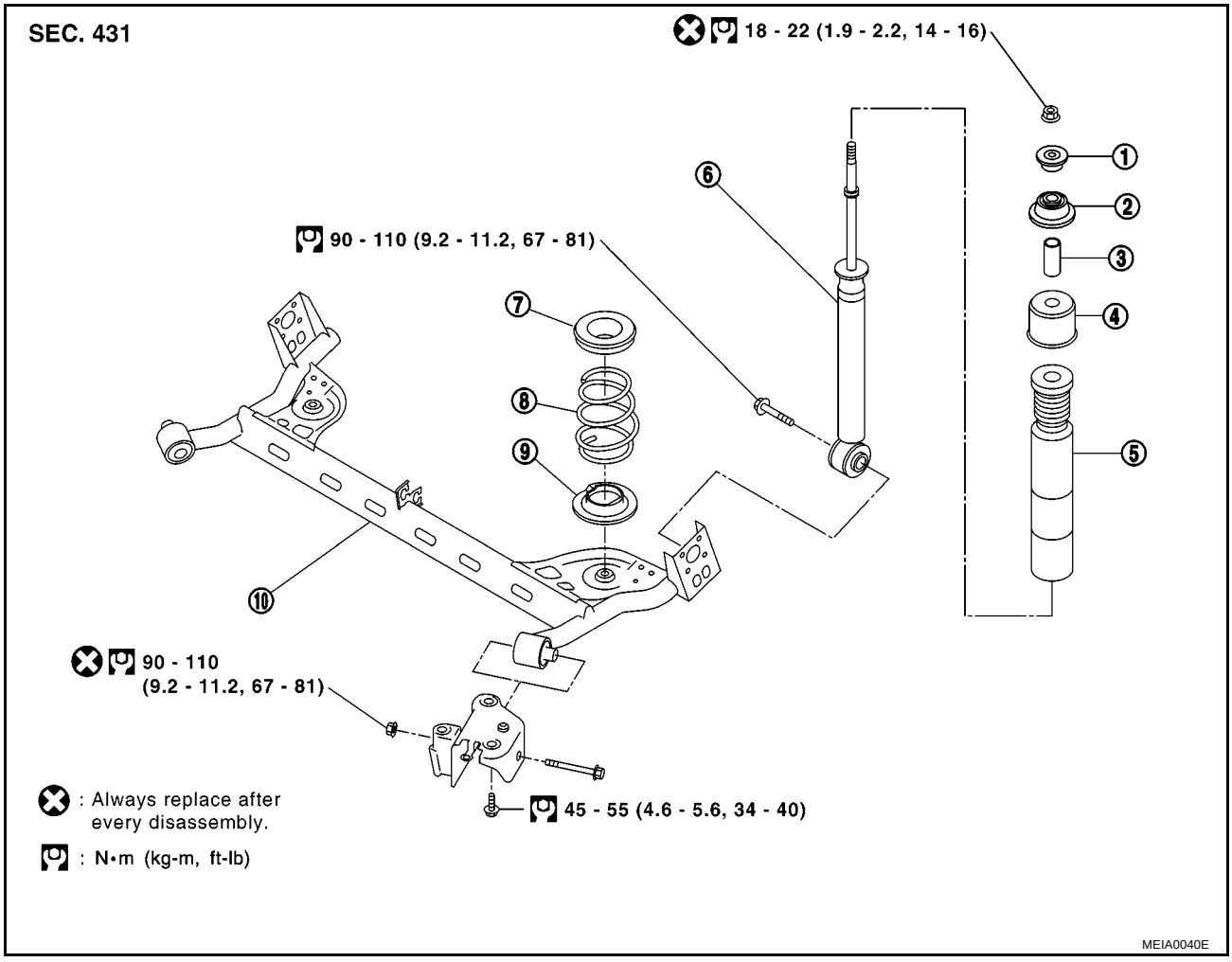
×: Applicable

REAR SUSPENSION ASSEMBLY

PFP:55020

Components

EES000ZO



1. Bushing
2. Bushing
3. Distance tube
4. Bound bumper cover
5. Bound bumper
6. Shock absorber
7. Rear spring rubber seat
8. Coil spring
9. Rear spring rubber seat
10. Rear suspension beam

On-Vehicle Inspection and Service

EES000ZP

Check axle and suspension parts for excessive play, wear, and damage.

- Move rear wheels (RH/LH) to check for unusual free play.
- Retighten all nuts and bolts to the specified torque.
- Check shock absorber for oil leakage and damage.

Wheel Alignment

EES000ZQ

DESCRIPTION

- Measure wheel alignment under unladen conditions. “Unladen conditions” means that fuel, coolant, and lubricant are full. However, spare tire, jack, and hand tools should be unloaded.

PRELIMINARY INSPECTION

1. Check the tires for improper air pressure and wear.
2. Check road wheels for runout.
3. Check wheel bearing axial end play.
4. Check shock absorber operation.
5. Check each mounting point of axle and suspension for looseness and deformation.
6. Check each link and arm for cracks, deformation, and other damage.
7. Check the vehicle posture.

CAMBER

Camber is preset at factory and cannot be adjusted.

Camber : -1°56′- -0°26′ (-1.94°- -0.44°)

- If the camber is not within specification, inspect and replace any damaged or worn rear suspension parts.

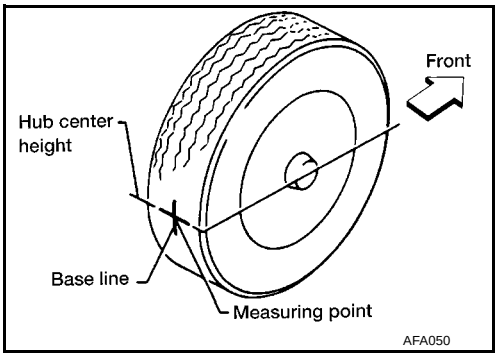
TOE-IN

Toe-in is preset at factory and cannot be adjusted. Measure toe-in using following procedure. If out of specification, inspect and replace any damaged or worn rear suspension parts.

WARNING:

- **Always perform following procedure on a flat surface.**
- **Make sure that no person is in front of the vehicle before pushing it.**

1. Bounce rear of vehicle up and down to stabilize the posture.
2. Push the vehicle straight ahead about 5 m (16 ft.).
3. Put a mark on base line of tread (rear side) of both tires at the same height as hub center. This mark is a measuring points.

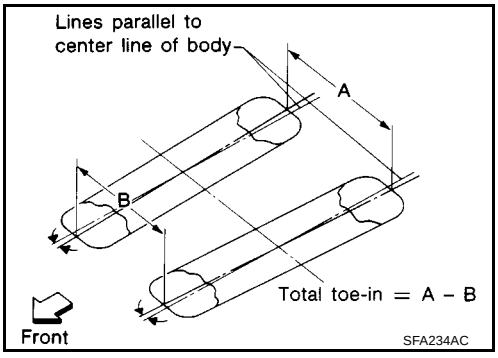


4. Measure distance “A” (rear side).
5. Push the vehicle slowly ahead to rotate the wheels 180 degrees (1/2 turn).

If the wheels have rotated more than 180 degrees (1/2 turn), try the above procedure again from the beginning. Never push vehicle backward.

6. Measure distance “B” (front tires).

Total toe-in: In 0- 8 mm (0 - 0.31 in)



SHOCK ABSORBER

PFP:56210

Removal and Installation

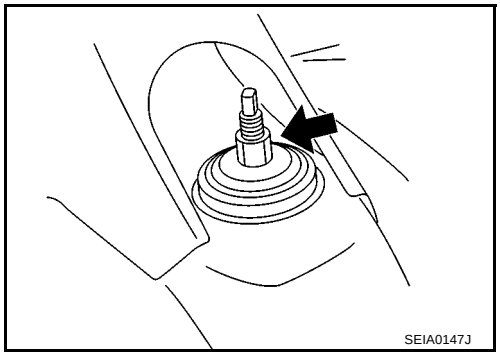
EES000ZR

REMOVAL

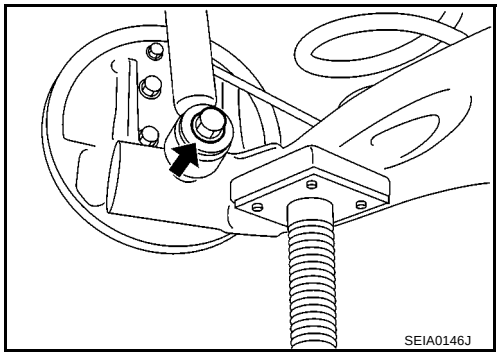
1. Raise vehicle and remove tire.
2. Using a screwdriver, remove luggage side lower finisher.

   CAUTION:
   Wrap the tip of a screwdriver with cloth to avoid damaging components.

3. Remove upper nuts of the shock absorber and remove washer, bushing on the upper side of shock absorber.


SEIA0147J

4. Set a jack under trailing arm of rear suspension beam and support it. Remove lower bolts of the shock absorber.
5. Remove shock absorber from the vehicle.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INSPECTION AFTER REMOVAL

Shock Absorber

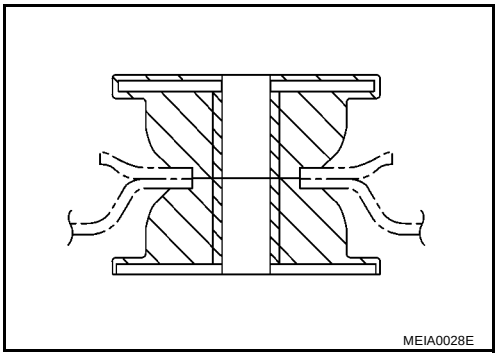
- Check shock absorber for deformation, cracks, and other damage. Replace if any non-standard conditions are found.
- Check piston rod for damage, uneven wear, and distortion, and replace shock absorber if necessary.
- Check welded and sealed areas for oil leakage, and replace if necessary.

Bound Bumper and Bushing

- Check bound bumper and bushing for cracks and damage. Replace if necessary.

INSTALLATION

- Refer to RSU-4, "Components" for tightening torque. Install in the reverse order of removal.
- When installing body side bushing, install the projection to the vehicle side hole securely.



COIL SPRING

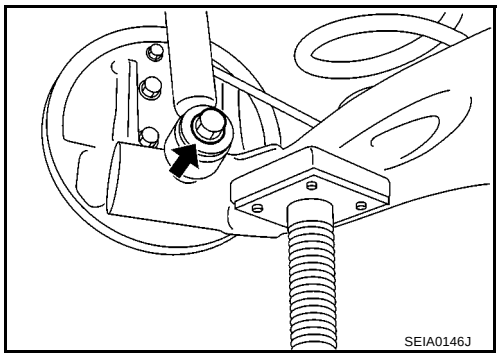
PFP:55020

Removal and Installation

EES000ZS

REMOVAL

1. Raise vehicle and remove tire.
2. Set a jack under trailing arm of rear suspension beam and support it. Remove lower side of the shock absorber. (left/right)
3. Remove jack. Remove coil spring and spring rubber seat.

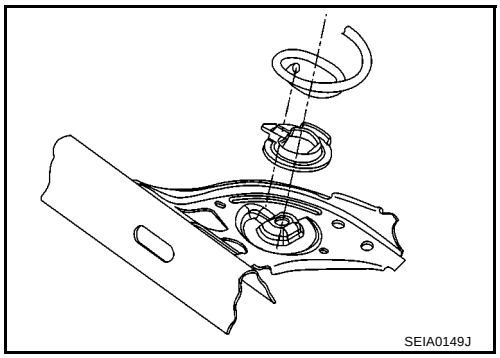


INSPECTION AFTER REMOVAL

- Check coil spring and spring rubber seat for deformation, cracks, and damage, and replace if necessary.

INSTALLATION

- Refer to RSU-4, "Components" for tightening torque. Tighten in the reverse order of removal.
- When installing spring, be sure to securely install the spring end position aligned to flush of spring rubber seat as shown in the figure.



REAR SUSPENSION BEAM

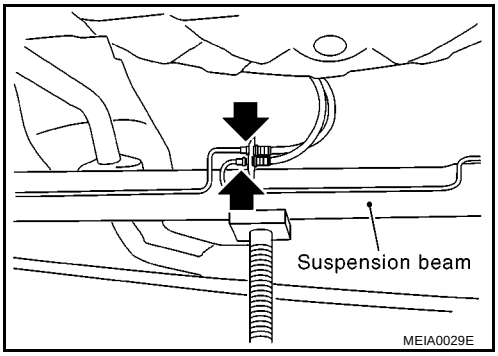
PFP:55501

Removal and Installation

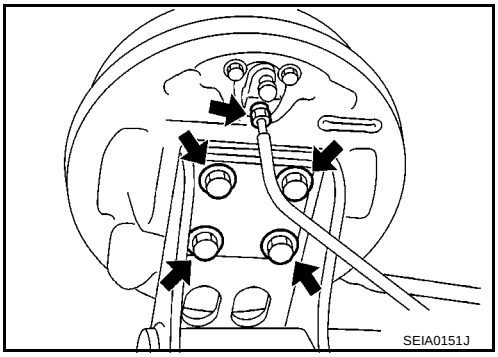
EES000ZT

REMOVAL

1. Raise vehicle, remove tire and replace parking lever.
2. Drain brake fluid. Refer to BR-9, "BRAKE FLUID" .
3. Loosen self-locking nut, and separate parking brake rear cable from rear brake and rear suspension beam. Refer to PB-3, "PARKING BRAKE SYSTEM" .
4. Remove ABS wheel sensor. Refer to BRC-44, "WHEEL SENSORS" .
5. Separate rear brake hose from brake piping. Refer to BR-11, "BRAKE PIPING AND HOSE" .
6. Remove shock absorber lower side (left/right), coil spring (left/right). Refer to RSU-6, "SHOCK ABSORBER" , RSU-8, "COIL SPRING"
7. Set a jack under suspension beam, and remove mounting bolts of suspension arm bracket and rear suspension beam.
8. Remove suspension beam.
9. Remove brake piping from rear suspension member beam. Refer to BR-11, "BRAKE PIPING AND HOSE" .



10. Remove spindle bolts and rear axle assembly.
11. Remove rear suspension arm bracket nuts and bolts. Remove rear suspension arm bracket from vehicle.

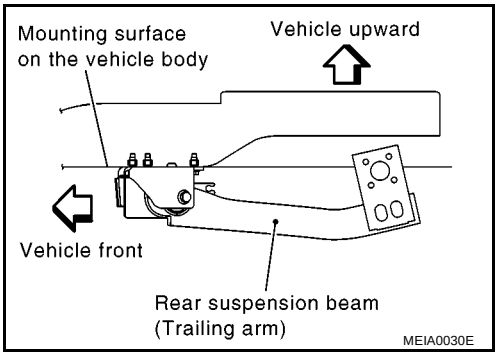


INSPECTION AFTER REMOVAL

- Check suspension beam and bushing for deformation, cracks, and damage. Replace if necessary.

INSTALLATION

- Refer to RSU-4, "Components" for tightening torque. Tighten in the reverse order of removal.
- Refer to BR-11, "BRAKE PIPING AND HOSE" for installation of brake piping and brake hose and for tightening torque.
- Refer to PB-3, "PARKING BRAKE SYSTEM" for installation of parking brake and for tightening torque.
- Tighten rear suspension arm bracket under unladen condition.
- Refer to BRC-44, "WHEEL SENSORS" for installation of ABS wheel sensor and for tightening torque.
- Refill with new brake fluid and bleed air. Refer to BR-9, "BRAKE FLUID" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Alignment

EES000ZU

Camber	-1°56′ - -0°26′ (-1.94° - -0.44°)
Toe-in	In 0 - 8 mm (0 - 0.31 in)

Tightening Torque

EES000ZV

Unit: N·m (kg-m)

Shock absorber piston rod lock nut	18 - 22 (1.9 - 2.2, 14 - 16)
Rear suspension beam to rear suspension arm bracket	90 - 110 (9.2 - 11.2, 67 - 81)
Shock absorber to rear suspension beam	90 - 110 (9.2 - 11.2, 67 - 81)
Rear suspension arm bracket to body	45 - 55 (4.6 - 5.6, 34 - 40)

SECTION SB
SEAT BELTS

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Precaution for Seat Belt Service 2
AFTER A COLLISION 2
SEAT BELTS 3
Removal and Installation of Front Seat Belt 3
REMOVAL 3
INSTALLATION 4
Removal and Installation of Rear Seat Belt 4
REMOVAL 4
INSTALLATION 4
Inspection 4
POST-ACCIDENT INSPECTION 4
INSPECTION FOR SEAT BELT RETRACTOR 5
INSPECTION OF ELR AND SEAT BELT WITH CHILD SAFETY SEAT ANCHOR SYSTEM 6

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EHS000QJ

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precaution for Seat Belt Service

EHS000QK

CAUTION:

- **Before removing the seat belt pre-tensioner assembly, turn the ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.**
- **Do not use electrical test equipment for seat belt pre-tensioner connector.**
- **After replacing or reinstalling seat belt pre-tensioner assembly, or reconnecting seat belt pre-tensioner connector, check the system function. Refer to SRS-17, "SRS Operation Check" .**
- **Do not use disassemble buckle or seat belt assembly.**
- **Replace anchor bolts if they are deformed or worn out.**
- **Never oil tongue and buckle.**
- **If any component of seat belt assembly is questionable, do not repair. Replace the whole seat belt assembly.**
- **If webbing is cut, frayed, or damaged, replace seat belt assembly.**
- **When replacing seat belt assembly, use a genuine seat belt assembly.**

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attaching hardware after any collision. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

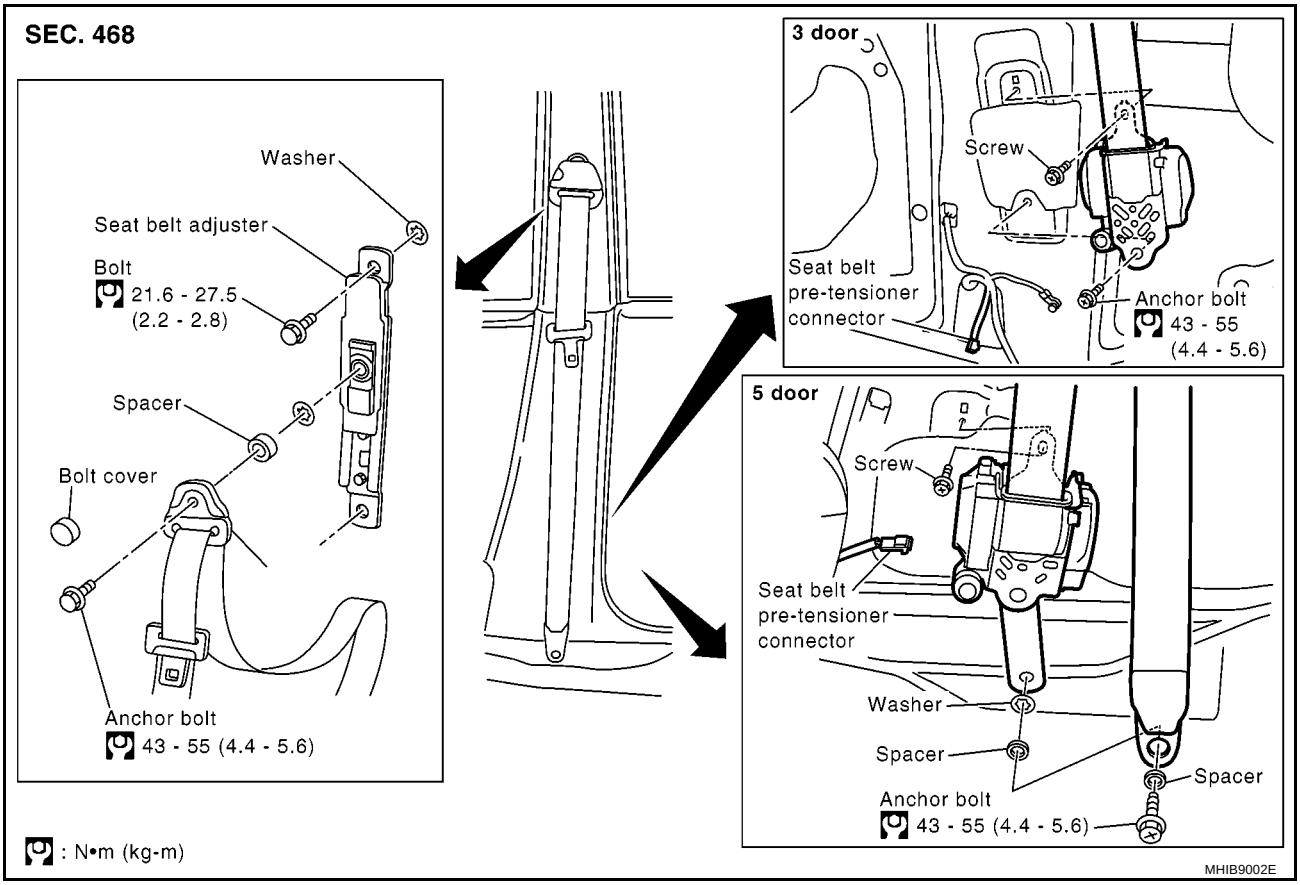
- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident. (i.e. torn webbing, bent retractor or guide, etc.)
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

SEAT BELTS

PFP:86884

Removal and Installation of Front Seat Belt

EHS000QL



CAUTION:

Before servicing SRS, turn ignition switch off, disconnect the battery ground cable and wait at least 3 minutes.

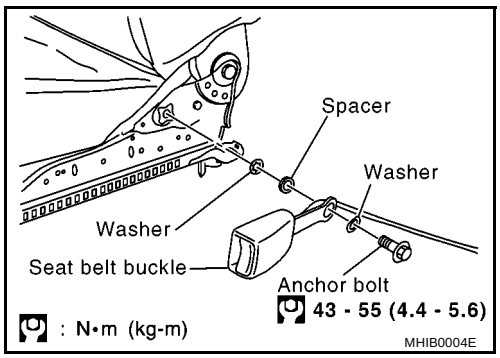
REMOVAL

Retractor

1. Remove bolt cover.
2. Remove shoulder anchor bolts.
3. For 5 door vehicle, remove the center pillar lower garnish. Remove rear side finisher for 3 door vehicle. Refer to EI-19, "Removal and Installation (5-Door)" , EI-20, "Removal and Installation (3-Door)" of “Body Side Trim” in EI section.
4. Remove seat belt pre-tensioner connector.
5. Remove pre-tensioner seat belt retractor mounting screw and floor anchor bolt. Then, remove seat belt assembly.

Buckle

1. Remove front seat from vehicle body. Refer to SE-7, "FRONT SEAT" in SE section.
2. Separate clip of buckle switch harness connector from the bottom of seat cushion.
3. Remove seat cushion inner finisher. Refer to SE-9, "Disassembly and Assembly of Seat Cushion" in SE section.
4. Remove anchor bolt (1) and buckle.

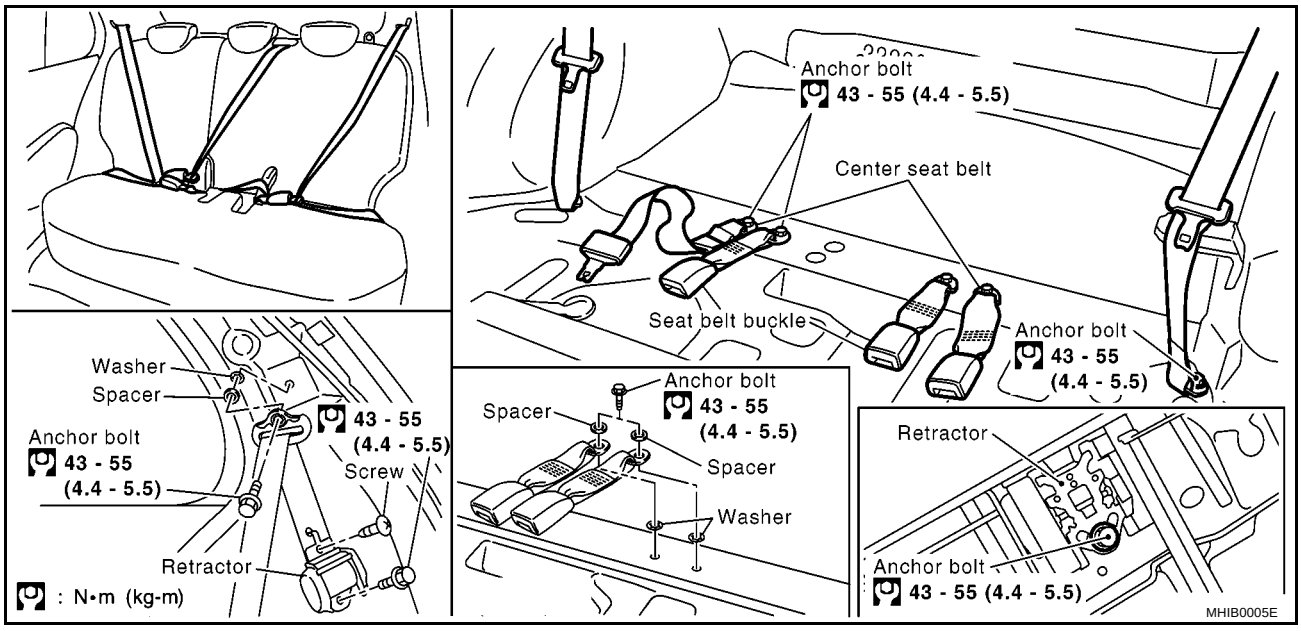


INSTALLATION

Install in the reverse order of removal.

Removal and Installation of Rear Seat Belt

EHS000QM



REMOVAL

1. Remove rear seat cushion. Refer to SE-11, "REAR SEAT" in SE section.
2. Remove luggage side upper finisher, luggage rear kickplate and luggage rear plate. Refer to SE-13, "Removal and Installation" in EI section.
3. Remove shoulder anchor bolt and floor anchor bolt.
4. Remove mounting clip of luggage side lower finisher, and move the luggage side lower finisher.
5. Remove seat belt retractor screw and anchor bolt. Remove seat belt assembly.
6. Remove floor anchor bolt. Remove tongue and buckle.

INSTALLATION

Install in the reverse order of removal.

Inspection

EHS000QN

POST-ACCIDENT INSPECTION

After a collision, inspect for damage or distortion of retractor, seat belt anchor, floor anchor, or shoulder anchor. Nissan recommends replacement of all seat belt assemblies in the following cases because these impairments may lead to personal injury.

- After a collision
- When installation point of seat belt assembly on vehicle is damaged.
- When it does not operate normally.

INSPECTION FOR SEAT BELT RETRACTOR

1. Using seat belt warning lamp, make sure it works normally.
   - When ignition is turned ON and driver seat belt is not in use, seat belt warning lamp is turned on. It is turned off when driver's seat belt is in use.
2. Check whether anchor bolts on seat belt retractor and buckle are securely tightened.
3. Confirm if the seat belt through anchor axis freely rotates, seat belt adjuster properly operates, or completely engages.
4. Retractor operation inspection

a. Pull out all webbing and check for twisting, cut, or other damage.

b. Retract webbing. Check if the webbing is retracted smoothly and completely into the retractor. When webbing is not retracted smoothly due to the dust or other reasons, carry out the following procedure with “SEAT BELT, TAPE SET”.

Inspection for Front Seat Belt Shoulder Anchor.

1. Pull webbing out 50 cm or more.
2. Fix webbing near the belt exit with a clip.
3. Pass the thin wire into the through part of shoulder anchor and webbing. Remove the sticking materials from the webbing by sliding the wire vertically along the surface of the webbing through part while pulling both sides of wire tightly.
4. Clean the remaining dirt by cleaning the webbing through part with a clean cloth.
5. Apply tape to the shoulder anchor belt through part where webbing touches.

   NOTE:
   Be careful to apply tape with no wrinkling or looseness.
6. Remove the seat belt fixing, and confirm webbing smoothly retracts.

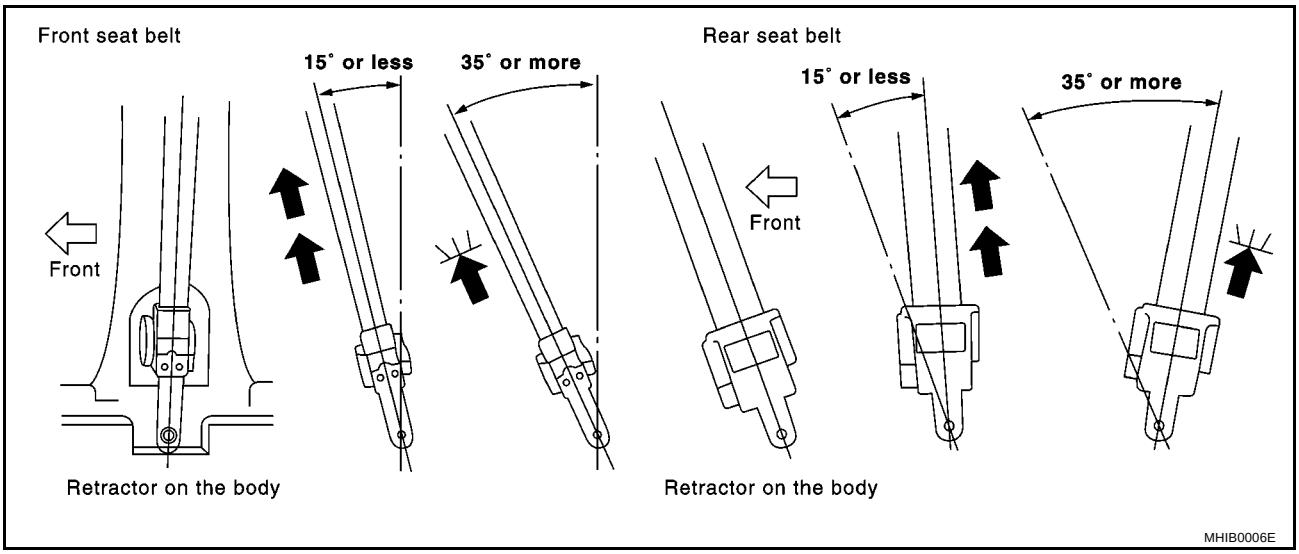
c. Insert the seat belt into the buckle and confirm seat belt is firmly secured.

d. Remove the seat belt from buckle. Release the seat belt and confirm webbing and tongue are placed correctly.

5. Seat belt retractor unit inspection

a. Remove seat belt retractor.

b. As shown in the figure, without twisting retractor, recline the seat belt retractor at the position retractor is mounted on the vehicle body. Slowly pull out the webbing.
   - Webbing is able to pull out when reclining 15 degrees or less.
   - Webbing is not able to pull out when reclining 35 degrees or more.



If it does not operate normally, replace seat belt assembly.

INSPECTION OF ELR AND SEAT BELT WITH CHILD SAFETY SEAT ANCHOR SYSTEM

ELR and Seat Belt With Child Safety Seat Anchor System

- ELR is a system which locks retractor in emergency cases such as sudden braking so that the webbing is not pulled out any further.
- Child safety seat anchor system is applied at the 3-point seat belt (outside seat) of back seat. Child safety seat anchor system functions when webbing is completely pulled out. Webbing is locked at certain point when retracting webbing little by little.
- There are 2 inspections: static and dynamic. Use the following procedures to check retractor for normal operation.

ELR Static Inspection

Does retractor lock and webbing stop immediately when quickly pulling webbing forward?

Inspection for Child Safety Seat Anchor System

1. Fully pull out webbing until “clicking” is heard.
2. Is “clicking” operating sound heard when retracting webbing little by little?
3. Is webbing locked and no longer pulled out when under tension?
4. Is child safety seat anchor system released when webbing is completely retracted?

ELR Dynamic Inspection

WARNING:

- **The following tests should be carried out in a safe, open place free of traffic and obstacles.**
- **The tests should be carried out on a dry paved road. Never attempt the tests on wet or unpaved road, open road, or highway. (This may cause an accident or personal injury.)**
- **Driver and passenger assume retractor will not lock and prepare themselves accordingly.**

1. Tighten driver and passenger seat belts.
2. Drive at approximately 16 km/h (MPH).
3. Notify passenger of a sudden stop. Driver and passenger prepare themselves for the possibility of retractor not locking. Then, driver fully depresses the brake pedal to stop suddenly.
4. While car stops, confirm if retractor is locked and webbing is not pulled out any more. Check for only retractor part if it is not locked.

SECTION SC
STARTING & CHARGING SYSTEM

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Wiring Diagrams and Trouble Diagnosis 3
PREPARATION 4
Special Service Tools 4
BATTERY 5
How to Handle Battery 5
METHODS OF PREVENTING OVER-DISCHARGE 5
CHECKING ELECTROLYTE LEVEL 5
SPECIFIC GRAVITY CHECK 6
Battery Test and Charging Chart 7
CHART I 7
CHART II 8
A: SLOW CHARGE 9
B: STANDARD CHARGE 11
C: QUICK CHARGE 12
Removal and Installation 14
CHARGING SYSTEM 15
System Description (CR Engine Models) 15
System Description (K9K Engine Models) 15
Wiring Diagram — CHARGE — (CR Engine Models) 16
Wiring Diagram — CHARGE — (K9K Engine Models) 17
Trouble Diagnoses (CR Engine Models) 19
DIAGNOSIS PROCEDURE 19
PRE-DIAGNOSIS INSPECTION 19
DIAGNOSIS CHART BY SYMPTOM 19
INSPECTION FLOW BY CHARGE WARNING LAMP 19
CHARGE WARNING LAMP LINE INSPECTION.. 20
VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION 21
INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION 23
INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION 23
DARK CURRENT INSPECTION 24
OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II 25
Trouble Diagnoses (K9K Engine Models) 26
DIAGNOSIS PROCEDURE 26
PRE-DIAGNOSIS INSPECTION 26
DIAGNOSIS CHART BY SYMPTOM 26
INSPECTION FLOW BY CHARGE WARNING LAMP 26
CHARGE WARNING LAMP LINE INSPECTION.. 27
VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION 28
INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION 30
INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION 30
DARK CURRENT INSPECTION 31
OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II 33
Removal and Installation (CR Engine Models) 34
REMOVAL 34
INSTALLATION 34
Removal and Installation (K9K Engine Models) 35
REMOVAL 35
INSTALLATION 35
Disassembly 36
REAR COVER 36
REAR BEARING 36
Inspection 36
ROTOR CHECK 36
BRUSH CHECK 36
STATOR CHECK 37
Assembly 37
RING FITTING IN REAR BEARING 37
REAR COVER INSTALLATION 37
STARTING SYSTEM 39
System Description 39
M/T MODELS 39
A/T MODELS 39
Wiring Diagram — START — (CR Engine Models).. 40

Wiring Diagram — START — (K9K Engine Models).. 42
Trouble Diagnoses 44
Removal and Installation (CR Engine Models) 45
REMOVAL 45
INSTALLATION 45
Removal and Installation (K9K Engine Models) 45
REMOVAL 45
INSTALLATION 45
Disassembly and Assembly 46
Inspection 49
MAGNETIC SWITCH CHECK 49
PINION/CLUTCH CHECK 49
BRUSH CHECK 49
YOKE CHECK 51
ARMATURE CHECK 51
Assembly 52
PINION PROTRUSION LENGTH ADJUSTMENT 52
SERVICE DATA AND SPECIFICATIONS (SDS) 54
Battery 54
Starter 54
Alternator 54

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

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The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Wiring Diagrams and Trouble Diagnosis

EKS007ZA

When you read wiring diagrams, refer to the followings:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-4, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When you perform trouble diagnosis, refer to the followings:

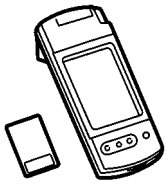
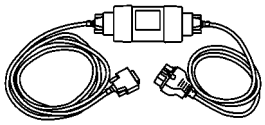
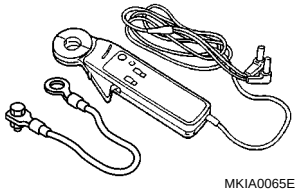
- GI-10, "How to Follow Trouble Diagnoses" in GI section
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

PREPARATION

PFP:00002

Special Service Tools

EKS007ZY

Tool name	Description	
CONSULT-II unit, and Program card AED02E	 PBIA3527J	System diagnose and inspection
CONSULT-II CONVERTER	 PBIA3526J	
Current measurement probe for CONSULT-II EG1187 1900	 MKIA0065E	

BATTERY

PFP:00011

How to Handle Battery

EKS007ZB

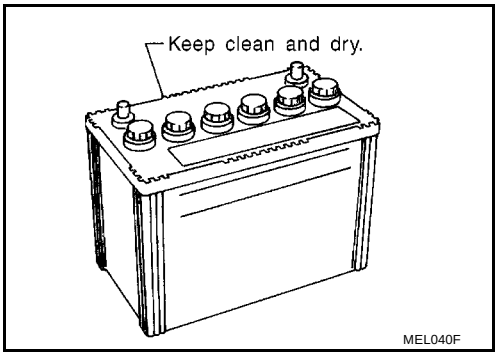
CAUTION:

- **If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.**
- **After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.**
- **Never add distilled water through the hole used to check specific gravity.**

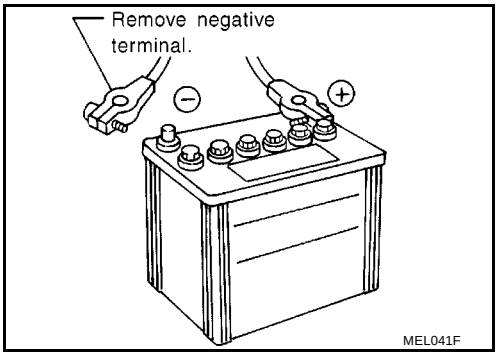
METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

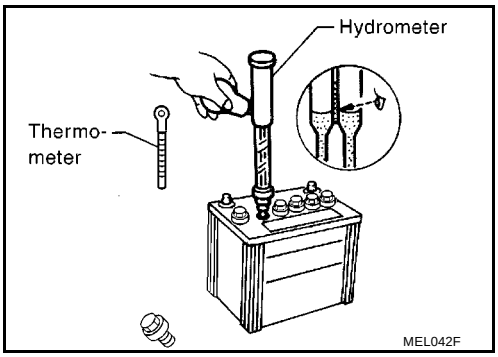
- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level.
  This also applies to batteries designated as “low maintenance” and “maintenance-free”.



- When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal. (If the vehicle has an extended storage switch, turn it off.)



- Check the charge condition of the battery.
  Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

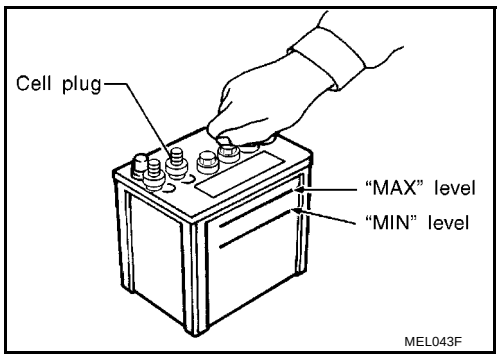


CHECKING ELECTROLYTE LEVEL

WARNING:

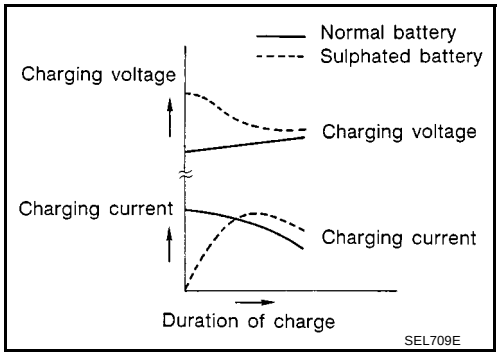
Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



Sulphation

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.
To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.
A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.

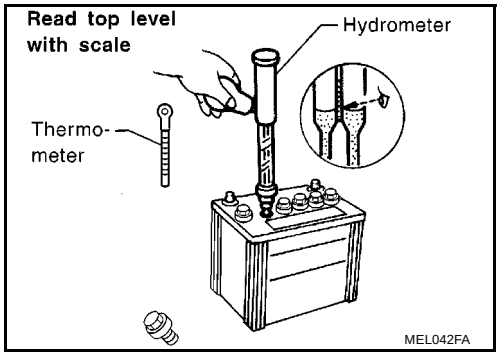


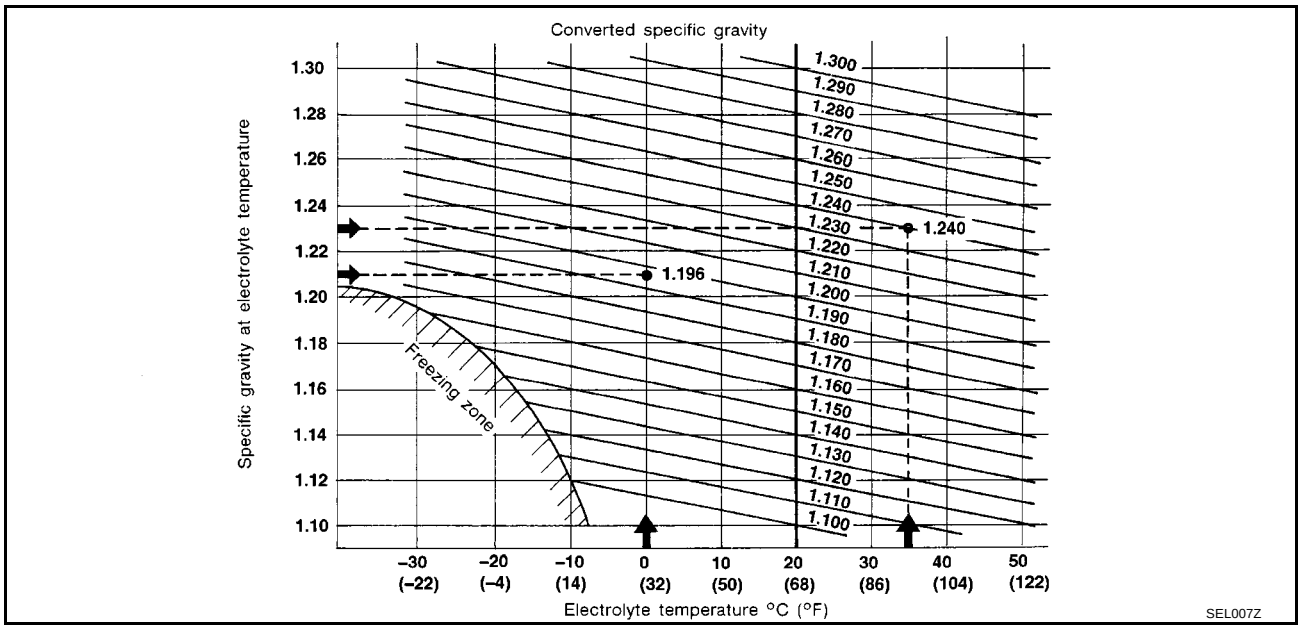
SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.
2. Convert into specific gravity at 20°C (68°F).

Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte is 1.230, converted specific gravity at 20°C (68°F) is 1.240.
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.





Battery Test and Charging Chart

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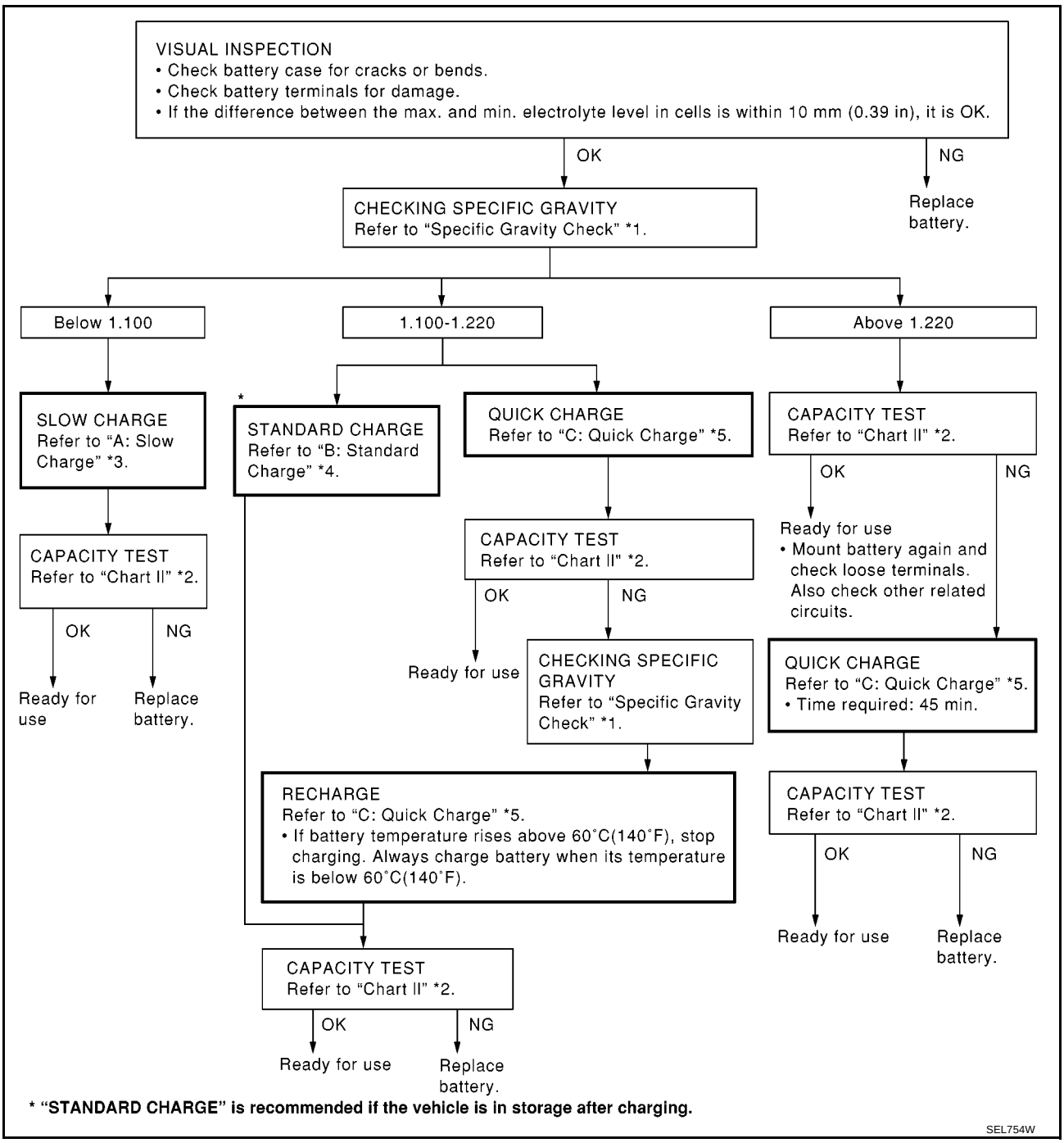
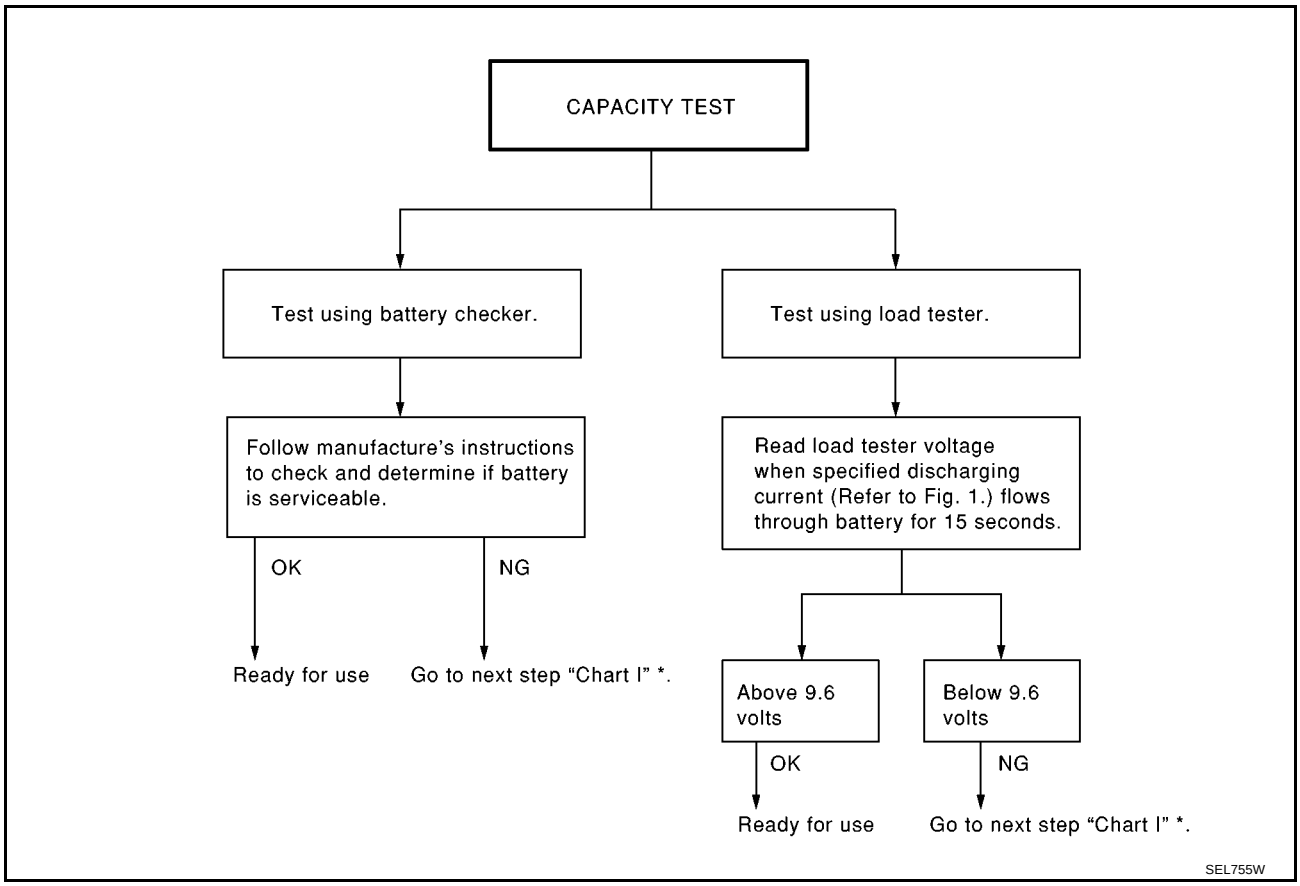
CHART I



*1. SC-6, "SPECIFIC GRAVITY CHECK"
*2. SC-8, "CHART II"
*3. SC-9, "A: SLOW CHARGE"
*4. SC-11, "B: STANDARD CHARGE"
*5. SC-12, "C: QUICK CHARGE"

CHART II



*. SC-7, "CHART I"

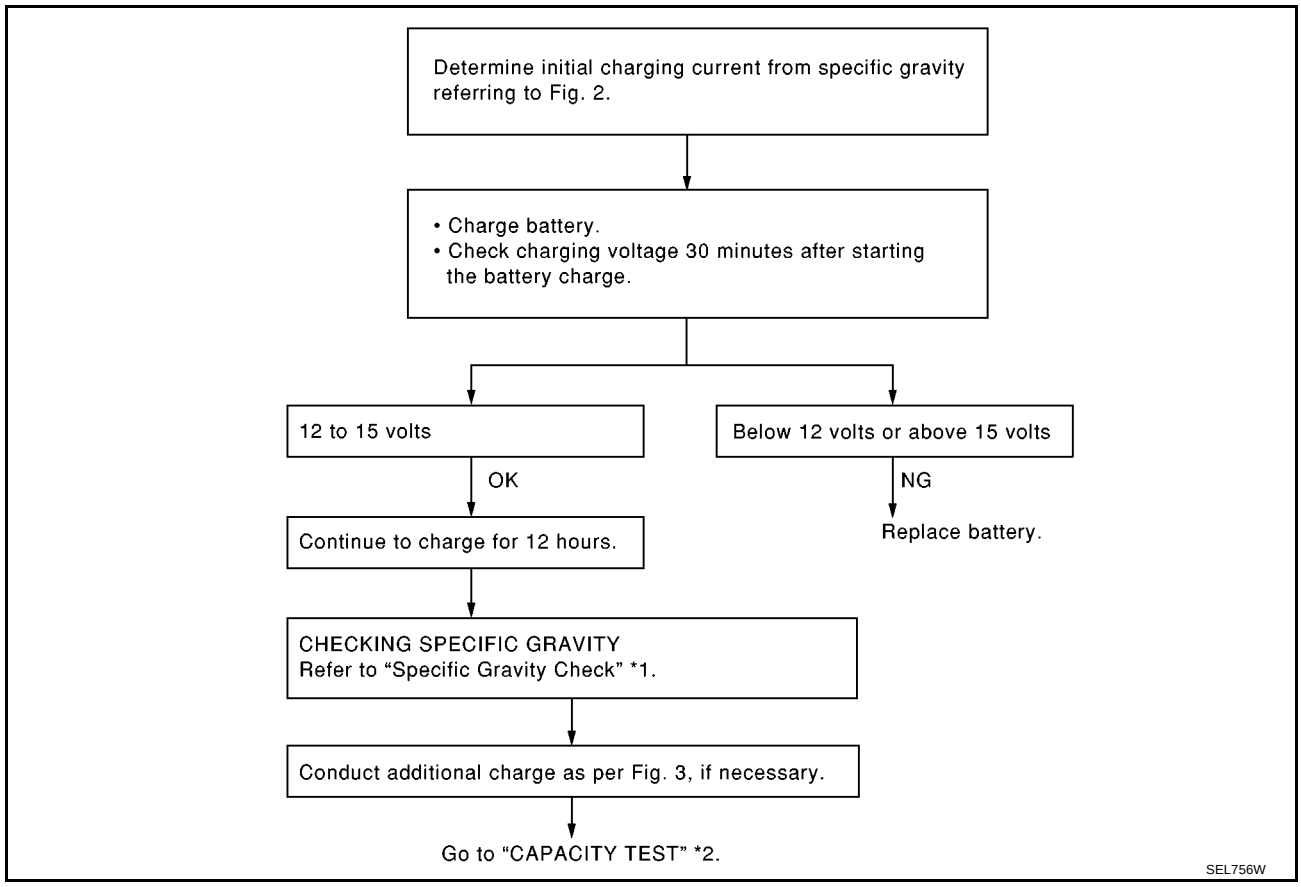
- Check battery type and determine the specified current using the following table.

Fig. 1 Discharging Current (Load Tester)

Type	Current (A)
28B19R(L)	90
34B19R(L)	99
46B24R(L)	135
55B24R(L)	135
50D23R(L)	150
55D23R(L)	180
65D26R(L)	195
80D26R(L)	195
75D31R(L)	210
063 [YUASA type code]	210
95D31R(L)	240
115D31R(L)	240
025 [YUASA type code]	240
065 [YUASA type code]	255
027 [YUASA type code]	285
075 [YUASA type code]	300
110D26R(L)	300
95E41R(L)	300
067 [YUASA type code]	325

Type	Current (A)
130E41R(L)	330
096 [YUASA type code]	375
096 [YUASA type code]	375
010S [YUASA type code]	360
LB1 FCM 047 620 [FULMAN type code]	420
LB2 FCM 055 622 [FULMAN type code]	510
LB2 FCM 050 622 [FULMAN type code]	600

A: SLOW CHARGE



*1. SC-6, "SPECIFIC GRAVITY CHECK"

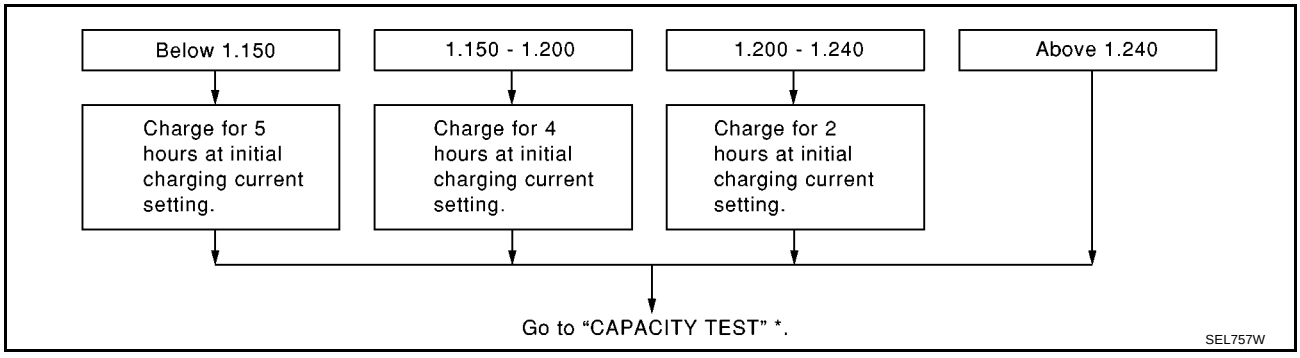
*2. SC-8, "CHART II"

Fig. 2 Initial Charging Current Setting (Slow Charge)

CON-VERTED SPECIFIC GRAVITY	BATTERY TYPE																							
	BL1 FCM 047 620 [FULMEN type code]	LB2 FCM 050 622 [FULMEN type code]	LB2 FCM 055 622 [FULMEN type code]	28B19R(L)	34B19R(L)	46B24R(L)	55B24R(L)	50D23R(L)	55D23R(L)	025 [YUASA type code]	027 [YUASA type code]	65D26R(L)	80D26R(L)	063 [YUASA type code]	067 [YUASA type code]	096 [YUASA type code]	75D31R(L)	95D31R(L)	115D31R(L)	110D26R(L)	95E41R(L)	065 [YUASA type code]	075 [YUASA type code]	096L [YUASA type code]	010S [YUASA type code]	130E41R(L)
Below 1.100	2.55 (A)	2.75 (A)	3.0 (A)	4.0 (A)		5.0 (A)		7.0 (A)				8.0 (A)				8.5 (A)	9.0 (A)	10.0 (A)						11.0 (A)		14.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 3 Additional Charge (Slow Charge)

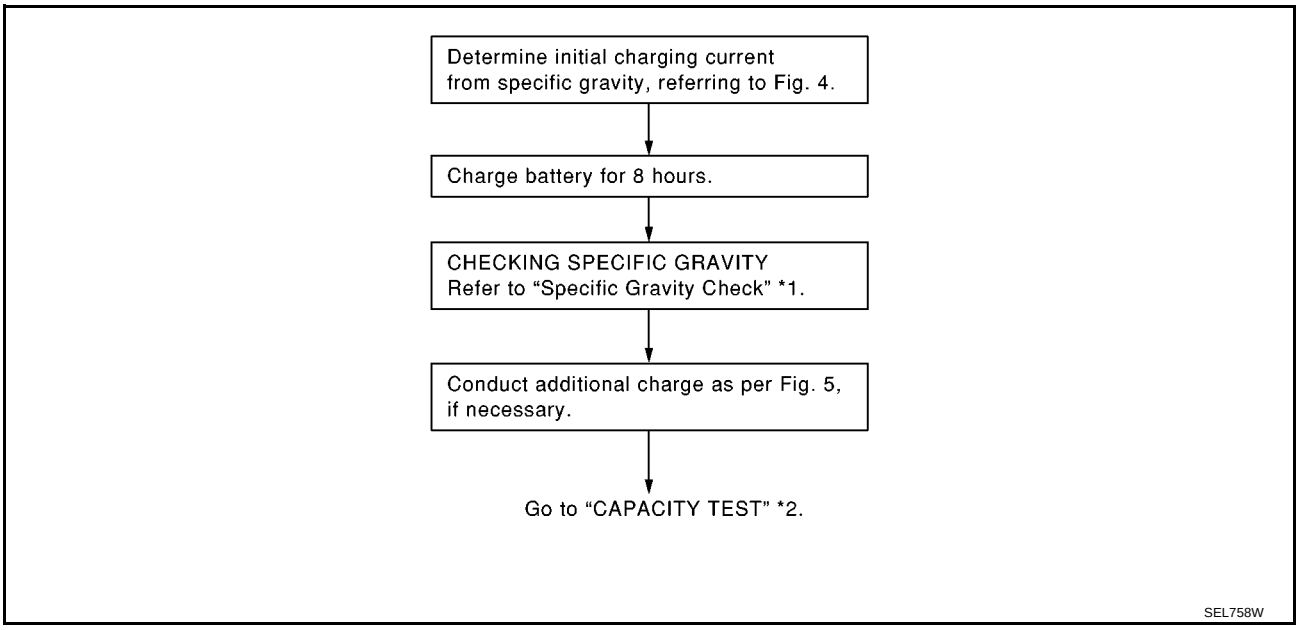


*. SC-8, "CHART II"

CAUTION:

- **Set charging current to value specified in Fig. 2. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.**
- **If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).**

B: STANDARD CHARGE



*1. SC-6, "SPECIFIC GRAVITY CHECK"

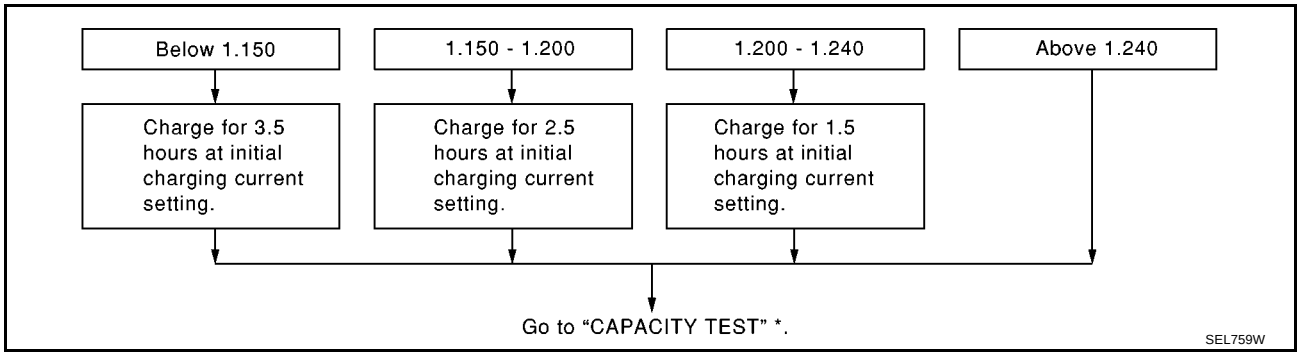
*2. SC-8, "CHART II"

Fig. 4 Initial Charging Current Setting (Standard Charge)

CON-VERTED SPECIFIC GRAVITY	BATTERY TYPE																								
	28B19R(L)	34B19R(L)	LB1 FCM 047 620 [FULMEN type code]	LB2 FCM 050 622 [FULMEN type code]	46B24R(L)	55B24R(L)	LB2 FCM 055 622 [FULMEN type code]	50D23R(L)	55D23R(L)	025 [YUASA type code]	027 [YUASA type code]	65D26R(L)	80D26R(L)	063 [YUASA type code]	067 [YUASA type code]	096 [YUASA type code]	75D31R(L)	95D31R(L)	115D31R(L)	110D26R(L)	95E41R(L)	065 [YUASA type code]	075 [YUASA type code]	096L [YUASA type code]	010S [YUASA type code]	130E41R(L)
1.100 - 1.130	4.0 (A)		4.1(A)	4.8(A)	5.0 (A)		2.0(A)	6.0 (A)				7.0 (A)					8.0 (A)	9.0 (A)						10.0 (A)		13.0 (A)
1.130 - 1.160	3.0 (A)		3.4(A)	4.0(A)	4.0 (A)		4.2(A)	5.0 (A)				6.0 (A)					7.0 (A)	8.0 (A)						9.0 (A)		11.0 (A)
1.160 - 1.190	2.0 (A)		2.8(A)	3.3(A)	3.0 (A)		3.3(A)	4.0 (A)				5.0 (A)					6.0 (A)	7.0 (A)						8.0 (A)		9.0 (A)
1.190 - 1.220	2.0 (A)		2.1(A)	2.3(A)	2.0 (A)		2.4(A)	3.0 (A)				4.0 (A)					5.0 (A)	5.0 (A)						6.0 (A)		7.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 5 Additional Charge (Standard Charge)

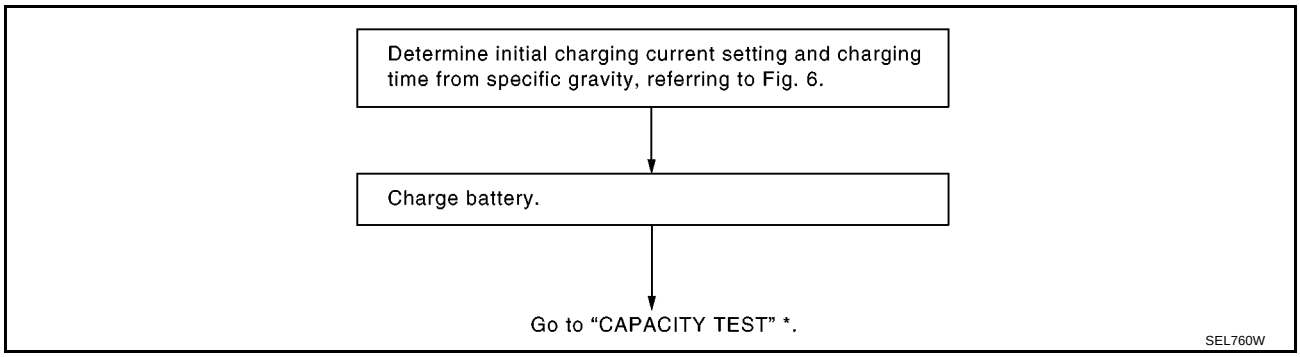


*. SC-8, "CHART II"

CAUTION:

- **Do not use standard charge method on a battery whose specific gravity is less than 1.100.**
- **Set charging current to value specified in Fig. 4. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.**
- **If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).**

C: QUICK CHARGE



*. SC-8, "CHART II"

Fig. 6 Initial Charging Current Setting and Charging Time (Quick Charge)

BATTERY TYPE	CURRENT [A]	CONVERTED SPECIFIC GRAVITY	
		1.100 - 1.130	2.5 hours
		1.130 - 1.160	2.0 hours
		1.160 - 1.190	1.5 hours
		1.190 - 1.220	1.0 hours
		Above 1.220	0.75 hours (45 min.)
28B19R(L)	10 (A)		
34B19R(L)			
46B24R(L)	15 (A)		
55B24R(L)			
50D23R(L)			
55D23R(L)	20 (A)		
65D26R(L)			
80D26R(L)			
025 [YUASA type code]			
027 [YUASA type code]			
063 [YUASA type code]			
LB1 FCM 047 620 [FULMEN type code]	21(A)		
BL2 FCM 050 622 [FULMEN type code]	23(A)		
LB2 FCM 055 622 [FULMEN type code]	24(A)		
067 [YUASA type code]	25 (A)		
096 [YUASA type code]			
065 [YUASA type code]			
075 [YUASA type code]			
096L [YUASA type code]	30 (A)		
010S [YUASA type code]			
75D31R(L)			
95D31R(L)			
115D31R(L)			
110D26R(L)			
95E41R(L)			
130E41R(L)	40 (A)		

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

CAUTION:

- **Do not use quick charge method on a battery whose specific gravity is less than 1.100.**
- **Set initial charging current to value specified in Fig. 6. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away from open flame while it is being charged.**
- **When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.**
- **Be careful of a rise in battery temperature because a large current flow is required during quick-charge operation.**
  If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

- **Do not exceed the charging time specified in Fig. 6, because charging battery over the charging time can cause deterioration of the battery.**

Removal and Installation

EKS007ZD

Observe the following to ensure proper servicing.

CAUTION:

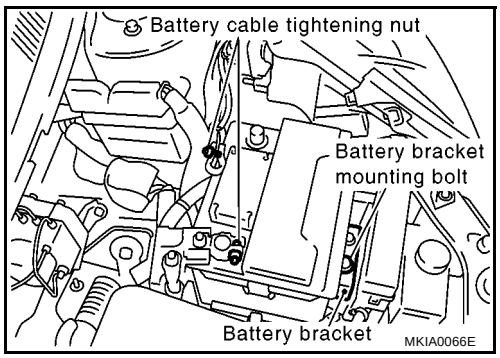
- **When removing, remove negative terminal first. But for installation, install positive terminal first.**
- **Tighten parts to the specified torque shown below.**

Battery bracket mounting bolt:

: 12.7 - 15.7 N·m (1.3 - 1.6 kg-m, 10 - 11 ft-lb)

Battery cable tightening nut:

: 3.0 - 5.0 N·m (0.31 - 0.51 kg-m, 27 - 44 in-lb)



CHARGING SYSTEM

PFP:00011

System Description (CR Engine Models)

EKS007ZE

The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.
Power is supplied at all times to alternator terminal 4 (S) through:

- 10A fuse [No. 26, located in the fuse block (J/B)].

Terminal B supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal 4 (S) detecting the input voltage. The charging circuit is protected by the 100A link.
The alternator is grounded to the body.
With the ignition switch in the ON or START position, power is supplied

- 10A fuse [No. 2, located in the fuse block (J/B)]
- to combination meter terminal 28 for the charge warning lamp.

Ground is supplied

- to terminal 38 of the combination meter
- through terminal 3 (L) of the alternator.

The charge warning lamp will illuminate. When the alternator is providing sufficient voltage with the engine running, the ground is opened and the charge warning lamp will go off.
If the charge warning lamp illuminates with the engine running, a fault is indicated.

System Description (K9K Engine Models)

EKS00K2U

The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.
With the ignition switch in the ON or START position, power is supplied to alternator terminal 4 (S) through:

- IPDM E/R (Intelligent Power Distribution Module Engine Room)

Terminal B supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal 4 (S) detecting the input voltage. The charging circuit is protected by the 100A link.
The alternator is grounded to the body.
With the ignition switch in the ON or START position, power is supplied

- 10A fuse [No. 2, located in the fuse block (J/B)]
- to combination meter terminal 28 for the charge warning lamp.

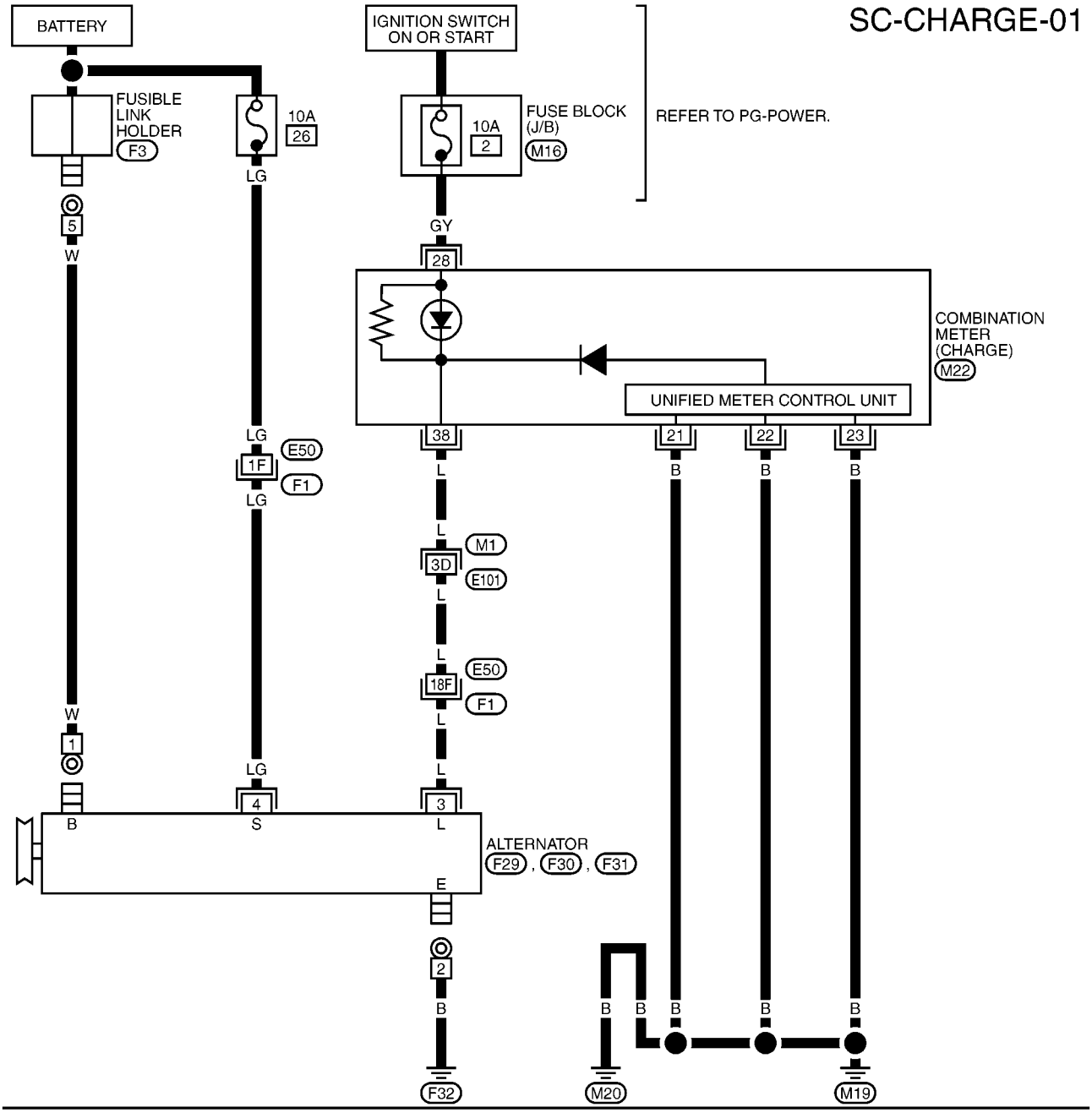
Ground is supplied

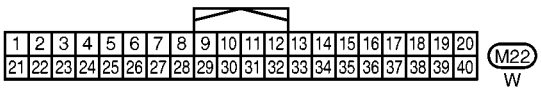
- to terminal 38 of the combination meter
- through terminal 3 (L) of the alternator.

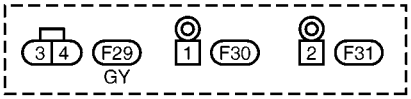
The charge warning lamp will illuminate. When the alternator is providing sufficient voltage with the engine running, the ground is opened and the charge warning lamp will go off.
If the charge warning lamp illuminates with the engine running, a fault is indicated.

Wiring Diagram — CHARGE — (CR Engine Models)

EKS007ZF





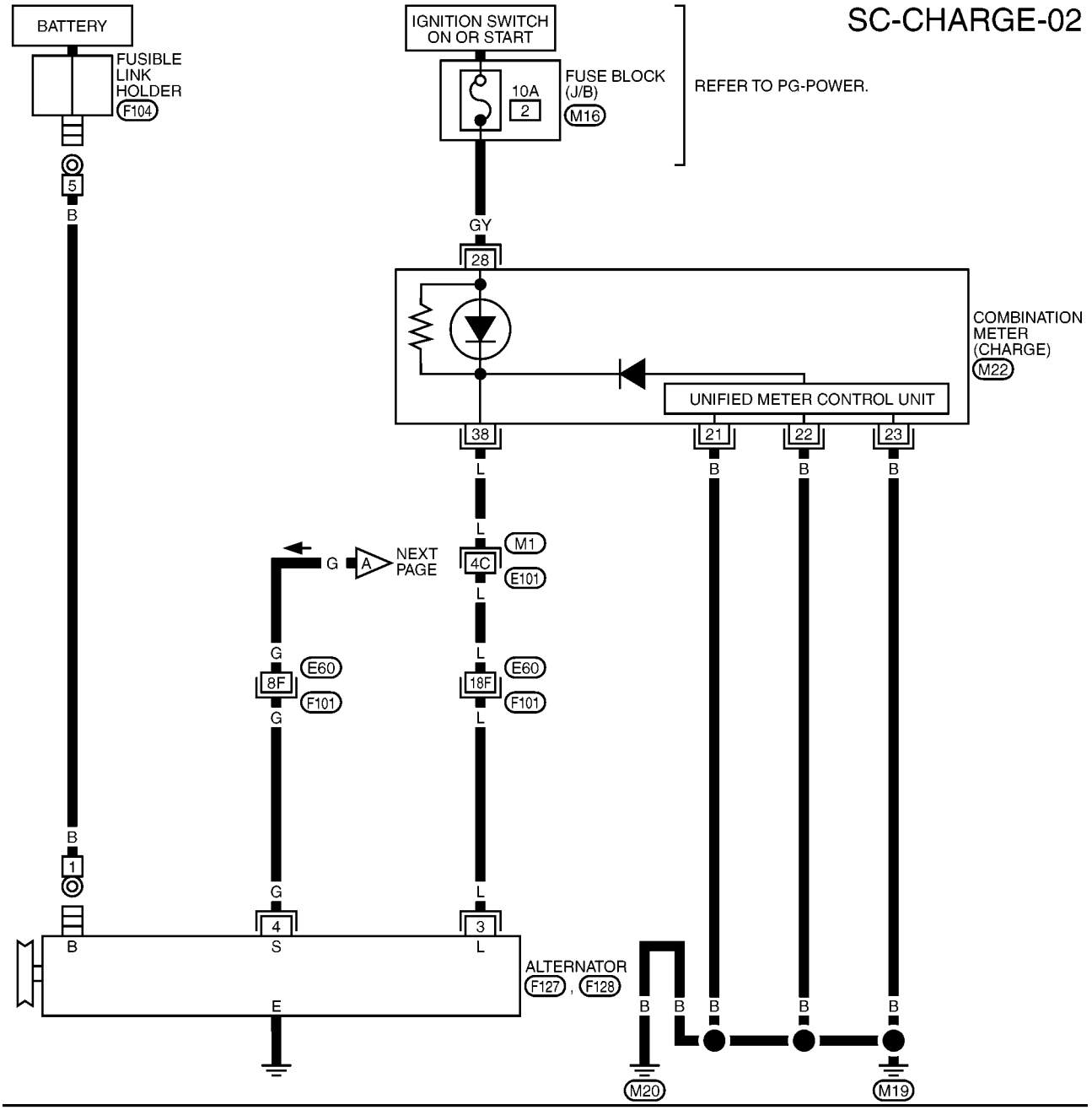


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA0787E

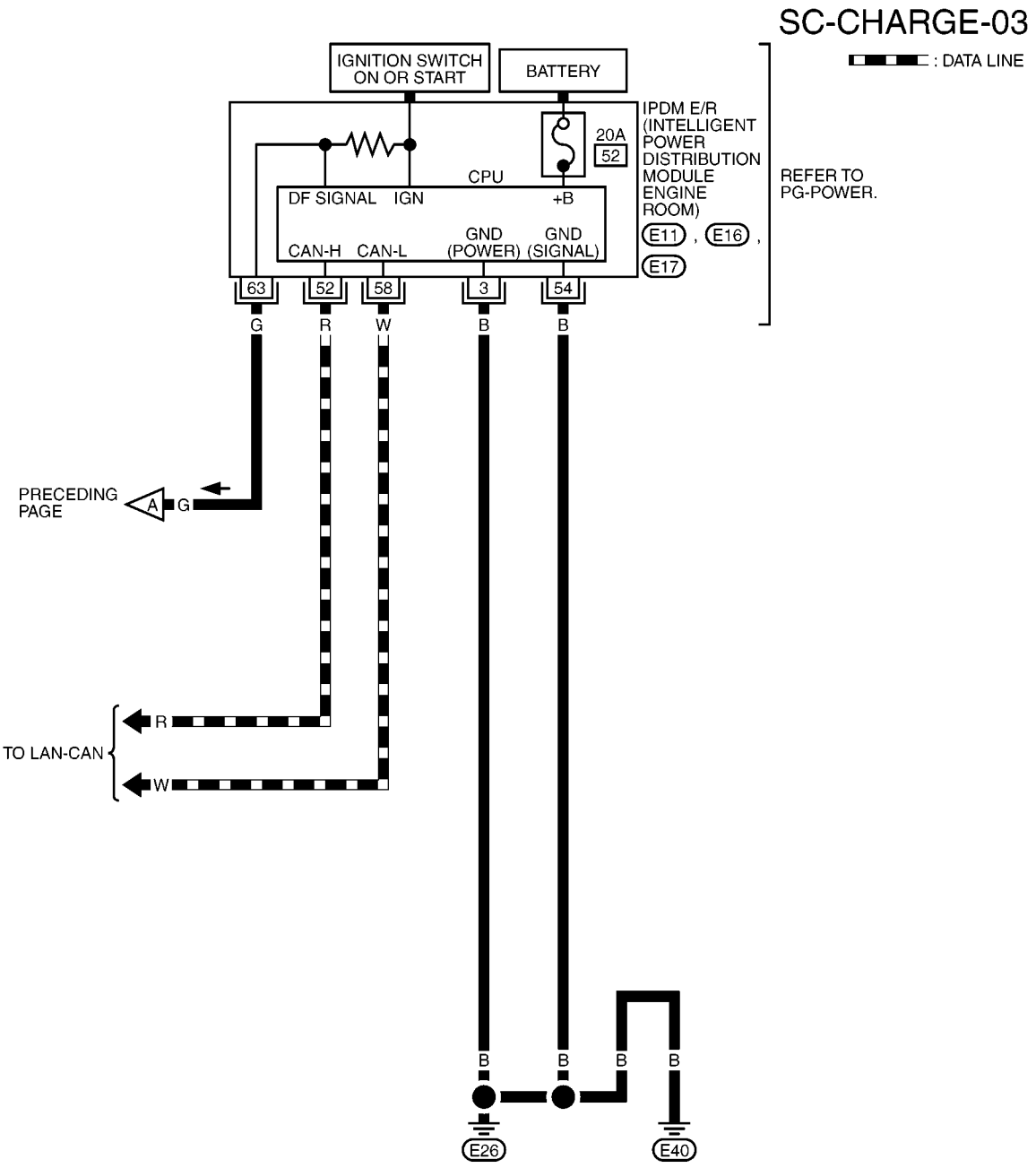
Wiring Diagram — CHARGE — (K9K Engine Models)

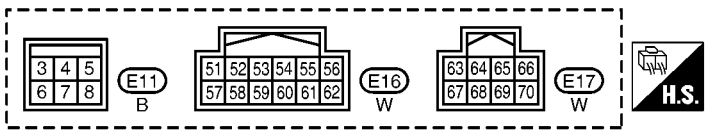
EKS00K2V



REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)

MKWA1451E


SC-CHARGE-03
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
20A
52
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E11 , E16 , E17
REFER TO PG-POWER.
CPU
DF SIGNAL
IGN
+B
CAN-H
CAN-L
GND (POWER)
GND (SIGNAL)
63
52
58
3
54
G
R
W
B
B
PRECEDING PAGE
A
G
TO LAN-CAN
R
W
B
B
B
B
E26
E40


3 4 5
6 7 8
E11
B
51 52 53 54 55 56
57 58 59 60 61 62
E16
W
63 64 65 66
67 68 69 70
E17
W
H.S.

MKWA1452E

Trouble Diagnoses (CR Engine Models)

EKS007ZG

DIAGNOSIS PROCEDURE

1. Check malfunction symptoms or customer's remarks.
2. Perform pre-diagnosis inspection. Refer to SC-19, "PRE-DIAGNOSIS INSPECTION" .
3. Perform trouble diagnosis for each trouble symptom. Refer to SC-19, "DIAGNOSIS CHART BY SYMPTOM"
4. Repair or replace parts indicated inspection flow based on the charge warning lamp. Refer to SC-19, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
5. End

PRE-DIAGNOSIS INSPECTION

1. Perform alternator belt inspection. Refer to EM-12, "DRIVE BELTS" in EM section.
2. Inspect battery.
3. Check alternator terminal B for loose or improper connection.
4. Check alternator connector and terminals for loose connection, disconnection and bend.
5. Check connecting condition of harness for charging system harness (fusible link terminal and battery terminal).
6. After performing 1 to 5 above, go to trouble diagnosis for symptoms. Refer to SC-19, "DIAGNOSIS CHART BY SYMPTOM" .

DIAGNOSIS CHART BY SYMPTOM

Symptom	Reference page
Battery discharge	Refer toSC-19, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
Charge warning lamp illuminates.	Refer to SC-19, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
Other than the above symptoms (splashing out of battery fluid, nasty smell and others)	SC-23, "INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION".

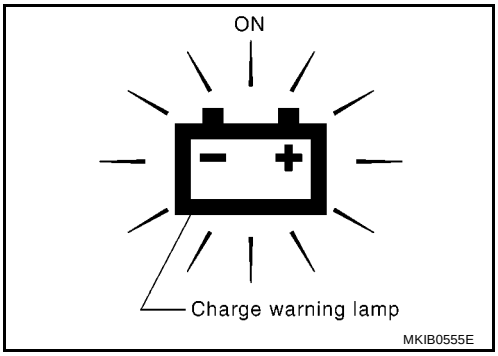
INSPECTION FLOW BY CHARGE WARNING LAMP

1. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch ON.
2. Check if charge warning lamp illuminates.

Does charge warning lamp illuminate?

YES >> GO TO 2.
NO >> Go to SC-20, "CHARGE WARNING LAMP LINE INSPECTION" .

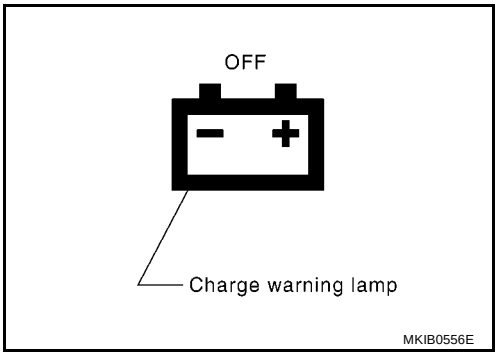


2. CHARGE WARNING LAMP INSPECTION

1. Start engine.
2. Check if charge warning lamp goes off.

Does charge warning lamp goes off?

YES >> GO TO 3.
NO >> Go to SC-21, "VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION" .

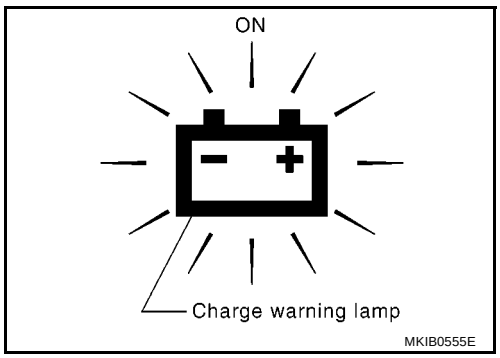


3. CHARGE WARNING LAMP INSPECTION

1. Set engine speed at 2,500 rpm.
2. Check if charge warning lamp illuminates.

Does charge warning lamp illuminate?

YES >> Go to SC-23, "INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION" .
NO >> Go to SC-23, "INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION" .



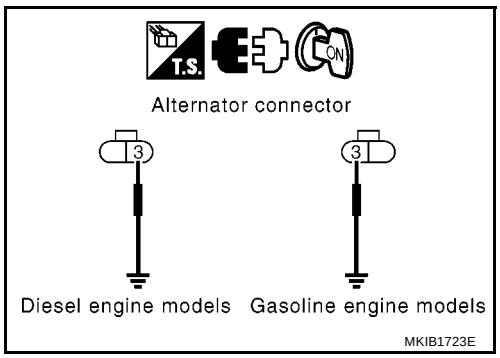
CHARGE WARNING LAMP LINE INSPECTION

CAUTION:
If open circuit is detected in L terminal, alternator cannot start generating.

INSPECTION PROCEDURE

1. CHARGE WARNING LAMP INSPECTION

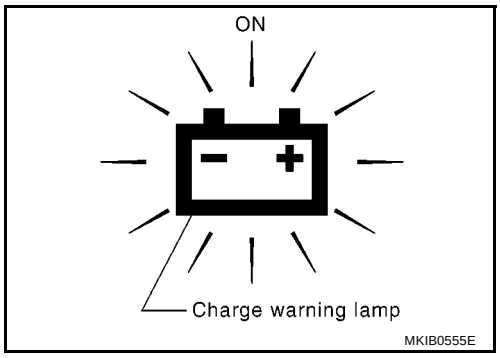
1. Turn ignition switch OFF.
2. Disconnect alternator connector
3. Connect alternator connector terminal 3 to ground.



4. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 4.
NO >> GO TO 2.



2. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Check meter and terminals (meter side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 3.
NG >> Repair terminals and connectors.

3. CONTINUITY INSPECTION

1. Disconnect combination meter connector.
2. Check continuity between combination meter connector terminal 38 and alternator connector terminal 3.

38 - 3 : Continuity should exist.

OK or NG

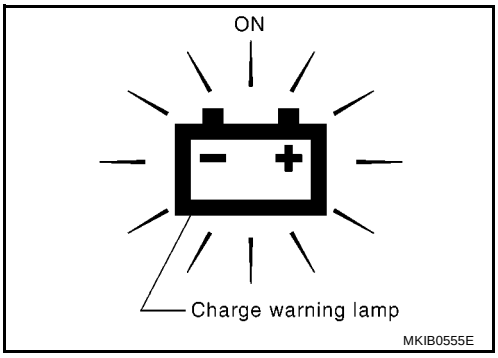
OK >> Replace combination meter. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

4. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch OFF.
2. Connect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> Repair alternator connector. (Poor connection and intermittent problem) (Do not replace alternator, since it is normal.)
NO >> Replace alternator. (circuit malfunction in alternator)



VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION

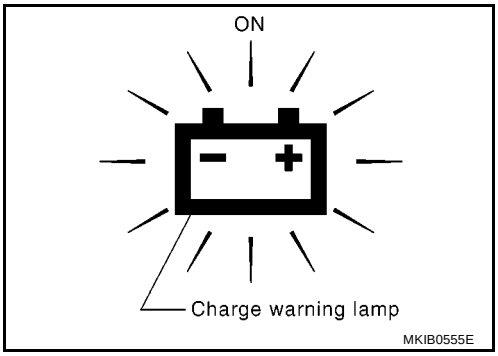
INSPECTION PROCEDURE

1. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp stay ON?

YES >> GO TO 5.
NO >> GO TO 2.



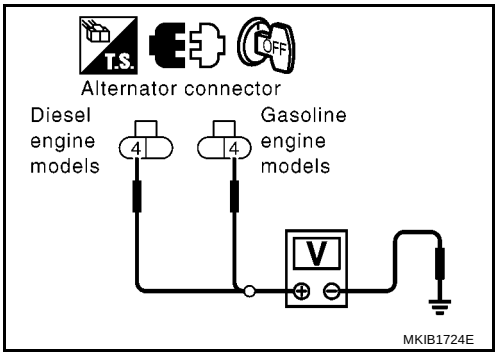
2. VOLTAGE INSPECTION

Check voltage between alternator connector terminal 4 and ground.

4 - Ground : 12V or more

Is the inspection result 12V or more?

YES >> Replace alternator.
NO >> GO TO 3.



3. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Check alternator connector and terminal 4 (alternator side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 4.
NG >> Repair terminals and connectors.

4. CHECK FUSES.

Check if alternator S terminal fuse #26 (10A) is blown.

OK or NG

OK >> Repair harness between fuse #26 (10A) and alternator connector terminal 4. (Do not replace alternator, since it is normal.)
NG >> Replace fuse. (Do not replace alternator, since it is normal.)

5. CONTINUITY INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter connector terminal 38 and ground, and combination meter connector terminal 38 and alternator terminal 3.

38 - Ground : Continuity should not exist.
38 - 3 : Continuity should exist.

OK or NG

OK >> Replace combination meter. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION

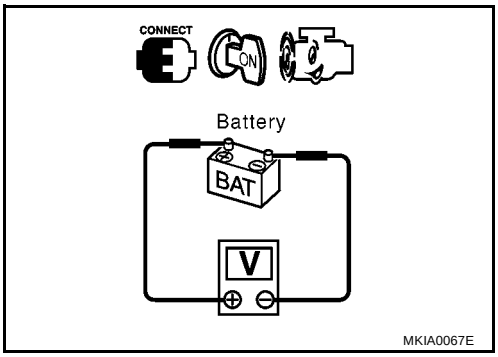
CAUTION:
Check them using charged battery performed battery inspection.

1. VOLTAGE INSPECTION

1. Increase engine speed to 2,500 rpm.
2. Turn electrical load to ON. (Headlamp LO turns on, blower fan motor maximum airflow amount)
3. Check battery voltage.

Is the inspection result 12.8V to 15.1V?

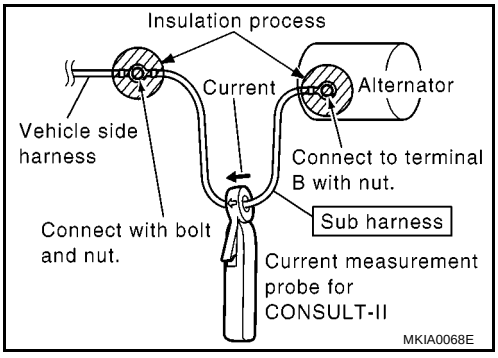
YES >> GO TO 2.
NO >> Replace alternator. (Alternator power generation error.)



2. CURRENT INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect the battery ground cable.
3. Attach current measurement probe for CONSULT-II to the harness for alternator terminal B. (If the probe can not be attached properly, then connect the sub-harness between alternator terminal B and the vehicle side harness as shown in figure, and attach the probe to sub-harness.)
4. Connect battery ground cable.
5. Increase engine speed to 2,500 rpm.
6. Turn electrical load to ON. (Headlamp LO turns on, blower fan motor maximum airflow amount, rear window defogger)
7. Check alternator terminal B current.

   CAUTION:
   Be careful of rotating parts because the engine is running.



Is the inspection result 30A or more?

YES >> GO TO dark current inspection. Refer to SC-24, "DARK CURRENT INSPECTION" . (Alternator is normal. Do not replace.)
NO >> Replace alternator. (Alternator power generation error.)

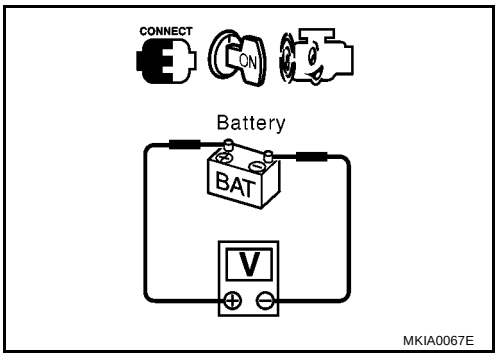
INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION

1. ALTERNATOR VOLTAGE INSPECTION

1. Increase engine speed to 2,500 rpm.
2. Check battery voltage.

Is the inspection result 16V or less?

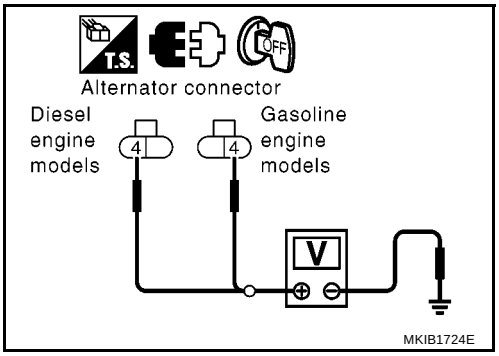
YES >> GO TO 2.
NO >> Replace alternator. (Excessive alternator power generation.)



2. BATTERY VOLTAGE INSPECTION

1. Turn the ignition switch OFF.
2. Disconnect alternator connector.
3. Check voltage between alternator connector terminal 4 and ground.

4 - Ground : 12V or more



Is the inspection result 12V or more?

YES >> Replace alternator. (Alternator power generation error)
NO >> GO TO 3.

3. FUSE CHECK

Check if fuse #26 (10A) is blown.

OK or NG

OK >> Repair harness between fuse #26 (10A) and alternator harness connector terminal 4. (Alternator is normal. Do not replace.)
NG >> Replace fuse. (Alternator is normal. Do not replace.)

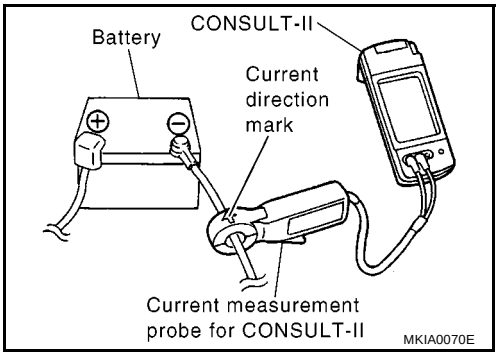
DARK CURRENT INSPECTION

Dark Current : Small current while ignition switch “OFF”.

NOTE:

- If battery ground cable is disconnected from battery terminal, a large dark current may not be reproduced. When battery discharge occurs, never disconnect battery terminal while using ammeter.
- Do not connect CONSULT-II CONVERTER to data link connector when measuring dark current. CONSULT-II power should be supplied using AC adapter or internal battery.

1. Attach current measurement probe for CONSULT-II to battery ground cable. Refer to SC-25, "OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II" .
2. Check that all electrical equipment is turned OFF.
3. Remove key. Close and lock doors. Check that room lamp turns off.
4. Measure dark current. Is it 50mA or less? Refer to SC-25, "OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II" .



NOTE:
Dark current stable time is different due to equipment and use of the vehicle. If it is not 50mA or less after leaving for 1 minute, measure dark current again after leaving for 30 minutes or more.
If YES, GO TO 7. If NO, GO TO 5.

5. Remove and install fuses one by one. Search for the fuse that greatly changes dark current.

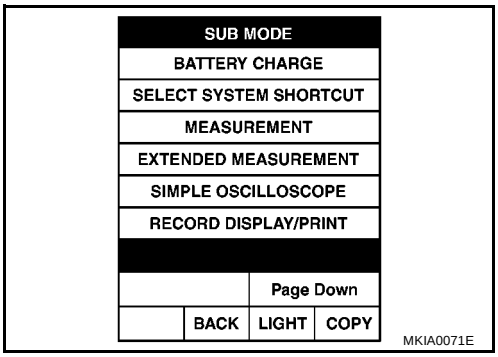
NOTE:
If dark current is greatly reduced when removing the fuse, and even if dark current is not greatly increased when installing it again, the fuse circuit may be the cause.

6. Check that dark current changes when moving the suspect circuit harness. If dark current changes, check harness for short. If dark current does not change, electronic unit in the circuit may not be entering the energy-saving mode when it turns OFF. If it does not enter the energy-saving mode, replace electronic unit.
7. No malfunction for alternator and electrical equipment. Electric load may be larger than alternator generating ability. Check the customer's usage.

OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II

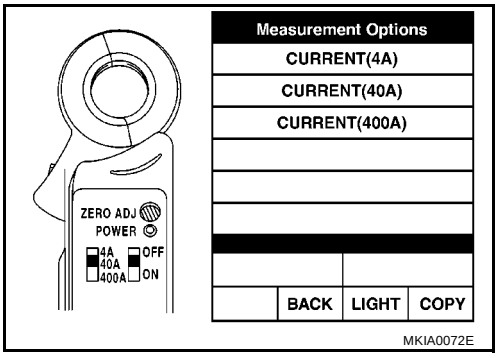
For details, refer to the supplied “CONSULT-II Current Probe Operation Manual”.

1. Turn current probe power supply OFF and connect to CONSULT-II. (Red: CH1, Black: Ground)
2. Touch “SUB MODE”.
3. Touch “Extending Measurement Mode” on “SUB MODE” screen.
4. CAUTION is displayed, touch “OK”.



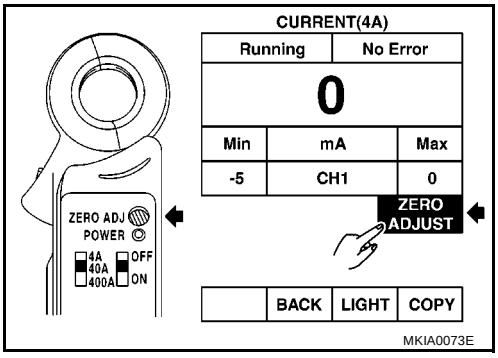
5. Set current probe range switch at the range to measure, turn current probe power supply ON. When measuring dark current, set 4A range. (Check that POWER indicator turns on. Refer to CONSULT-II Current Probe Operation Manual.)
6. Touch the same measuring range at CONSULT-II.

   NOTE:
   If current probe measuring range is different from CONSULT-II measuring range, incorrect value is displayed.



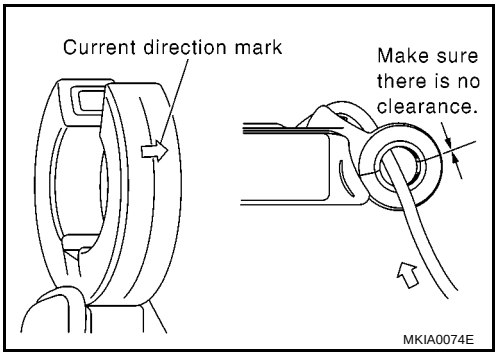
7. Adjust 0 point of current probe or CONSULT-II. (Do not clamp anything to probe.)

   NOTE:
   If 0 point is dislocated greatly, adjust at current probe side generally.



8. Align current direction mark, clamp harness, and measure current. If current direction is incorrect, it is displayed negative value.

   NOTE:
   - When current is measured, close probe joint securely.
   - If multiple harnesses are clamped, measurement cannot be performed. Always clamp only one.



Trouble Diagnoses (K9K Engine Models)

EKS00K2W

DIAGNOSIS PROCEDURE

1. Check malfunction symptoms or customer's remarks.
2. Perform pre-diagnosis inspection. Refer to SC-26, "PRE-DIAGNOSIS INSPECTION" .
3. Perform trouble diagnosis for each trouble symptom. Refer to SC-26, "DIAGNOSIS CHART BY SYMPTOM"
4. Repair or replace parts indicated inspection flow based on the charge warning lamp. Refer to SC-26, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
5. End

PRE-DIAGNOSIS INSPECTION

1. Perform alternator belt inspection. Refer to EM-121, "DRIVE BELTS" .
2. Inspect battery.
3. Check alternator terminal B for loose or improper connection.
4. Check alternator connector and terminals for loose connection, disconnection and bend.
5. Check connecting condition of harness for charging system harness (fusible link terminal and battery terminal).
6. After performing 1 to 5 above, go to trouble diagnosis for symptoms. Refer to SC-26, "DIAGNOSIS CHART BY SYMPTOM" .

DIAGNOSIS CHART BY SYMPTOM

Symptom	Reference page
Battery discharge	Refer toSC-26, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
Charge warning lamp illuminates.	Refer to SC-26, "INSPECTION FLOW BY CHARGE WARNING LAMP" .
Other than the above symptoms (splashing out of battery fluid, nasty smell and others)	SC-30, "INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION".

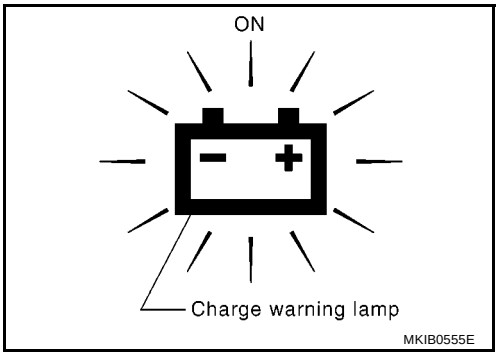
INSPECTION FLOW BY CHARGE WARNING LAMP

1. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch ON.
2. Check if charge warning lamp illuminates.

Does charge warning lamp illuminate?

YES >> GO TO 2.
NO >> Go to SC-27, "CHARGE WARNING LAMP LINE INSPECTION" .

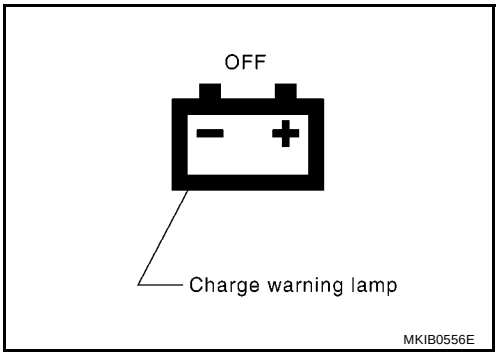


2. CHARGE WARNING LAMP INSPECTION

1. Start engine.
2. Check if charge warning lamp goes off.

Does charge warning lamp goes off?

YES >> GO TO 3.
NO >> Go to SC-28, "VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION" .



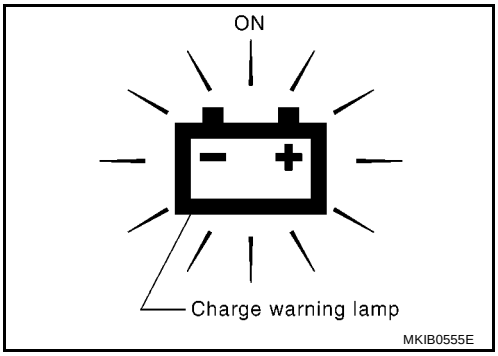
3. CHARGE WARNING LAMP INSPECTION

1. Set engine speed at 2,500 rpm.
2. Check if charge warning lamp illuminates.

Does charge warning lamp illuminate?

YES >> Go to SC-30, "INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION" .

NO >> Go to SC-30, "INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION" .



CHARGE WARNING LAMP LINE INSPECTION

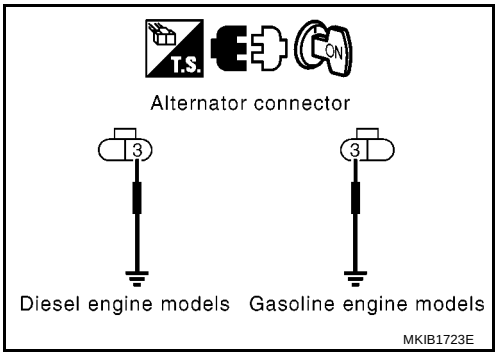
CAUTION:

If open circuit is detected in L terminal, alternator cannot start generating.

INSPECTION PROCEDURE

1. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch OFF.
2. Remove alternator connector.
3. Connect alternator connector terminal 3 to ground.

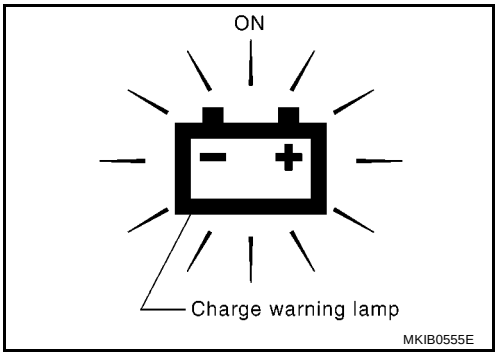


4. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 4.

NO >> GO TO 2.



2. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Check combination meter and terminals (meter side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 3.

NG >> Repair terminals and connectors.

3. CONTINUITY INSPECTION

1. Disconnect combination meter connector.
2. Check continuity between combination meter connector terminal 38 and alternator connector terminal 3.

38 - 3 : Continuity should exist.

OK or NG

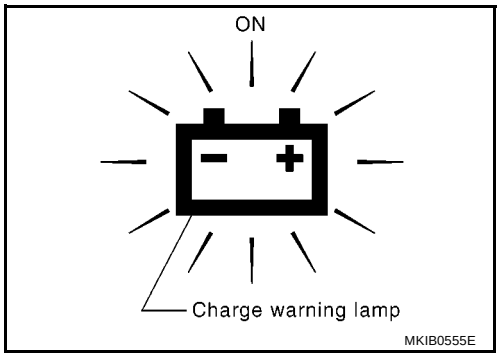
OK >> Replace combination meter. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

4. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch OFF.
2. Connect alternator connectors.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> Repair alternator connector. (Poor connection and intermittent problem) (Do not replace alternator, since it is normal.)
NO >> Replace alternator. (circuit malfunction in alternator)



VOLTAGE DETECTION LINE AND CHARGE WARNING LAMP INSPECTION

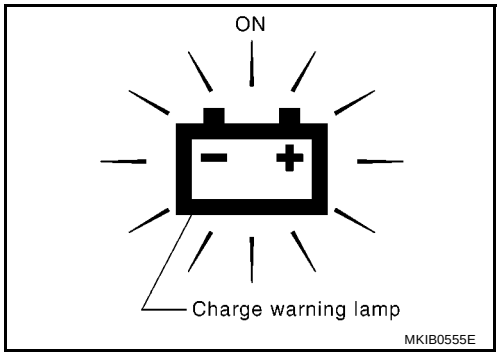
INSPECTION PROCEDURE

1. CHARGE WARNING LAMP INSPECTION

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp stay ON?

YES >> GO TO 6.
NO >> GO TO 2.



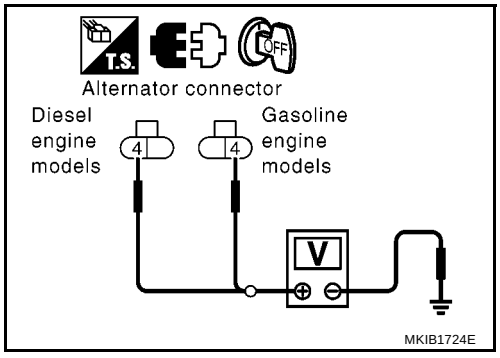
2. VOLTAGE INSPECTION

Check voltage between alternator connector terminal 4 and ground.

4 - Ground : 12V or more

Is the inspection result 12V or more?

YES >> Replace alternator.
NO >> GO TO 3.



3. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Check alternator connector and terminal 4 (alternator side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 4.
NG >> Repair terminals and connectors.

4. CONNECTOR INSPECTION

Check IPDM E/R and terminals (IPDM E/R side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 5.
NG >> Repair terminals and connectors.

5. CONTINUITY INSPECTION

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R connector terminal 63 and alternator connector terminal 4.

63 - 4 : Continuity should exist.

OK or NG

OK >> Replace IPDM E/R. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

6. CONTINUITY INSPECTION

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter connector terminal 38 and ground, and combination meter connector terminal 38 and alternator terminal 3.

38 - Ground : Continuity should not exist.
38 - 3 : Continuity should exist.

OK or NG

OK >> Replace combination meter. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

INSPECTION OF INSUFFICIENT ALTERNATOR POWER GENERATION

CAUTION:

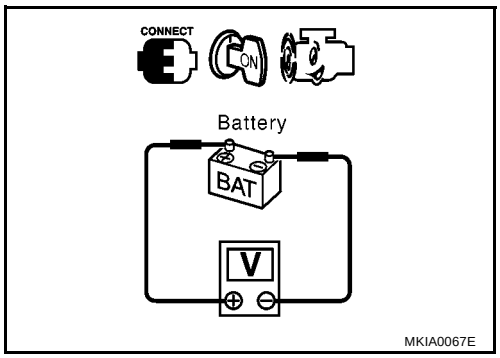
Check them using charged battery performed battery inspection.

1. VOLTAGE INSPECTION

1. Increase engine speed to 2,500 rpm.
2. Turn electrical load to ON. (Headlamp LO turns on, blower fan motor maximum airflow amount)
3. Check battery voltage.

Is the inspection result 12.8V to 15.1V?

YES >> GO TO 2.
NO >> Replace alternator. (Alternator power generation error.)

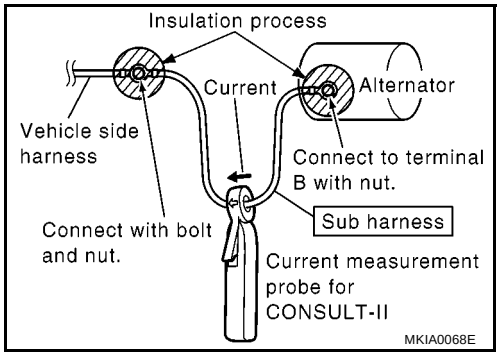


2. CURRENT INSPECTION

1. Turn ignition switch OFF.
2. Disconnect the battery ground cable.
3. Attach current measurement probe for CONSULT-II to the harness for alternator terminal B. (If the probe can not be attached properly, then connect the sub-harness between alternator terminal B and the vehicle side harness as shown in figure, and attach the probe to sub-harness.)
4. Connect battery ground cable.
5. Increase engine speed to 2,500 rpm.
6. Turn electrical load to ON. (Headlamp LO turns on, blower fan motor maximum airflow amount, rear window defogger)
7. Check alternator terminal B current.

   CAUTION:

   Be careful of rotating parts because the engine is running.



Is the inspection result 30A or more?

YES >> GO TO dark current inspection. Refer to SC-31, "DARK CURRENT INSPECTION" . (Alternator is normal. Do not replace.)
NO >> Replace alternator. (Alternator power generation error.)

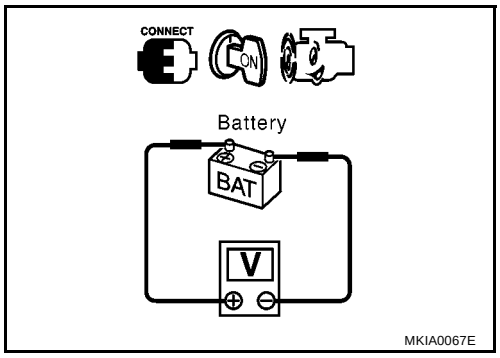
INSPECTION OF EXCESSIVE ALTERNATOR POWER GENERATION

1. ALTERNATOR VOLTAGE INSPECTION

1. Increase engine speed to 2,500 rpm.
2. Check battery voltage.

Is the inspection result 16V or less?

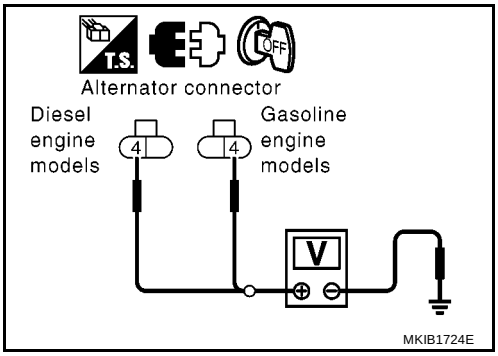
YES >> GO TO 2.
NO >> Replace alternator. (Excessive alternator power generation.)



2. BATTERY VOLTAGE INSPECTION

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.
4. Check voltage between alternator connector terminal 4 and ground.

4 - Ground : 12V or more



Is the inspection result 12V or more?

YES >> Replace alternator. (Alternator power generation error)
NO >> GO TO 3.

3. CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Check IPDM E/R and terminals (IPDM E/R side, and harness side) for damage, deformation or improper connection.

OK or NG

OK >> GO TO 4.
NG >> Repair terminals and connectors.

4. CONTINUITY INSPECTION

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R connector terminal 63 and alternator connector terminal 4.

63 - 4 : Continuity should exist.

OK or NG

OK >> Replace IPDM E/R. (Do not replace alternator, since it is normal.)
NG >> Repair the harnesses or connectors. (Do not replace alternator, since it is normal.)

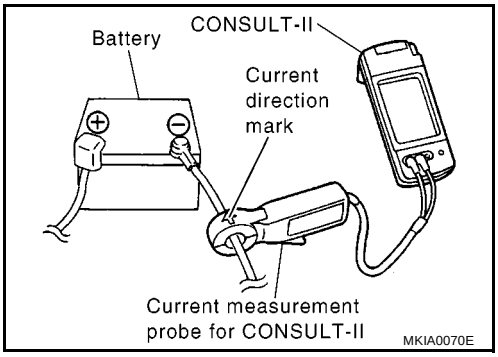
DARK CURRENT INSPECTION

Dark Current: Small current while ignition switch is “OFF”.

NOTE:

- If battery ground cable is disconnected from battery terminal, a large dark current may not be reproduced. When battery discharge occurs, never disconnect battery terminal while using ammeter.
- Do not connect CONSULT-II CONVERTER to data link connector when measuring dark current. CONSULT-II power should be supplied using AC adapter or internal battery.

1. Attach current measurement probe for CONSULT-II to battery ground cable. Refer to SC-33, "OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II" .
2. Check that all electrical equipment is turned OFF.
3. Remove key. Close and lock doors. Check that room lamp turns off.
4. Measure dark current. Is it 50mA or less? Refer to SC-33, "OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II" .



NOTE:
Dark current stable time is different due to equipment and use of the vehicle. If it is not 50mA or less after leaving for 1 minute, measure dark current again after leaving for 30 minutes or more.
If YES, GO TO 7. If NO, GO TO 5.

5. Remove and install fuses one by one. Search for the fuse that greatly changes dark current.

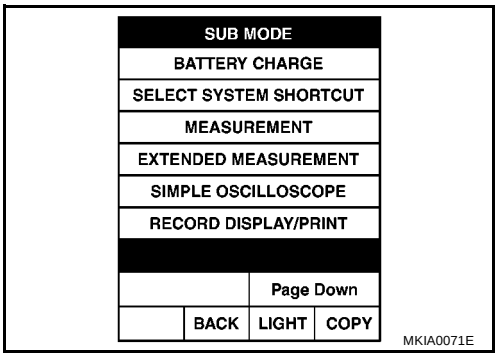
NOTE:
If dark current is greatly reduced when removing the fuse, and even if dark current is not greatly increased when installing it again, the fuse circuit may be the cause.

6. Check that dark current changes when moving the suspect circuit harness. If dark current changes, check harness for short. If dark current does not change, electronic unit in the circuit may not be entering the energy-saving mode when it turns OFF. If it does not enter the energy-saving mode, replace electronic unit.
7. No malfunction for alternator and electrical equipment. Electric load may be larger than alternator generating ability. Check the customer's usage.

OPERATION PROCEDURE OF CURRENT MEASUREMENT PROBE FOR CONSULT-II

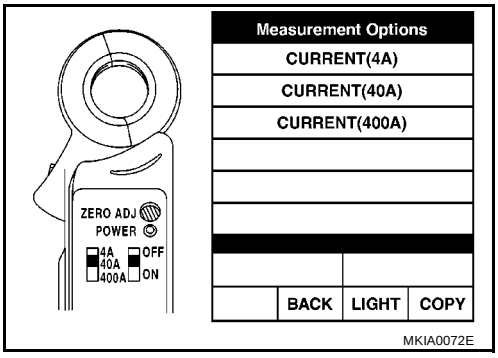
For details, refer to the supplied “CONSULT-II Current Probe Operation Manual”.

1. Turn current probe power supply OFF and connect to CONSULT-II. (Red: CH1, Black: Ground)
2. Touch “SUB MODE”.
3. Touch “Extending Measurement Mode” on “SUB MODE” screen.
4. CAUTION is displayed, touch “OK”.



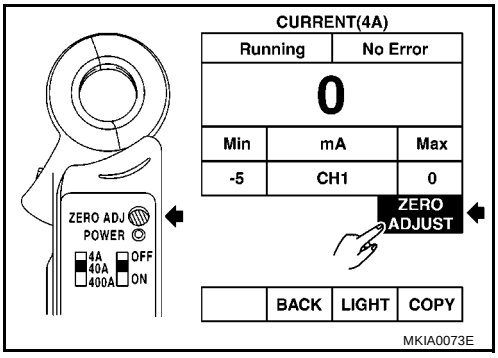
5. Set current probe range switch at the range to measure, turn current probe power supply ON. When measuring dark current, set 4A range. (Check that POWER indicator turns on. Refer to CONSULT-II Current Probe Operation Manual.)
6. Touch the same measuring range at CONSULT-II.

   NOTE:
   If current probe measuring range is different from CONSULT-II measuring range, incorrect value is displayed.



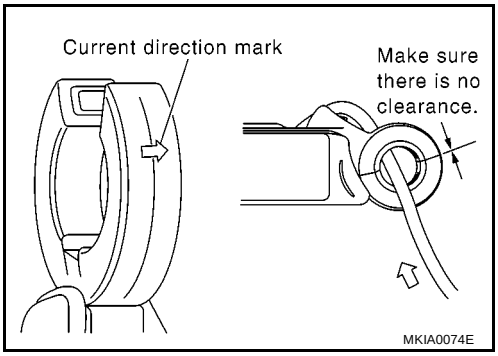
7. Adjust 0 point of current probe or CONSULT-II. (Do not clamp anything to probe.)

   NOTE:
   If 0 point is dislocated greatly, adjust at current probe side generally.



8. Align current direction mark, clamp harness, and measure current. If current direction is incorrect, it is displayed negative value.

   NOTE:
   - When current is measured, close probe joint securely.
   - If multiple harnesses are clamped, measurement cannot be performed. Always clamp only one.

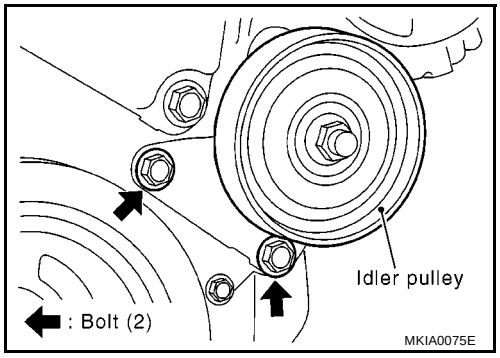


Removal and Installation (CR Engine Models)

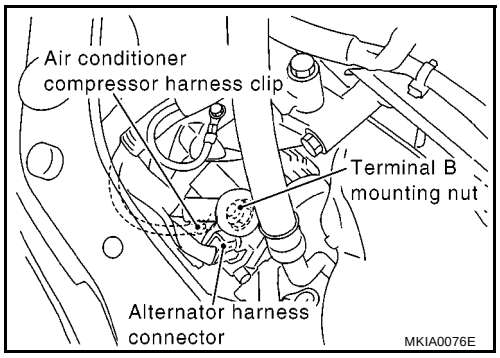
EKS007ZH

REMOVAL

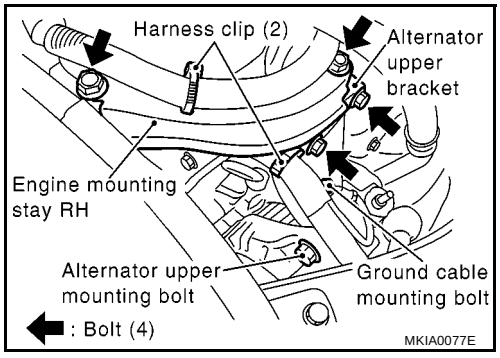
1. Disconnect battery ground cable.
2. Remove fender protector from RH side.
3. Remove alternator drive belt. Refer to EM-14, "Removal and Installation" .
4. Remove idler pulley bracket mounting bolt, and remove idler pulley assembly.



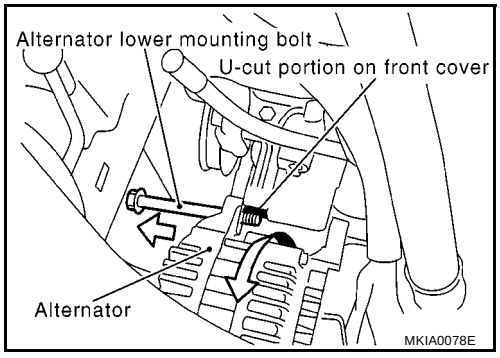
5. Disconnect alternator harness connector.
   B terminal mounting nut, ground wire mounting nut, and remove harness clips.



6. Remove engine mounting stay from RH side.
7. Remove alternator upper bracket mounting bolt, and alternator mounting bolt from upper side.



8. Loosen lower side alternator mounting bolt, and pull out from U-cut portion on front cover.
9. Remove alternator assembly from engine.



INSTALLATION

Install in the reverse order of removal, taking care of the following point.

- Install alternator, and check tension of belt. Refer to EM-12, "Tension Adjustment" in “ENGINE MECHANICAL (EM)” section.

CAUTION:

Be sure to tighten B terminal mounting nut carefully.

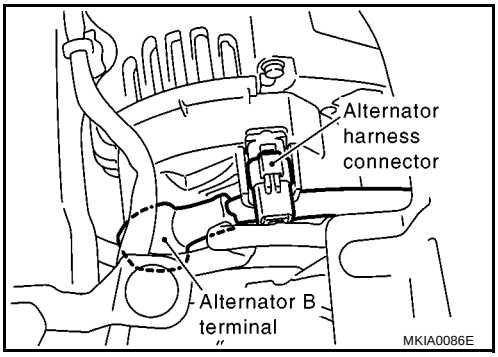
B terminal nut:	**: 9.32 - 10.8 N·m (0.95 - 1.1 kg-m, 82 - 95 in-lb)**
Ground bolt:	**: 2.94 - 4.9 N·m (0.30 - 0.49 kg-m, 26 - 43 in-lb)**
Alternator mounting bolt:	**: 33.3 - 46.1 N·m (3.4 - 4.7 kg-m, 24 - 34 ft-lb)**
Alternator upper bracket bolt:	**: 33.3 - 46.1 N·m (3.4 - 4.7 kg-m, 24 - 34 ft-lb)**
Engine mounting stay bolt:	**: 40.0 - 50.0 N·m (4.1 - 5.1 kg-m, 30 - 37 ft-lb)**
Idler pulley bracket bolt:	**: 16.6 - 23.5 N·m (1.7 - 2.4 kg-m, 12 - 17 ft-lb)**
Idler pulley nut:	**: 25.5 - 33.3 N·m (2.6 - 3.3 kg-m, 19 - 24 ft-lb)**

Removal and Installation (K9K Engine Models)

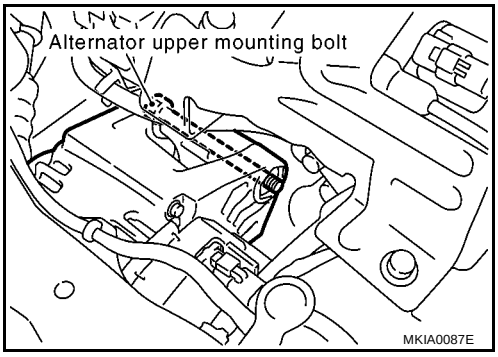
EKS00K2X

REMOVAL

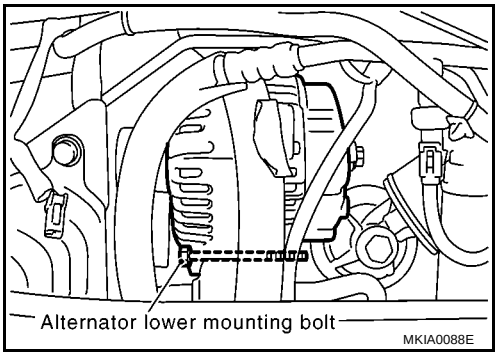
1. Disconnect battery ground cable.
2. Remove under cover and RH fender protector.
3. Remove front bumper. Refer to EI-4, "FRONT BUMPER" .
4. Remove alternator drive belt. Refer to EM-121, "DRIVE BELTS" .
5. Disconnect alternator harness connector and B terminal nut.



6. Remove alternator mounting bolt from upper side.



7. Remove alternator mounting bolt from lower side.
8. Remove alternator assembly from engine.



INSTALLATION

Install in the reverse order of removal, taking care of the following point.

- Install alternator, and check tension of belt. Refer to EM-121, "DRIVE BELTS" .

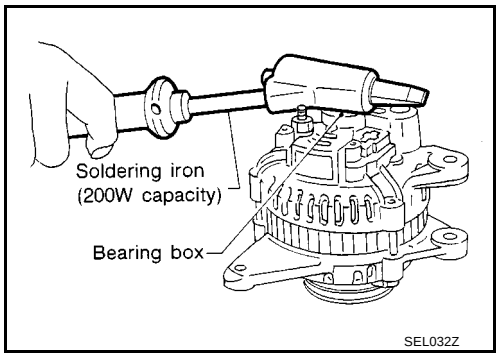
CAUTION:

Be sure to tighten B terminal mounting nut carefully.

Disassembly

EKS007ZJ

REAR COVER



CAUTION:

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, heat just bearing box section with a 200W soldering iron.
Do not use a heat gun, as it can damage diode assembly.

REAR BEARING

CAUTION:

- **Do not reuse rear bearing after removal. Replace with a new one.**
- **Do not lubricate rear bearing outer race.**

Inspection

EKS007ZK

ROTOR CHECK

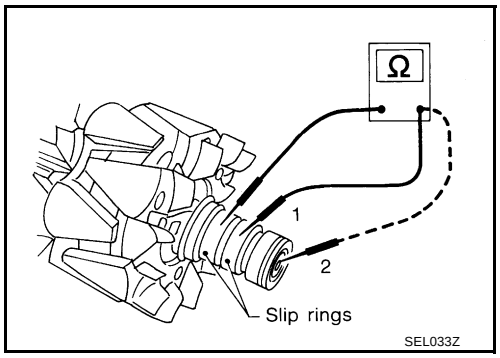
1. Resistance test

Resistance	**: Refer to SDS. SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .**

   - Not within the specified values... Replace rotor.
2. Insulator test
   - Continuity exists... Replace rotor.
3. Check slip ring for wear.

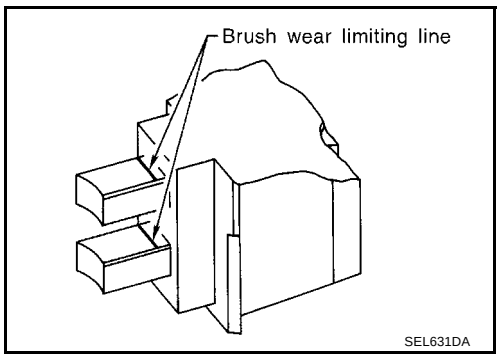
Slip ring minimum outer diameter	**: Refer to SDS. SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .**

   - Not within the specified values... Replace rotor.



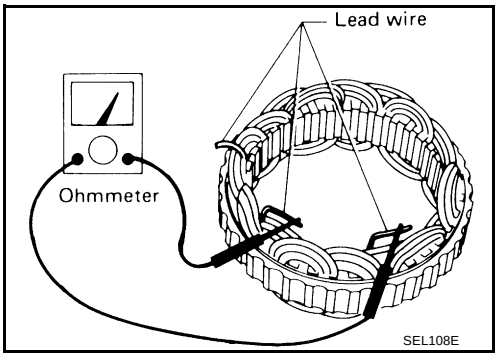
BRUSH CHECK

1. Check smooth movement of brush.
   - Not smooth... Check brush holder and clean.
2. Check brush for wear.
   - Replace brush if it is worn down to the limit line.

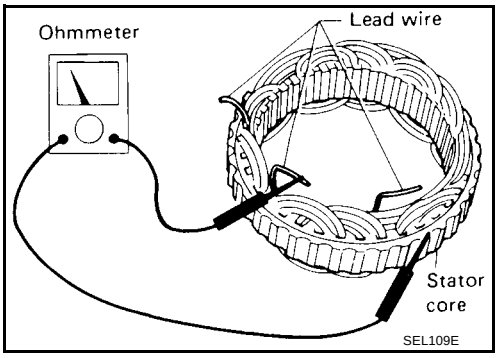


STATOR CHECK

1. Continuity test
   - No continuity... Replace stator.



2. Ground test
   - Continuity exists... Replace stator.



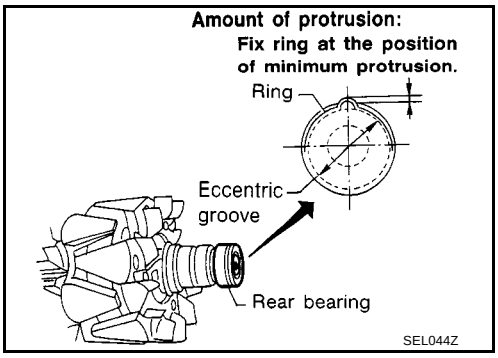
EKS007ZL

Assembly

RING FITTING IN REAR BEARING

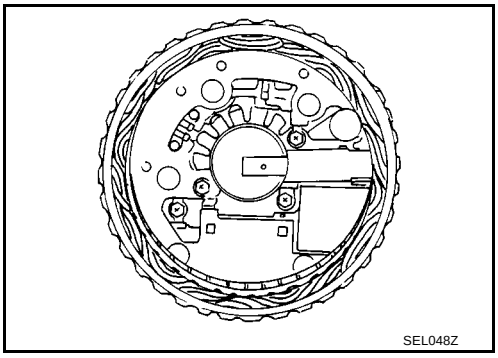
- Fix ring into groove in rear bearing so that it is as close to the adjacent area as possible.

CAUTION:
Do not reuse rear bearing after removal.

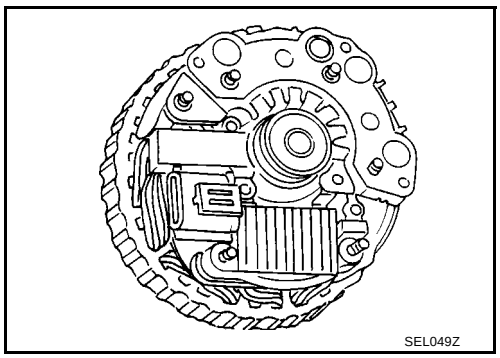


REAR COVER INSTALLATION

1. Fit brush assembly, diode assembly, regulator assembly and stator.



2. Push brushes up with fingers and install them to rotor.
Take care not to damage slip ring sliding surface.


SEL049Z

STARTING SYSTEM

PFP:00011

System Description

EKS007ZM

M/T MODELS

Power is supplied at all times

- through 40A fusible link (letter H, located in the fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No.50 located in IPDM E/R]
- to park/neutral position switch terminal 2
- through 10A fuse [No.4, located in fuse block(J/B)]
- through IPDM E/R terminal 21
- to starter relay.

With the shift lever in the N position (under the ignition switch ON or START position)
Power is supplied

- through park/neutral position switch terminal 2 and 3
- to IPDM E/R terminal 31

and then starter relay is energized.
When ignition switch turn to START position, power is supplied

- through ignition switch terminal 1 and 5
- through IPDM E/R terminal 1
- to starter motor terminal 1.

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine starts.

A/T MODELS

Power is supplied at all times

- through 40A fusible link (letter H, located in the fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 50 located in the intelligent power distribution module]
- to park/neutral position switch terminal 1.

With the selector lever in the P or N position (under the ignition switch ON or START position)
Power is supplied

- through park/neutral position switch terminal 1 and 2
- through IPDM E/R terminal 21
- to starter relay.
- through park/neutral position switch terminal 1 and 2
- to IPDM E/R terminal 31.

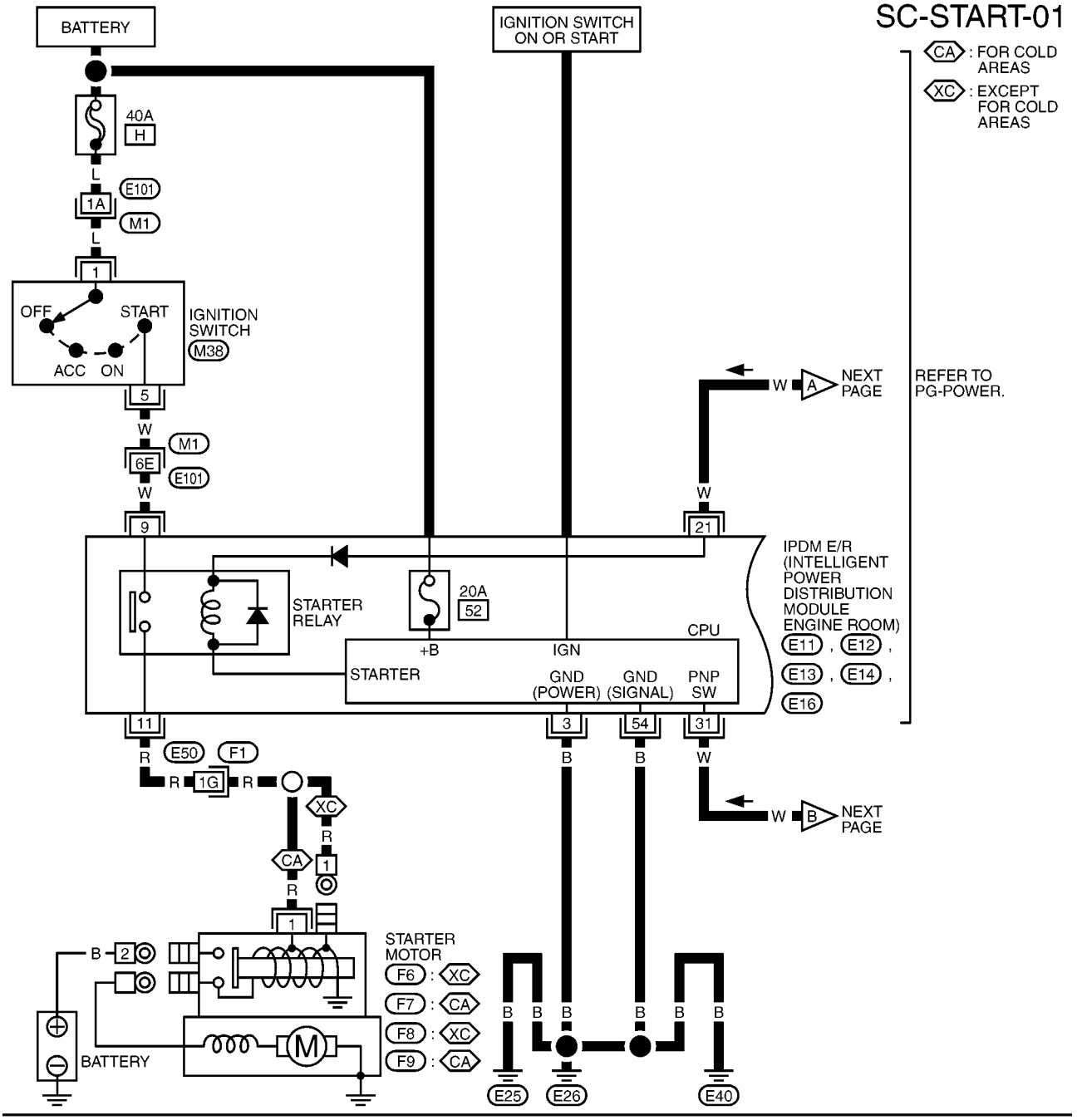
and then starter relay is energized.
When ignition switch turn to START position, power is supplied

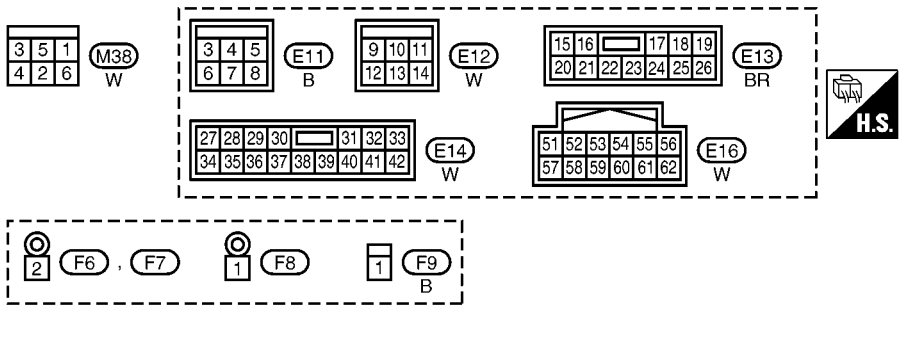
- through ignition switch terminal 1 and 5
- through IPDM E/R terminal 9 and 11
- to starter motor terminal 1

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to the engine block. With power and ground supplied, cranking occurs and the engine starts.

Wiring Diagram — START — (CR Engine Models)

EKS007ZN

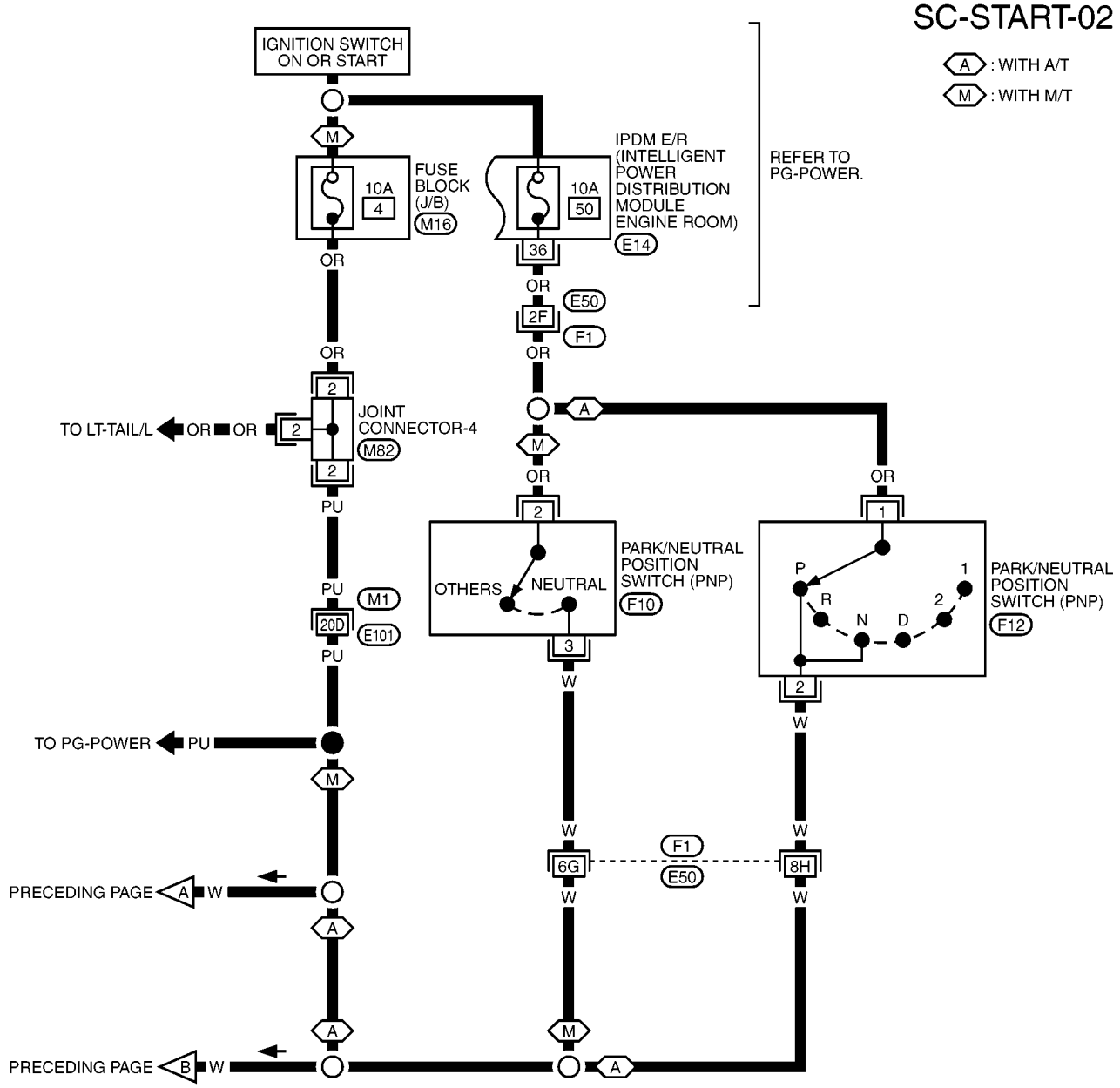


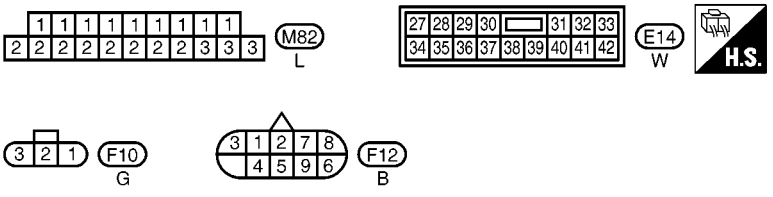


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)

MKWA1827E

SC-START-02



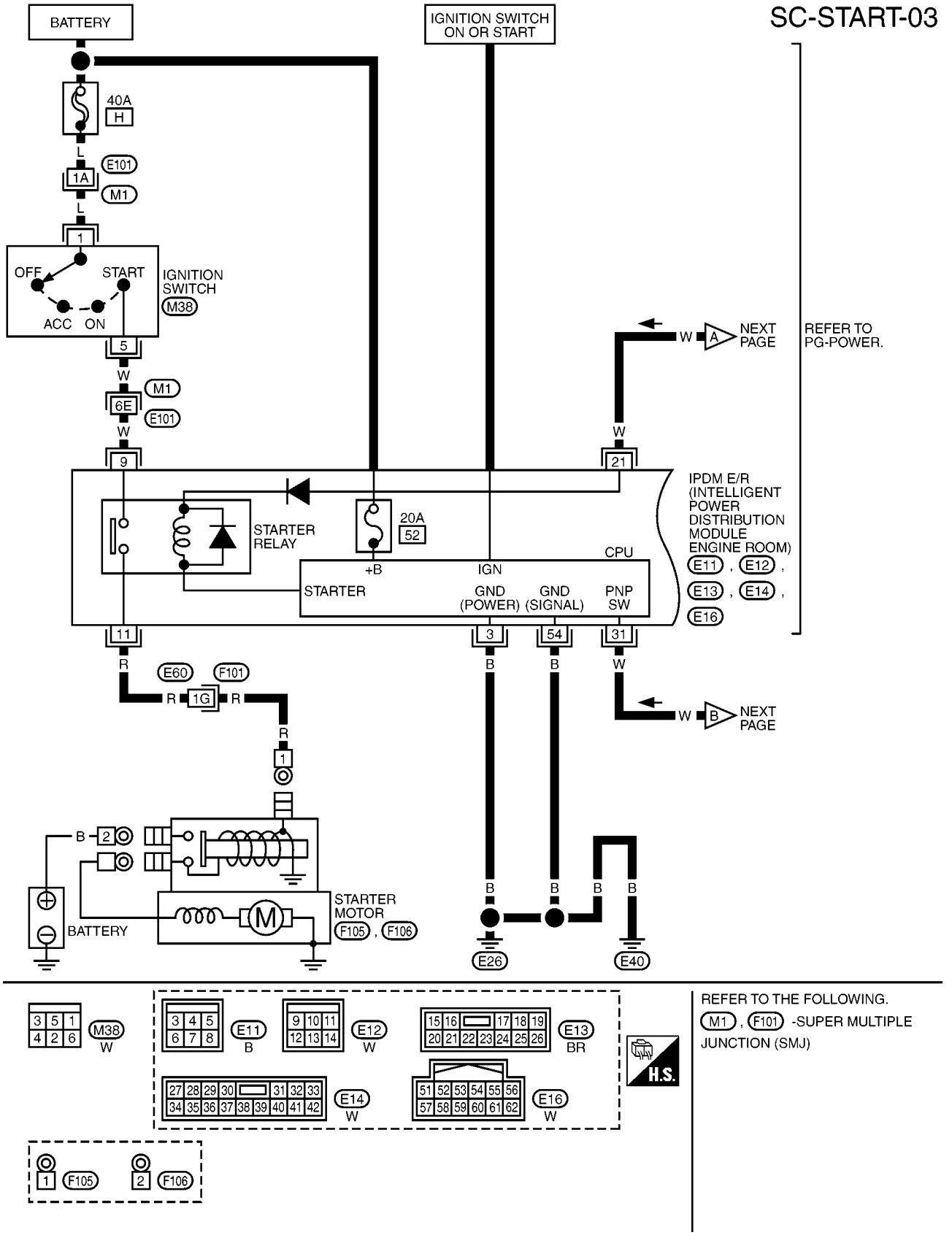


REFER TO THE FOLLOWING.
M1 , F1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1828E

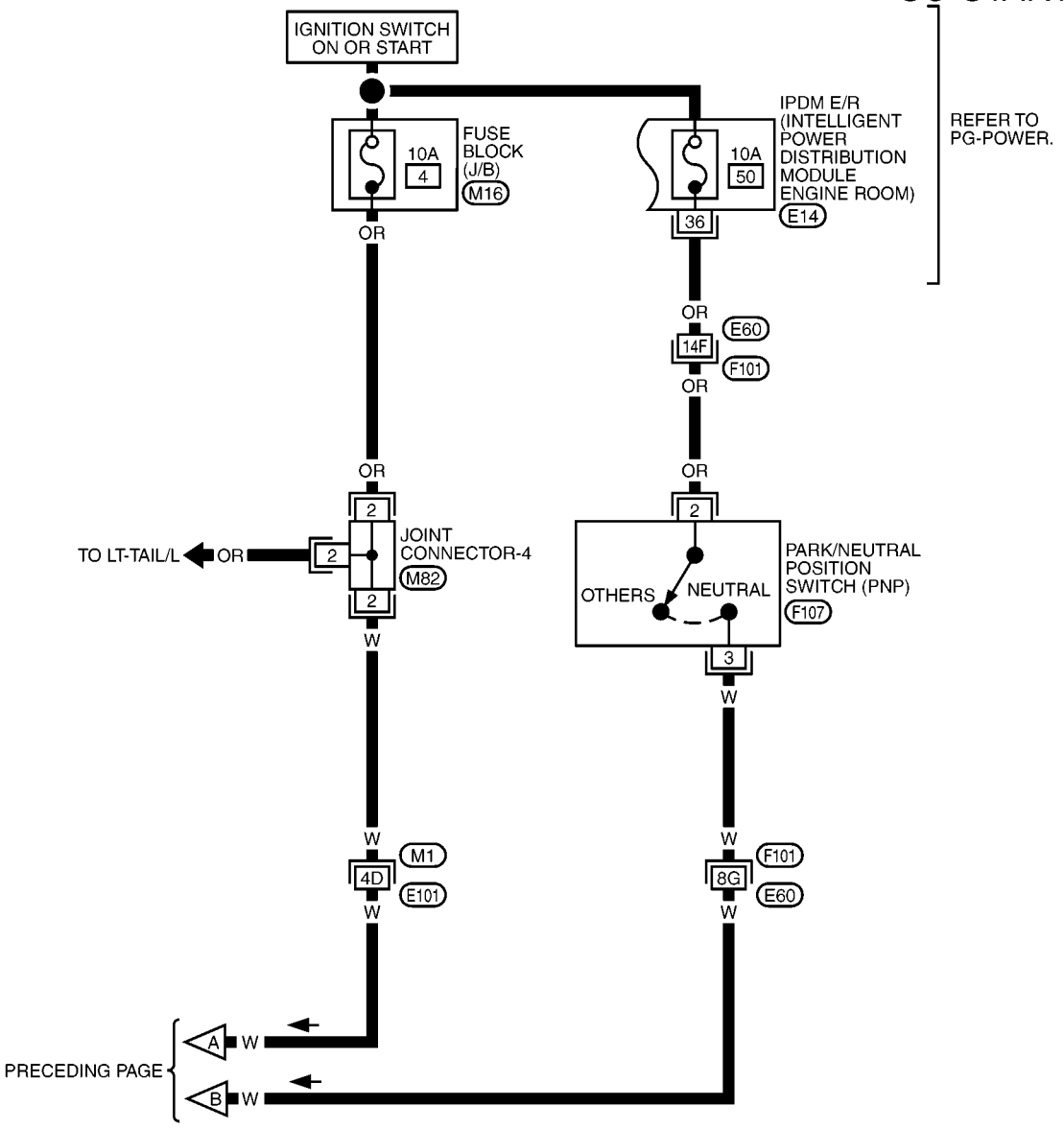
Wiring Diagram — START — (K9K Engine Models)

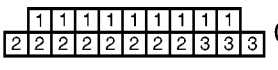
EKS00K2Z

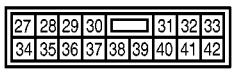


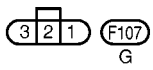
MKWA1455E

SC-START-04









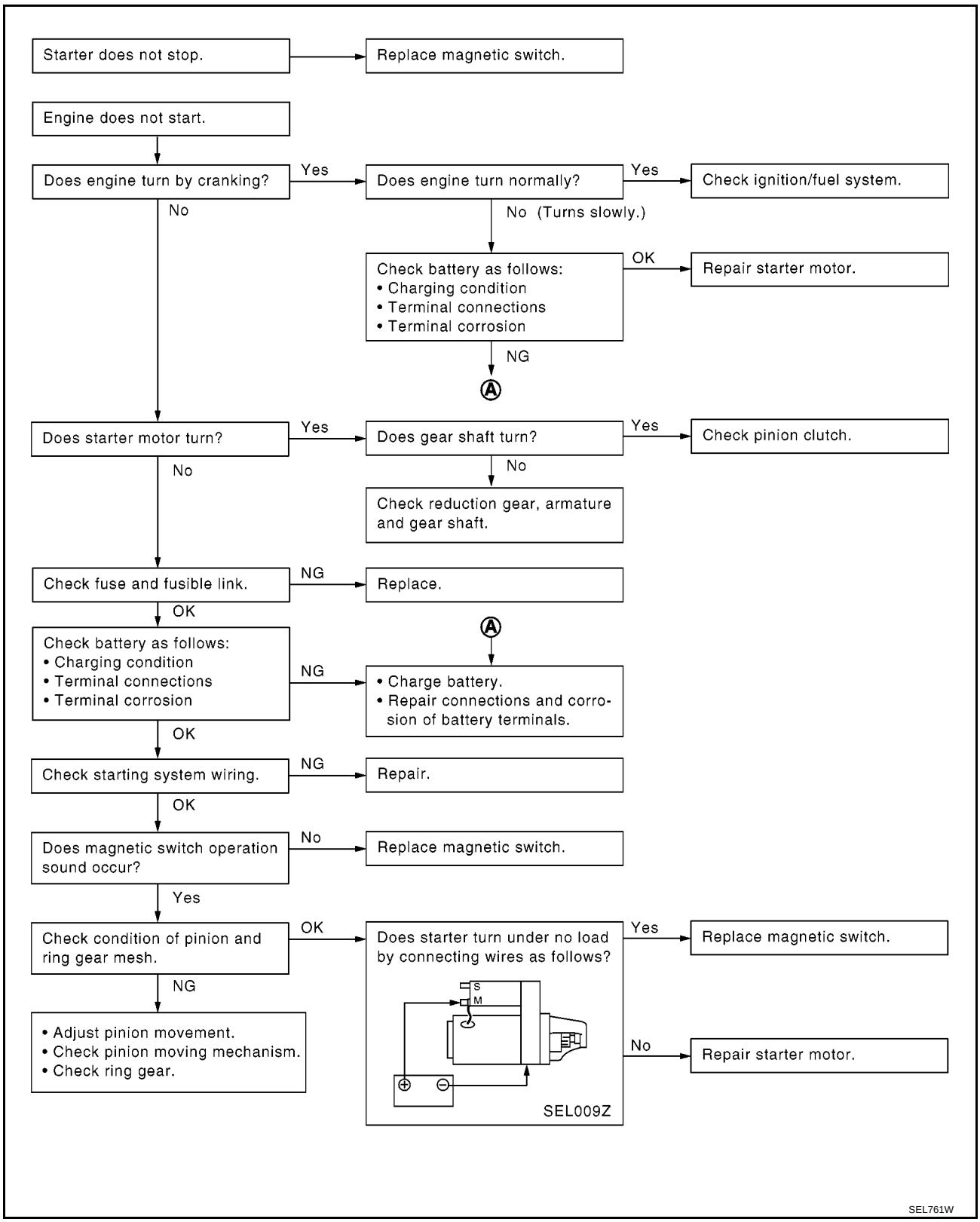
REFER TO THE FOLLOWING.
M1 , F101 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1456E

Trouble Diagnoses

EKS007ZQ

If any abnormality is found, immediately disconnect battery negative terminal.

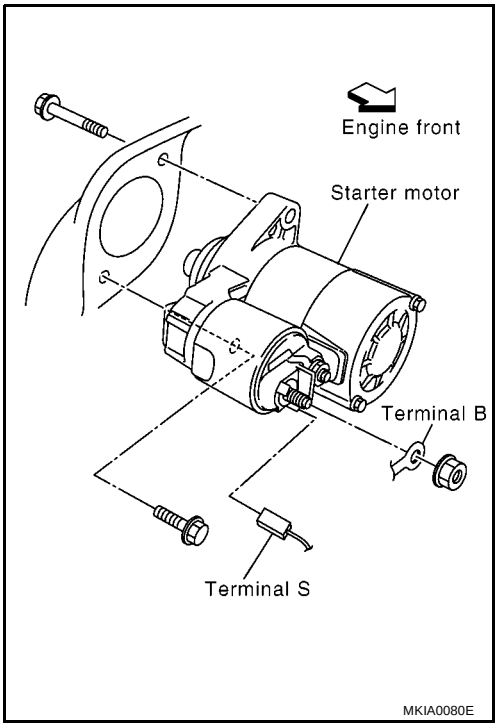


Removal and Installation (CR Engine Models)

EKS007ZR

REMOVAL

1. Disconnect negative battery cable.
2. Remove starter motor mounting bolt from upper side.
3. Disconnect S terminal and B terminal from starter motor.
4. Remove starter motor mounting bolt from lower side.
5. Remove starter motor from lower side the vehicle.



INSTALLATION

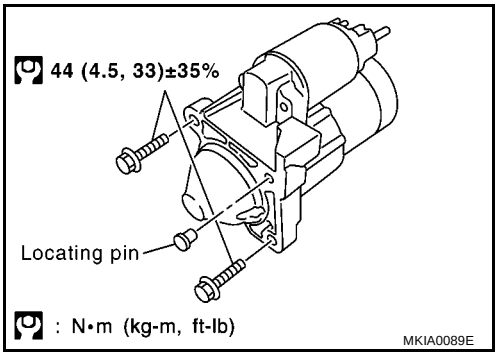
Install in the reverse order of removal.

Removal and Installation (K9K Engine Models)

EKS00K30

REMOVAL

1. Disconnect negative battery cable.
2. Remove starter motor mounting bolt from upper side.
3. Disconnect S terminal and B terminal from starter motor.
4. Remove starter motor mounting bolt from lower side.
5. Remove starter motor from lower side the vehicle.

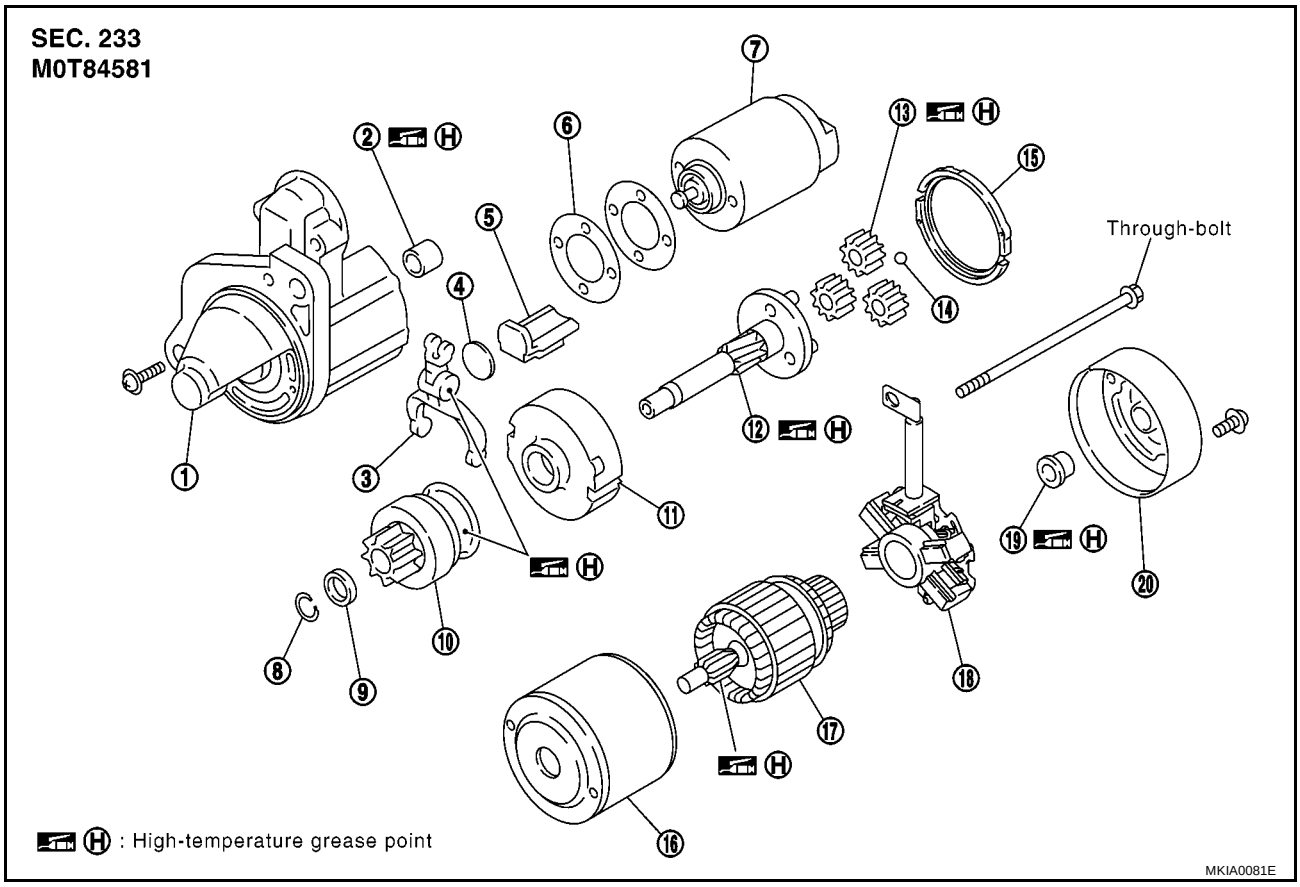


INSTALLATION

Install in the reverse order of removal.

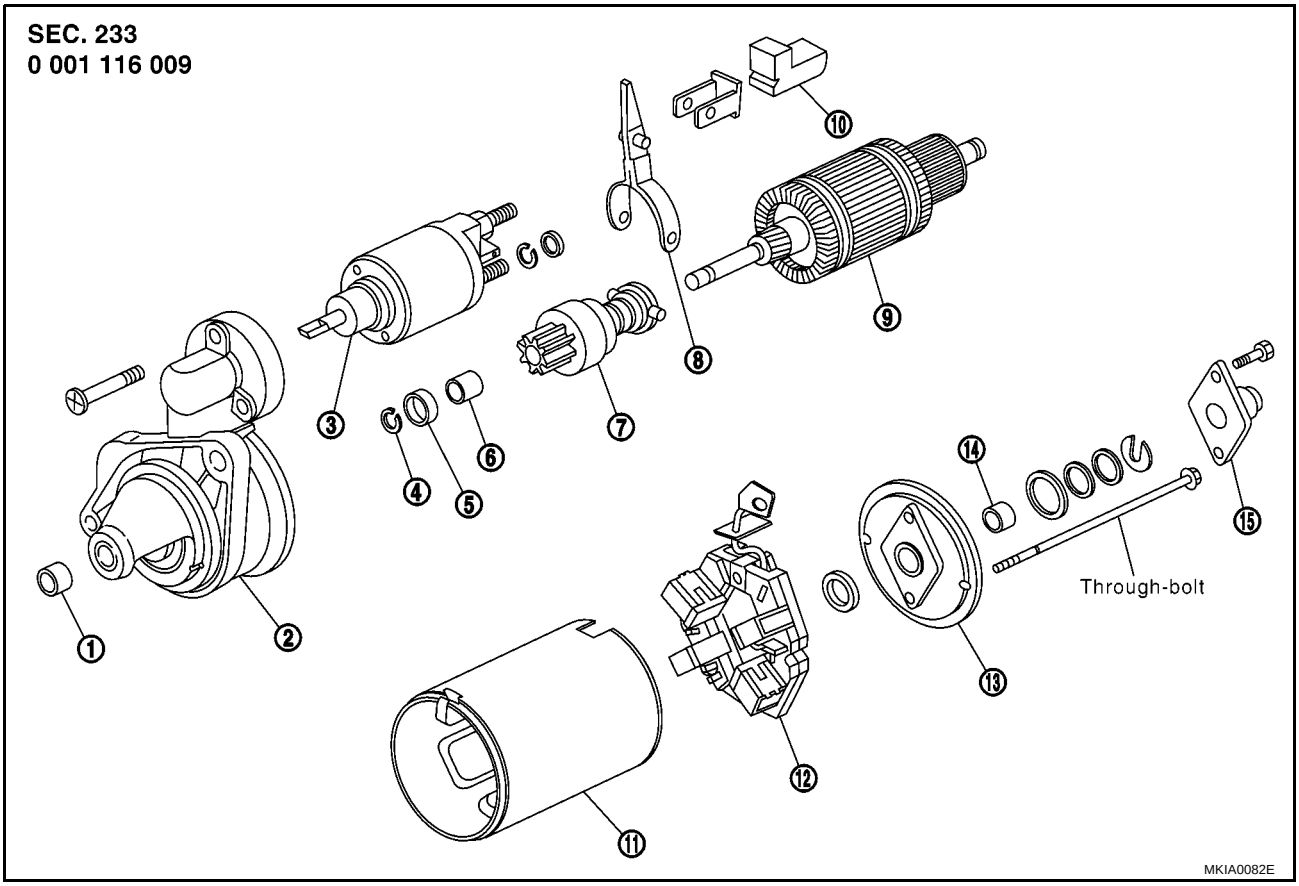
Disassembly and Assembly

EKS007ZS



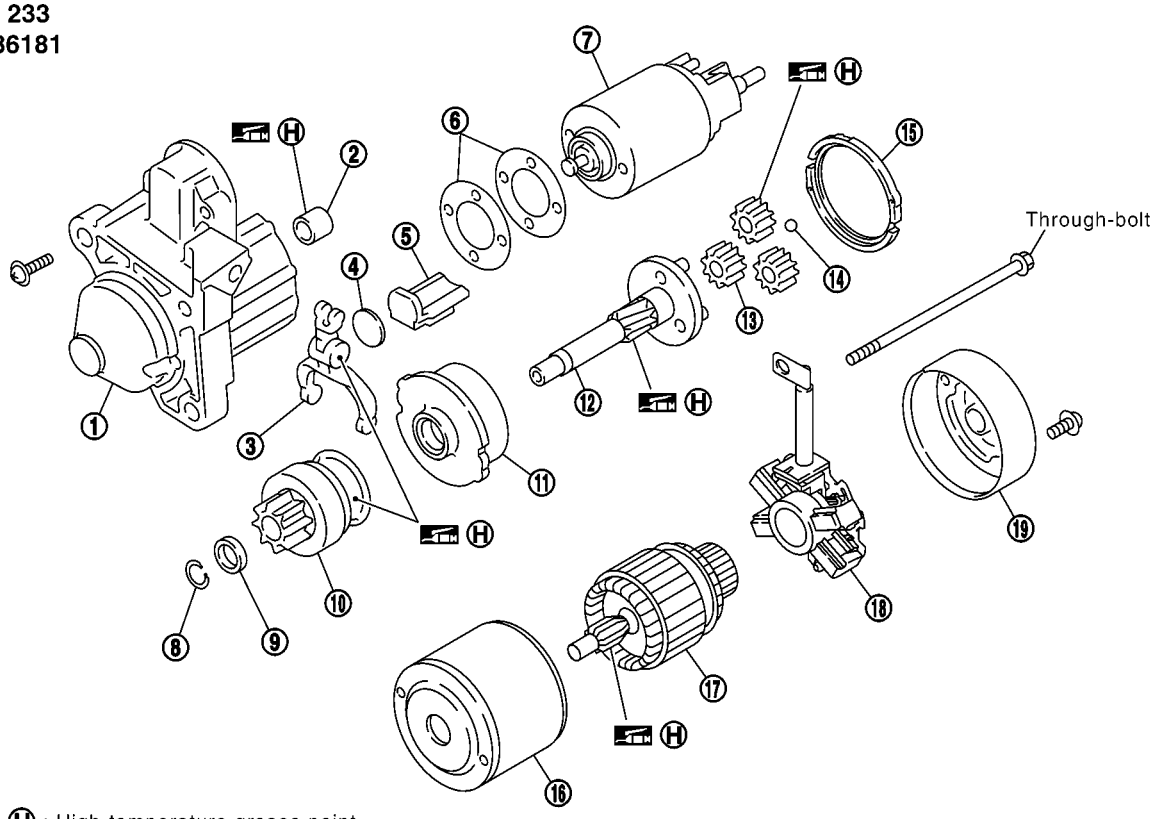
1. Gear case	2. Sleeve bearing	3. Shift lever
4. Plate	5. Packing	6. Adjusting plate
7. Magnetic switch assembly	8. Stopper clip	9. Pinion stopper
10. Pinion assembly	11. Internal gear	12. Pinion shaft
13. Planetary gear	14. Ball	15. Packing
16. Yoke	17. Armature	18. Brush holder assembly
19. Rear bearing	20. Rear cover	

Through-bolt:
M0T84581
: 4.1 - 7.1 N·m (0.45 - 0.72 kg-m, 39.1 - 62.5 in-lb)



1. Bushing
2. Gear case
3. Magnetic switch assembly
4. Stopper clip
5. Pinion stopper
6. Bushing
7. Pinion assembly
8. Shift lever
9. Armature
10. Packing
11. Yoke
12. Brush holder
13. Rear cover
14. Bushing
15. Cap

SEC. 233
M0T86181



1. Gear case
2. Gear case metal
3. Shift lever
4. Plate
5. Packing
6. Adjusting plate
7. Magnetic switch assembly
8. Stopper clip
9. Pinion stopper
10. Pinion assembly
11. Internal gear
12. Gear shaft
13. Planetary gear
14. Ball
15. Packing
16. Yoke
17. Armature
18. Brush holder
19. Rear cover

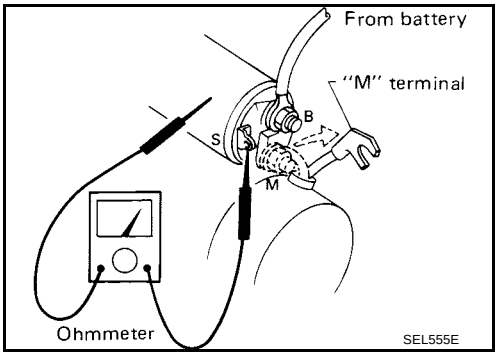
Inspection

EKS007ZT

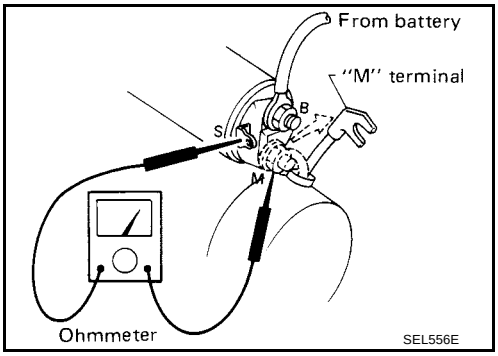
MAGNETIC SWITCH CHECK

- Before starting to check, disconnect battery ground cable.
- Disconnect “M” terminal of starter motor.

1. Continuity test (between “S” terminal and switch body).
   - No continuity ... Replace.

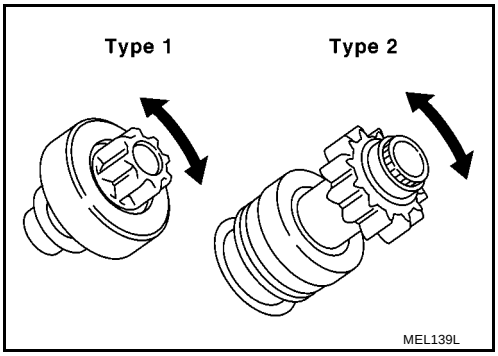


2. Continuity test (between “S” terminal and “M” terminal).
   - No continuity ... Replace.



PINION/CLUTCH CHECK

1. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth (If equipped).
   - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
   - If it locks or rotates in both directions, or unusual resistance is evident. ... Replace.



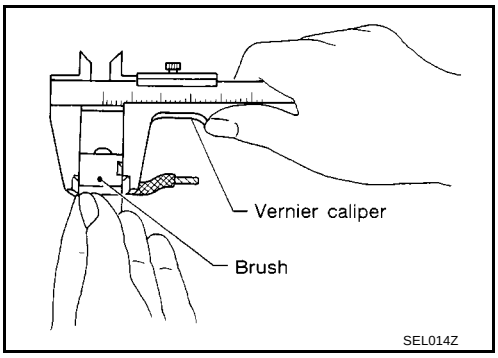
BRUSH CHECK

Brush

Check wear of brush.

Wear limit length **: Refer to SDS. SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .**

- Excessive wear ... Replace.

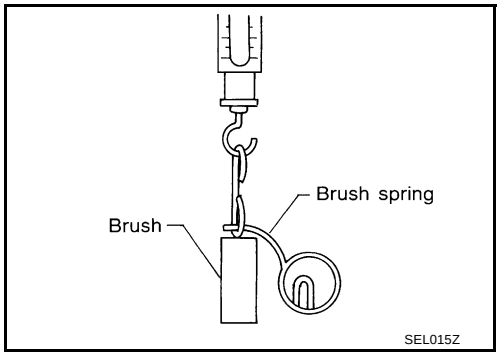


Brush Spring Check

Check brush spring pressure with brush spring detached from brush.

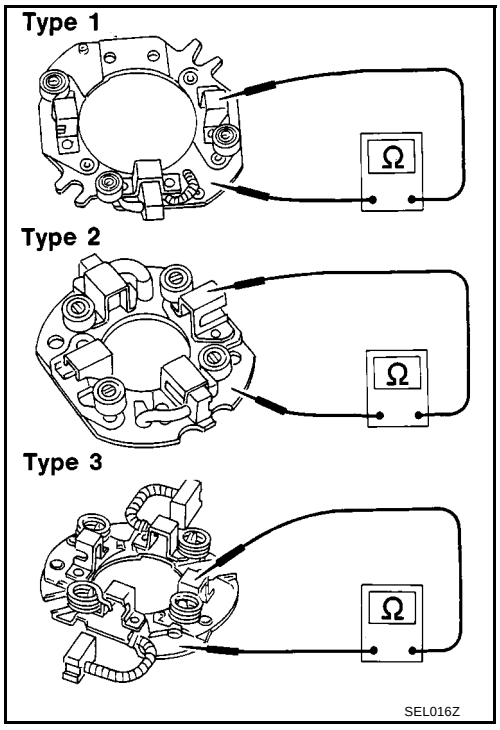
Spring pressure (with new brush)	**: Refer to SDS. SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .**

- Not within the specified values ... Replace.



Brush Holder

1. Perform insulation test between brush holder (positive side) and its base (negative side).
   - Continuity exists. ... Replace.
2. Check brush to see if it moves smoothly.
   - If brush holder is bent, replace it; if sliding surface is dirty, clean.

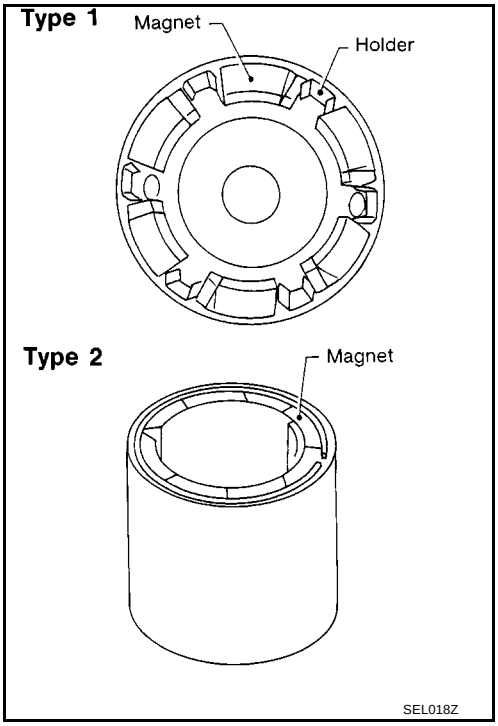


YOKE CHECK

Magnet is secured to yoke by bonding agent. Check magnet to see that it is secured to yoke and for any cracks. Replace malfunctioning parts as an assembly.

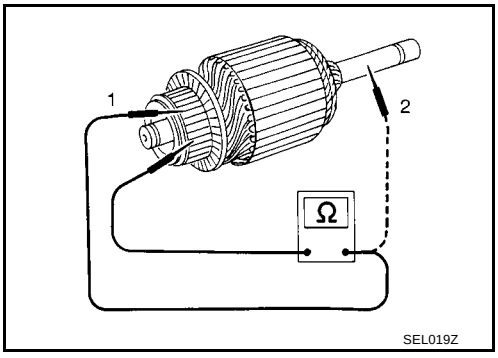
CAUTION:

Do not clamp yoke in a vice or strike it with a hammer.

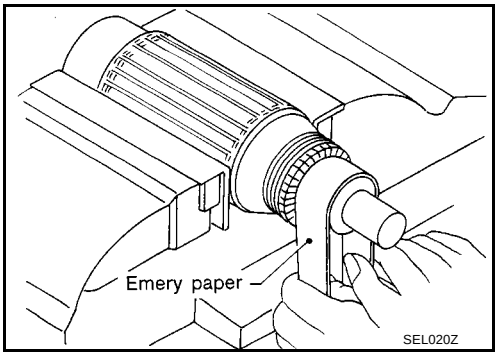


ARMATURE CHECK

1. Continuity test (between two segments side by side).
   - No continuity ... Replace.
2. Insulation test (between each commutator bar and shaft).
   - Continuity exists. ... Replace.

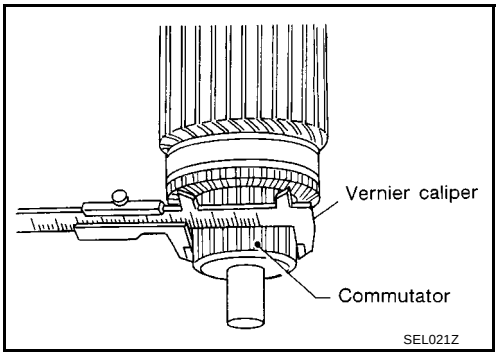


3. Check commutator surface.
   - Rough ... Sand lightly with No. 500 - 600 emery paper.



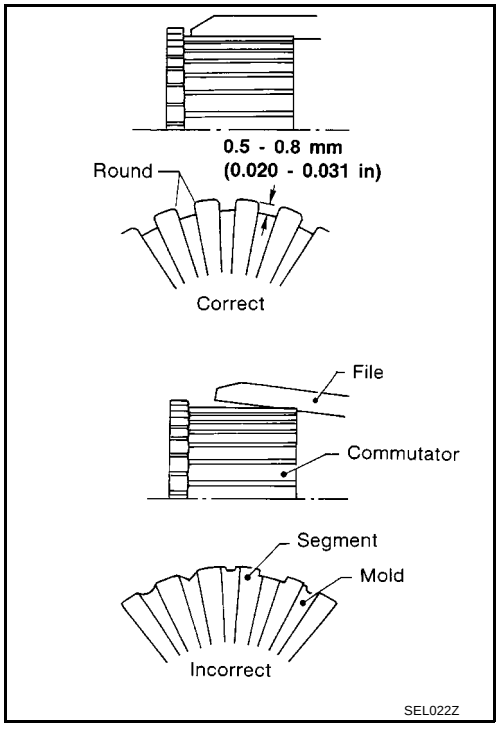
4. Check diameter of commutator.

Commutator minimum diameter : **Refer to SDS.** SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



- Less than specified value ... Replace.

5. Check depth of insulating mold from commutator surface.



- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in)

Assembly

EKS007ZU

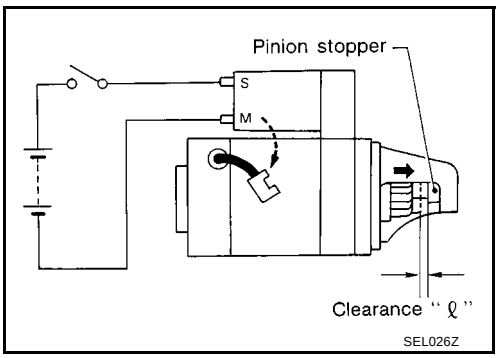
Apply high-temperature grease to lubricate the bearing, gears and frictional surface when assembling the starter.
Carefully observe the following instructions.

PINION PROTRUSION LENGTH ADJUSTMENT

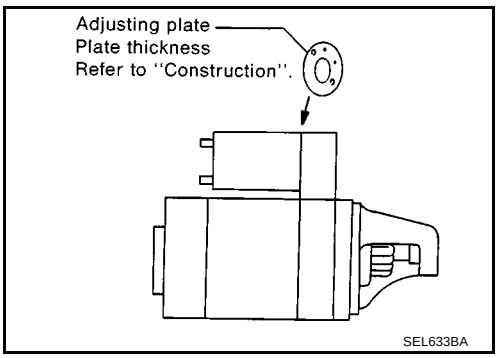
Clearance

With pinion driven out by magnetic switch, push pinion back to remove slack and measure clearance "ℓ" between the front edge of the pinion and the pinion stopper.

Clearance "ℓ" : **Refer to SDS.** SC-54, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



- Not in the specified value ... Adjust by adjusting plate.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Battery

EKS007ZV

Applied model	CR10, CR12, CR14		
Type	FULMEN type code		
	LB1 (FCM 047 620)	LB2 (FCM 055 622)	LB2 (FCM 050 622)
Capacity V-AH	12-47	12-55	12-50

Starter

EKS007ZW

Type		M0T84581	0 001 116 009	M0T86181
		MITSUBISHI make Reduction gear type	BOSCH make Non reduction	MITSUBISHI make Reduction gear type
Applied model		CR12, CR14	CR10, CR12, CR14	K9K engine
System voltage V		12		
No-load	Terminal voltage V	11.0	11.5	
	Current A	Less than 90	Less than 48	Less than 90
	Revolution rpm	More than 2,800	More than 5,800	More than 2,500
Minimum diameter of commutator mm (in)		—	33.5 (1.319)	—
Minimum length of brush mm (in)		—	3.5 (0.138)	—
Brush spring tension N (kg, lb)		—	—	—
Clearance between bearing metal and armature shaft mm (in)		Less than 0.2 (0.008)	—	—
Clearance "ℓ" between pinion front edge and pinion stopper mm (in)		0.3 - 2.5 (0.012 - 0.098)	0.0 - 3.9 (0 - 0.154)	0.5 - 2.0 (0.020 - 0.079)

Alternator

SMA for VIN >SJN**AK12U1044368

EKS007ZX

Type	252694	—
	VALEO Make	—
Applied model	CR10, CR12, CR14	K9K
Nominal rating V-A	12-77	—
Ground polarity	Negative	—
Minimum revolutions under no-load (When 13.5V is applied) rpm	—	—
Hot output current (When 13.5V is applied) A/rpm	More than 39/1,800 More than 60/2,500 More than 76/5,000 More than 77/6,000	—
Regulated output voltage V	14.4	—
Minimum length of brush mm (in)	—	—
Brush spring pressure N (g, oz)	—	—
Slip ring minimum diameter mm (in)	—	—
Rotor coil resistance at 20° (68°F) Ω	—	—

SECTION SE
SEAT

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Precautions 2
CLIP AND FASTENER 3
List of Table 3
HEATED SEAT 4
Description 4
Wiring Diagram — H/SEAT 5
FRONT SEAT 7
Component Parts Location 7
Removal and Installation 8
REMOVAL 8
INSTALLATION 8
Disassembly and Assembly of Seatback 8
SEATBACK TRIM PAD 8
SEATBACK FRAME 9
Disassembly and Assembly of Seat Cushion 9
SEAT CUSHION TRIM PAD 9
SEAT CUSHION FRAME 9
REAR SEAT 11
Component Parts Location 11
BENCH SEAT 11
SPLIT SEAT 12
SLIDE SEAT 13
Removal and Installation 13
REMOVAL 13
INSTALLATION 15
REAR SEATBACK DISASSEMBLY AND ASSEMBLY 16

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EIS004P3

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions

EIS004P4

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

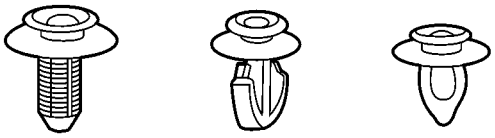
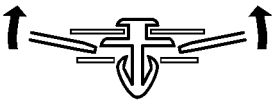
- Do not use any organic solvent, such as thinner or benzine.

CLIP AND FASTENER

PFP:76906

List of Table

EIS004ON

Symbol No.	Shapes	Removal & Installation
C101		**Removal:** Remove by bending up with flat-bladed screwdrivers or clip remover. 

MIIB0032E

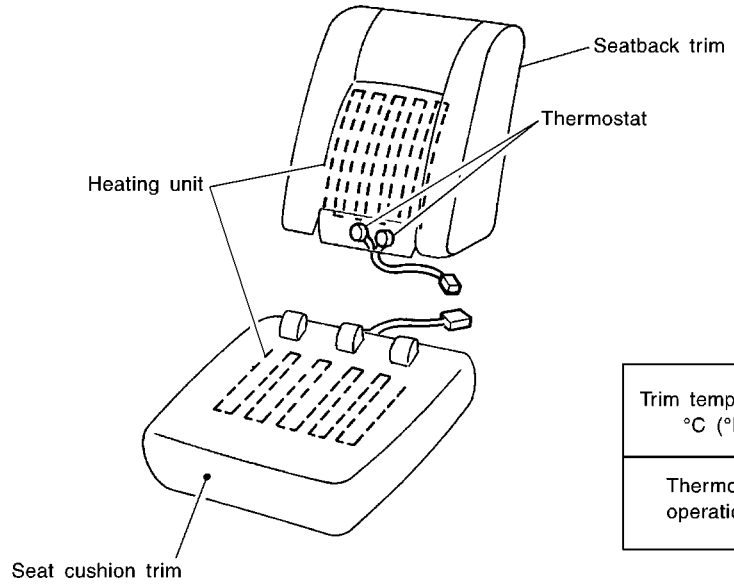
HEATED SEAT

PFP:87335

Description

EIS004P5

- When handling seat, be extremely careful not to scratch heating unit.
- To replace heating unit, seat trim and pad should be separated.
- Do not use any organic solvent, such as thinner, benzene, alcohol, etc. to clean trims.



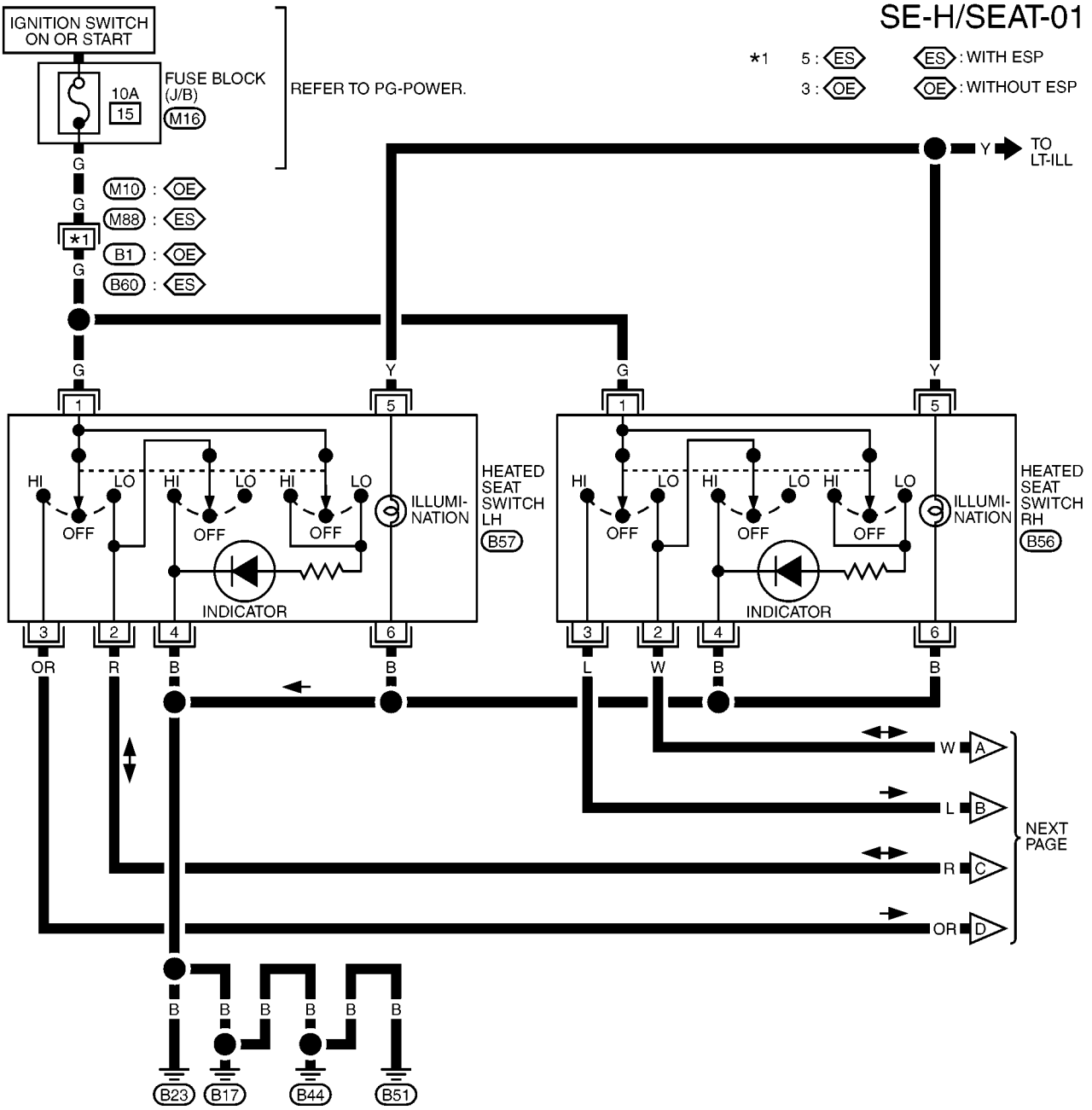
Trim temperature °C (°F)	Increasing to 35 - 45 (95 - 113)	Decreasing to 25 - 35 (77 - 95)
Thermostat operation	OFF	ON

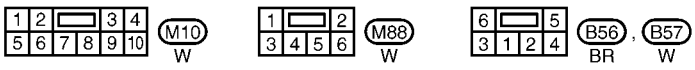
SBT314

Wiring Diagram — H/SEAT

SMA for VIN >SJN**AK12U1309269 EIS004P6

SE-H/SEAT-01

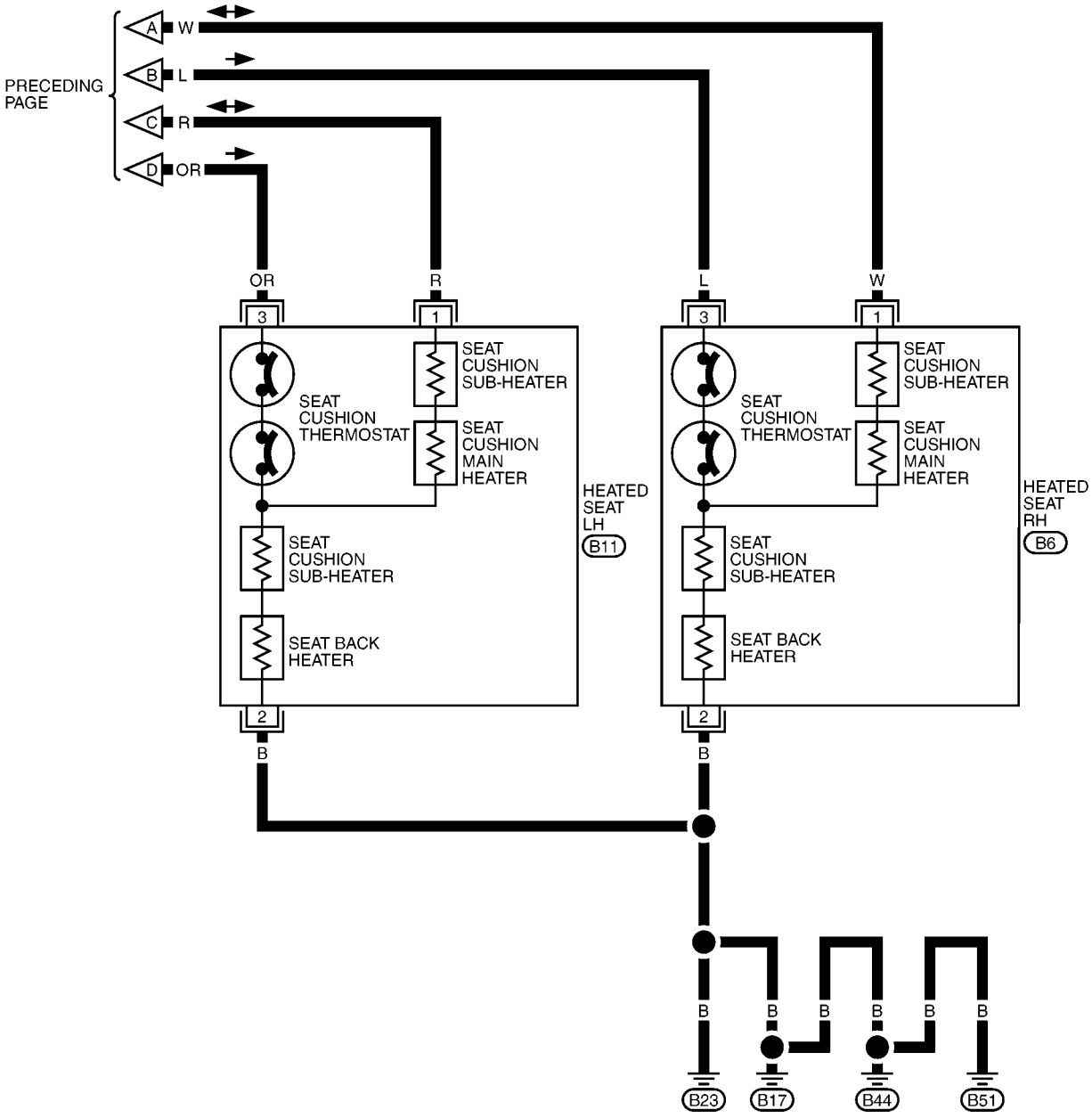


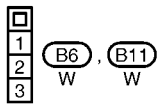


REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1815E

SE-H/SEAT-02





MKWA0836E

FRONT SEAT

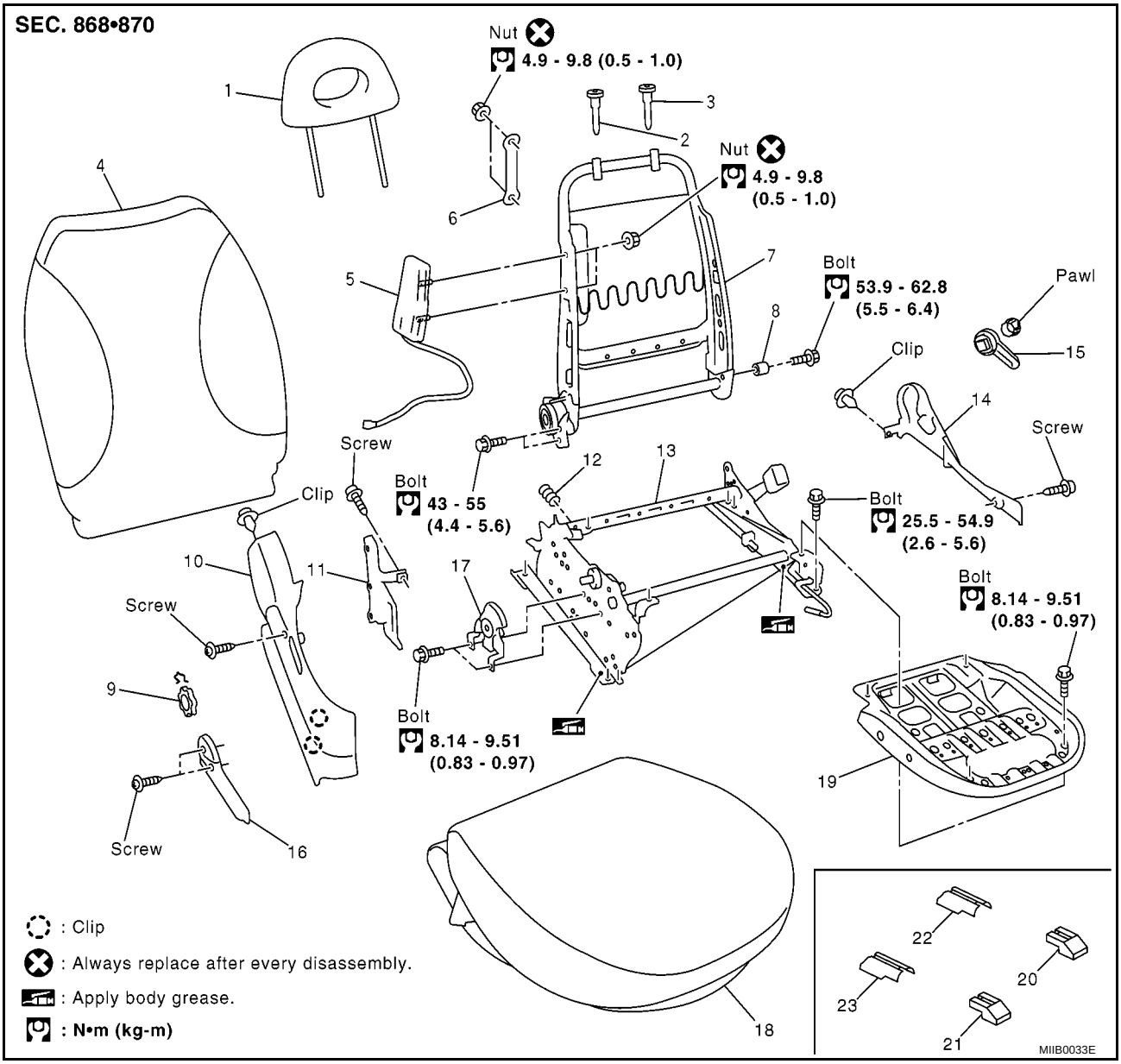
PFP:87000

Component Parts Location

SMA for VIN >SJN**AK12U1277776

EIS004OP

CAUTION:
When removing and installing seats, use shop cloths to protect the parts from damage.



1. Headrest
2. Headrest holder (free)
3. Headrest holder (locked)
4. Seatback trim & pad
5. Side air bag module
6. Fixed inner cross rod
7. Seatback frame
8. Plastic collar
9. Reclining dial
10. Seat slide outer finisher
11. Slide inner cover
12. Spring
13. Seat slide assembly
14. Seat slide inner finisher
15. Lumber support lever knob
16. Seat lifter lever
17. Seat lifter lever bracket
18. Seat cushion trim & pad
19. Seat cushion frame
20. Front leg cover (inner)
21. Front leg cover (outer)
22. Rear leg cover (inner)
23. Rear leg cover (outer)

Removal and Installation

EIS004OQ

REMOVAL

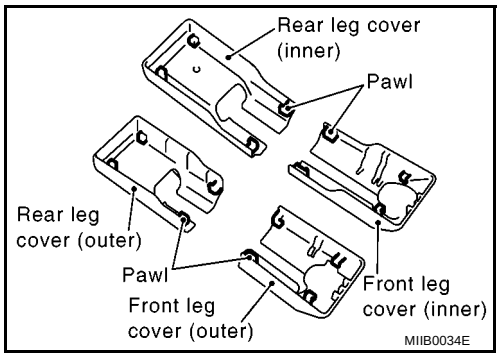
CAUTION:

For vehicles equipped with side air bags, disconnect the battery negative terminal, and wait at least 3 minutes before beginning work.

1. Remove side air bag module connector (vehicles with side air bags) and seatbelt buckle switch harness connector.
2. Remove front and rear leg covers.
3. Remove bolts (4), and remove seat from vehicle.

   CAUTION:

   When removing and installing, use shop cloths to protect parts from damage and interference.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

When removing and installing, use shop cloths to protect parts from damage and interference.

Disassembly and Assembly of Seatback

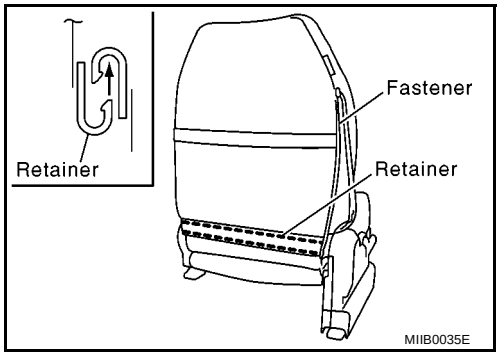
EIS004OR

SEATBACK TRIM PAD

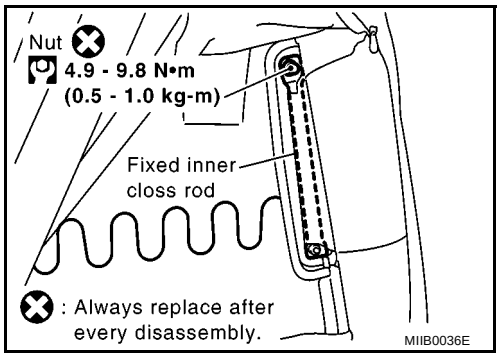
SMA for VIN >SJN**AK12U1277776

Disassembly

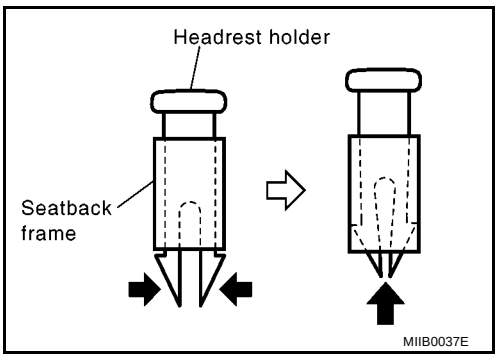
1. Unfasten seatback fastener. (Vehicles with side air bags)
2. Remove retainer.



3. Turn over seatback trim, remove nuts (2), and remove fixed inner cross rod. (Vehicles with side air bags)



4. Use pincers, etc., to push up hooks shown by the arrows in the figure, and remove headrest holder from seatback.
5. Remove seatback trim and pad from seatback frame.



Assembly

Install in the reverse order of removal.

CAUTION:
Before installing headrest holder, check its orientation (front/rear and right/left).

SEATBACK FRAME

Disassembly

1. Remove seatback trim&pad.
2. Pull out side air bag connector from back of seat cushion.
3. Remove lumber support lever knob, seat lifter lever, reclining dial, seat slide out finisher, slide inner cover, and seat slide inner finisher.
4. Remove seatback frame bolts and remove seatback frame from seat slide assembly.

Assembly

Install in the reverse order of removal.

CAUTION:
After assembling seatback frame, make sure reclining device operates.

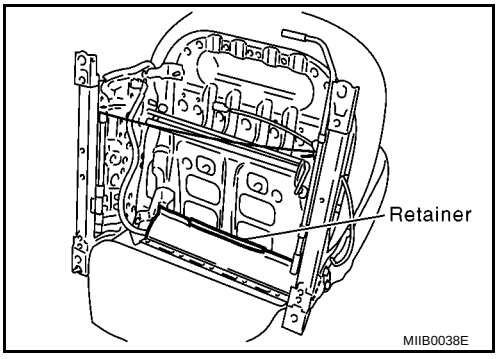
Disassembly and Assembly of Seat Cushion

EIS004OS

SEAT CUSHION TRIM PAD

Disassembly

1. Remove seat lifter cover, seat lifter lever, reclining lever, seat slide out finisher, slide inner cover, and seat slide inner finisher.
2. Remove seatback frame bolts, and the remove seat cushion assembly from seatback frame
3. Remove retainer from the back of cushion.
4. Remove seat cushion trim&pad from seat cushion frame.



Assembly

Install in the reverse order of removal.

CAUTION:
When assembling seat cushion assembly in seatback assembly, make sure the reclining device operates.

SEAT CUSHION FRAME

Disassembly

1. Remove short cushion trim&pad.
2. Remove bolts (4), and then remove seat cushion frame from seat slide assembly.

Assembly

Install in the reverse order of removal.

REAR SEAT

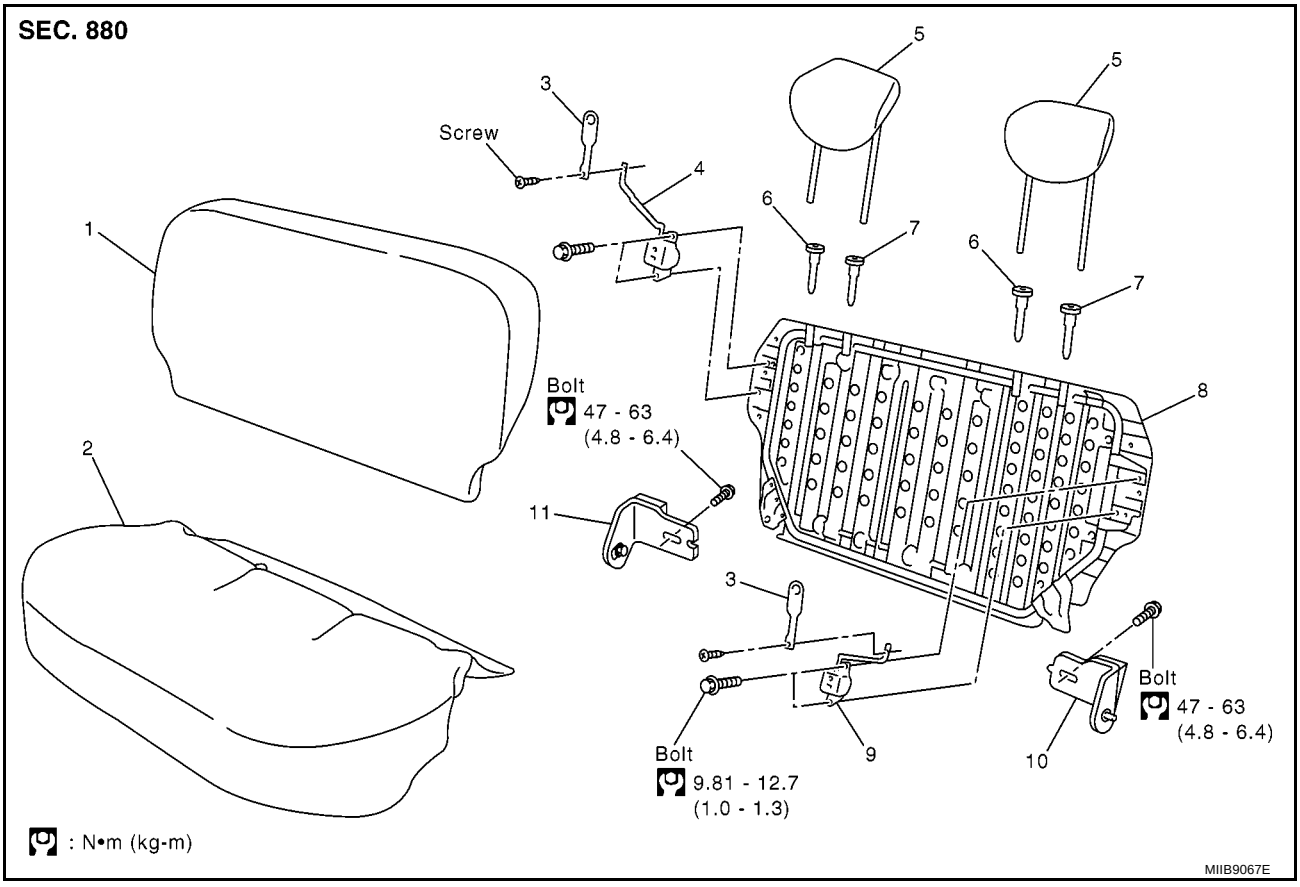
PFP:88300

Component Parts Location

EIS004OT

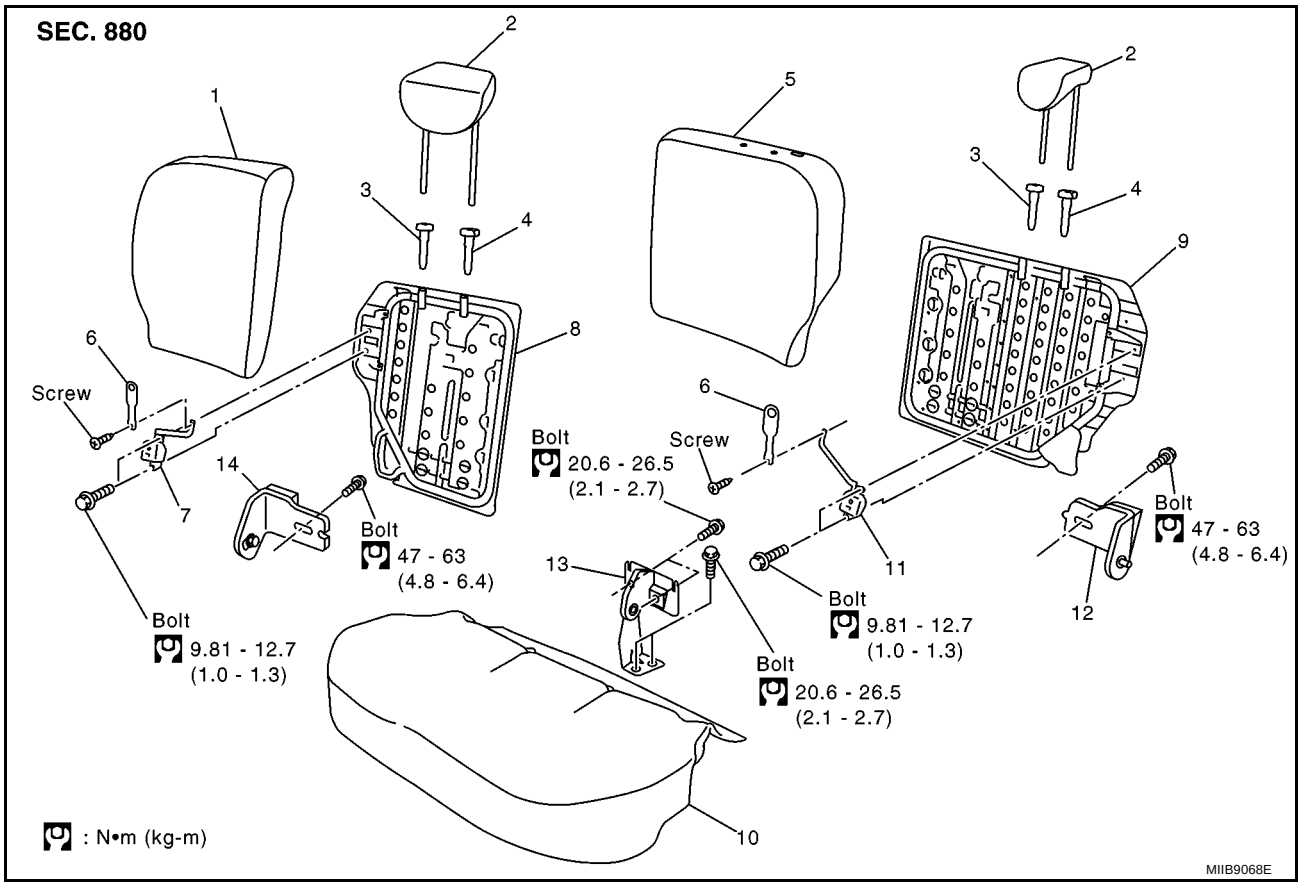
BENCH SEAT

SMA for VIN >SJN**AK12U1133256



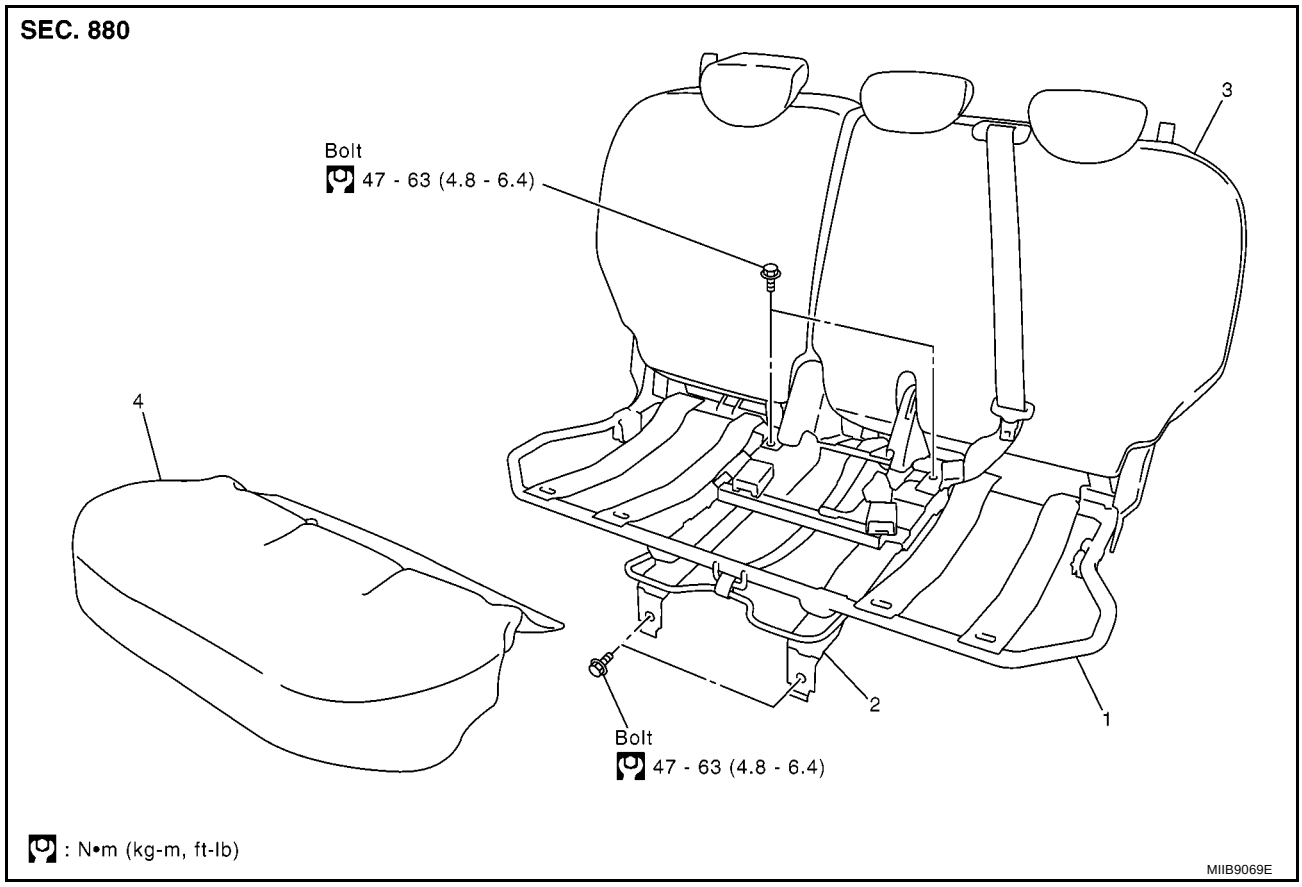
1. Rear seatback trim and pad
2. Seat cushion trim and pad
3. Seatback lock knob
4. Rear seat lock (RH)
5. Headrest
6. Headrest holder (free)
7. Headrest holder (locked)
8. Seatback frame
9. Rear seat lock (LH)
10. Rear seat side bracket (LH)
11. Rear seat side bracket (RH)

SPLIT SEAT



1. Rear seatback trim and pad (RH)
2. Headrest
3. Headrest holder (free)
4. Headrest holder (locked)
5. Rear seatback trim and pad (LH)
6. Seatback lock knob
7. Rear seat lock (RH)
8. Rear seatback frame (RH)
9. Rear seatback frame (LH)
10. Rear set cushion assembly
11. Rear seat lock (LH)
12. Rear seat side bracket (LH)
13. Rear center bracket (RH)
14. Rear seat side bracket (RH)

SLIDE SEAT



1. Seat slide assembly
2. Slide rail
3. Rear seatback trim and pad
4. Seat cushion trim and pad

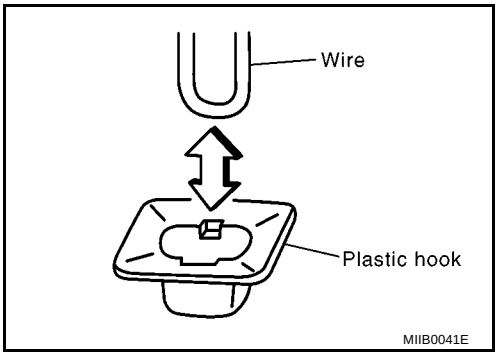
Removal and Installation

EIS004OU

REMOVAL

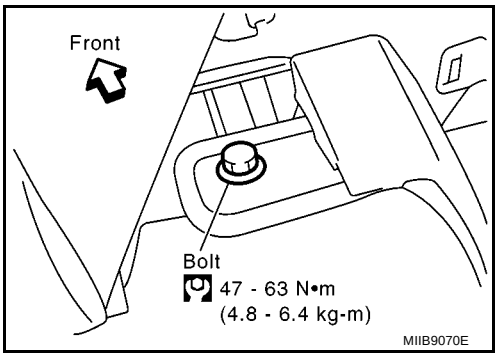
Seat Cushion

- Lift up seat cushion bottom, remove wire from plastic hooks (2 locations), and pull forward to remove.



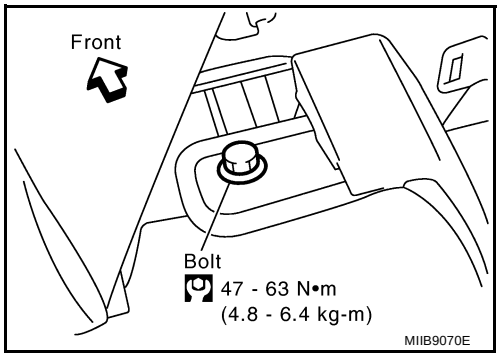
Seatback (Bench Seat)

- Turn over rear seatback carpet, remove rear seat side bracket bolts (2), and remove seatback from vehicle.

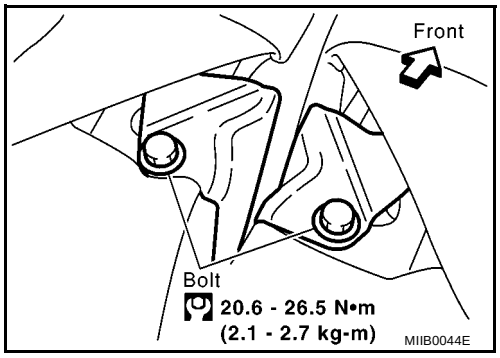


seatback (Split Seat)

1. Turn over rear seatback carpet, remove side bracket bolts (2), and remove seatback from vehicle.

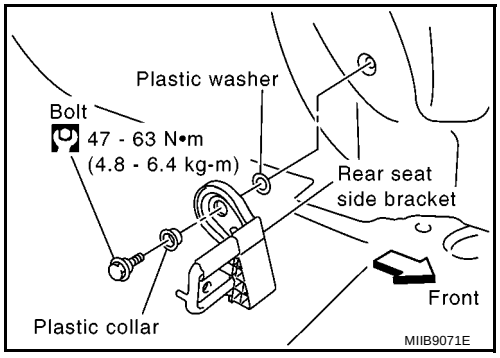


2. Turn over rear seatback carpet, remove center bracket seatback bolts (2), and remove.



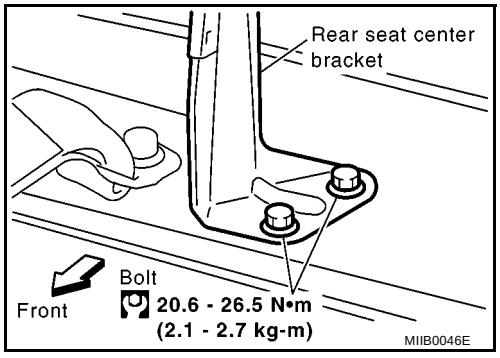
Rear Seat Side Bracket

1. Remove seat cushion and rear seatback.
2. Remove bolts (1 at LH/RH each), and remove rear seat side brackets (LH/RH) from vehicle.



Rear Seat Center Bracket

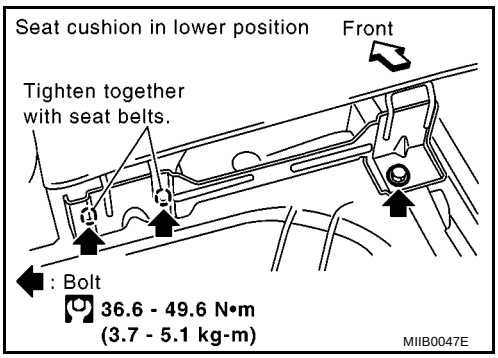
1. Remove rear seat cushion and rear seatback.
2. Remove bolts (two), and them remove rear seat center bracket from vehicle.



Child Car Seat Anchor That Complies With ISO FIX

1. Remove seat cushion.

2. Remove bolts (1 at LH/RH each), and them remove child car seat anchors that complies with ISO FIX (LH/RH) from vehicle.



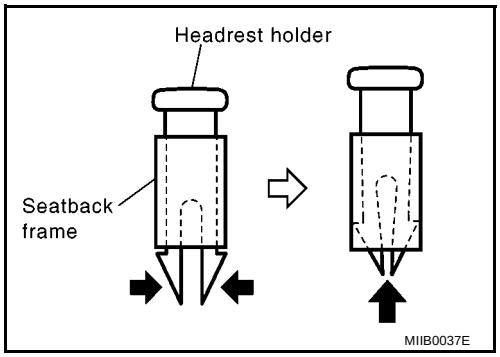
INSTALLATION

Install in the reverse order of removal.

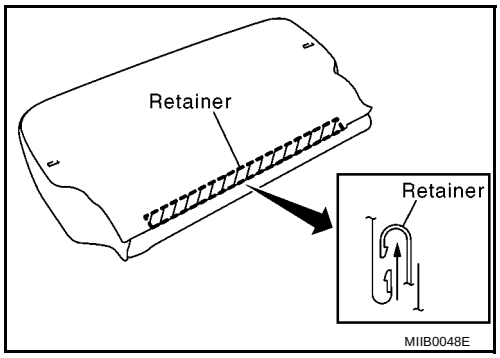
REAR SEATBACK DISASSEMBLY AND ASSEMBLY

Disassembly

1. Use pincers, etc., to push up hooks shown by the arrows in the figure, and remove headrest holder from seatback.



2. Remove retainer, and separate seatback trim&pad, and seatback frame.



Assembly

Install in the reverse order of removal.

CAUTION:

Before installing headrest holder, check its orientation (front/rear and right/left).

SECTION SRS

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for SRS “AIR BAG” and “SEAT BELT PRE-TENSIONER” Service 3
Wiring Diagram and Trouble Diagnosis 3
PREPARATION 4
Special Service Tools 4
Commercial Service Tool 5
SUPPLEMENTAL RESTRAINT SYSTEM (SRS) 6
SRS Configuration 6
Front Seat Belt Pre-tensioner with Load Limiter 7
Front Side Air Bag 7
Side Curtain Air Bag 7
TROUBLE DIAGNOSIS 8
Trouble Diagnosis Introduction 8
DIAGNOSIS FUNCTION 8
HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR 8
WORK FLOW 9
Component Parts Location 10
Schematic 11
Wiring Diagram — SRS— 12
CONSULT-II Function 15
DIAGNOSIS MODE FOR CONSULT-II 15
HOW TO CHANGE SELF-DIAGNOSIS MODE WITH CONSULT-II 15
HOW TO ERASE SELF-DIAGNOSIS RESULTS 16
Self-Diagnosis Function (Without CONSULT-II) 16
HOW TO CHANGE SELF-DIAGNOSIS MODE WITHOUT CONSULT-II 16
HOW TO ERASE SELF-DIAGNOSIS RESULTS 16
SRS Operation Check 17
DIAGNOSTIC PROCEDURE 1 17
Trouble Diagnosis with CONSULT-II 19
DIAGNOSTIC PROCEDURE 2 19
CONSULT-II DIAGNOSTIC CODE CHART (“SELF-DIAG [CURRENT]”) 20
DIAGNOSTIC PROCEDURE 3 23
DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2) 25
DIAGNOSTIC PROCEDURE 5 25
Trouble Diagnosis without CONSULT-II 29
DIAGNOSTIC PROCEDURE 6 29
WARNING LAMP FLASH CODE CHART 30
Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn Off 34
DIAGNOSTIC PROCEDURE 7 34
Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn On 35
DIAGNOSTIC PROCEDURE 8 35
DRIVER AIR BAG MODULE 36
Removal and Installation 36
REMOVAL 36
INSTALLATION 37
SPIRAL CABLE 38
Removal and Installation 38
REMOVAL 38
INSTALLATION 39
FRONT PASSENGER AIR BAG MODULE 40
Removal and Installation 40
REMOVAL 40
INSTALLATION 40
FRONT SIDE AIR BAG MODULE 41
Removal and Installation 41
REMOVAL 41
INSTALLATION 42
SIDE CURTAIN AIR BAG MODULE 43
Removal and Installation 43
REMOVAL 43
INSTALLATION 44
CRASH ZONE SENSOR 45
Removal and Installation 45
REMOVAL 45
INSTALLATION 45
SIDE AIR BAG (SATELLITE) SENSOR 46
Removal and Installation 46
REMOVAL 46
INSTALLATION 46

SEAT BELT PRE-TENSIONER 47
Removal and Installation 47
DIAGNOSIS SENSOR UNIT 48
Removal and Installation 48
REMOVAL 48
INSTALLATION 48
ECU DISCRIMINATED NO. 48
DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER 49
Caution for Air Bag Module and Seat Belt Pre-tensioner 49
CHECKING DEPLOYMENT TOOL 49
DEPLOYMENT PROCEDURES FOR AIR BAG MODULE (OUTSIDE OF VEHICLE) 50
DEPLOYMENT PROCEDURES FOR SEAT BELT PRE-TENSIONER (OUTSIDE OF VEHICLE) 54
DEPLOYMENT OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER WHILE MOUNTED IN VEHICLE 55
DISPOSING OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER 55
COLLISION DIAGNOSIS 56
For Frontal Collision 56
SRS INSPECTION (FOR FRONTAL COLLISION) 56
For Side Collision 57
WHEN THE SIDE AIR BAG IS ACTIVATED IN THE SIDE COLLISION: 57
WHEN SRS IS NOT ACTIVATED IN THE SIDE COLLISION: 58
SRS INSPECTION (FOR SIDE COLLISION) 58

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EHS000RR

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Precautions for SRS “AIR BAG” and “SEAT BELT PRE-TENSIONER” Service

EHS000RS

- Do not use electrical test equipment to check SRS circuits unless instructed to in this Service Manual.
- Before servicing the SRS, turn ignition switch “OFF”, disconnect battery ground cable and wait at least 3 minutes.
  For approximately 3 minutes after the cables is removed, it is still possible for the air bag and seat belt pre-tensioner to deploy. Therefore, do not work on any SRS connectors or wires until at least 3 minutes have passed.
- Diagnosis sensor unit must always be installed with their arrow marks “⇐” pointing towards the front of the vehicle for proper operation. Also check diagnosis sensor unit for cracks, deformities or rust before installation and replace as required.
- The spiral cable must be aligned with the neutral position since its rotations are limited. Do not attempt to turn steering wheel or column after removal of steering gear.
- Handle air bag module carefully. Always place driver and front passenger air bag modules with the pad side facing upward and place front side air bag module standing with stud bolt side setting bottom.
- Conduct self-diagnosis to check entire SRS for proper function after replacing any components.
- After air bag inflates, the front instrument panel assembly should be replaced if damaged.

Wiring Diagram and Trouble Diagnosis

EHS001N8

When you read wiring diagrams, refer to the followings:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-4, "POWER SUPPLY ROUTING" in PG section

When you perform trouble diagnosis, refer to the followings:

- GI-11, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

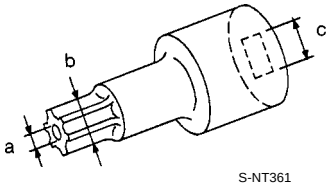
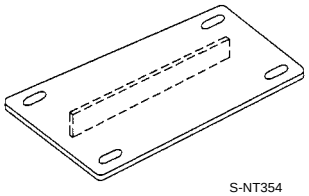
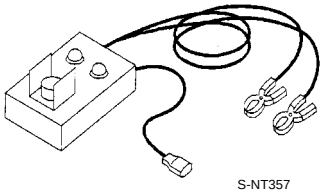
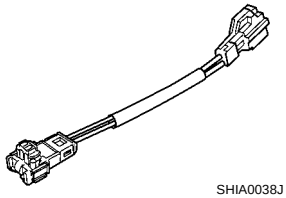
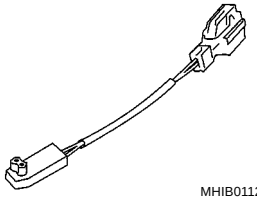
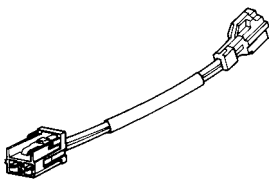
Check for any service bulletins before servicing the vehicle.

PREPARATION

PFP:00002

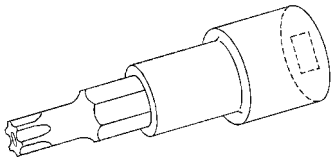
Special Service Tools

EHS000RU

Tool number Tool name		Application
HT61961000 and HT62152000 combined Tamper resistant TORX bit	 S-NT361	Size: T50 **a: 3.5 (0.138) dia.** **b: 8.5 - 8.6 (0.335 - 0.339) dia.** **c: approx. 10 (0.39) sq.** Unit: mm (in)
KV99105300 Air bag module bracket	 S-NT354	Anchoring air bag module
KV99106400 Deployment tool	 S-NT357	Disposing of air bag module
KV99109700 ● Deployment tool adapter for driver air bag module ● Deployment tool adapter for front passenger air bag module ● Deployment tool adapter for pre-tensioner seat belt (For 3 door models)	 SHIA0038J	● Connection between the deployment tool and driver air bag module ● Connection between the deployment tool and front passenger air bag module ● Connection between the deployment tool and pre-tensioner seat belt
KV99109800 Deployment tool adapter for pre-tensioner seat belt (For 5 door models)	 MHIB0112E	Connection between the deployment tool and pre-tensioner seat belt
KV999R0080 Deployment tool adapter for side curtain air bag module	 ZZA1166D	Connection between the deployment tool and side curtain air bag module

Commercial Service Tool

EHS000RV

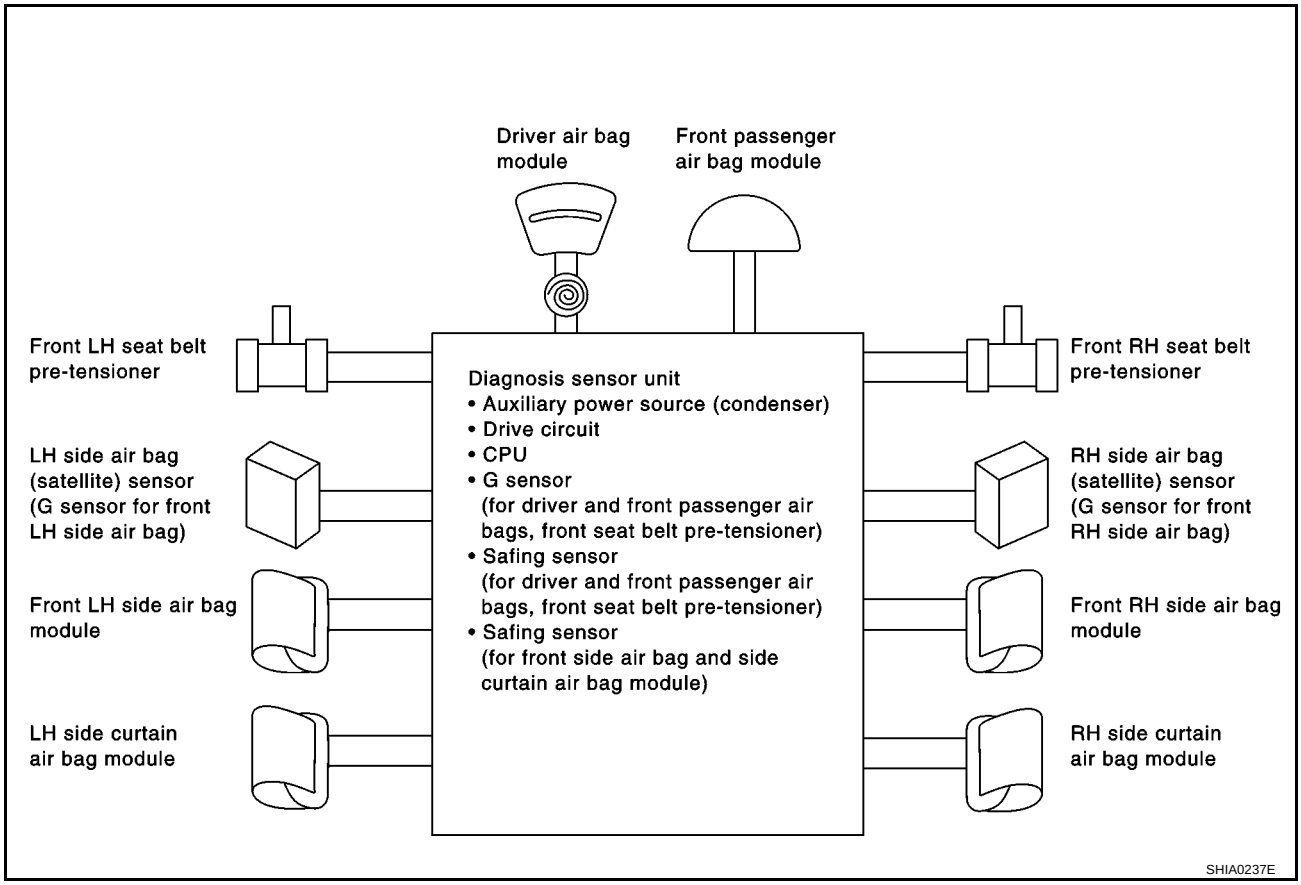
Tool name		Application
Tamper resistant TORX bit	 S-NT757	Size: T30

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

PFP:28556

SRS Configuration

EHS000RW



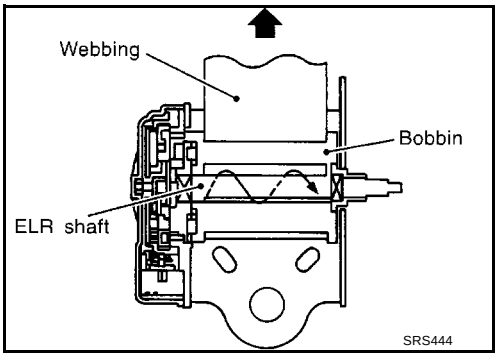
The air bag deploys if the diagnosis sensor unit activates while the ignition switch is in the ON or START position.
The collision modes for which supplemental restraint systems are activated are different among the SRS systems. For example, the driver air bag module and front passenger air bag module are activated in a frontal collision but not in a side collision.
SRS configurations which are activated for some collision modes are as follows;

SRS configuration	Frontal collision	Left side collision	Right side collision
Driver air bag module	×	—	—
Front passenger air bag module	×	—	—
Front LH seat belt pre-tensioner	×	—	—
Front RH seat belt pre-tensioner	×	—	—
Front LH side air bag module	—	×	—
Front RH side air bag module	—	—	×
LH side curtain air bag module	—	×	—
RH side curtain air bag module	—	—	×

Front Seat Belt Pre-tensioner with Load Limiter

EHS000RX

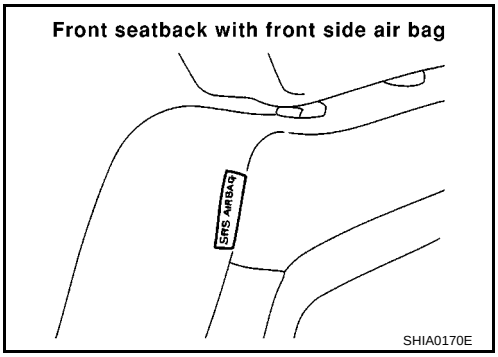
The seat belt pre-tensioner system with load limiter is installed for both the driver's seat and the front passenger's seat. It operates simultaneously with the SRS air bag system in the event of a frontal collision with an impact exceeding a specified level.
When the frontal collision with an impact exceeding a specified level occurs, seat belt slack resulting from clothing or other factors is immediately taken up by the pre-tensioner. Vehicle passengers are securely restrained.
When passengers in a vehicle are thrown forward in a collision and the restraining force of the seat belt exceeds a specified level, the load limiter permits the specified extension of the seat belt by the twisting of the ELR shaft, and a relaxation of the chest-area seat belt web tension while maintaining force.



Front Side Air Bag

EHS000RY

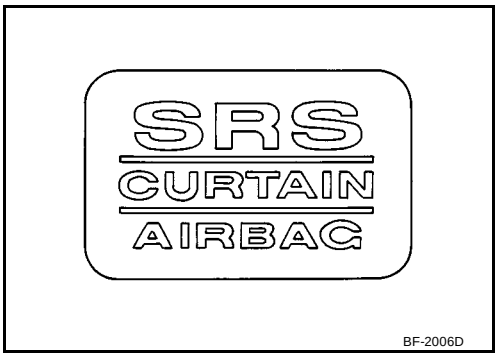
Front side air bag is built-in type.
The front seatbacks with built-in type side air bag have the labels as shown.



Side Curtain Air Bag

EHS000RZ

The side curtain air bags have the labels as shown.



TROUBLE DIAGNOSIS

PFP:00004

Trouble Diagnosis Introduction

EHS000S0

CAUTION:

- **Do not use electrical test equipment on any circuit related to the SRS unless instructed in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**
- **Do not attempt to repair, splice or modify the SRS wiring harness. If the harness is damaged, replace it with a new one.**
- **Keep ground portion clean.**

DIAGNOSIS FUNCTION

The SRS self-diagnosis results can be read by using “AIR BAG” warning lamp and/or CONSULT-II.
The User mode is exclusively prepared for the customer (driver). This mode warns the driver of a system malfunction through the operation of the “AIR BAG” warning lamp.
The Diagnosis mode allows the technician to locate and inspect the malfunctioning part.
The mode applications for the “AIR BAG” warning lamp and CONSULT-II are as follows:

	User mode	Diagnosis mode	Display type
“AIR BAG” warning lamp	X	X	ON-OFF operation
CONSULT-II	—	X	Monitoring

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Information from Customer

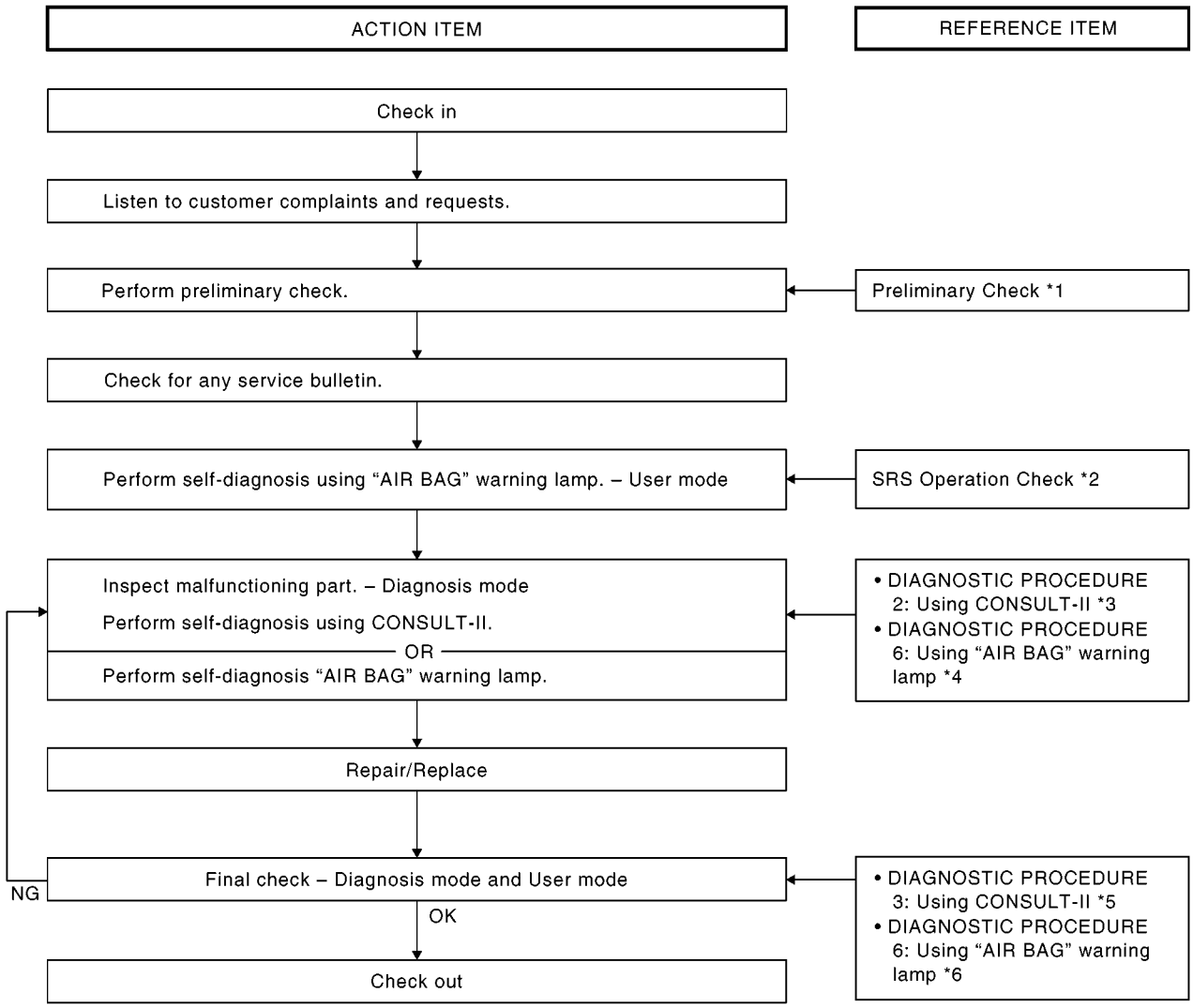
WHAT..... Vehicle model
WHEN..... Date, Frequencies
WHERE..... Road conditions
HOW..... Operating conditions, Symptoms

Preliminary Check

Check that the following parts are in good order.

- Battery (Refer to SC-5, "How to Handle Battery" .)
- Fuse (Refer to SRS-12, "Wiring Diagram — SRS—" .)
- System component-to-harness connections

WORK FLOW



PHIA0710E

*1: SRS-8, "Preliminary Check"

*2: SRS-17, "SRS Operation Check"

*3: SRS-19, "DIAGNOSTIC PROCEDURE 2"

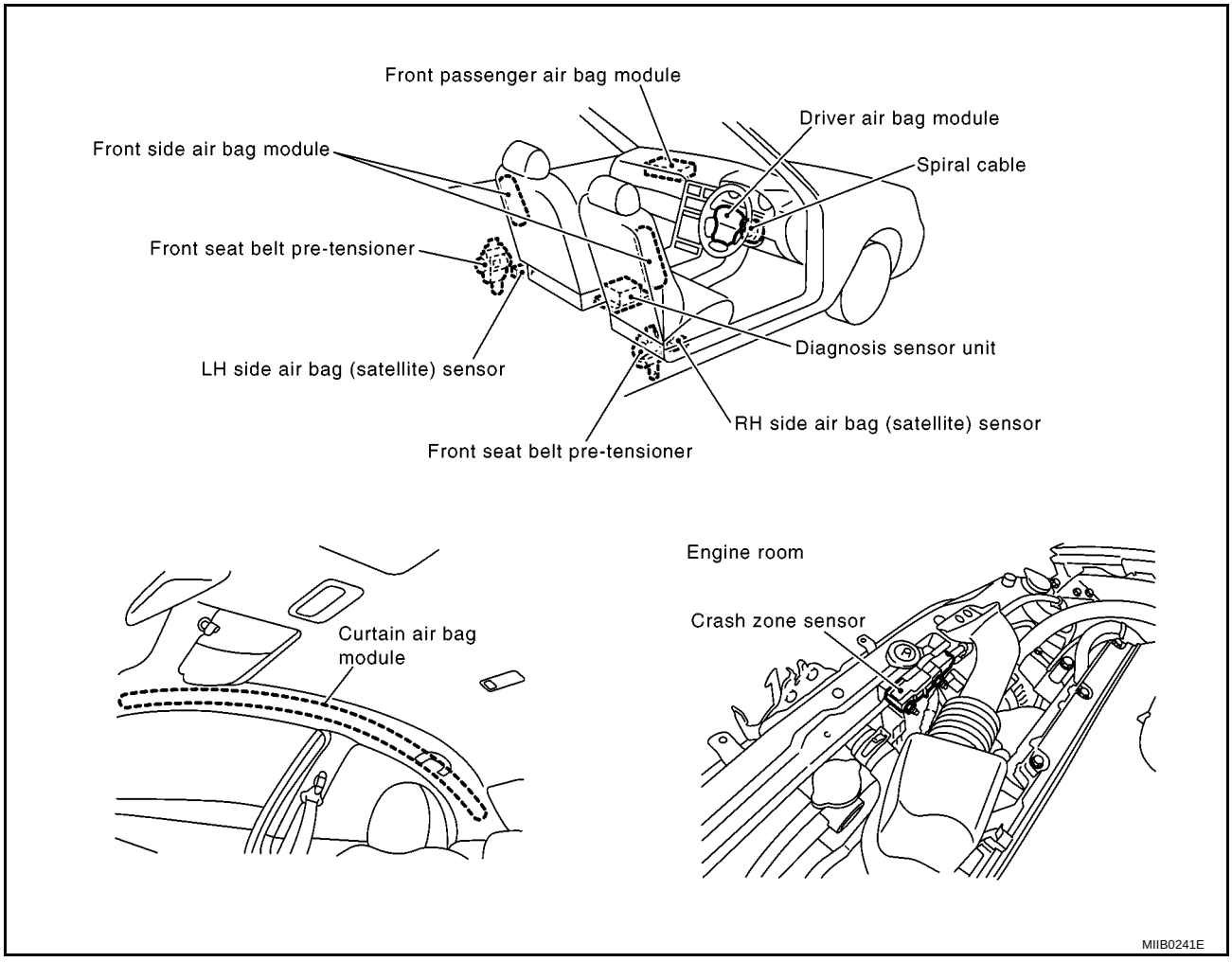
*4: SRS-29, "DIAGNOSTIC PROCEDURE 6"

*5 SRS-23, "DIAGNOSTIC PROCEDURE 3"

*6 SRS-29, "DIAGNOSTIC PROCEDURE 6"

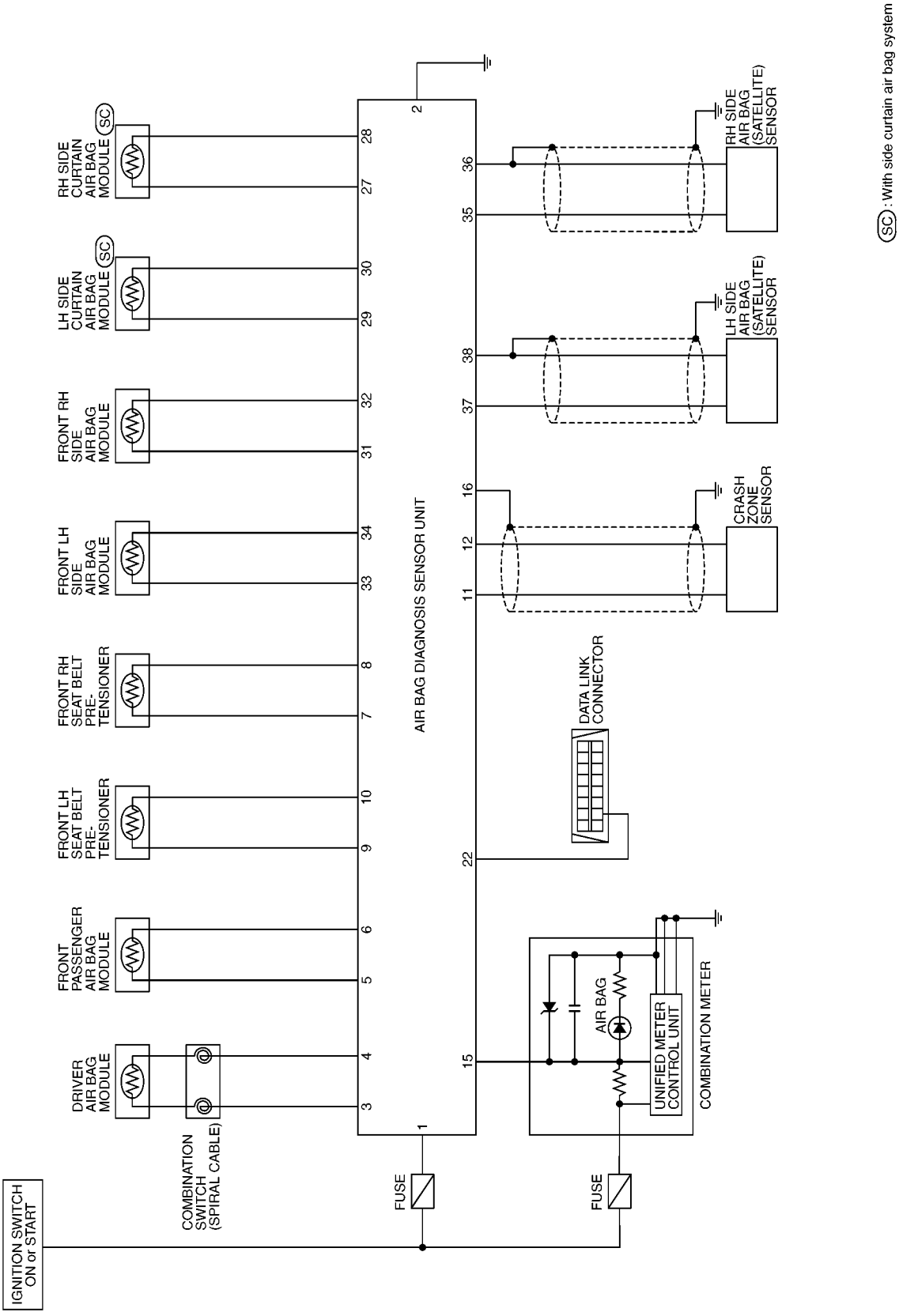
Component Parts Location

EHS000S1



Schematic

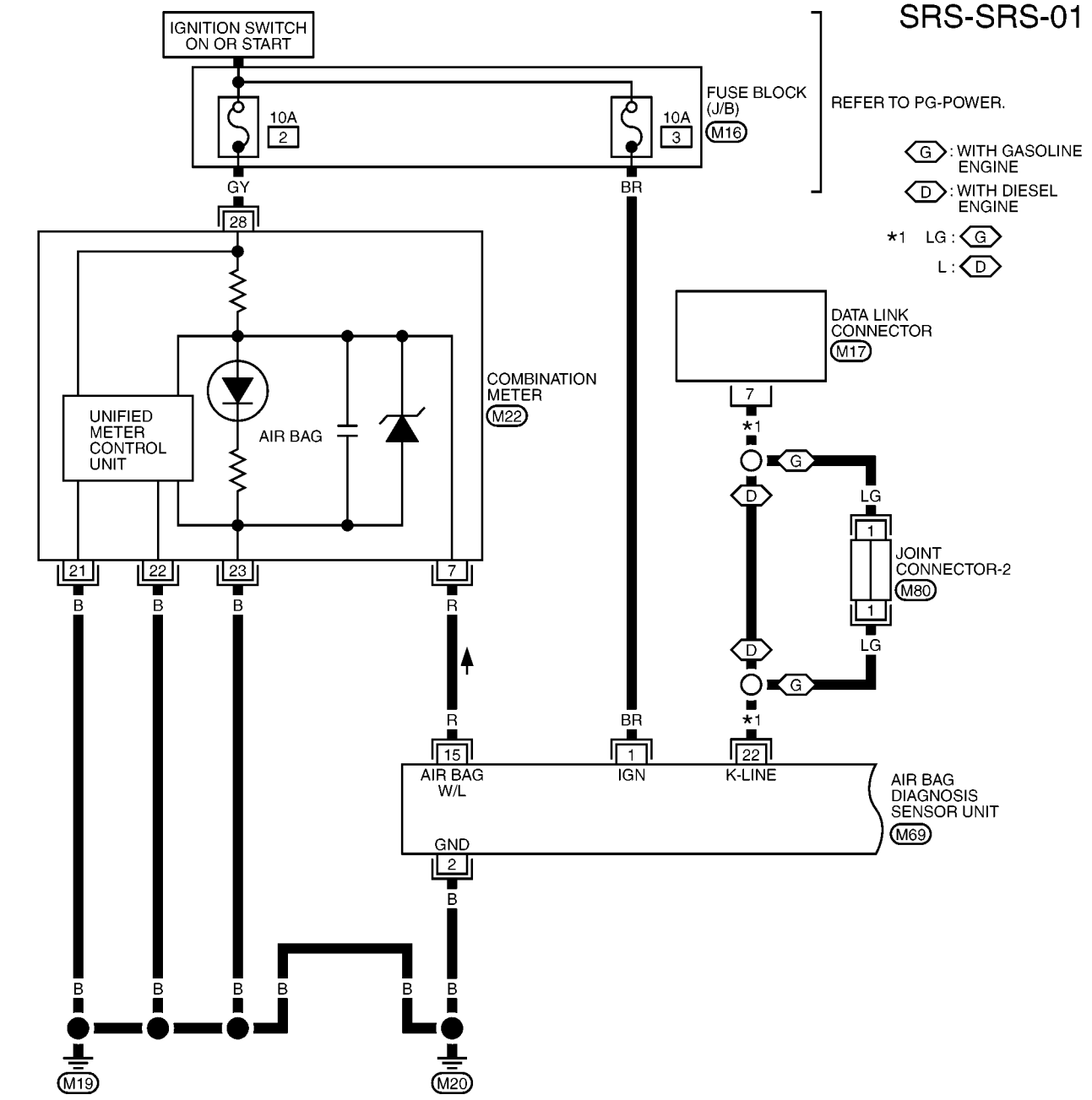
EHS000SE

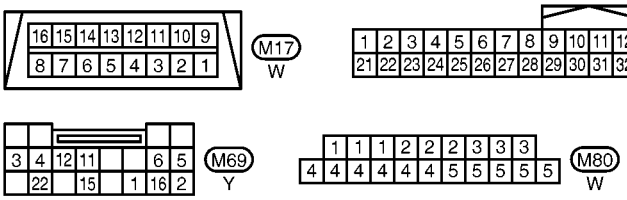


MHWA0010E

Wiring Diagram — SRS—

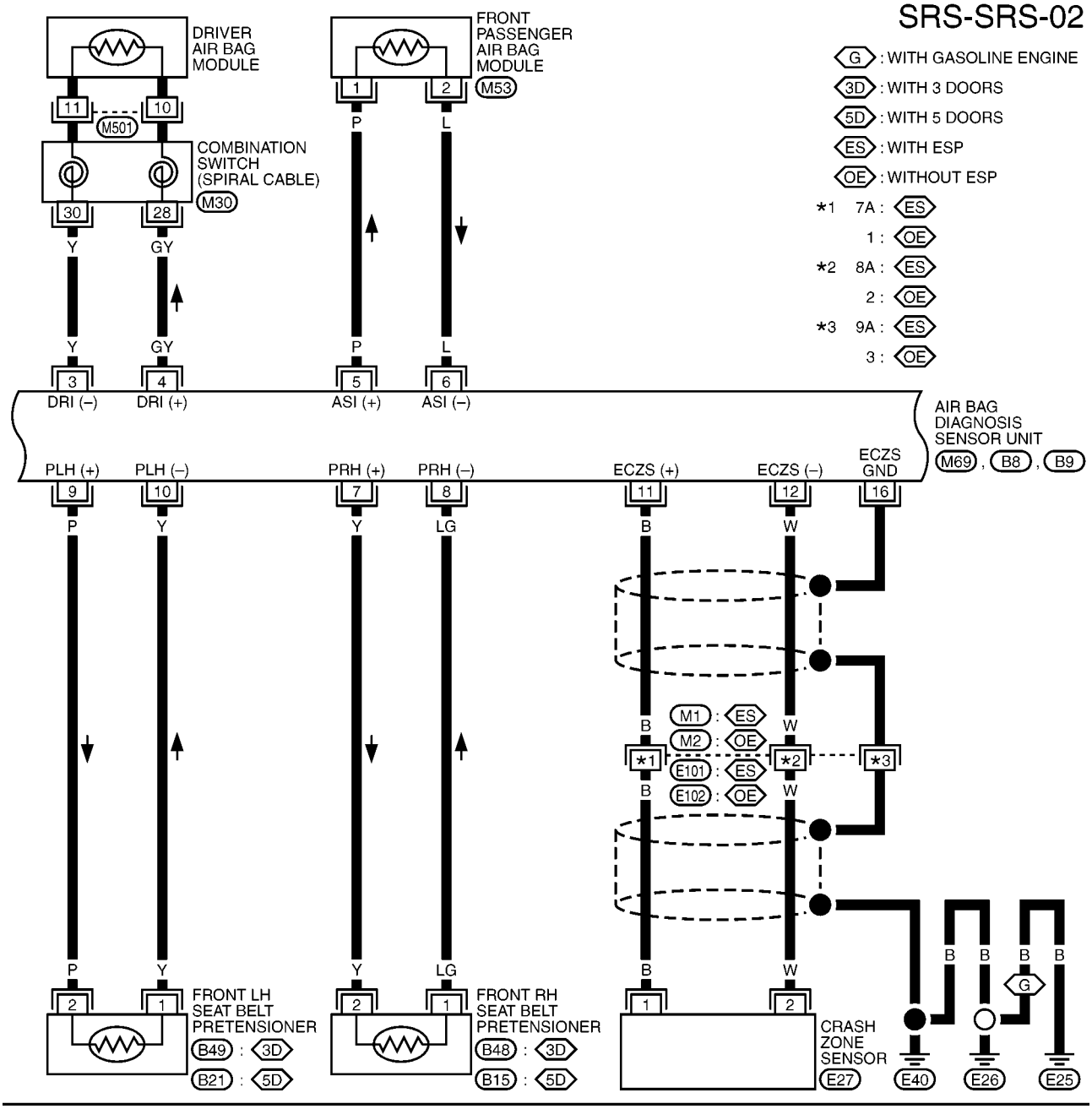
SMA for VIN >SJN**AK12U1277776 EHS000S3

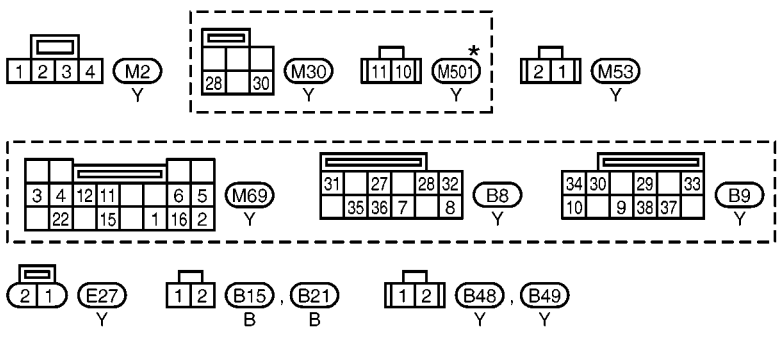




REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MHWA0021E



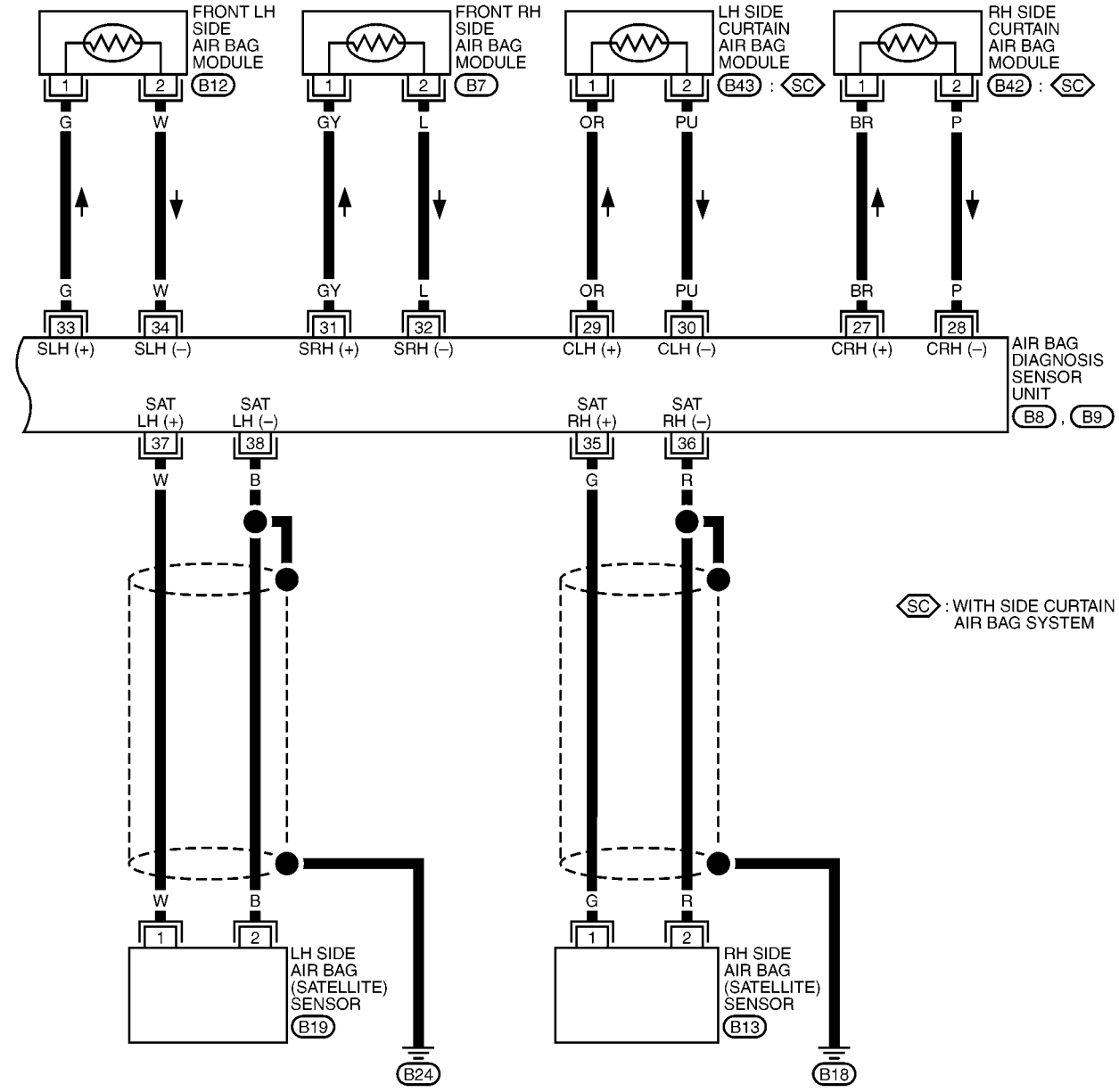


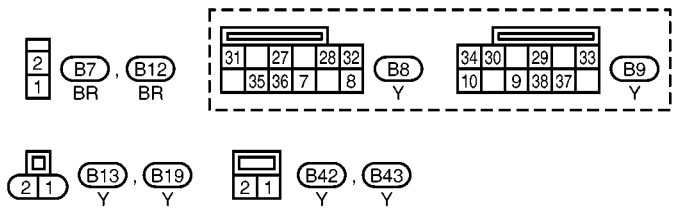
★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)

MHWA0022E

SRS-SRS-03





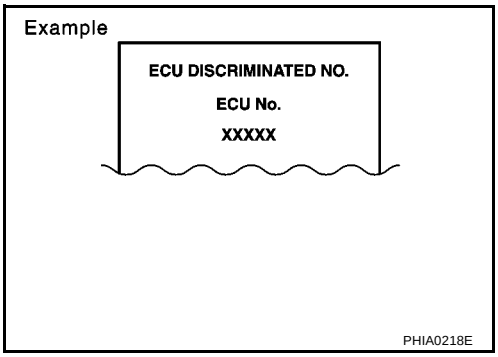
MHWA0023E

CONSULT-II Function

EHS000S4

DIAGNOSIS MODE FOR CONSULT-II

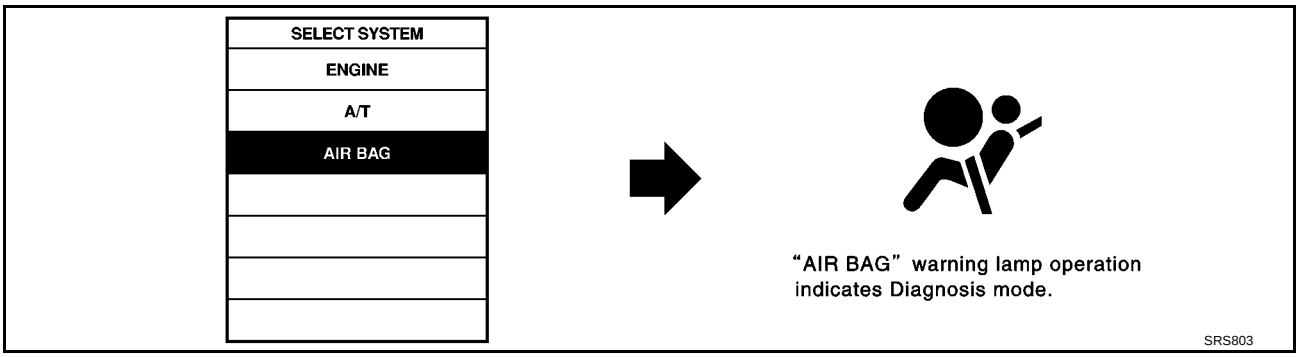
- “SELF-DIAG [CURRENT]”
  A current Self-diagnosis result (also indicated by the number of warning lamp flashes in the Diagnosis mode) is displayed on the CONSULT-II screen in real time. This refers to a malfunctioning part requiring repairs.
- “SELF-DIAG [PAST]”
  Diagnosis results previously stored in the memory are displayed on the CONSULT-II screen. The stored results are not erased until memory erasing is executed.
- “TROUBLE DIAG RECORD”
  With TROUBLE DIAG RECORD, diagnosis results previously erased by a reset operation can be displayed on the CONSULT-II screen.
- “ECU DISCRIMINATED NO.”
  The diagnosis sensor unit for each vehicle model is assigned with its own, individual classification number. This number will be displayed on the CONSULT-II screen, as shown. When replacing the diagnosis sensor unit, refer to the part number for the compatibility. After installation, replacement with a correct unit can be checked by confirming this classification number on the CONSULT-II screen.
  After repair, make sure the discriminated number of diagnosis sensor unit installed to vehicle are same. Refer to SRS-48, "ECU DISCRIMINATED NO." .



HOW TO CHANGE SELF-DIAGNOSIS MODE WITH CONSULT-II

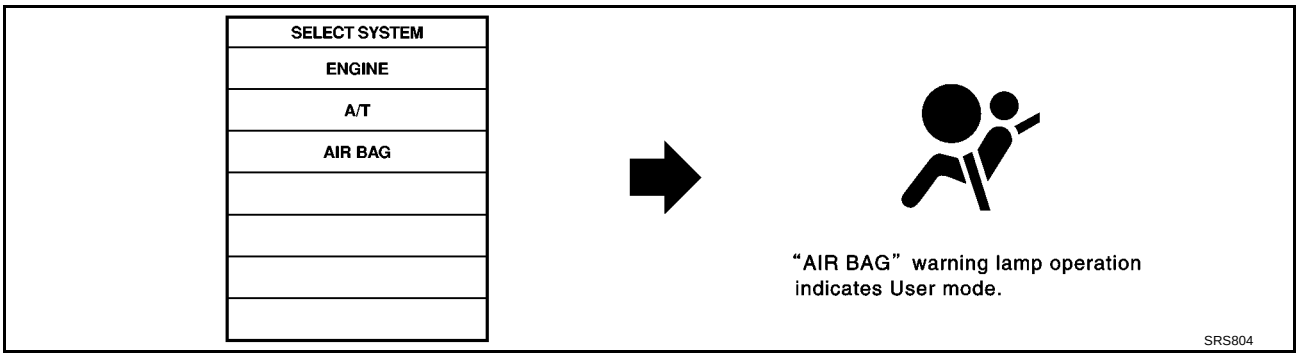
From User Mode to Diagnosis Mode

After selecting “AIR BAG” on the “SELECT SYSTEM” screen, User mode automatically changes to Diagnosis mode.



From Diagnosis Mode to User Mode

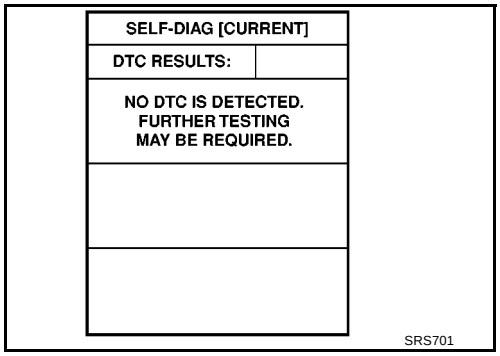
To return to User mode from Diagnosis mode, touch “BACK” key of CONSULT-II until “SELECT SYSTEM” appears, Diagnosis mode automatically changes to User mode.



HOW TO ERASE SELF-DIAGNOSIS RESULTS

- “SELF-DIAG [CURRENT]”
  A current Self-diagnosis result is displayed on the CONSULT-II screen in real time.
  After the malfunction is repaired completely, no malfunction is detected on “SELF-DIAG [CURRENT]”.
- “SELF-DIAG [PAST]”
  Return to the “SELF-DIAG [CURRENT]” CONSULT-II screen by touching “BACK” key of CONSULT-II and select “SELF-DIAG [CURRENT]” in SELECT DIAG MODE. Touch “ERASE” in “SELF-DIAG [CURRENT]” mode.

  NOTE:
  If the memory of the malfunction in “SELF-DIAG [PAST]” is not erased, the User mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.
- “TROUBLE DIAG RECORD”
  The memory of “TROUBLE DIAG RECORD” cannot be erased.

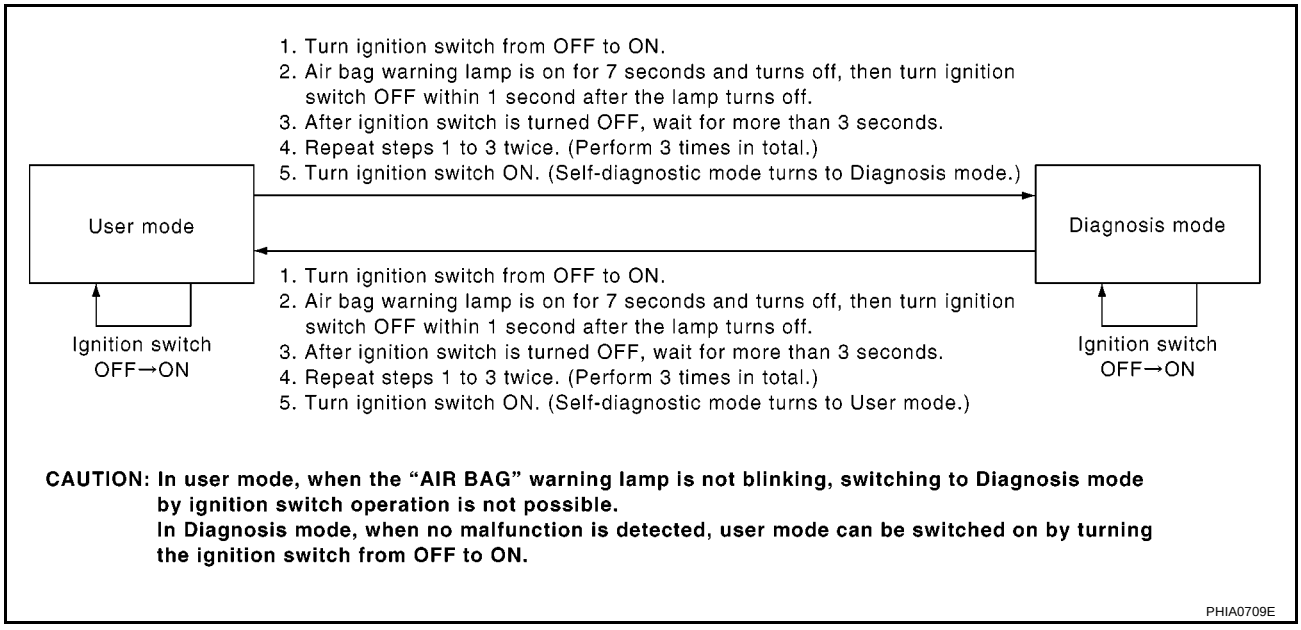


Self-Diagnosis Function (Without CONSULT-II)

EHS001N9

- The reading of these results is accomplished “User mode” and “Diagnosis mode”.
- After a malfunction is repaired, turn ignition switch ON. Diagnosis mode returns to the User mode. At that time, the self-diagnostic result is cleared.

HOW TO CHANGE SELF-DIAGNOSIS MODE WITHOUT CONSULT-II



HOW TO ERASE SELF-DIAGNOSIS RESULTS

After a malfunction is repaired, turn the ignition switch OFF for at least one second, then back ON. Diagnosis mode returns to the User mode. At that time, the self-diagnostic result is cleared.

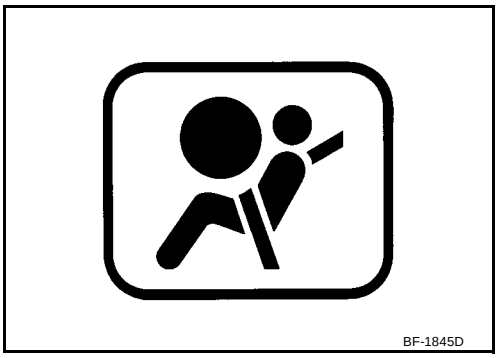
SRS Operation Check

EHS001NA

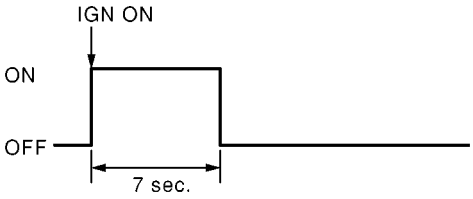
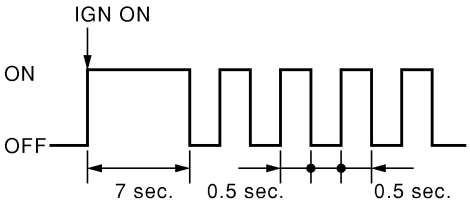
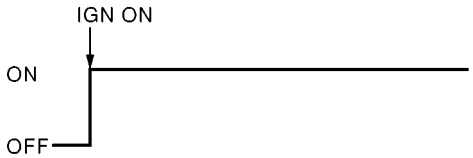
DIAGNOSTIC PROCEDURE 1

Checking Air Bag Operation by Using “AIR BAG” Warning Lamp — User Mode

1. Turn the ignition switch from OFF to ON, and check that the air bag warning lamp blinks.
2. Compare the SRS air bag warning lamp blinking pattern with the examples.



Warning lamp examples

“AIR BAG” warning lamp operation-User mode-	SRS condition	Reference item
 SHIA0011E	● No malfunction is detected. ● No further action is necessary.	—
 SHIA0012E	● The system is malfunctioning and need to be repaired as indicated.	Go to SRS-19, "DIAGNOSTIC PROCEDURE 2" or SRS-29, "DIAGNOSTIC PROCEDURE 6" .
 SHIA0013E	● Air bag is deployed. ● Seat belt pre-tensioner is deployed.	Go to SRS-56, "COLLISION DIAGNOSIS" .
	● Diagnosis sensor unit is malfunctioning. ● Air bag power supply circuit is malfunctioning. ● SRS air bag warning lamp circuit is malfunctioning.	Go to SRS-34, "Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn Off" .
SHIA0014E	● Diagnosis sensor unit is malfunctioning. ● Air bag warning lamp circuit is malfunctioning.	Go to SRS-35, "Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn On" .

Trouble Diagnosis with CONSULT-II

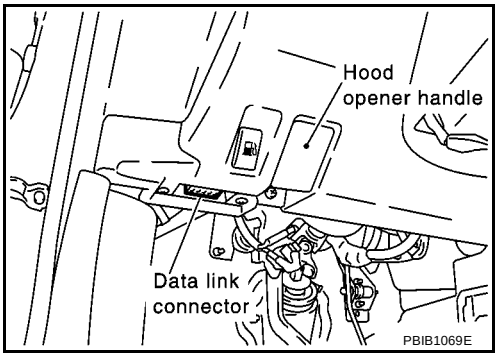
EHS001NB

DIAGNOSTIC PROCEDURE 2

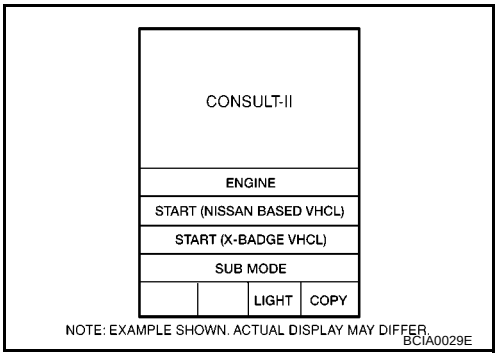
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

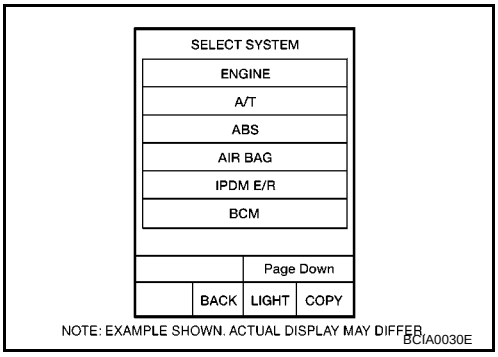
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector.
3. Turn ignition switch ON.



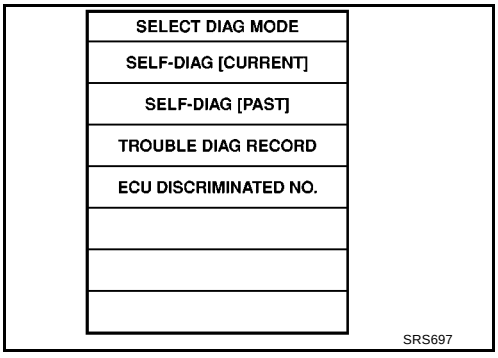
4. Touch “START(NISSAN BASED VHCL)”.



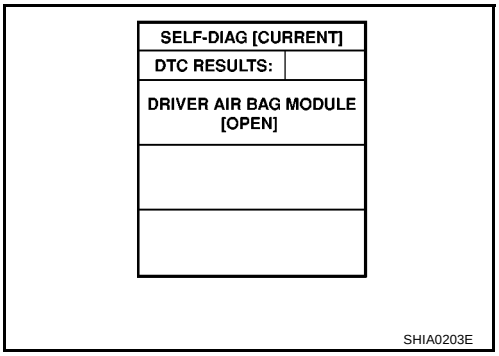
5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “SELF-DIAG [CURRENT]”.

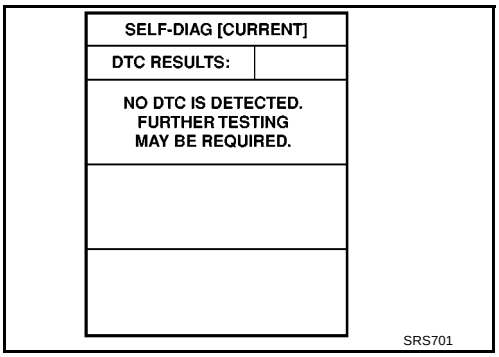


7. Diagnostic code is displayed on “SELF-DIAG [CURRENT]”.



If no malfunction is detected on “SELF-DIAG [CURRENT]” even though malfunction is detected in “SRS Operation Check”, check the battery voltage. If the battery voltage is less than 9 V, charge or replace the battery. SRS-23, "DIAGNOSTIC PROCEDURE 3" . If the battery voltage is OK, go to SRS-25, "DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)" diagnose the following cases:

- Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair.
- The SRS system malfunctions intermittently.



CONSULT-II DIAGNOSTIC CODE CHART (“SELF-DIAG [CURRENT]”)

Diagnostic item	Explanation		Repair order “Recheck SRS at each replacement”
NO DTC IS DETECTED.	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	● Low battery voltage (Less than 9V)	● Go to SRS-23, "DIAGNOSTIC PROCEDURE 3" after charging the battery.
		● Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. ● Intermittent malfunction has been detected in the past.	● Go to SRS-25, "DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)" . ● Go to SRS-25, "DIAGNOSTIC PROCEDURE 5" .
	● No malfunction is detected.		—
DRIVER AIRBAG MODULE [OPEN]	● Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace driver air bag module. (Before disposal, it must be deployed.) 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit. 6. Replace the related harness.
DRIVER AIRBAG MODULE [VB-SHORT]	● Driver air bag module circuit is shorted to a power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT]	● Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT]	● Driver air bag module circuit is shorted between lines.		
ASSIST A/B MODULE [OPEN]	● Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
ASSIST A/B MODULE [VB-SHORT]	● Front passenger air bag module circuit is shorted to a power supply circuit.		
ASSIST A/B MODULE [GND-SHORT]	● Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT]	● Front passenger air bag module circuit is shorted between lines.		

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
CRASH ZONE SEN [UNIT FAIL] CRASH ZONE SEN [COMM FAIL] CRASH ZONE SEN [UNMATCH]	● Crash zone sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [OPEN]	● Front LH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front LH setback assembly (front LH side air bag module). (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT]	● Front LH side air bag module circuit is shorted to a power supply circuit.	
SIDE MODULE LH [GND-SHORT]	● Front LH side air bag module circuit is shorted to ground.	
SIDE MODULE LH [SHORT]	● Front LH side air bag module circuit is shorted between lines.	
SIDE MODULE RH [OPEN]	● Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front RH setback assembly (front RH side air bag module). (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT]	● Front RH side air bag module circuit is shorted to some power supply circuit.	
SIDE MODULE RH [GND-SHORT]	● Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT]	● Front RH side air bag module circuit is shorted between lines.	
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	● LH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	● RH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [OPEN]	● Front LH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT]	● Front LH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	● Front LH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	● Front LH pre-tensioner circuit is shorted between lines.	

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
PRE-TEN FRONT RH [OPEN]	● Front RH pre-tensioner circuit is shorted to a power supply circuit.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT]	● Front RH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	● Front RH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	● Front RH pre-tensioner circuit is shorted between lines.	
CURTAIN MODULE LH [OPEN]	● LH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace LH side curtain air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
CURTAIN MODULE LH [VB-SHORT]	● LH side curtain air bag module circuit is shorted to some power supply circuits.	
CURTAIN MODULE LH [GND-SHORT]	● LH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE LH [SHORT]	● LH side curtain air bag module circuit is shorted between lines.	
CURTAIN MODULE RH [OPEN]	● RH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace RH side curtain air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
CURTAIN MODULE RH [VB-SHORT]	● RH side curtain air bag module circuit is shorted to a power supply circuit.	
CURTAIN MODULE RH [GND-SHORT]	● RH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE RH [SHORT]	● RH side curtain air bag module circuit is shorted between lines.	
CONTROL UNIT	● Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the diagnosis sensor unit.

NOTE:

- Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using air bag warning lamp or CONSULT-II each time repair is finished. If malfunction is still observed, proceed to the next step. When malfunction is eliminated, further repair work is not required.

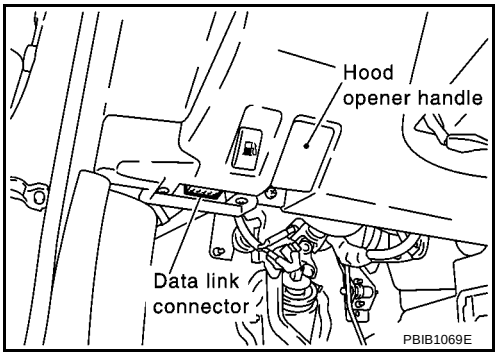
DIAGNOSTIC PROCEDURE 3

Final checking after repairing SRS by using CONSULT-II — Diagnosis mode

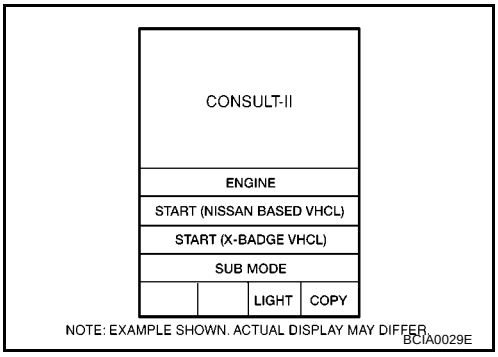
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

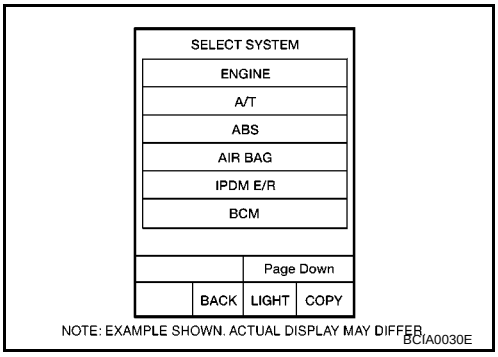
1. After repairing SRS, connect both battery cables.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.
3. Turn ignition switch “ON”.



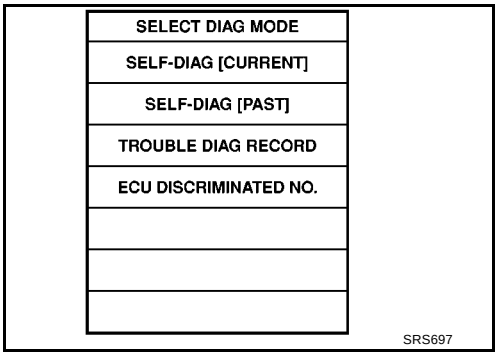
4. Touch “START(NISSAN BASED VHCL)”.



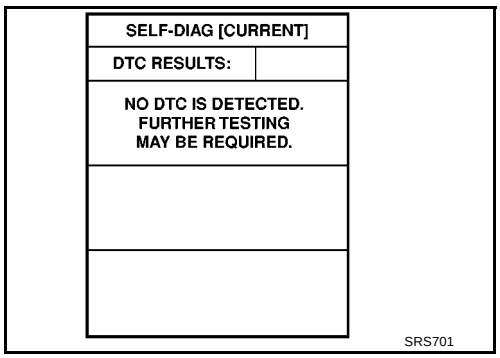
5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



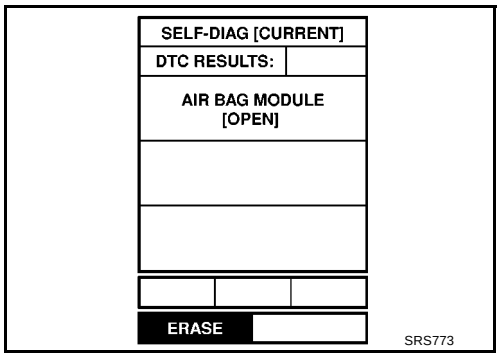
6. Touch “SELF-DIAG [CURRENT]”.



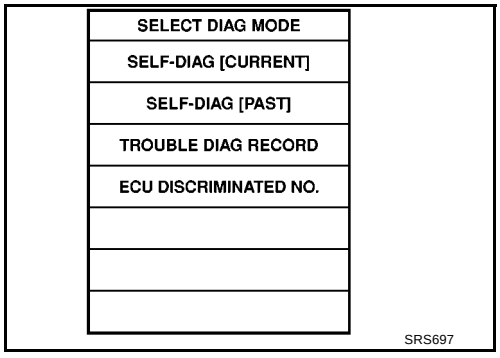
7. If no malfunction is detected on “SELF-DIAG [CURRENT]”, repair of SRS is completed. Go to step 8.
   If any malfunction is detected on “SELF-DIAG [CURRENT]”, the malfunctioning part is not repaired completely or another malfunctioning part is detected. Go to SRS-19, "DIAGNOSTIC PROCEDURE 2" , and repair malfunctioning part completely.



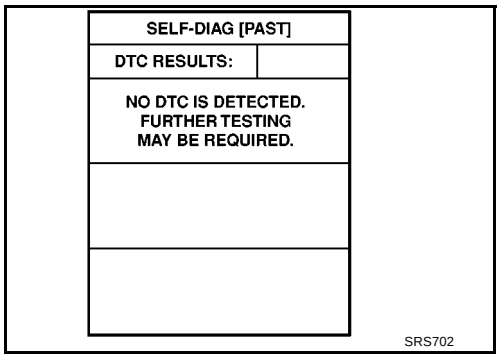
8. Touch “ERASE”.
   NOTE:
   Touch “ERASE” to clear the memory of the malfunction (“SELF-DIAG [PAST]”).
   If the memory of the malfunction in “SELF-DIAG [PAST]” is not erased, the User mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.



9. Touch “BACK” key of CONSULT-II to “SELECT DIAG MODE” screen. Touch “SELF-DIAG [PAST]”.



10. Check that no malfunction is detected on “SELF-DIAG [PAST]”.
11. Touch “BACK” key of CONSULT-II until “SELECT SYSTEM” appears in order to return to User mode from Diagnosis mode.
12. Turn ignition switch OFF then turn off and disconnect CONSULT-II.
13. Go to SRS-17, "Checking Air Bag Operation by Using “AIR BAG” Warning Lamp — User Mode" .



DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)

Inspecting SRS malfunctioning record

1. CONSIDER POSSIBILITY OF NOT ERASING SELF-DIAGNOSTIC RESULT AFTER REPAIRING

Is it the first time for maintenance of SRS?

YES or NO

YES >> Go to SRS-19, "DIAGNOSTIC PROCEDURE 2" .

NO >> Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. Go to SRS-23, "DIAGNOSTIC PROCEDURE 3" .

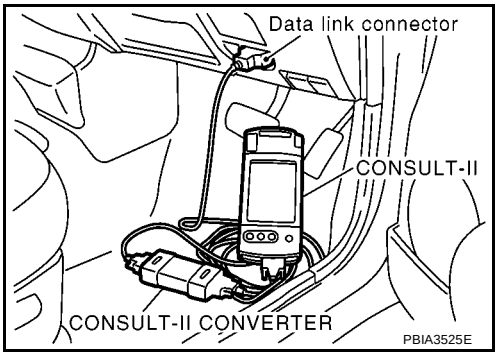
DIAGNOSTIC PROCEDURE 5

Inspecting SRS intermittent malfunction by using CONSULT-II — Diagnosis mode

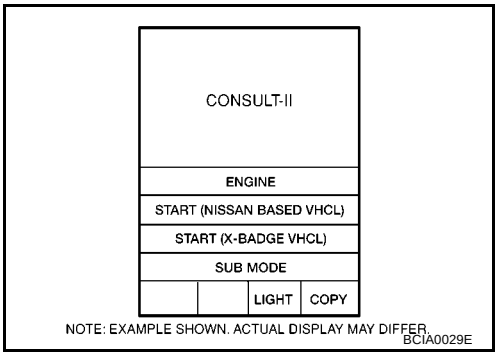
CAUTION:

If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunction might be detected in self-diagnosis depending on control unit which carry out CAN communication.

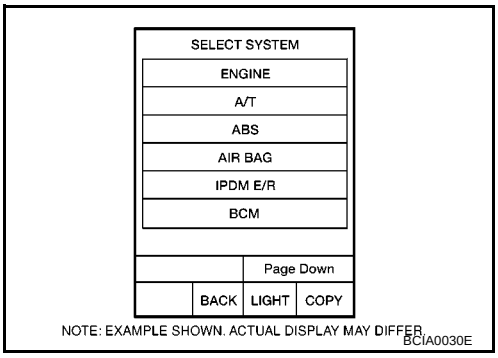
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.



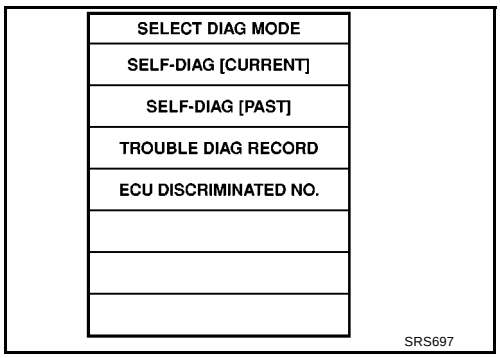
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



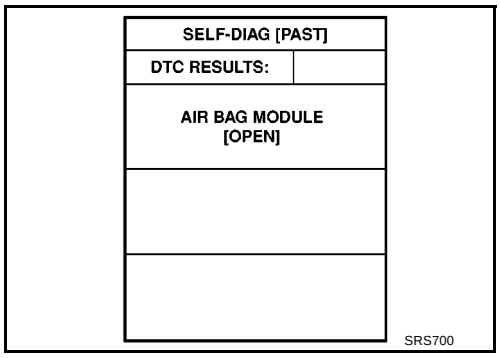
5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



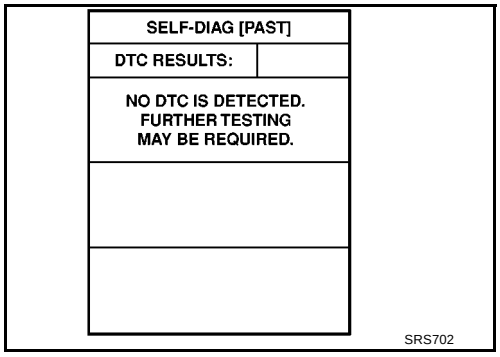
6. Touch “SELF-DIAG [PAST]”.



7. If diagnostic codes are displayed on “SELF-DIAG [PAST]”, go to step 10.

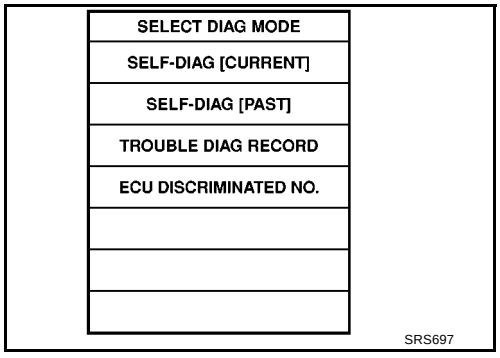


If no malfunction is detected on “SELF-DIAG [PAST]”, touch “BACK” and go back to “SELECT DIAG MODE”.

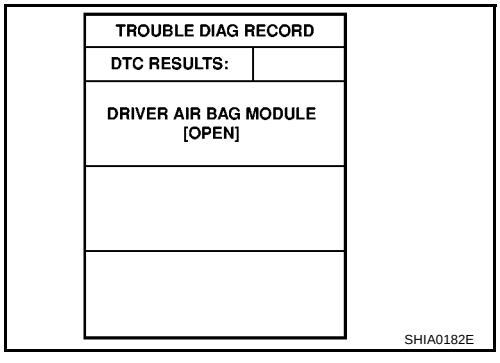


8. Touch “TROUBLE DIAG RECORD”.

NOTE:
With “TROUBLE DIAG RECORD”, diagnosis results previously erased by a reset operation can be displayed.



9. Diagnostic code is displayed on “TROUBLE DIAG RECORD”.
10. Touch “PRINT”.
11. Compare diagnostic codes to SRS-27, "CONSULT-II Diagnostic Code Chart (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)" .
12. Touch “BACK” key of CONSULT-II until “SELECT SYSTEM” appears.
13. Turn ignition switch OFF, then turn off and disconnect CONSULT-II, and both battery cables.



14. Repair the system as outlined by the “Repair order” in “Intermittent Malfunction Diagnostic Code Chart”, that corresponds to the self-diagnostic result. For replacement procedure of component parts, refer to the Removal and Installation procedure for the appropriate component.
15. Go to SRS-23, "DIAGNOSTIC PROCEDURE 3" , for final checking.

CONSULT-II Diagnostic Code Chart (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

Diagnostic item	Explanation		Repair order “Recheck SRS at each replacement”
NO DTC IS DETECTED.	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	● Low battery voltage (Less than 9V)	● Go to SRS-23, "DIAGNOSTIC PROCEDURE 3" .
	● No malfunction is detected.		● Go to SRS-23, "DIAGNOSTIC PROCEDURE 3" .
DRIVER AIRBAG MODULE [OPEN]	● Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace driver air bag module (Before disposal, it must be deployed.), diagnosis sensor unit and spiral cable.
DRIVER AIRBAG MODULE [VB-SHORT]	● Driver air bag module circuit is shorted to a power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT]	● Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT]	● Driver air bag module circuit is shorted between lines.		
ASSIST A/B MODULE [OPEN]	● Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and front passenger air bag module (Before disposal, it must be deployed.).
ASSIST A/B MODULE [VB-SHORT]	● Front passenger air bag module circuit is shorted to a power supply circuit.		
ASSIST A/B MODULE [GND-SHORT]	● Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT]	● Front passenger air bag module circuit is shorted between lines.		
CRASH ZONE SEN [UNIT FAIL] CRASH ZONE SEN [COMM FAIL]	● Crash zone sensor		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace crash zone sensor and diagnosis sensor unit.
SIDE MODULE LH [OPEN]	● Front LH side air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and LH side air bag module. (Before disposal, it must be deployed.).
SIDE MODULE LH [VB-SHORT]	● Front LH side air bag module circuit is shorted to a power supply circuit.		
SIDE MODULE LH [GND-SHORT]	● Front LH side air bag module circuit is shorted to ground.		
SIDE MODULE LH [SHORT]	● Front LH side air bag module circuit is shorted between lines.		

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
SIDE MODULE RH [OPEN]	● Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and RH side air bag module (Before disposal, it must be deployed.)
SIDE MODULE RH [VB-SHORT]	● Front RH side air bag module circuit is shorted to a power supply circuit.	
SIDE MODULE RH [GND-SHORT]	● Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT]	● Front RH side air bag module circuit is shorted between lines.	
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	● LH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and LH side air bag (Satellite) sensor.
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	● RH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and RH side air bag (Satellite) sensor.
PRE-TEN FRONT LH [OPEN]	● Front LH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and front LH seat belt (Before disposal, it must be activated.)
PRE-TEN FRONT LH [VB-SHORT]	● Front LH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	● Front LH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	● Front LH pre-tensioner circuit is shorted between lines.	
PRE-TEN FRONT RH [OPEN]	● Front RH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and front RH seat belt (Before disposal, it must be activated.)
PRE-TEN FRONT RH [VB-SHORT]	● Front RH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	● Front RH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	● Front RH pre-tensioner circuit is shorted between lines.	
CURTAIN MODULE LH [OPEN]	● LH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and LH side curtain air bag module. (Before disposal, it must be deployed.)
CURTAIN MODULE LH [VB-SHORT]	● LH side curtain air bag module circuit is shorted to a power supply circuits.	
CURTAIN MODULE LH [GND-SHORT]	● LH side curtain air bag module circuit is shorted to ground.	

Diagnostic item	Explanation	Repair order “Recheck SRS at each replacement”
CURTAIN MODULE RH [OPEN]	● RH side curtain air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. If the harness check result is OK, replace the diagnosis sensor unit and RH side curtain air bag module. (Before disposal, it must be deployed.)
CURTAIN MODULE RH [VB-SHORT]	● RH side curtain air bag module circuit is shorted to a power supply circuit.	
CURTAIN MODULE RH [GND-SHORT]	● RH side curtain air bag module circuit is shorted to ground.	
CURTAIN MODULE RH [SHORT]	● RH side curtain air bag module circuit is shorted between lines.	
CONTROL UNIT	● Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the diagnosis sensor unit.

Trouble Diagnosis without CONSULT-II

EHS001NC

DIAGNOSTIC PROCEDURE 6

Inspecting SRS Malfunctioning Parts by Using “AIR BAG” Warning Lamp—Diagnosis Mode

NOTE:

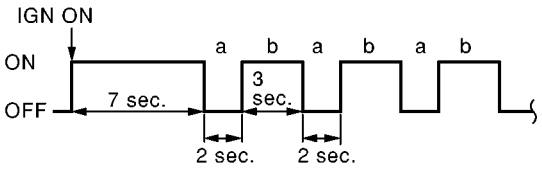
SRS will not enter Diagnosis mode if no malfunction is detected in User mode.

1. Turn ignition switch ON.
2. After “AIR BAG” warning lamp lights for 7 seconds, turn ignition switch OFF within 1 second.
3. Wait more than 3 seconds.
4. Repeat the steps 1 to 3 two times.
5. Turn ignition switch ON.

SRS is now in Diagnosis mode.
“AIR BAG” warning lamp operates in Diagnosis mode as follows:

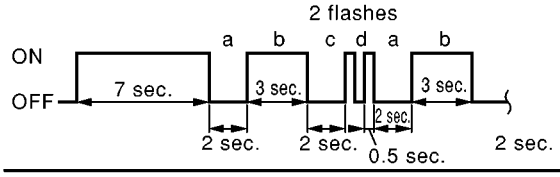
WARNING LAMP FLASH CODE CHART

<Diagnosis results (previously stored in the memory) might not be erased after repair or intermittent malfunctions have been detected in the past.>

Flash pattern	Repair order
a through b are repeated.  	1. Go to DIAGNOSTIC PROCEDURES 2 and 3.

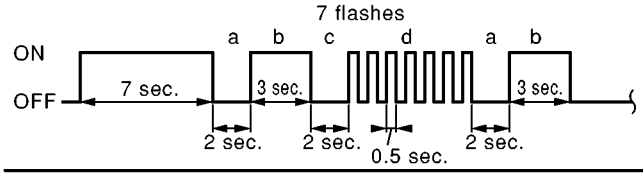
SHIA0026E

<Driver air bag module>

Flash pattern	Repair order
a through d are repeated. d: Two flashes indicates malfunctioning driver air bag module circuit.  	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the spiral cable. 4. Replace driver air bag module. (Before disposal, it must be deployed.) 5. Replace the diagnosis sensor unit. 6. Replace the related harness.

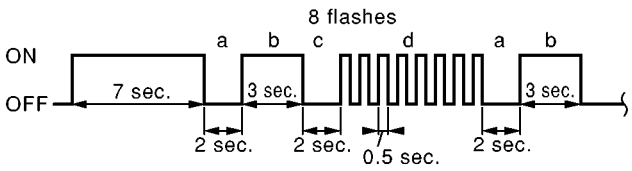
PHIA0185E

<Diagnosis sensor unit>

Flash pattern	Repair order
a through d are repeated. d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.  	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the diagnosis sensor unit. 4. Replace the related harness.

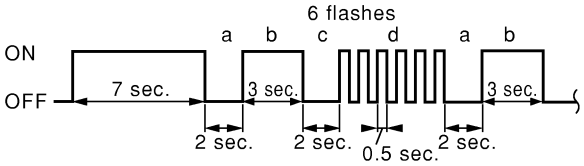
SHIA0028E

<Front passenger air bag module>

Flash pattern	Repair order
a through d are repeated. d: Eight flashes indicate malfunctioning front passenger air bag module circuit.  	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front passenger air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

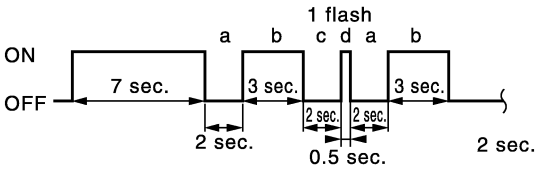
SHIA0029E

<Crash zone sensor>

Flash pattern	Repair order
a through d are repeated. d: Six flashes indicate malfunctioning crash zone sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the crash zone sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

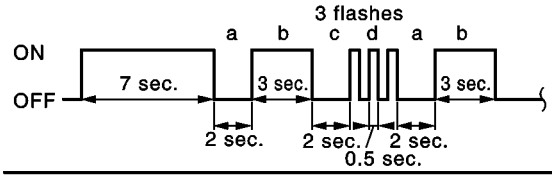
SHIA0083E

<Front RH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

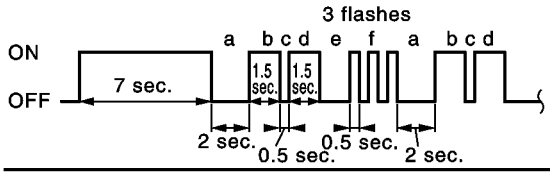
SHIA0030E

<Front LH seat belt pre-tensioner>

Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

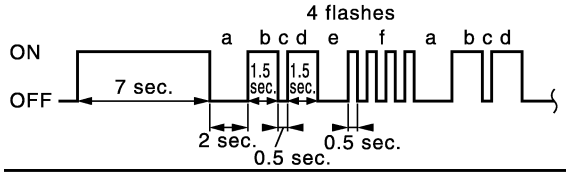
SHIA0031E

<RH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

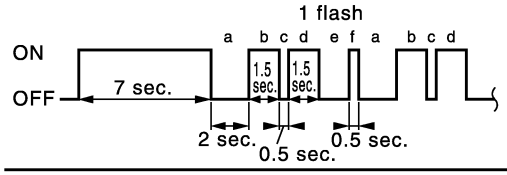
SHIA0032E

<LH side air bag (Satellite) sensor>

Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

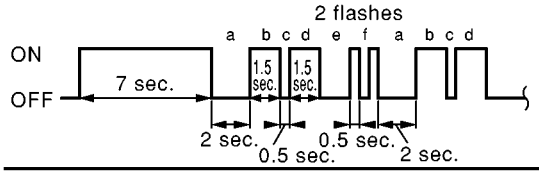
SHIA0033E

<Front RH side air bag module>

Flash pattern	Repair order
a through f are repeated. f: One flash indicate malfunctioning front RH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front RH side air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

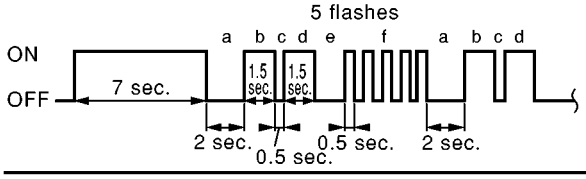
SHIA0034E

<Front LH side air bag module>

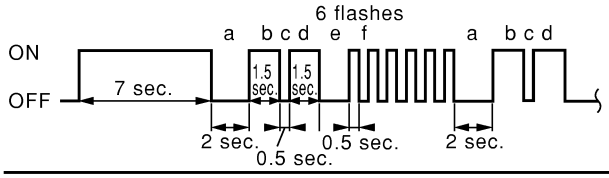
Flash pattern	Repair order
a through f are repeated. f: Two flashes indicate malfunctioning front LH side air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace front LH side air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

SHIA0035E

<RH side curtain air bag module>

Flash pattern	Repair order
a through f are repeated. f: Five flashes indicate malfunctioning RH side curtain air bag module circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace RH side curtain air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

SHIA0084E

<LH side curtain air bag module>	
Flash pattern	Repair order
a through f are repeated. f: Six flashes indicate malfunctioning LH side curtain air bag module circuit.  SHIA0086E	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace LH side curtain air bag module. (Before disposal, it must be deployed.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn Off

EHS001ND

DIAGNOSTIC PROCEDURE 7

1. CHECK THE DEPLOYMENT OF AIR BAG MODULE

Is air bag module deployed?

YES or NO

YES >> Refer to SRS-56, "COLLISION DIAGNOSIS" .
NO >> GO TO 2.

2. CHECK THE AIR BAG FUSE

Check 10A fuse [No.3, located in fuse block (J/B)].
Refer to PG-4, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 3

3. CHECK AIR BAG FUSE AGAIN

Replace “AIR BAG” fuse and turn ignition switch ON.

Does the “AIR BAG” fuse blow again?

YES >> Repair main harness.
NO >> **INSPECTION END**

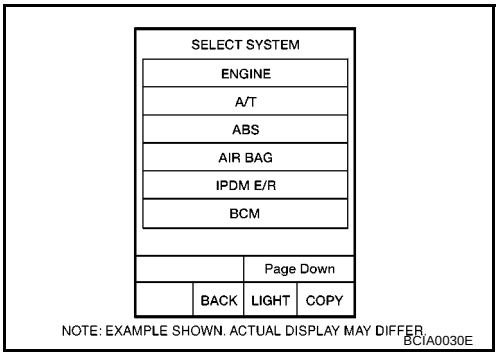
4. CHECK DIAGNOSIS SENSOR UNIT

Connect CONSULT-II and touch “START”.

- Is “AIR BAG” displayed on CONSULT-II?

YES or NO

YES >> GO TO 5.
NO >> Visually check the wiring harness connection of diagnosis sensor unit. If the harness connection check result is OK, replace diagnosis sensor unit.



5. CHECK HARNESS CONNECTION

Is harness connection between warning lamp and diagnosis sensor unit OK?

OK or NG

OK >> Replace diagnosis sensor unit.
NG >> Connect “AIR BAG” warning lamp and diagnosis sensor unit connector properly. If “AIR BAG” warning lamp still does not go off, replace harness.

Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn On

EHS001NE

DIAGNOSTIC PROCEDURE 8

1. CHECK “METER” FUSE

Check 10A fuse [No.2, located in fuse block (J/B)].
Refer to PG-4, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK “METER” FUSE AGAIN

Replace 10A fuse [No.2, located in fuse block (J/B)] and turn ignition switch ON.

Does the meter fuse blow again?

YES >> Repair the related harness.
NO >> **INSPECTION END**

3. CHECK HARNESS CONNECTION BETWEEN DIAGNOSIS SENSOR UNIT AND COMBINATION METER

Disconnect diagnosis sensor unit connector and turn ignition switch ON.

- Does “AIR BAG” warning lamp turn on?

YES or NO

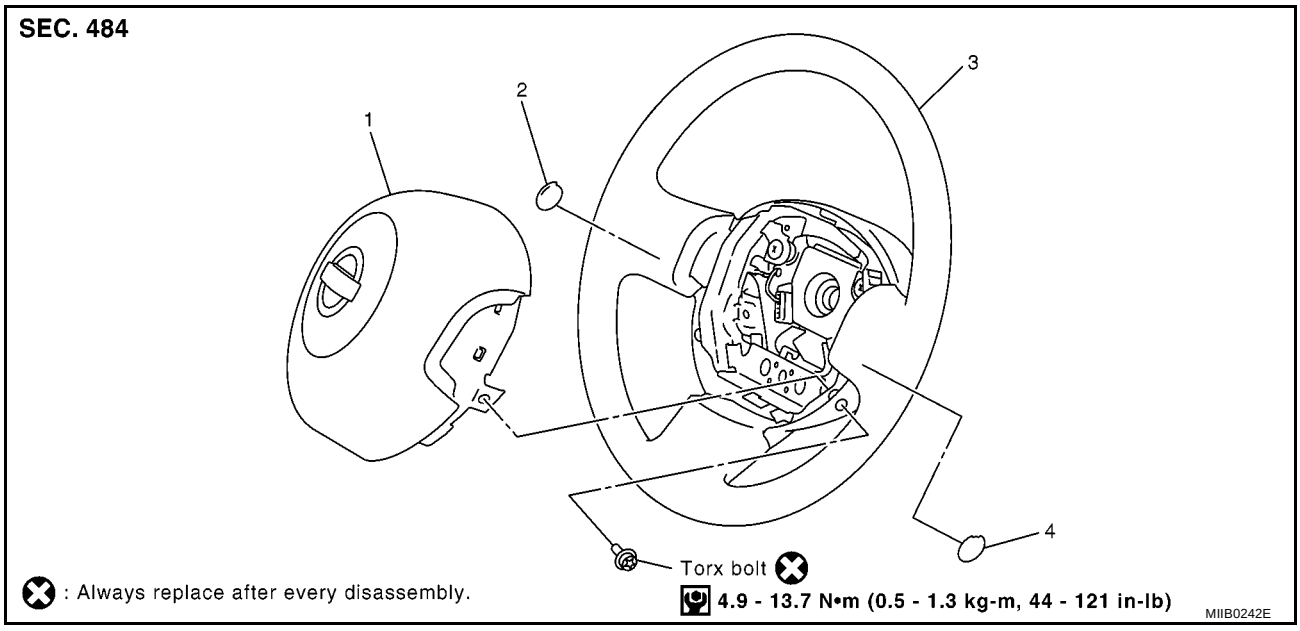
YES >> Replace diagnosis sensor unit.
NO >> Replace combination meter assembly.

DRIVER AIR BAG MODULE

PFP:K8510

Removal and Installation

EHS000QZ



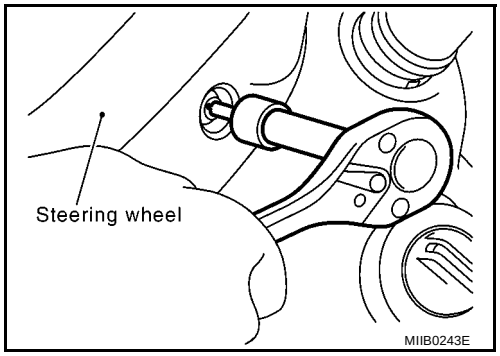
1. Driver air bag module
2. Side lid (LH)
3. Steering wheel
4. Side lid (RH)

REMOVAL

CAUTION:

- **Before servicing SRS, turn the ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the side of driver air bag module.**

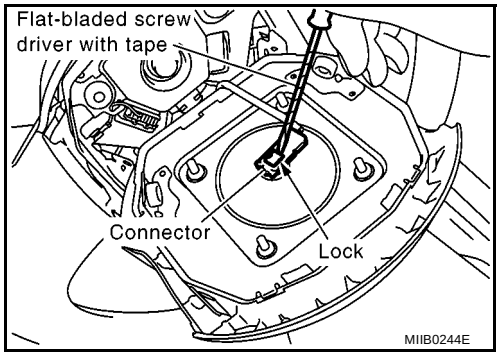
1. Remove the side lids.
2. Remove the right and left side special bolts.



3. Disconnect the steering wheel switch sub-harness connector.
4. Disconnect the air bag harness connector, and remove the driver air bag module.

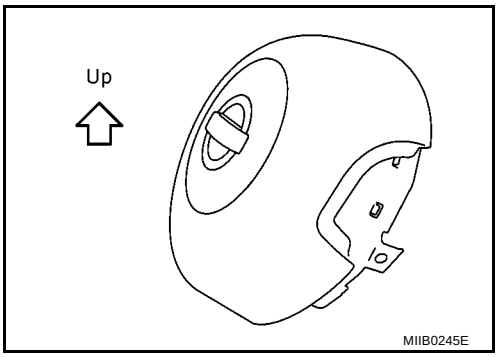
CAUTION:

- **For removing and installing air bag harness connector, insert a flat-bladed screwdriver wrapped with a tape into lock, and raise lock to remove connector.**
- **Install connector with lock raised, and push lock into connector.**
- **Confirm the lock is fully pushed in after mounting connector.**

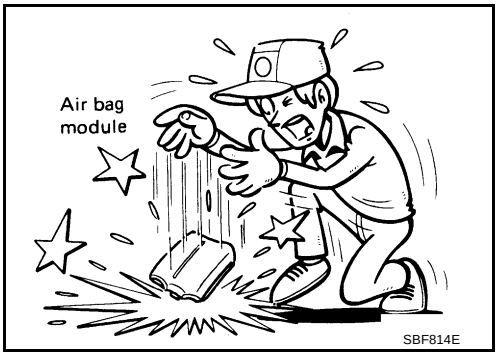


CAUTION:

- **Always work from the side of driver air bag module.**
- **Always place driver air bag module with pad side facing upward.**
- **Do not insert any foreign objects (screwdriver, etc.) into driver air bag module.**
- **Do not attempt to disassemble driver air bag module.**
- **Do not use old bolts after removal; replace with new bolts.**
- **Do not expose the driver air bag module to temperatures exceeding 90°C (194°F).**



- **Replace driver air bag module if it has been dropped or sustained an impact.**
- **Do not allow oil, grease or water to come in contact with the front passenger air bag module.**



INSTALLATION

Install in the reverse order of removal.

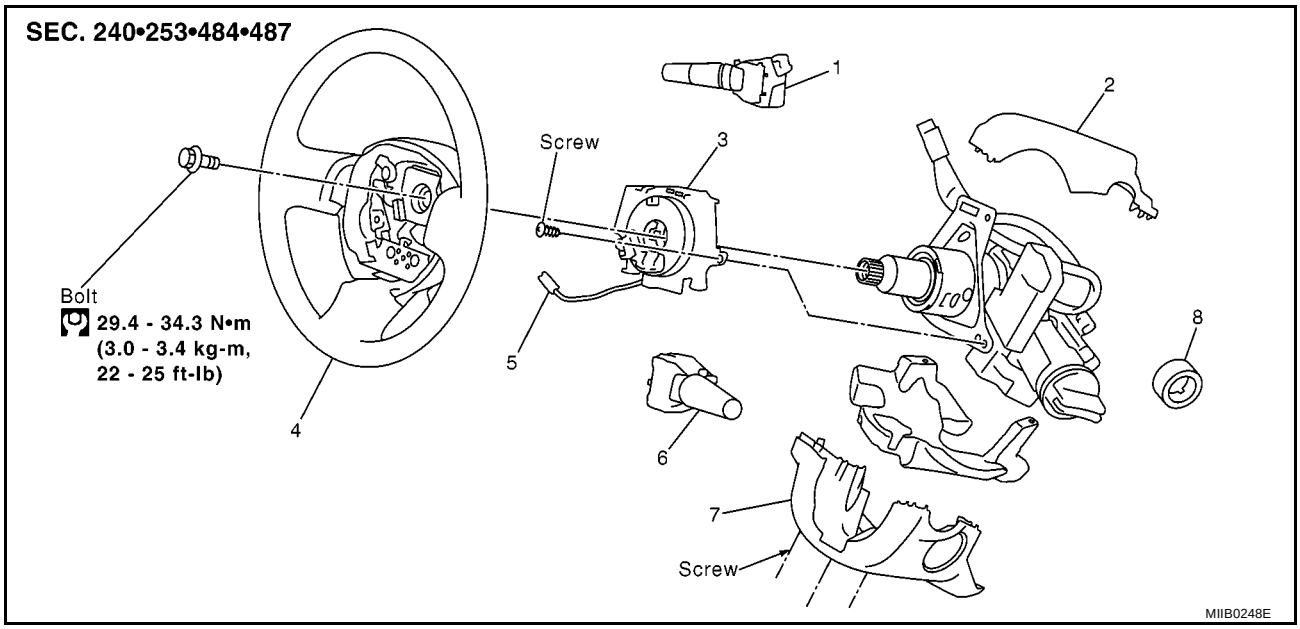
- For installing the air bag module, tighten the special bolts.
- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .

SPIRAL CABLE

PFP:25554

Removal and Installation

EHS000R0



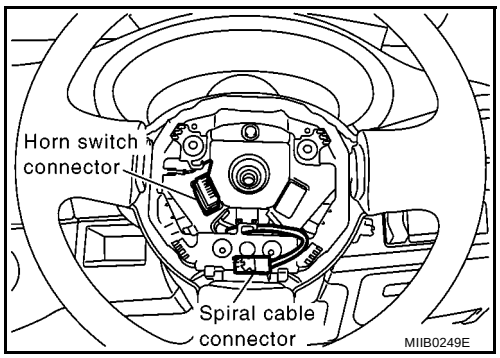
1. Wiper and washer switch
2. Steering column cover (upper)
3. Spiral cable
4. Steering wheel
5. Air bag module connector
6. Light and turn signal switch
7. Steering column cover (Lower)
8. Key cylinder escutcheon

REMOVAL

CAUTION:

Before servicing SRS, turn the ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.

1. Remove driver air bag module. Refer to SRS-36, "DRIVER AIR BAG MODULE" .
2. Set the steering wheel in the neutral position.
3. Remove horn switch connector.

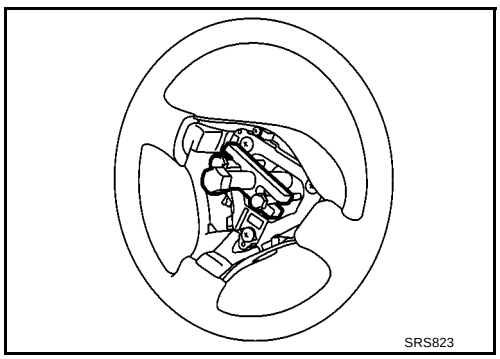


4. Remove steering wheel nut.
5. Remove steering wheel.

CAUTION:

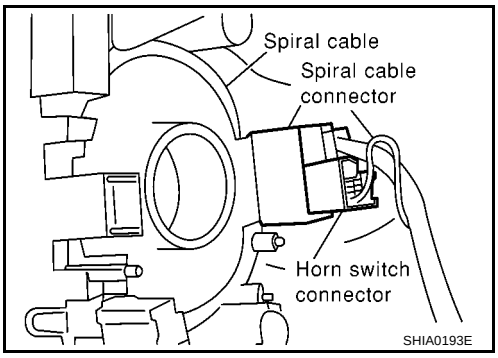
Do not tap or bump the steering wheel.

- **Do not attempt to disassemble spiral cable.**
- **Do not apply lubricant to the spiral cable.**



6. Remove steering column cover. Refer to IP-6, "F. Steering Column Cover" .
7. Remove wiper and washer switch, lighting and turn signal switch.
8. Loosen screws. While pushing upper plastic tab, remove spiral cable.
9. Remove horn switch connector, and then spiral cable connector.

CAUTION:
Also, with the steering linkage disconnected the cable may snap by turning the steering wheel beyond the limited number of turns. The spiral cable can be turned counterclockwise about 2.5 turns from the right end position.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **The spiral cable may snap due to steering operation if the cable is installed in an improper position.**
- **Also, with the steering linkage disconnected the cable may snap by turning the steering wheel beyond the limited number of turns. The spiral cable can be turned counterclockwise about 2.5 turns from the right end position.**
- **After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

FRONT PASSENGER AIR BAG MODULE

PFP:K8515

Removal and Installation

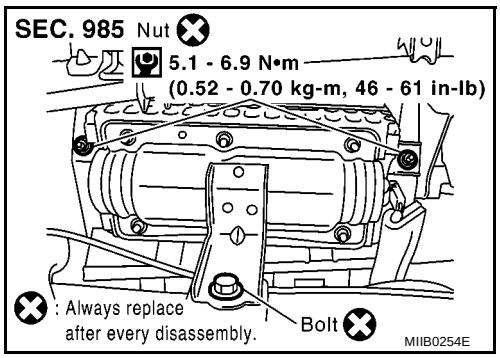
EHS000R2

REMOVAL

CAUTION:

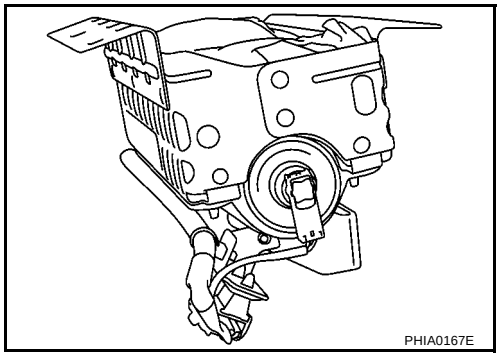
- **Before servicing SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the side of or under front passenger air bag module.**

1. Remove glove box lid and glove box cover assembly. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect the air bag harness connector from the passenger air bag module.
3. Remove mounting bolt and nut.
4. Pull out and remove passenger air bag module from the lower side of instrument panel to bottom so that no impact is given on passenger air bag module.

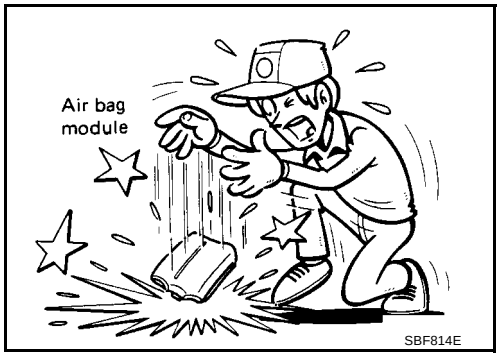


CAUTION:

- **Always place front passenger air bag module with warning label side facing upward.**
- **Do not insert any foreign objects (screwdriver, etc.) into front passenger air bag module.**
- **Do not attempt to disassemble front passenger air bag module.**
- **Do not use old bolts after removal; replace with new bolts.**



- **Replace front passenger air bag module if it has been dropped or sustained an impact.**
- **Do not expose the front passenger air bag module to temperature exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the front passenger air bag module.**
- **After front passenger air bag module inflates, the instrument panel assembly should be replaced.**



INSTALLATION

Install in the reverse order of removal.

Mounting bolt (special bolt):

: 14.7 - 24.5 N·m (1.5 - 2.4 kg-m, 11 - 18 ft-lb)

CAUTION:

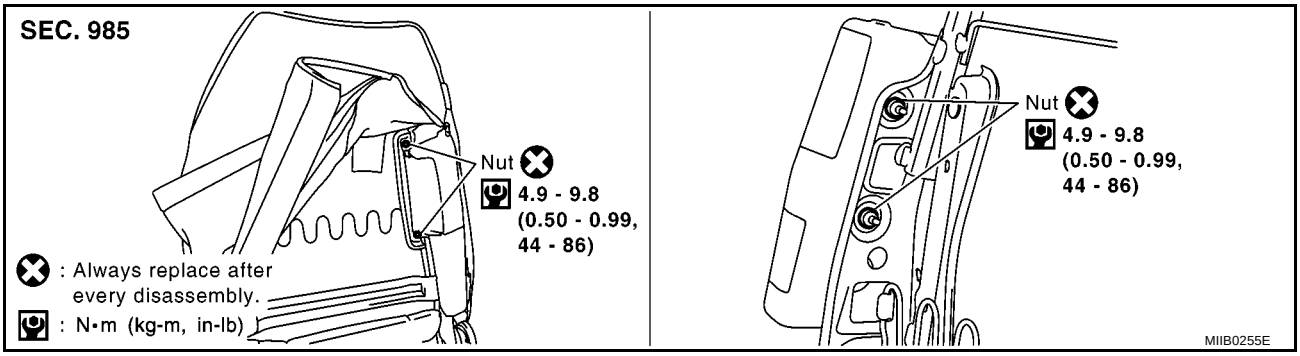
- **Always work from the side of or under front passenger air bag module.**
- **After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

FRONT SIDE AIR BAG MODULE

PFP:K8EH0

Removal and Installation

EHS000R3



REMOVAL

CAUTION:

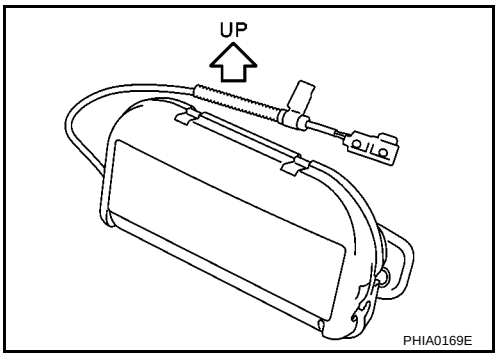
Removal of front side air bag module should only be done to allow deployment of front side air bag module prior to disposal of seatback assembly.
Only complete seatback assemblies can be replaced. Refer to SE-7, "FRONT SEAT" .

- **Before servicing SRS, turn the ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the rear of the front side air bag module.**

1. Remove the driver and/or passenger seat. Refer to SE-9, "Disassembly and Assembly of Seat Cushion" .
2. Remove the seatback trim and pad. Refer to SE-8, "Disassembly and Assembly of Seatback" .
3. Remove the air bag module harness clips.
4. Remove the special nuts coated with bonding agent from the front side air bag module, and remove the front side air bag module.

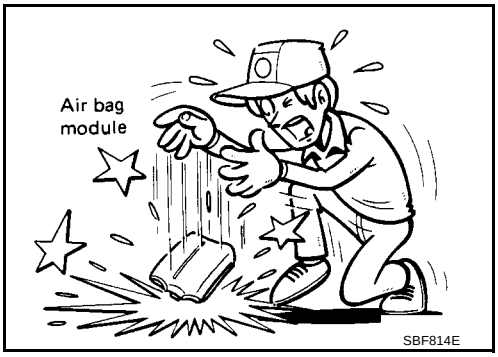
CAUTION:

- **Always place the front side air bag module standing with the stud bolts side facing down.**
- **Do not insert any foreign objects (screwdriver, etc.) into front side air bag module.**
- **Do not attempt to disassemble front side air bag module.**



CAUTION:

- **Replace front seatback assembly (side air bag module) if it has been dropped or sustained an impact.**
- **Do not expose front seatback assembly (side air bag module) to temperature exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the front side air bag module.**
- **After front side air bag module inflates, front seatback assembly must be replaced.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

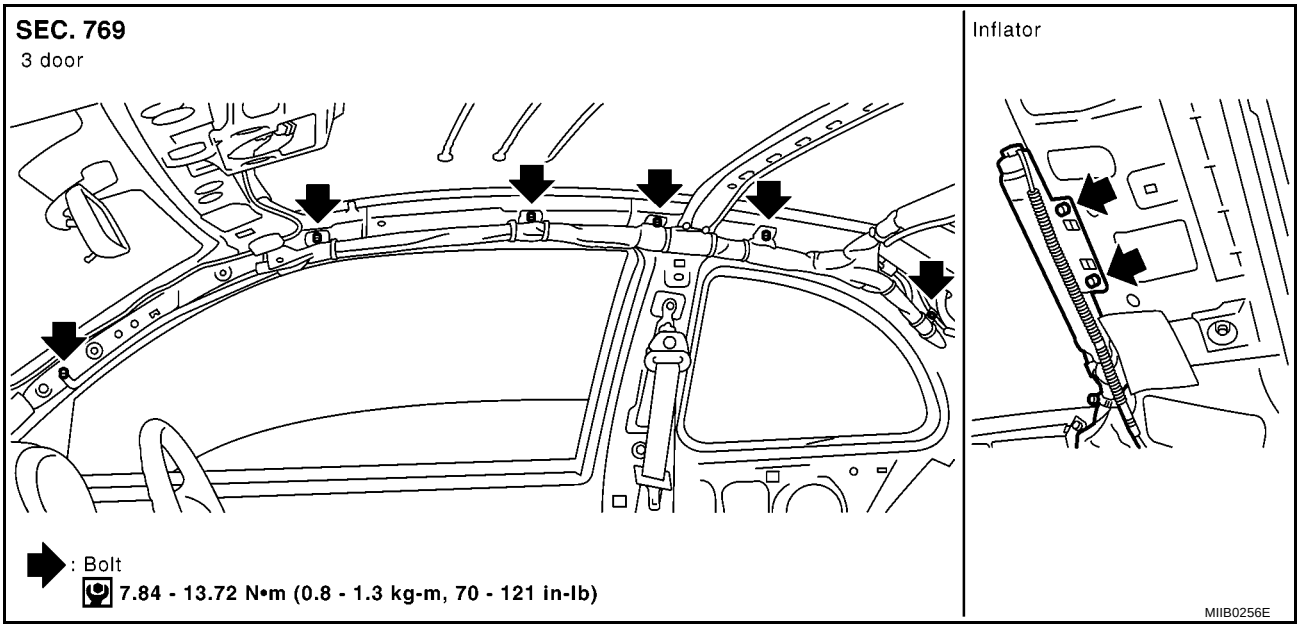
- **Always work from the side of or under front side air bag module.**
- **After the work is completed, perform self-diagnosis to make sure that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

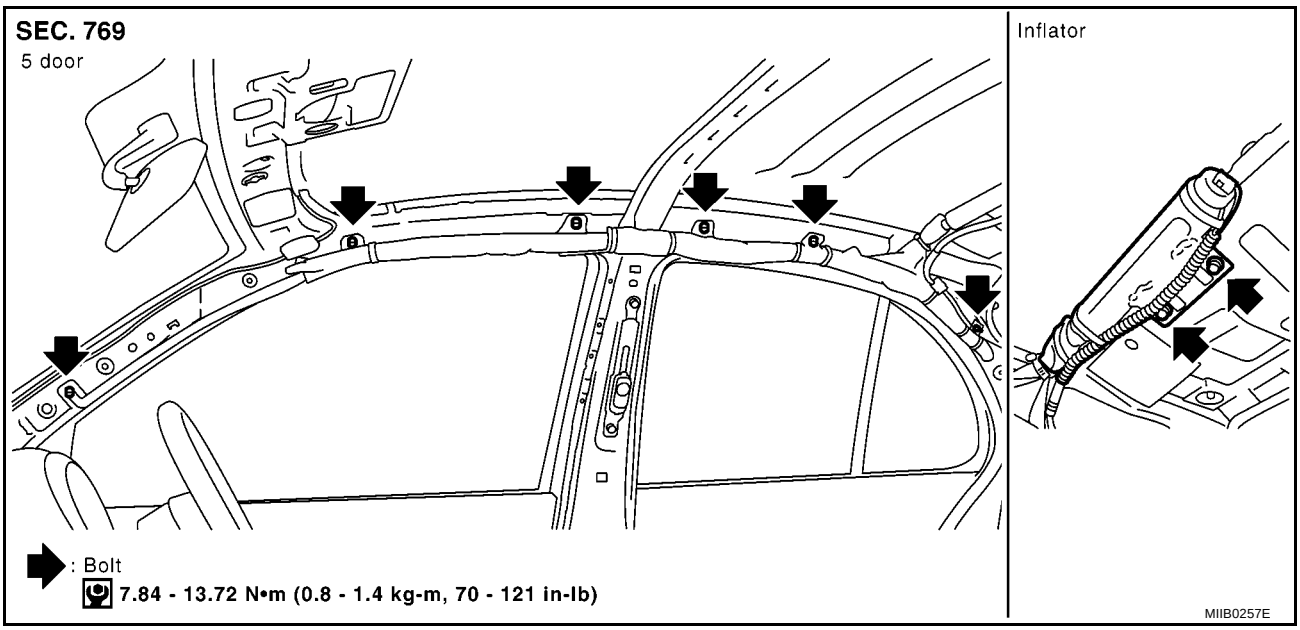
SIDE CURTAIN AIR BAG MODULE

PFP:985P0

Removal and Installation

EHS000R4





REMOVAL

CAUTION:

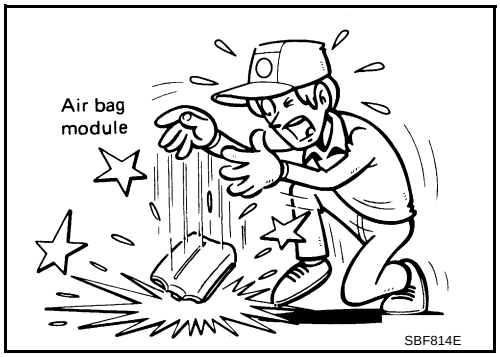
- **Before servicing SRS, turn the ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the side of the side curtain air bag module.**

1. Remove headliner. Refer to EI-24, "HEADLINER" .
2. Disconnect curtain air bag module connector.
3. Remove the side curtain air bag module fixing bolts and clips.
4. Remove the side curtain air bag module.

CAUTION:

- **Always place the side curtain air bag module with the warning label facing upward.**
- **Do not attempt to disassemble side curtain air bag module.**
- **Do not insert any foreign objects (screw driver, etc.) into air bag module connector.**

- **Replace side curtain air bag module if it has been dropped or sustained an impact.**
- **Do not expose the air bag module to temperatures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the side curtain air bag module.**



INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Always work from the side of the side curtain air bag module.**
- **After replacement of side curtain air bag module perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

CRASH ZONE SENSOR

PFP:98582

Removal and Installation

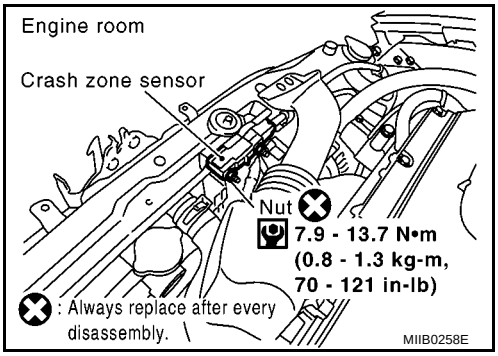
EHS000R5

REMOVAL

CAUTION:

Before servicing SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.

1. Remove front grill. (Only for the right side of vehicle) Refer to EI-8, "Removal and Installation" .
2. Disconnect crash zone sensor connector.
3. Remove mounting bolts, and then crush zone sensor.



CAUTION:

- **Replace crash zone sensor if it has been dropped or sustained an impact.**
- **Do not attempt to disassemble crash zone sensor.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check crash zone sensor for proper installation.**
- **After the work is complete perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

SIDE AIR BAG (SATELLITE) SENSOR

PFP:98830

Removal and Installation

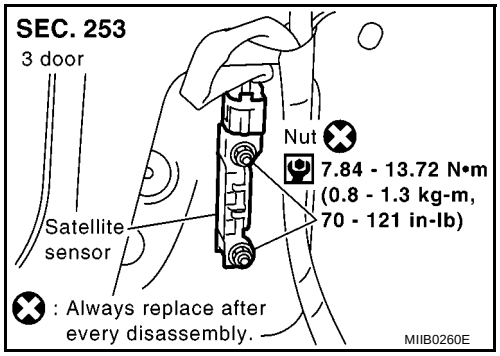
EHS000R7

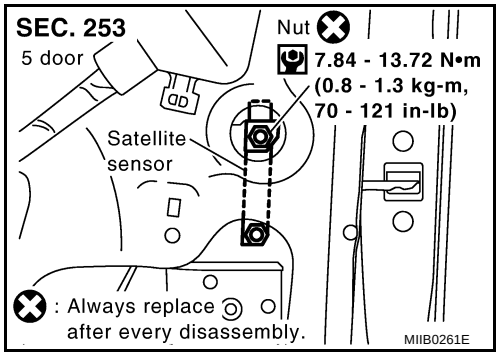
REMOVAL

CAUTION:

Before servicing SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.

1. Remove front seat belt. Refer to SB-3, "Removal and Installation of Front Seat Belt" .
2. Remove side air bag (Satellite) sensor connector.
3. Remove mounting nut, and then remove side air bag (Satellite) sensor.





CAUTION:

- **Do not use old nuts; replace with new ones.**
- **Check side air bag (Satellite) sensor to ensure it is free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with new one.**
- **Do not attempt to disassemble side air bag (Satellite) sensor if it has been dropped or sustained an impact.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check side air bag (Satellite) sensor for proper installation.**
- **After replacement of side air bag (Satellite) sensor, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

SEAT BELT PRE-TENSIONER

PFP:86884

Removal and Installation

EHS000R8

For removal and installation procedures, refer to SB-3, "Removal and Installation of Front Seat Belt" .

DIAGNOSIS SENSOR UNIT

PFP:28556

Removal and Installation

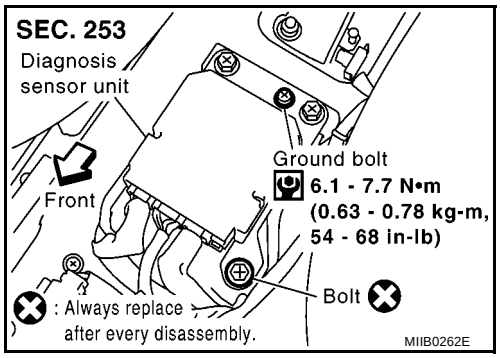
EHS000R9

REMOVAL

CAUTION:

Before servicing SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.

1. Disconnect each harness connector for air bag module and seat belt pre-tensioner.
2. Remove console box. Refer to IP-4, "INSTRUMENT PANEL ASSEMBLY" .
3. Remove the diagnosis sensor unit connector.
4. Remove mounting bolts and grounding bolt, and then remove diagnosis sensor unit.



INSTALLATION

Install in the reverse order of removal.

Hexagon bolt:

: 19.6 - 29.4 N·m (2.0 - 3.0 kg-m, 15 - 22 ft-lb)

TORX bolt:

: 14.7 - 24.5 N·m (1.5 - 2.4 kg-m, 11 - 18 ft-lb)

CAUTION:

- **Check the diagnosis sensor unit for proper installation.**
- **After replacement of diagnosis sensor unit, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-17, "SRS Operation Check" .**

ECU DISCRIMINATED NO.

After replacing the diagnosis sensor unit, make sure that the diagnosis unit identification is correct for the vehicle as equipped.

Specification	Discriminated No.
Driver air bag module and passenger air bag module, seat belt pre-tensioner and side air bag module	A925
Driver air bag module and passenger air bag module, seat belt pre-tensioner, side air bag module and side curtain air bag module	A926

DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER

PFP:00014

Caution for Air Bag Module and Seat Belt Pre-tensioner

EHS000SB

- Before disposing of air bag module and seat belt pre-tensioner, or vehicles equipped with such systems, deploy the systems. If such systems have already been deployed due to an accident, dispose of them as indicated inSRS-49, "DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER" .
- When deploying the air bag module and seat belt pre-tensioner, always use the Special Service Tool; Deployment tool (KV99106400).
- When deploying the air bag module and seat belt pre-tensioner, stand at least 5 m (16 ft) away from the deployment component.
- When deploying air bag module and seat belt pre-tensioner, a fairly loud noise is made, followed by smoke being released. The smoke is not poisonous, however, be careful not to inhale smoke since it irritates the throat and can cause choking.
- Always activate one air bag module at a time.
- Due to heat, leave air bag module unattended for more than 30 minutes after deployment. Also leave seat belt pre-tensioner unattended for more than 10 minutes after deployment.
- Be sure to wear gloves when handling a deployed air bag module and seat belt pre-tensioner.
- Never apply water to the deployed air bag module and seat belt pre-tensioner.
- Wash your hands clean after finishing work.
- Place the vehicle outdoors with an open space of at least 6 m (20 ft) on all sides when deploying air bag module and seat belt pre-tensioner while mounted in vehicle.
- Use a voltmeter to make sure the vehicle battery is fully charged.
- Do not dispose of the air bag module and seat belt pre-tensioner un-deployed.

CHECKING DEPLOYMENT TOOL

Connecting to Battery

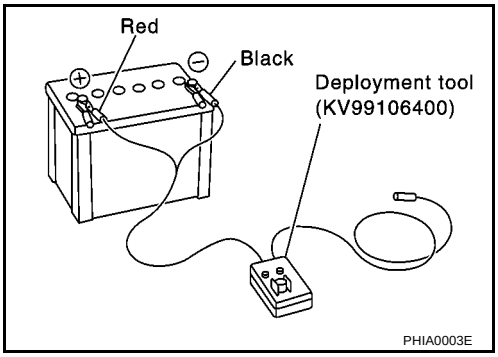
CAUTION:

The battery must show voltage of 9.6 V or more.

Remove the battery from the vehicle and place it on dry wood blocks approximately 5 m (16 ft) away from the vehicle.

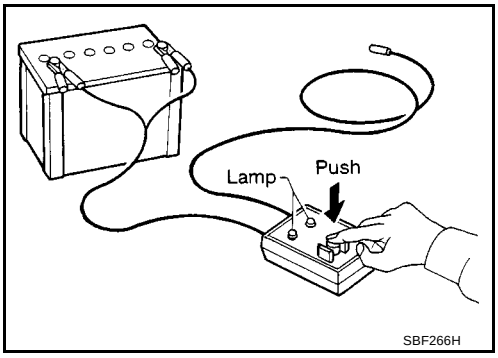
- Wait 3 minutes after the vehicle battery is disconnected before proceeding.
- Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.

Make sure the polarity is correct. The right side lamp in the tool, marked “deployment tool power”, should glow with a green light. If the right side lamp glows red, reverse the connections to the battery.



Deployment Tool Check

Press the deployment tool switch to the ON position. The left side lamp in the tool, marked “air bag connector voltage” should illuminate. If it does not illuminate, replace the tool.



Air Bag Deployment Tool Lamp Illumination Chart (Battery Connected)

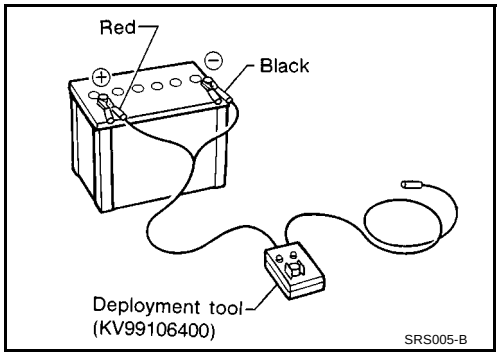
Switch operation	Left side lamp, green* “AIR BAG CONNECTOR VOLTAGE”	Right side lamp, green* “DEPLOYMENT TOOL POWER”
OFF	OFF	ON
ON	ON	ON

*: If this lamp glows red, the tool is connected to the battery incorrectly. Reverse the connections and make sure the lamp glows green.

DEPLOYMENT PROCEDURES FOR AIR BAG MODULE (OUTSIDE OF VEHICLE)

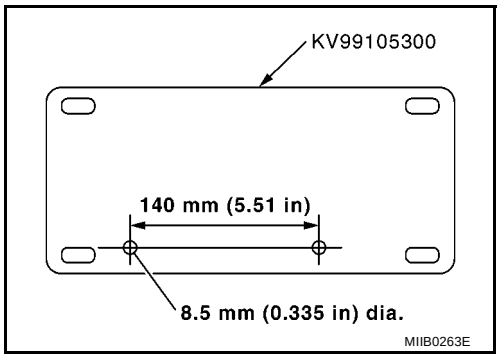
Unless the vehicle is being scrapped, deploying the air bag in the vehicle is not recommended. This may cause damage to the vehicle interior.

Anchor air bag module bracket (SST: KV99105300) in a vise secured to a firm foundation during deployment.



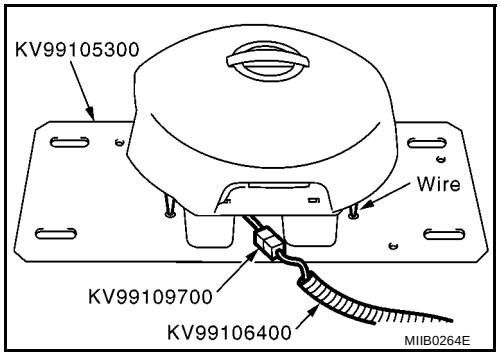
Deployment of Driver Air Bag Module (Outside of Vehicle)

1. Make an 8.5 mm (0.335 in) diameter hole in air bag module bracket (SST: KV99105300) at the position shown in figure at right.

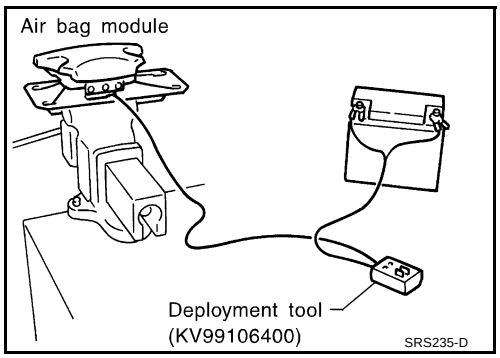


2. Using wire, secure air bag module to air bag module bracket at two places.

   CAUTION:
   Use wire of at least 1 mm (0.041 in) diameter.



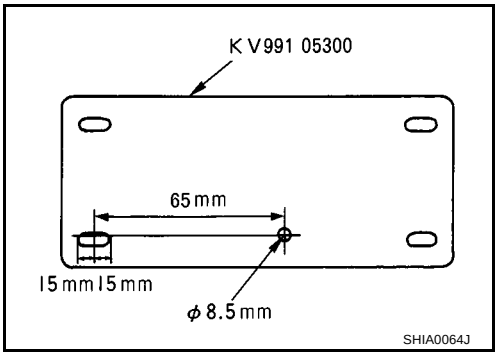
3. Firmly secure air bag module bracket with air bag module attached in a vise.
4. Connect deployment tool adapter (SST: KV99109700) to deployment tool (SST: KV99106400) to air bag module connector.
5. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
7. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module will deploy.



CAUTION:
When deploying the driver air bag module, stand at least 5 m (16 ft) away from the air bag module.

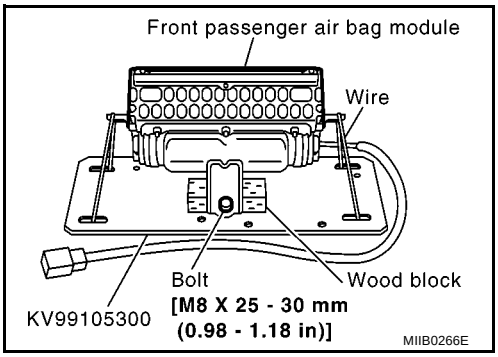
Deployment of Front Passenger Air Bag Module (Outside of Vehicle)

1. Make an 8.5 mm (0.335 in) diameter hole in air bag module bracket (SST: KV99105300) at the position shown in figure at right.
2. Firmly secure air bag module bracket (SST: KV99105300) in a vise.

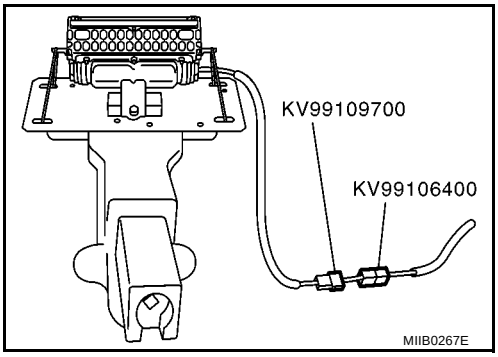


3. Match a hole in air bag module bracket (held in vise) and front passenger air bag module and fix them with a bolt [M8 × 25 - 30 mm (0.98 - 1.18 in)] and wire.

CAUTION:
If a gap exists between front passenger air bag module and air bag module bracket, use a piece of wood inserted in the gap to stabilize the air bag module.

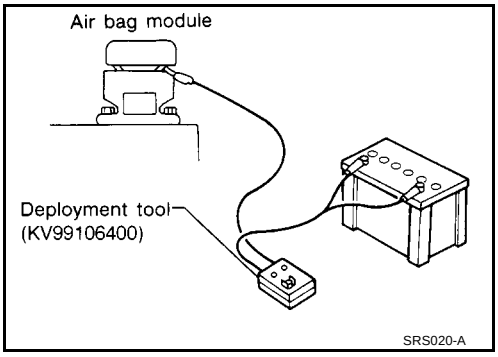


4. Connect deployment tool adapter (SST: KV99109700) to deployment tool (SST: KV99106400) connector and front passenger air bag module connector.
5. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.



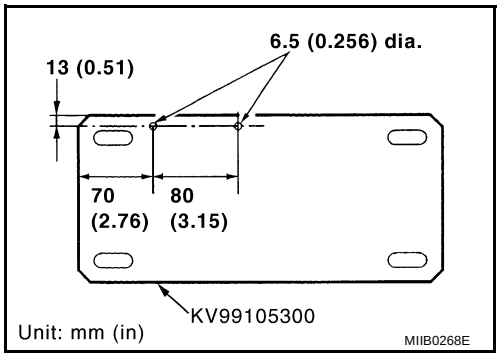
7. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module will deploy.

CAUTION:
- **When deploying the front passenger air bag module, do not stand on the deploying side.**
- **Stand at least 5 m (16 ft) away from the air bag module.**



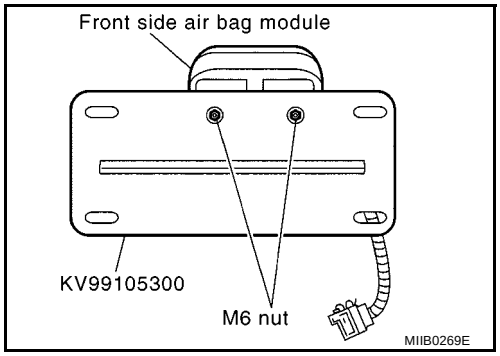
Deployment of Front Side Air Bag Module (Outside of Vehicle)

1. Make 6.5 mm (0.256 in) diameter holes in air bag module bracket (SST: KV99105300) at the position shown in figure at right.

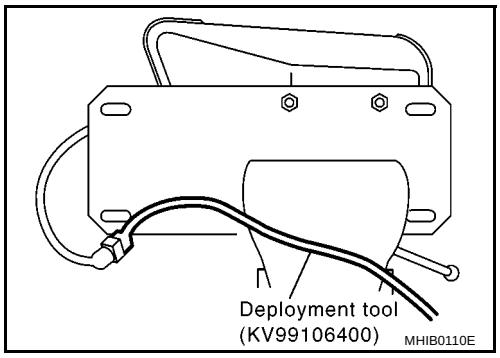


2. Firmly secure air bag module bracket (SST: KV99105300) in a vise.
3. Insert the stud bolts of side air bag module into the two holes in air bag module bracket (held in vise) and fix them with two M6 nuts.

CAUTION:
Side air bag module should be secured to air bag module bracket (SST: KV99105300) in a vise with stud bolt side setting bottom.

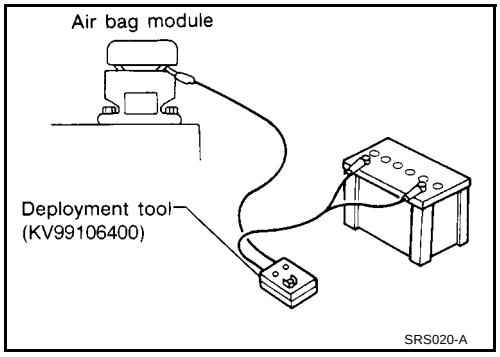


4. Connect deployment tool (SST: KV99106400) connector to connector on air bag module.



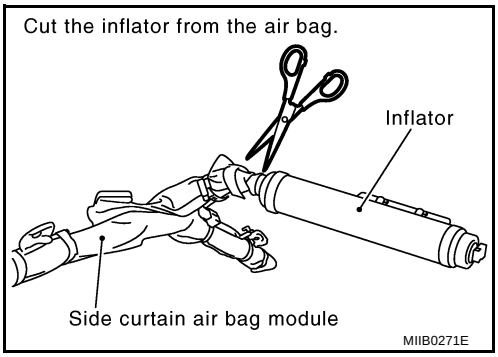
5. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
7. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module will deploy.

CAUTION:
When deploying the front side air bag module, stand at least 5 m (16 ft) away from the air bag module.

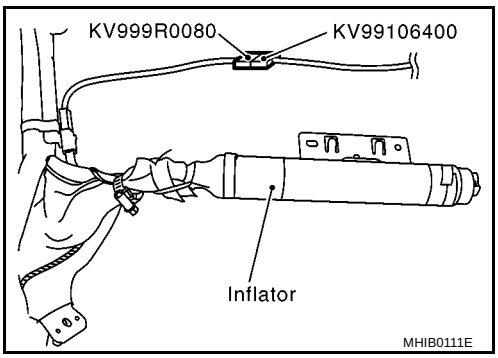


Deployment of Side Curtain Air Bag Module (Outside of Vehicle)

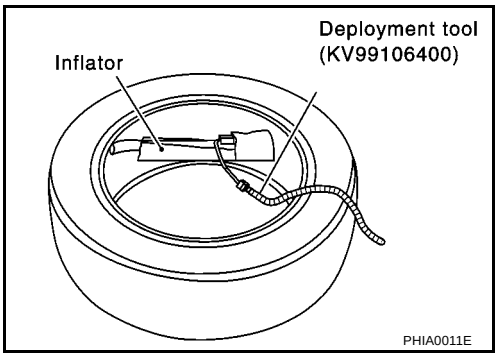
1. Cut the inflator from side curtain air bag module.



2. Connect deployment tool (SST: KV99106400) connector to deployment tool adapter (SST: KV999R0080) the inflator.



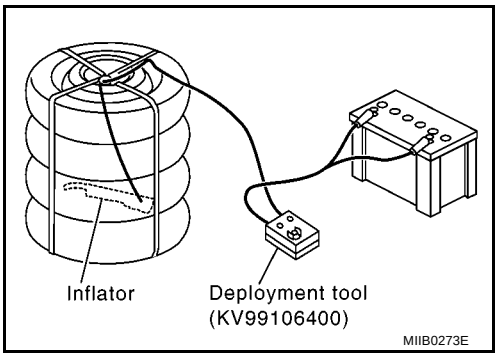
3. Put the inflator connected with the deployment tool adaptor (SST: KV999R0080) into a tire without wheel.



4. Put the tyre with the inflator onto another tyre without wheel. Add an additional tyre without wheel and then a tyre mounted on a wheel on top.

   CAUTION:
   Tie all tyres together with a strap in order keep them standing.

5. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
6. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.

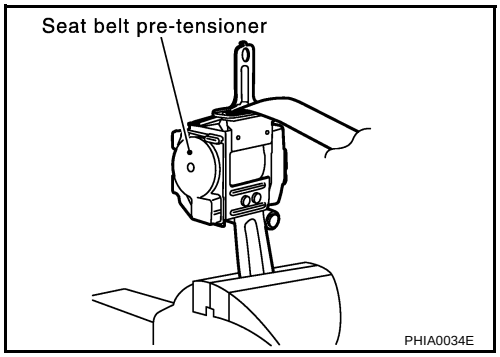


7. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module will deploy.

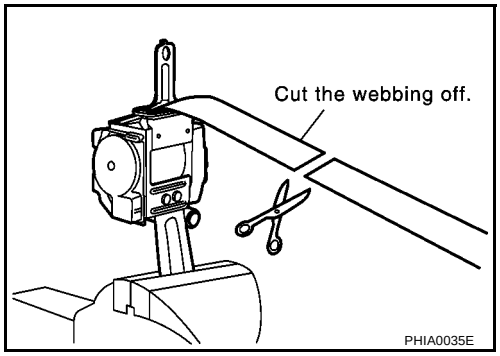
   CAUTION:
   When deploying the side curtain air bag module, stand at least 5 m (16 ft) away from the side curtain air bag module.

DEPLOYMENT PROCEDURES FOR SEAT BELT PRE-TENSIONER (OUTSIDE OF VEHICLE)

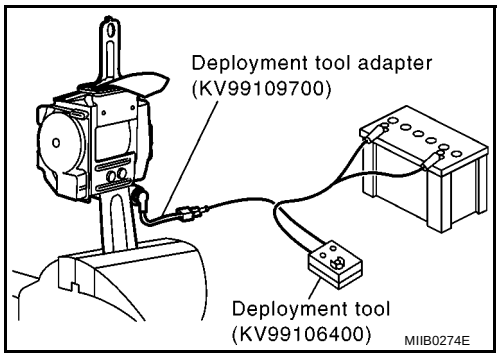
1. Firmly grip pre-tensioner in a vise.



2. Cut the webbing off.



3. Connect deployment tool adapter (SST: KV99109700) to deployment tool (SST: KV99106400) connector and front seat belt pre-tensioner connector.
4. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
5. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
6. Press the button on the deployment tool. The left side lamp on the tool, marked “seat belt pre-tensioner connector voltage”, will illuminate and the seat belt pre-tensioner will deploy.



CAUTION:

When deploying the front seat belt pre-tensioner, stand at least 5 m (16 ft) away from the seat belt pre-tensioner.

DISPOSAL OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER

DEPLOYMENT OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER WHILE MOUNTED IN VEHICLE

When disposing of a vehicle, deploy air bag module and seat belt pre-tensioners while they are mounted in vehicle.

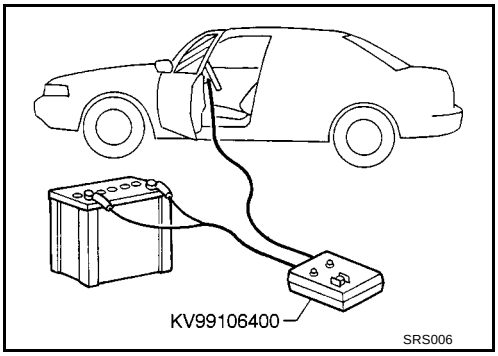
CAUTION:

When deploying air bag module or seat belt pre-tensioner, ensure vehicle is empty.

1. Disconnect both the vehicle battery cables and wait 3 minutes.
2. Disconnect air bag module and seat belt pre-tensioner connector.
3. Connect deployment tool (SST: KV99106400) to air bag module or seat belt pre-tensioner.
   For driver air bag module, attach deployment tool adapter (SST: KV99109700) to the tool connector.
   For front passenger air bag module, attach deployment tool adapter (SST: KV99109700) to the tool connector.
   For side air bag module, direct connect deployment tool (SST: KV99106400).
   For seat belt pre-tensioner, attach deployment tool adapter [SST: KV99109700 (for 3 door models) or KV99109800 (for 5 door models)] to the tool connector.
   For side curtain air bag module, attach deployment tool adapter (SST: KV999R0080) to the tool connector.
4. Connect red clip of deployment tool to battery positive terminal and black clip to negative terminal.
5. The lamp on the right side of the tool, marked “deployment tool power”, should glow green, not red.
6. Press the button on the deployment tool. The left side lamp on the tool, marked “air bag connector voltage”, will illuminate and the air bag module or seat belt pre-tensioner will deploy.

   CAUTION:

   Activate only one air bag module or seat belt pre-tensioner at a time.

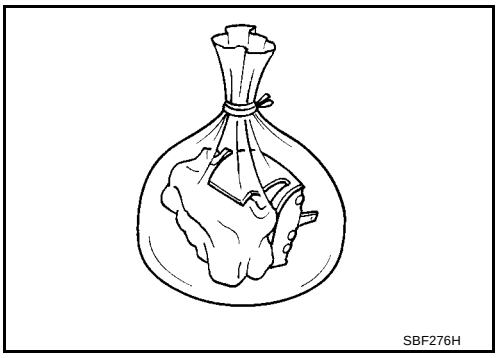


DISPOSING OF AIR BAG MODULE AND SEAT BELT PRE-TENSIONER

Deployed air bag module and seat belt pre-tensioner are very hot. Before disposing of air bag module, and seat belt pre-tensioner wait at least 30 minutes, and 10 minutes, respectively. Seal them in a plastic bag before disposal.

CAUTION:

- **Never apply water to a deployed air bag module and seat belt pre-tensioner.**
- **Be sure to wear gloves when handling a deployed air bag module and seat belt pre-tensioner.**
- **No poisonous gas is produced upon air bag module deployment. However, be careful not to inhale gas since it irritates throat and can cause choking.**
- **Do not attempt to disassemble air bag module and seat belt pre-tensioner.**
- **Air bag module and seat belt pre-tensioner cannot be reused.**
- **Wash your hands clean after finishing work.**



COLLISION DIAGNOSIS

PFP:00015

For Frontal Collision

EHS000SC

To repair the SRS, perform the following steps.

When SRS (except the front side air bag and side curtain air bag modules) is activated in a collision:

1. Replace the diagnosis sensor unit.
2. Remove the air bag modules (except the front side air bag modules and side curtain air bag modules), crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
3. Check the SRS components using the table below:

– Replace any SRS components showing visible signs of damage (dents, cracks and deformation).

4. Install new air bag modules (except the front side air bag modules and side curtain air bag modules) crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
5. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-17, "SRS Operation Check" for details. Ensure entire SRS operates properly.

When SRS is not activated in a collision:

1. Check the SRS components using the table below:

– Replace any SRS components showing visible signs of damage (dents, cracks and deformation).

2. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-17, "SRS Operation Check" for details. Ensure entire SRS operates properly.

SRS INSPECTION (FOR FRONTAL COLLISION)

Part	SRS is activated	SRS is NOT activated
Air bag module (driver and front passenger air bag module)	REPLACE Install with new bolts.	1. Remove air bag module. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. – Install driver air bag module into the steering wheel to check fit and alignment with the wheel. – Install passenger air bag module into the instrument panel to check fit with the instrument panel. 3. No damage found, reinstall with new bolts. 4. If damaged—REPLACE air bag modules with new special bolts. Air bag must be deployed before disposal.
Crash zone sensor	REPLACE the crash zone sensor and bracket with new nuts.	1. Remove the crash zone sensor. Check harness connectors for damage, terminals for deformities, and harness for binding. 2. Check for visible signs of damage (dents, cracks, deformation) of the crash zone sensor and bracket. 3. Install the crash zone sensor to check fit. 4. No damage found, reinstall with new bolts. 5. If damaged—REPLACE the crash zone sensor and bracket with new nuts.
Seat belt pre-tensioner assemblies	REPLACE Install seat belt pre-tensioner with new bolts.	1. Remove seat belt pre-tensioners. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Check belts for damage and anchors for loose mounting. 3. Check retractor for smooth operation. 4. Check seat belt adjuster for damage. 5. If no damage is found, reinstall seat belt pre-tensioner assembly with new bolts. 6. If damaged—REPLACE seat belt pre-tensioners with new bolts. Seat belt pre-tensioners must be deployed before disposal.
Diagnosis sensor unit	REPLACE Install with new bolts.	1. Check case for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall with new bolts and ground bolt. 4. If damaged—REPLACE diagnosis sensor unit with new bolts and ground bolt.

Part	SRS is activated	SRS is NOT activated
Steering wheel	1. Visually check steering wheel for deformities. 2. Check harness (built into steering wheel) and connectors for damage, and terminals for deformities. 3. Install air bag module to check fit or alignment with steering wheel. 4. Check steering wheel for excessive free play. 5. If no damage is found, reinstall with nut. 6. If damaged—REPLACE.	
Spiral cable	1. Visually check spiral cable and combination switch for damage. 2. Check connectors and protective tape for damage. 3. Check steering wheel for noise, binding or heavy operation. 4. If no damage is found, reinstall with screws. 5. If damaged—REPLACE.	
Harness and connectors	1. Check connectors for poor connection, damage, and terminals for deformities. 2. Check harness for binding, chafing, cuts, or deformities. 3. If no damage is found, reinstall the harness and connectors. 4. If damaged—REPLACE damaged section of harness. Do not attempt to repair, splice or modify any SRS harness.	
Instrument panel	1. Visually check instrument panel for damage. 2. If no damage is found, reinstall the instrument panel. 3. If damaged—REPLACE the instrument panel with bolts.	

For Side Collision

EHS000SD

WHEN THE SIDE AIR BAG IS ACTIVATED IN THE SIDE COLLISION:

1. Replace the following components:
- All parts of front seatback (including front seatback frame) with front side air bag module (on the side on which front side air bag is activated)
- Curtain air bag module (on the side on which side curtain air bag is activated)
- Diagnosis sensor unit
- Satellite sensor (on the side on which side air bag and side curtain air bag is activated)
2. Check the SRS components and the related parts using the following table.
- Replace any SRS components and the related parts showing visible signs of damage (dents, cracks, deformation).
3. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-17, "SRS Operation Check" . Ensure entire SRS operates properly.

WHEN SRS IS NOT ACTIVATED IN THE SIDE COLLISION:

1. Check the SRS components and the related parts using the following table.

– Replace any SRS components and the related parts showing visible signs of damage (dents, cracks, deformation).

2. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-17, "SRS Operation Check" . Ensure entire SRS operates properly.

SRS INSPECTION (FOR SIDE COLLISION)

Part	Front side air bag and side curtain air bag is activated	Front side air bag and side curtain air bag is NOT activated
(LH or RH) side curtain air bag module	Replace the side curtain air bag module. (Repair the center pillar inner, etc. before installing new one if damaged.)	1. Check for visible signs of damage (dents, tears, deformation) of the center pillar on the collision side. 2. If damaged— Remove the side curtain air bag module. 3. Check for visible signs of damaged (tears etc.) of the side curtain air bag module. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damage is found, reinstall the side curtain air bag module with new bolts. 6. If damaged—REPLACE the side curtain air bag module with new bolts. Air bag must be deployed before disposal.
Front (LH or RH) side air bag module	REPLACE all parts of seatback with deployed front side air bag module.	1. Check for visible signs of damage (dents, tears, deformation) of the seatback on the collision side. 2. Check harness and connectors for damage, and terminals for deformities. 3. If damaged—REPLACE the front seatback assembly. Air bag must be deployed before disposal.
(LH or RH) side air bag (Satellite) sensor	REPLACE the side air bag (Satellite) sensor on the collision side with new nuts. (Repair the center pillar inner, etc. before installing new one if damaged.)	1. Remove the side air bag (Satellite) sensor on the collision side. Check harness connectors for damage, terminals for deformities, and harness for binding. 2. Check for visible signs of damage (dents, cracks, deformation) of the side air bag (Satellite) sensor. 3. Install the side air bag (Satellite) sensor to check fit. 4. If no damage is found, reinstall the side sir bag (Satellite) sensor with new nuts. 5. If damaged—REPLACE the side air bag (Satellite) sensor with new nuts.
Diagnosis sensor unit	REPLACE the diagnosis sensor unit with the new bolts.	1. Check case and bracket for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall the diagnosis sensor unit with new bolts and ground bolt. 4. If damaged—REPLACE the diagnosis sensor unit with new bolts and ground bolt.
Seat belt pre-tensioner assembly	1. Check if the seat belt can be extended smoothly. If the seat belt cannot be extended smoothly, – Check for deformities of the center pillar inner. – If the center pillar inner has no damage, REPLACE the seat belt pre-tensioner assembly. 2. Remove the seat belt pre-tensioner assembly on the collision side. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 3. Check for visible signs of damage (dents, cracks, deformation) of the seat belt pre-tensioner assembly. 4. Check seat belt adjuster for damage. 5. If no damage is found, reinstall the seat belt pre-tensioner assembly. 6. If damaged—REPLACE the seat belt pre-tensioner assembly with new bolts. The seat belt pre-tensioner assembly must be deployed before disposal.	

Part	Front side air bag and side curtain air bag is activated	Front side air bag and side curtain air bag is NOT activated
Seat with front side air bag	REPLACE all parts of front seatback (including front seatback frame)	1. Visually check the seat on the collision side. 2. Remove the seat on the collision side and check the following for damage and deformities. – Harness, connectors and terminals – Frame and recliner (for front and rear seat), and also adjuster and slides (for front seat) 3. If no damage is found, reinstall the seat. 4. If damaged—REPLACE the damaged seat parts using new bolts.
Center inner pillar	1. Check the center inner pillar on the collision side for damage (dents, cracks, deformation). 2. If damaged—REPAIR the center inner pillar.	
Trim/headlining	1. Check for visible signs of damage (dents, cracks, deformation) of the interior trim on the collision side. 2. If damaged—REPLACE the damaged trim parts.	

SECTION STC
STEERING CONTROL SYSTEM

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
Maintenance Information 2
RHD MODELS 2
LHD MODELS 2
PREPARATION 3
Special Service Tools 3
ON-VEHICLE SERVICE 4
Steering Angle Adjustment (WORK SUPPORT) 4
OPERATION PROCEDURE 4
SYSTEM DESCRIPTION 5
System Component Parts Location 5
Electric Power Steering Function 5
Fail-Safe Function 5
TROUBLE DIAGNOSIS 6
Diagnosis Procedure 6
BASIC CONCEPT 6
Component Parts Location 7
Wiring Diagram 8
Control Unit Input/Output Signal Standard 9
STANDARD WHEN USING CIRCUIT TESTER 9
STANDARD VALUES WITH CONSULT-II 9
CONSULT-II Function (EPS) 11
DESCRIPTION 11
CONSULT-II BASIC OPERATION 11
SELF-DIAG RESULTS 12
DATA MONITOR 12
CONTROL UNIT PART NUMBER 13
CAN Communication 14
SYSTEM DESCRIPTION 14
CAN Communication Unit 14
TYPE 1/TYPE 2 15
TYPE 3/TYPE 4 17
TYPE 5/TYPE 6 19
TYPE 7/TYPE 8 22
TYPE 9/TYPE 10 24
Correct and Quick Diagnosis 26
CHECK THE FOLLOWING ITEMS WITH THE VEHICLE STOPPED. 26
CHECK THE FOLLOWING ITEMS WITH THE VEHICLE RUNNING. 26
Basic Inspection 26
BASIC INSPECTION 1 INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY 26
BASIC INSPECTION 2 INSPECTION OF ELECTRIC POWER STEERING WARNING LAMP 26
Inspection 1: Battery Voltage Is Incorrect 27
Inspection 2: No Setting 28
Inspection 3: Steering Angle Has Not Been Adjusted. 28
Inspection 4: Torque Sensor Malfunction 28
Inspection 5: Steering Angle Sensor Malfunction 29
Inspection 6: Motor Malfunction 29
Inspection 7: EEPROM Malfunction 29
Inspection 8: Control Unit Malfunction 29
Inspection 9: CAN Communication System 29
Symptom 1: Steering Wheel Operation Is Heavy or Light 30
Symptom 2: Steering Force and Steering Wheel Return Force Are Different in Right and Left. Steering Wheel Is Pulled to One Side 30
Symptom 3: Steering Wheel Does Not Return Properly 31
Symptom 4: Steering Effort Is Uneven (Torque Variation) 31
Symptom 5: EPS Warning Lamp Keeps Illuminating. 32

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EGS000LM

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Maintenance Information

EGS000LN

If any of following part is replaced, always replace with new* one.
If it's not (or fail to do so), the electrical system may not be operated properly.
*: New one means a virgin control unit that has never been energized on-board.

RHD MODELS

- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM
- IPDM E/R
- Combination meter
- EPS control unit

LHD MODELS

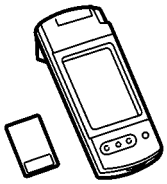
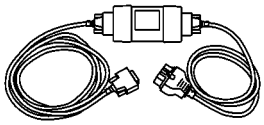
- BCM (Models without Intelligent Key system)
- Intelligent Key unit (Models with Intelligent Key system)
- ECM

PREPARATION

PFP:00002

Special Service Tools

EGS000JF

Description		Application
CONSULT-II unit, and Program card AED02E	 PBIA3527J	For system diagnosis, and checks
CONSULT-II CONVERTER	 PBIA3526J	

ON-VEHICLE SERVICE

PFP:00000

Steering Angle Adjustment (WORK SUPPORT)

EGS000JG

- If steering column or steering gear is installed or removed, make sure to adjust steering angle.

  CAUTION:
  Use CONSULT-II to adjust steering angle. (Adjustment cannot be achieved without using CONSULT-II.)

OPERATION PROCEDURE

1. Connect CONSULT-II and CONVERTER to data link connector. Refer to STC-11, "CONSULT-II BASIC OPERATION" .
2. Touch “EPS”, “WORK SUPPORT”, and “EPS CALIBRATION”.
3. Start engine.
4. Set steering wheel to straight-ahead position.
5. Turn steering wheel to right until it stops.
6. Return steering wheel to straight-ahead position.

   CAUTION:
   Error should be within ±10°.
7. Touch “START”.
8. Turn steering wheel to right or left until it stops. When “END” is displayed on screen of CONSULT-II, turn ignition switch OFF and let it remain OFF for 15 seconds or longer.

   CAUTION:
   If ignition switch is turned ON within 15 seconds, steering angle adjustment is not performed, and steering wheel angle cannot be adjusted.
9. Monitor “ANGLE ST” on data monitor for at least 15 seconds. Make sure steering wheel is in straight-ahead position and error is within 0°±10°. Now steering angle adjustment is completed.

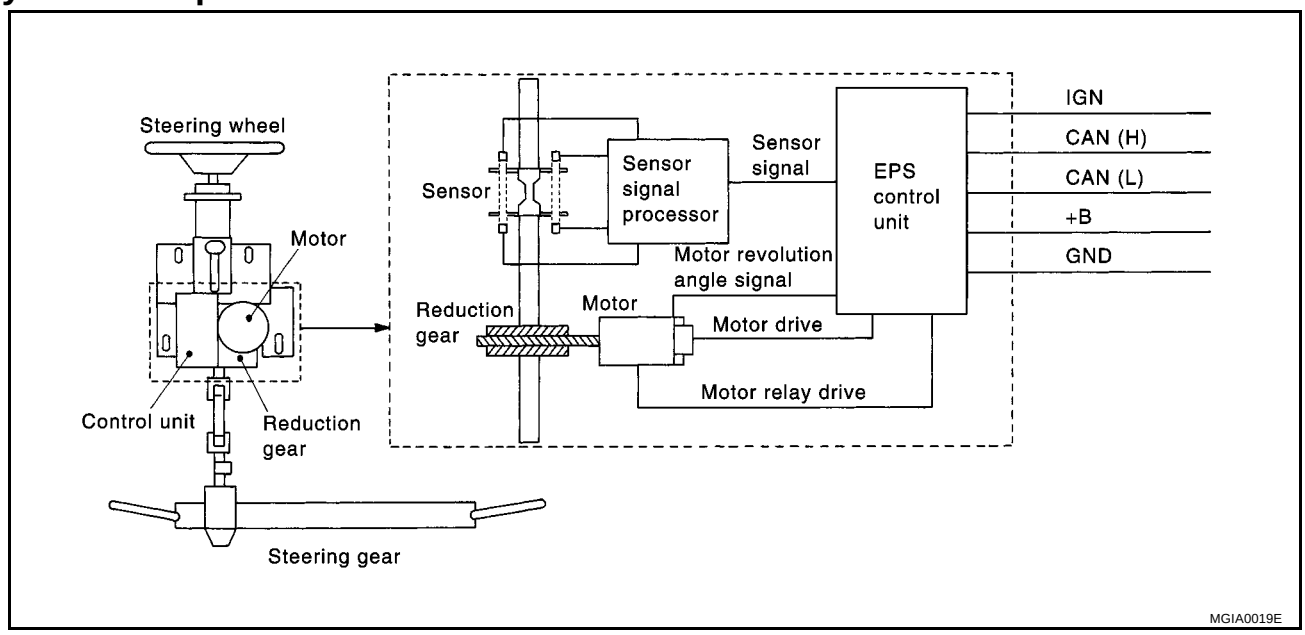
   CAUTION:
   Once “EPAS CALBRATION” is started, make sure to continue it until the end. If it is interrupted in the middle, steering angle signal will not be sent normally, so steering wheel cannot return properly after turning steering wheel.

SYSTEM DESCRIPTION

PFP:00000

System Component Parts Location

EGS000JH



Electric Power Steering Function

EGS000JI

Part name	Function
Electric power steering (EPS) control unit	● Using steering torque, steering angle signal, and vehicle speed signal from sensor, outputs optimum assistance torque signal to motor.
	● If power steering is continuously operated for a long time, reduces output signal to motor to protect motor and control unit.
	● If malfunction occurs in electric system, fail-safe function starts operating and stops output signal to motor. Steering function switches to manual operation. At that time, it illuminates warning lamp to inform that system is malfunctioning.
	● Diagnosis with CONSULT-II allows determination of the malfunctioning part.
	● Controls communication with other control units with CAN communication.
Motor	● Generates assistance torque with control signal from control unit.
Sensor	● Detects steering torque, and outputs signal to control unit.
Reduction gear	● Amplifies assistance torque generated by motor with worm gear, and sends to column shaft.
Warning lamp	● Turns ON when fail-safe function is operated to inform that system is malfunctioning and steering wheel becomes manual operation.
	● Turns ON when ignition switch is turned ON for purpose of bulb check. Then turns OFF approximately 1 second later.

Fail-Safe Function

EGS000JJ

If malfunction occurs in system, normal control stops and the system switches to fail-safe status. At the same time, electric power steering warning lamp turns on and steering wheel switches to manual steering status. (Steering wheel operating force becomes heavy.)

TROUBLE DIAGNOSIS

PFP:00004

Diagnosis Procedure

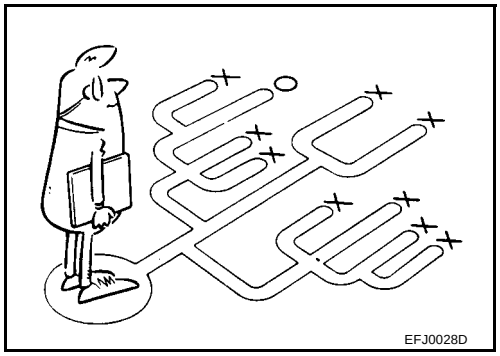
EGS000JK

BASIC CONCEPT

- The most important point in performing error trouble diagnosis is to thoroughly understand the vehicle systems (both control and mechanical).

- It is also important to clarify customer concerns before starting the inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

  CAUTION:
  Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that ... ,” or “maybe the customer mentions this symptom”.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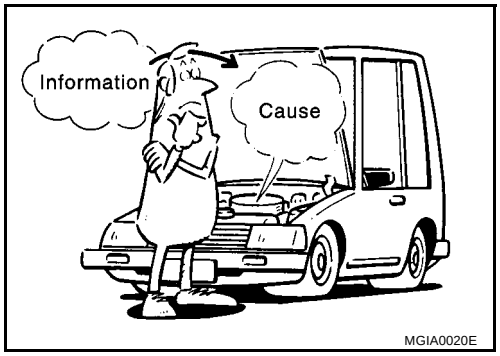
- It is essential to check symptoms right from the beginning in order to repair a failure completely.
  For an intermittent failure, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent failures are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any symptom diagnosis, no one can judge if the failure has actually been eliminated.
- After completing trouble diagnosis, be sure to perform “erase memory”. Refer to STC-12, "SELF-DIAG RESULTS" .



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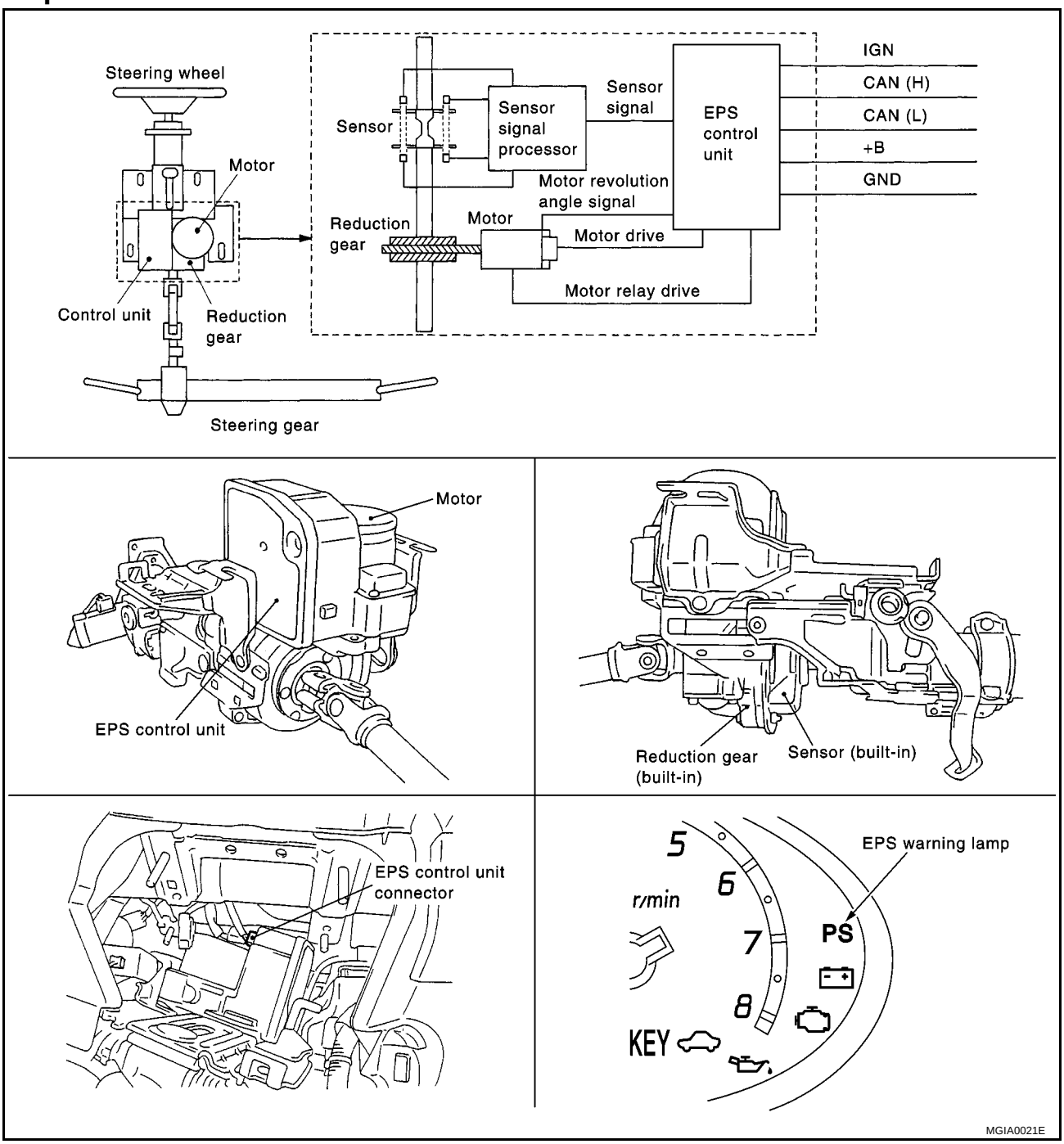
- For an intermittent error, move the harness or harness connector by hand to check for poor contact or false open circuit.
- Always read GI section to confirm the general precautions. Refer to GI-3, "PRECAUTIONS" .

Component Parts Location

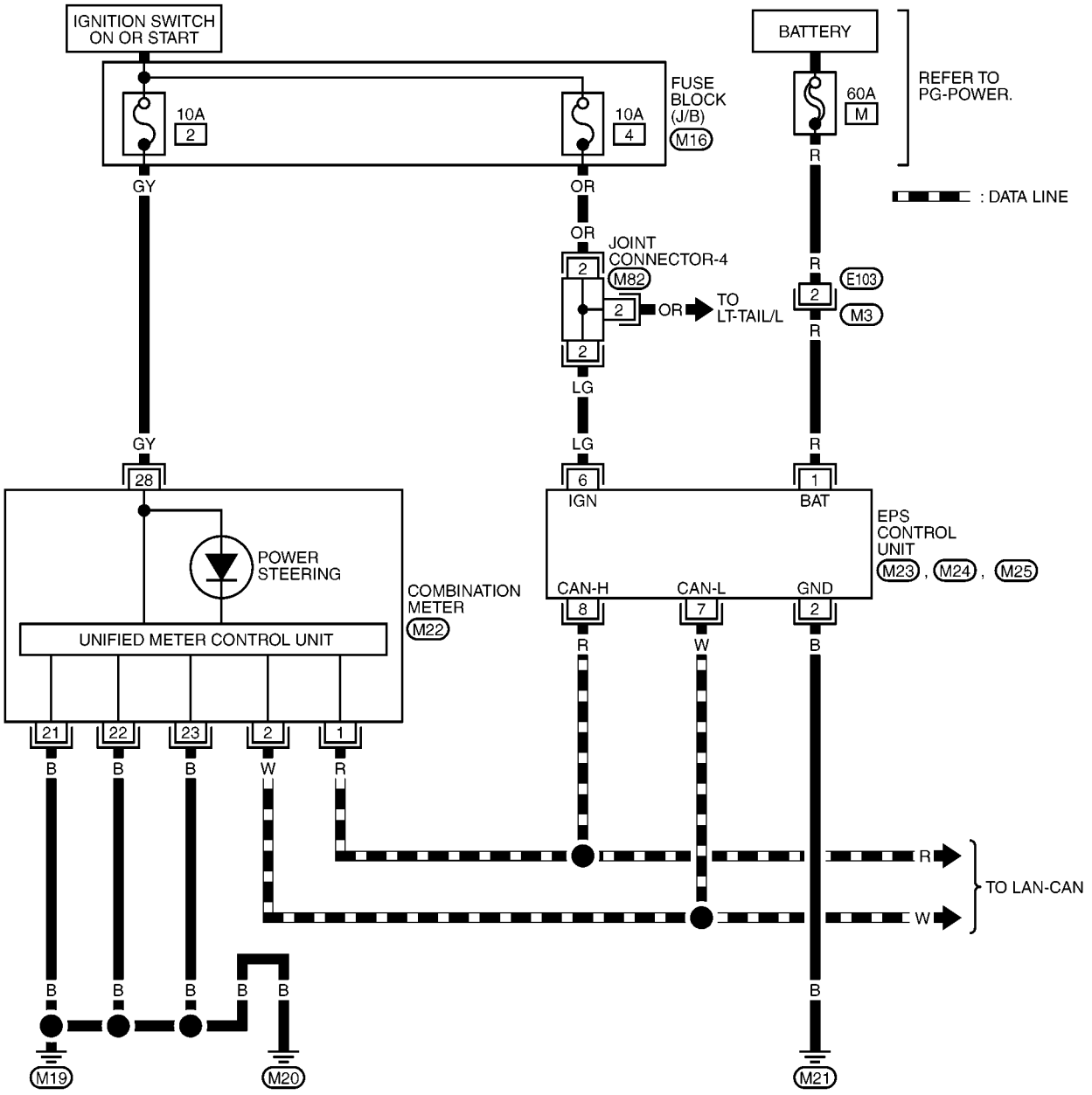
EGS000JL

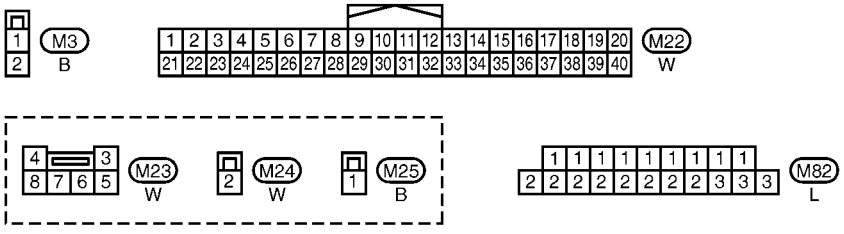


Wiring Diagram

EGS000JM

STC-EPS-01





REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MGWA0002E

Control Unit Input/Output Signal Standard

EGS000JN

STANDARD WHEN USING CIRCUIT TESTER

Connector terminal		Measuring point	Measuring condition	Reference values for normal operation (Note 1)
+	—			
1	Ground	Battery power	Ignition switch ON, OFF	Battery voltage (approx. 12V)
2	Ground	Ground	With control unit connector removed	: Continuity should exist.
6	Ground	Ignition power supply	Ignition switch ON	: Battery voltage (approx. 12V)
			Ignition switch OFF	: 0V
7	—	CAN- (L)	—	—
8	—	CAN+ (H)	—	—

Note 1: If circuit tester for measuring voltage is used for check, be careful not to forcibly extend any connector terminals.

STANDARD VALUES WITH CONSULT-II

CAUTION:

Output signal indicates data calculated by control unit. Even if output circuit (harness) is open, it may indicate normal value.

Monitor item	Data monitor		Error inspection checklist
	Condition	Reference values for normal operation	
VOLTAGE ST (V)	Ignition switch ON or engine is running	Battery voltage (approx. 12V)	Battery voltage [malfunction] STC-27, "Inspection 1: Battery Voltage Is Incorrect"
TORQUE ST (Nm)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	At neutral (steering effort is zero): Approx. 0 Nm Right or left turn will change value.	Torque sensor [malfunction] STC-28, "Inspection 4: Torque Sensor Malfunction"
ANGLE ST (°)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	At neutral (straight-ahead position): Approx. 0° Right or left turn will change value.	Steering angle sensor has not been adjusted.STC-28, "Inspection 3: Steering Angle Has Not Been Adjusted." Steering angle sensor [malfunction] STC-29, "Inspection 5: Steering Angle Sensor Malfunction"
VELOCITY ST (d/s)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	When steering wheel stops: Approx. 0 d/s Right or left turn will change value.	
POWER ST (A)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	At neutral (steering effort is zero and steering is in straight-ahead position.): Approx. 0A Right or left turn will change value.	Torque sensor [malfunction] STC-28, "Inspection 4: Torque Sensor Malfunction" Motor [malfunction] STC-29, "Inspection 6: Motor Malfunction" EEPROM [malfunction] STC-29, "Inspection 7: EEPROM Malfunction" Control unit [malfunction] STC-29, "Inspection 8: Control Unit Malfunction"
CONSIGNED POWER ST (A)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	At neutral (steering effort is zero and steering is in straight-ahead position.): Approx. 0A Right or left turn will change value.	
CONSIGNED TORQUE ST (Nm)	Turn steering wheel to right and left while ignition switch is ON or engine is running.	At neutral (steering effort is zero and steering is in straight-ahead position.): Approx. 0 Nm Right or left turn will change value.	

Monitor item	Data monitor		Error inspection checklist
	Condition	Reference values for normal operation	
EPAS TEMPERATURE (°C)	Ignition switch ON or engine is running	Control unit temperature is displayed.	Motor [malfunction] STC-29, "Inspection 6: Motor Malfunction"
DERATING LEVEL (%)	Ignition switch ON or engine is running	It is normally 100%. If stationary steering is performed excessively, percentage decreases gradually. After leaving it for a while it will return to 100%.	This is normal.
VEHICLE SPEED (km/h)	Ignition switch ON or engine is running	Almost in accordance with speedometer display It may not synchronize immediately after ignition switch turns ON. This is not a malfunction.	CAN communication system STC-29, "Inspection 9: CAN Communication System"
FAULT INDICATOR ST (ON-OFF)	Ignition switch ON or engine is running	Electric power steering warning lamp is ON: ON Electric power steering warning lamp is OFF: OFF	Check malfunctioning parts with self-diagnosis and data monitor.
ENGINE STATUS (stop, stall, run, crank)	Ignition switch ON or engine is running	Status of engine is displayed.	CAN communication system STC-29, "Inspection 9: CAN Communication System"
R RANGE (ON, OFF, invalid)	Ignition switch ON or engine is running	Status of R position is displayed.	

CONSULT-II Function (EPS)

EGS000JO

DESCRIPTION

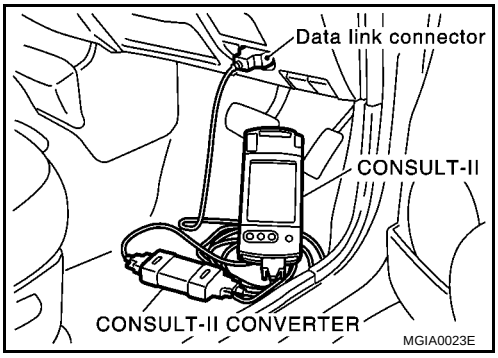
CONSULT-II can display each diagnostic item using the diagnostic test modes shown following. Data is received and transmitted via the control module communication line.

Mode	Description	Shifting mode	Display
WORK SUPPORT	● Steering angle adjustment Sets initial setting and performs modification of steering wheel angle signal.	Easy to shift by touching keys on CONSULT-II.	Easy to display on the CONSULT-II screen.
SELF-DIAG RESULTS	● Displays self-diagnostic results.		
DATA MONITOR	● Can be used in locating major cause on the basis of self-diagnostic results. ● Can monitor (observation and recording) and print out input/output of EPS control unit.		
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of CAN communication can be read.		
ECU PART NUMBER	Displays control unit (EPS column assembly) part number.		

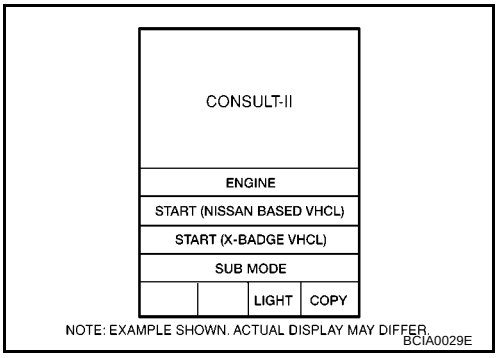
CONSULT-II BASIC OPERATION

1. Connect CONSULT-II and CONVERTER to data link connector, and turn ignition switch ON or start engine.
   For details, refer to separately supplied “CONSULT-II Operation Manual (Supplement-III)” and “CONSULT-II CONVERTER Operation Manual”.

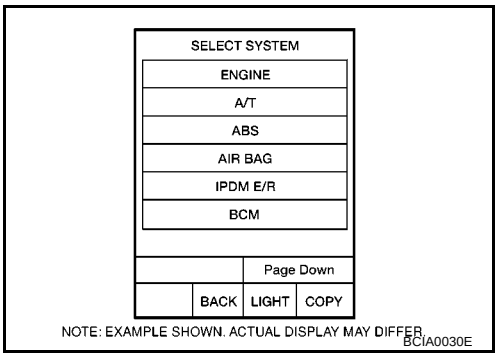
   CAUTION:
   If CONSULT-II is used without connecting CONSULT-II CONVERTER, malfunction might be detected by self-diagnosis according to control unit which performs CAN communication.



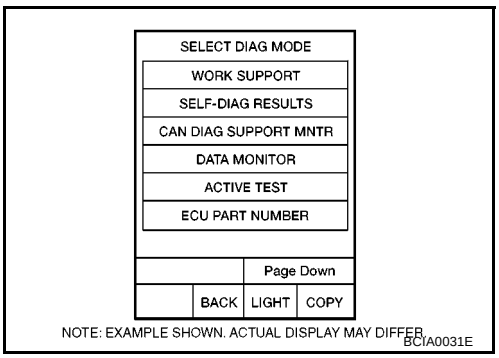
2. Touch “START (NISSAN BASED VHCL)”.



3. Touch “EPS” on “SELECT SYSTEM” screen.
   - If “EPS” is not displayed, print out “SELECT SYSTEM” screen. Then refer to LAN-4, "Precautions When Using CONSULT-II" .



4. Select desired part to be diagnosed on “SELECT DIAG MODE” screen.
   For details, refer to separately supplied “CONSULT-II Operation Manual (Common) (Supplement-I) (Supplement-II) (Supplement-III)”.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
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SELF-DIAG RESULTS

Operation Procedure

1. Connect CONSULT-II and CONVERTER to data link connector, and turn ignition switch ON.
2. Touch “START (NISSAN BASED VHCL)”, “EPS”, “SELF-DIAG RESULTS” in this order.
3. self-diagnostic results is displayed. (If necessary, touch “PRINT” to print out self-diagnostic results.) If “System Normal” is displayed, check EPS warning lamp system. Refer to STC-26, "Basic Inspection" .
4. Perform inspection by following to “Display Item List”. Repair or replace parts as necessary.
5. After repairing or replacing malfunctioning parts, perform “erase memory” to erase malfunction record in memory.
   - Turn ignition switch OFF, and turn ignition switch ON again. Then touch “START (NISSAN BASED VHCL)”, “EPS”, “SELF-DIAG RESULTS”, “ERASE” in this order to erase malfunction memory.
6. Perform self-diagnosis again to make sure malfunctioning memory is erased.

   CAUTION:
   If memory is not erased, repeat the procedure from step 3.

Display Item List

Suspect systems	Error return condition	Inspection system
Battery voltage is incorrect.	Power supply supplied to EPS is incorrect.	[Inspection 1] STC-27
No setting	Initial EPS setting has not been set.	[Inspection 2] STC-28
Steering angle has not been adjusted.	Steering angle signal has not been adjusted.	[Inspection 3] STC-28
Torque sensor malfunction	Torque sensor incorporated in column assembly is malfunctioning.	[Inspection 4] STC-28
Steering angle sensor malfunction	Steering angle sensor incorporated in column assembly is malfunctioning.	[Inspection 5] STC-29
Motor malfunction	Motor or motor driver in control unit is malfunctioning.	[Inspection 6] STC-29
EEPROM malfunction	EEPROM in control unit is malfunctioning.	[Inspection 7] STC-29
Control unit malfunction	Control unit is malfunctioning.	[Inspection 8] STC-29
CAN communication system	CAN communication system is malfunctioning.	[Inspection 9] STC-29
Vehicle speed signal error	Vehicle speed signal received with CAN communication has error.	
Engine signal error	Engine signal received with CAN communication has error.	
R position error	R position signal received with CAN communication has error.	

DATA MONITOR

Operation Procedure

1. Connect CONSULT-II and CONVERTER to data link connector, and start engine.
2. Touch “START (NISSAN BASED VHCL)”, “EPS”, “DATA MONITOR” in this order.
3. Return to monitor item selection screen, and touch any of “ALL SIGNALS”, “CAN DIAG SUPPORT MNTR”, or “SELECTION FROM MENU”.
4. Touch “START”.
5. Screen of data monitor is displayed.

Display Item List

×: Applicable —: Not applicable

Item name (display or unit)	Select Item Menu		Remarks
	ALL SIG-NALS	SELCTION FROM MENU	
VOLTAGE ST (V)	×	×	Displays power supply voltage supplied to control unit.
TORQUE ST (Nm)	×	×	Displays steering torque detected by torque sensor.
ANGLE ST (°)	×	×	Displays steering wheel angle detected by steering angle sensor.
VELOCITY ST (°/S)	×	×	Displays steering wheel angle speed detected by steering angle sensor.
POWER ST (A)	×	×	Displayed current command value to be applied to motor.
CONSIGNED POWER ST (A)	×	×	Displays current value flowing in motor. **NOTE:** If steering wheel is turned quickly, the value may not match the command value. This is not malfunction.
CONSIGNED TORQUE (Nm)	×	×	Displays assistance torque generated by electric power steering.
EPAS TEMPERATURE (°C)	×	×	Displays temperature in control unit.
DERATING LEVEL (%)	×	×	It is normally 100%. If stationary steering is performed excessively, percentage decreases gradually. After leaving it for a while, it will return to 100%.
VEHICLE SPEED (km/h)	×	×	Almost in accordance with speedometer display. It may not accord immediately after ignition switch turns ON. This is not a malfunction.
FAULT INDICATOR ST (ON - OFF)	×	×	When fail-safe is in operation or electric power steering warning lamp is ON: ON When fail-safe is not in operation or electric power steering warning lamp is OFF: OFF
ENGINE STATUS (stop, stall, run, crank)	×	×	Status of engine is displayed.
R RANGE (ON, OFF, invalid)	×	×	Status of R position is displayed.

CONTROL UNIT PART NUMBER

1. Connect CONSULT-II and CONVERTER to data link connector, and turn ignition switch ON.
2. Touch “START (NISSAN BASED VHCL)”, “EPS”, “ECU PART NUMBER”.

- Part No. on control unit (EPS column assembly) label is displayed on CONSULT-II.

CAN Communication

EGS0013F

SYSTEM DESCRIPTION

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

CAN Communication Unit

EGS0019P

Go to CAN system, when selecting your car model from the following table.

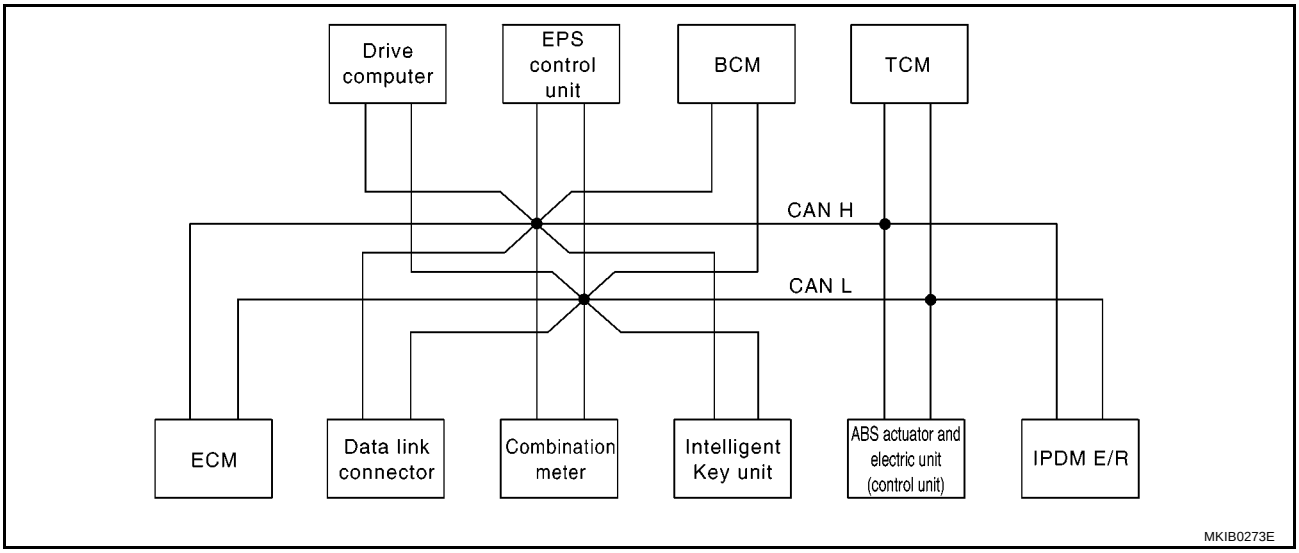
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	STC-15, "TYPE 1/TYPE 2"				STC-17, "TYPE 3/TYPE 4"				STC-19, "TYPE 5/TYPE 6"				STC-22, "TYPE 7/TYPE 8"				STC-24, "TYPE 9/TYPE 10"			

×: Applicable

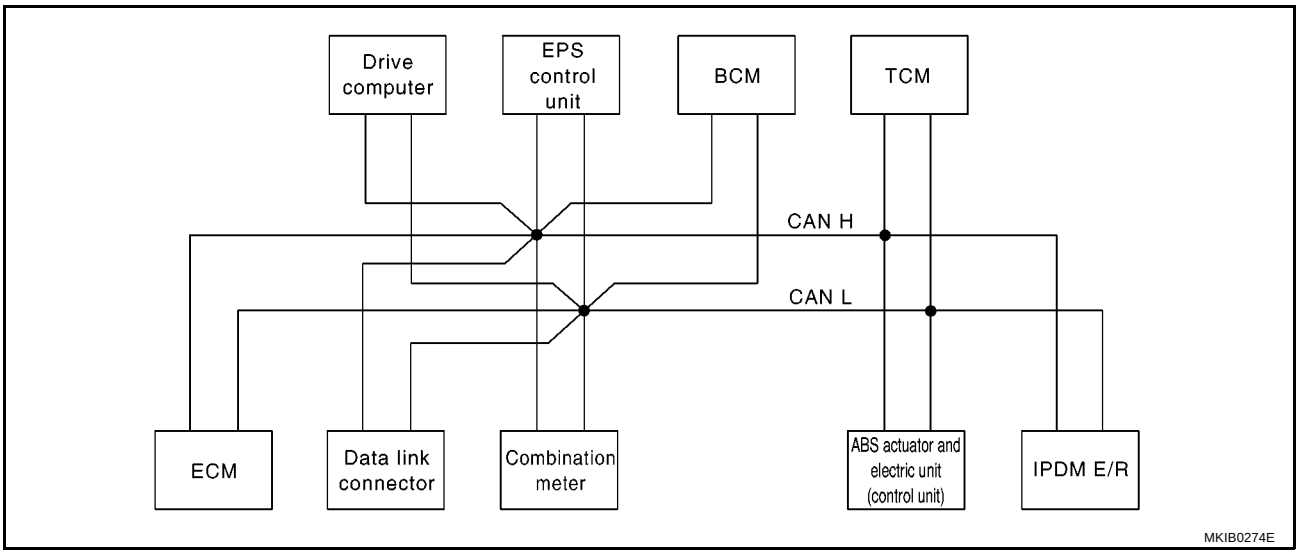
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

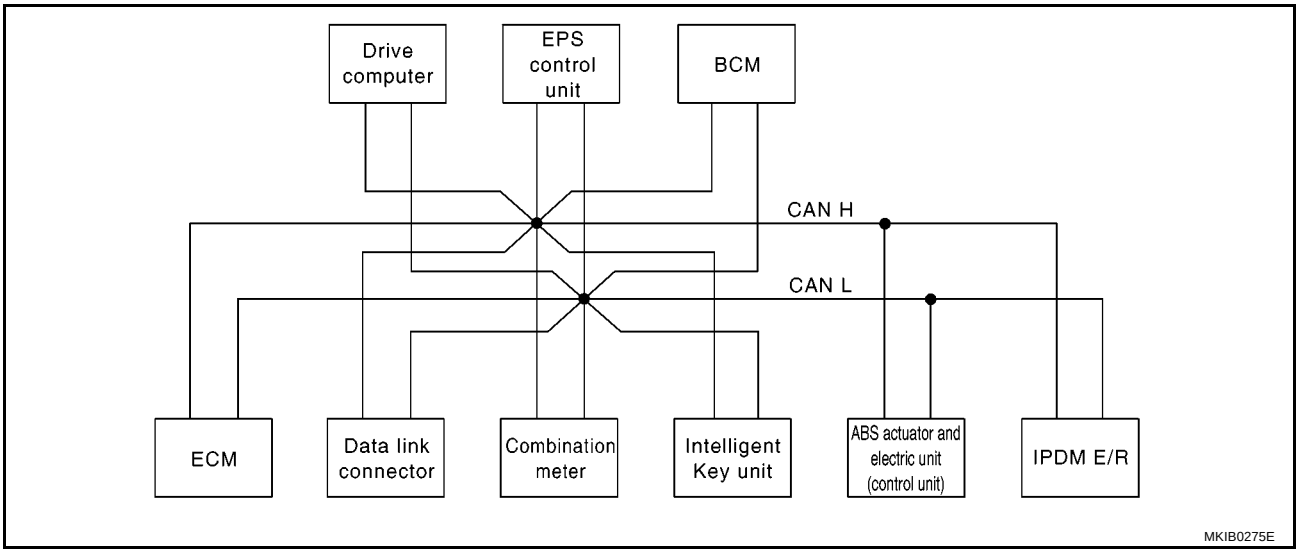
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

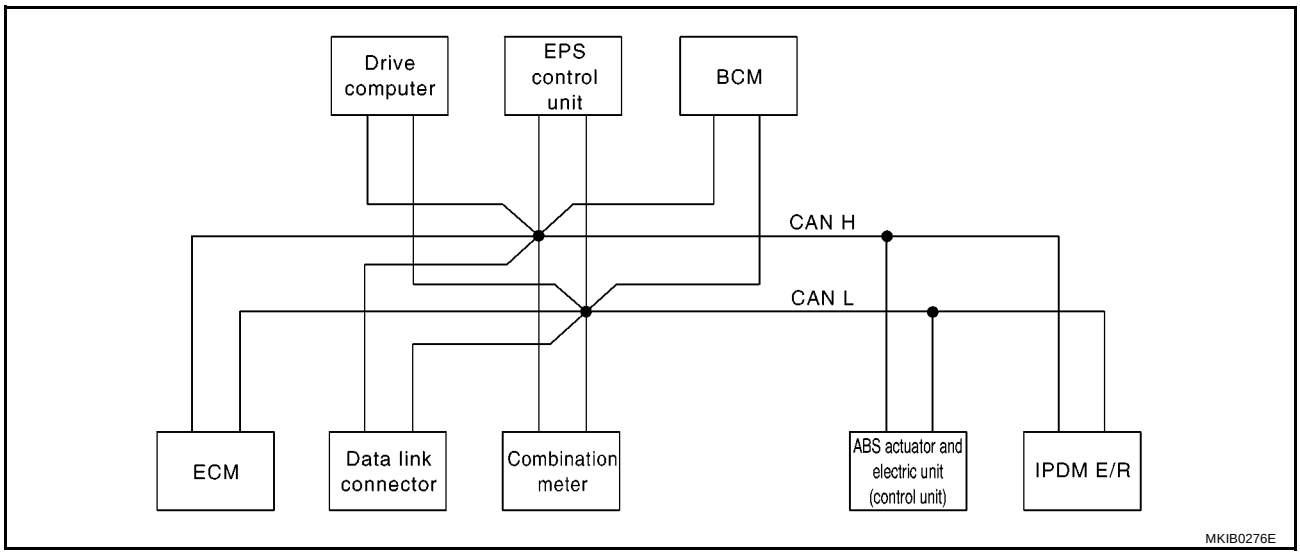
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

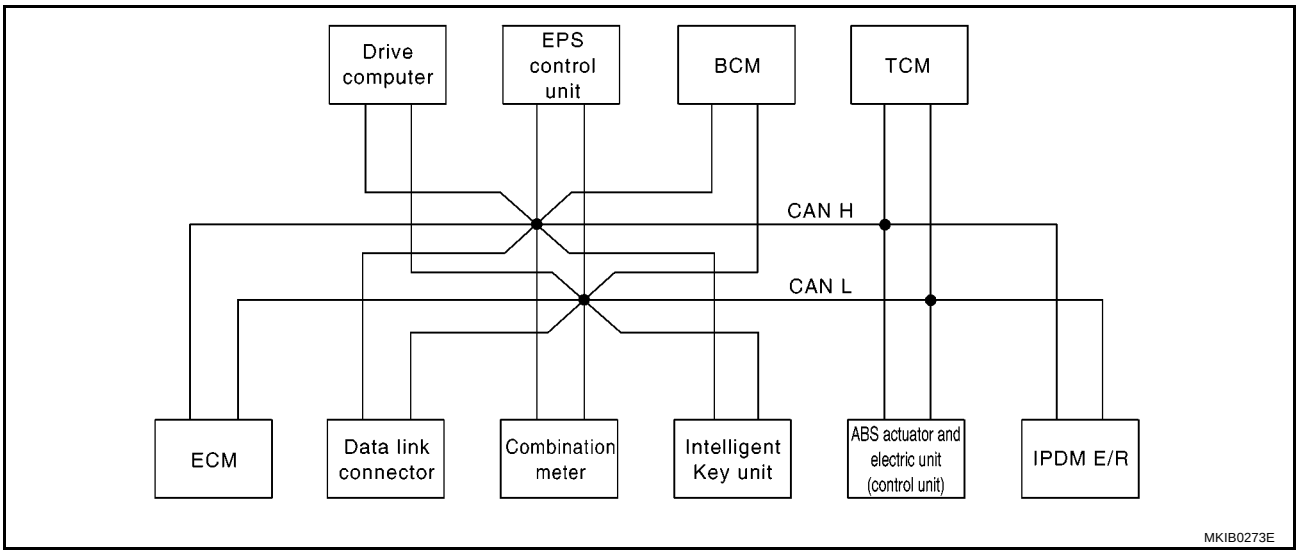
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

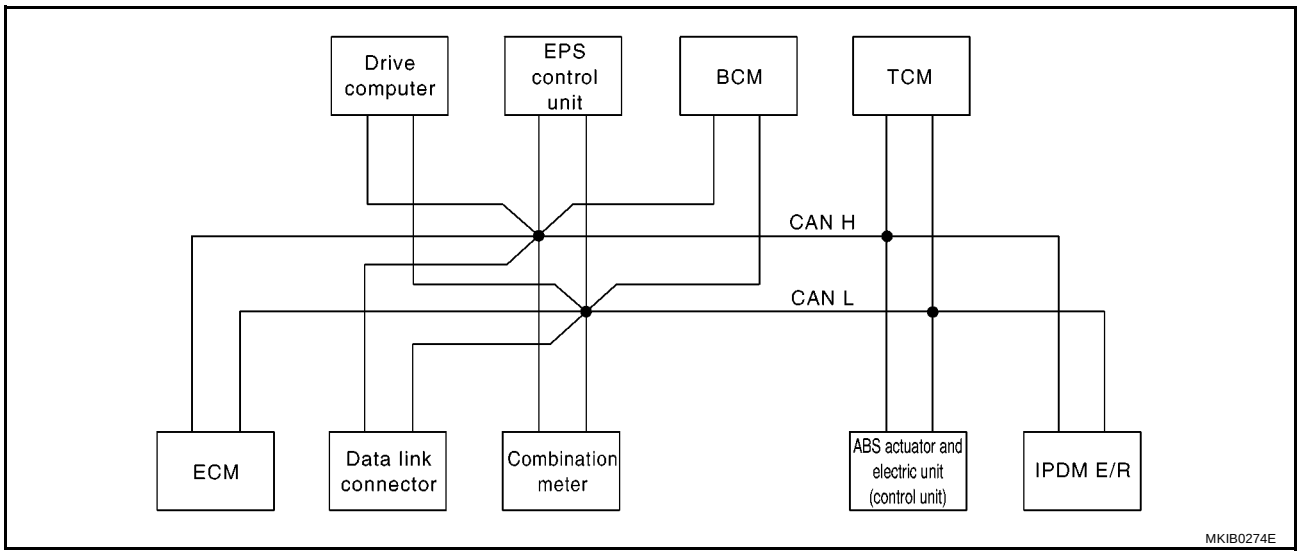
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T

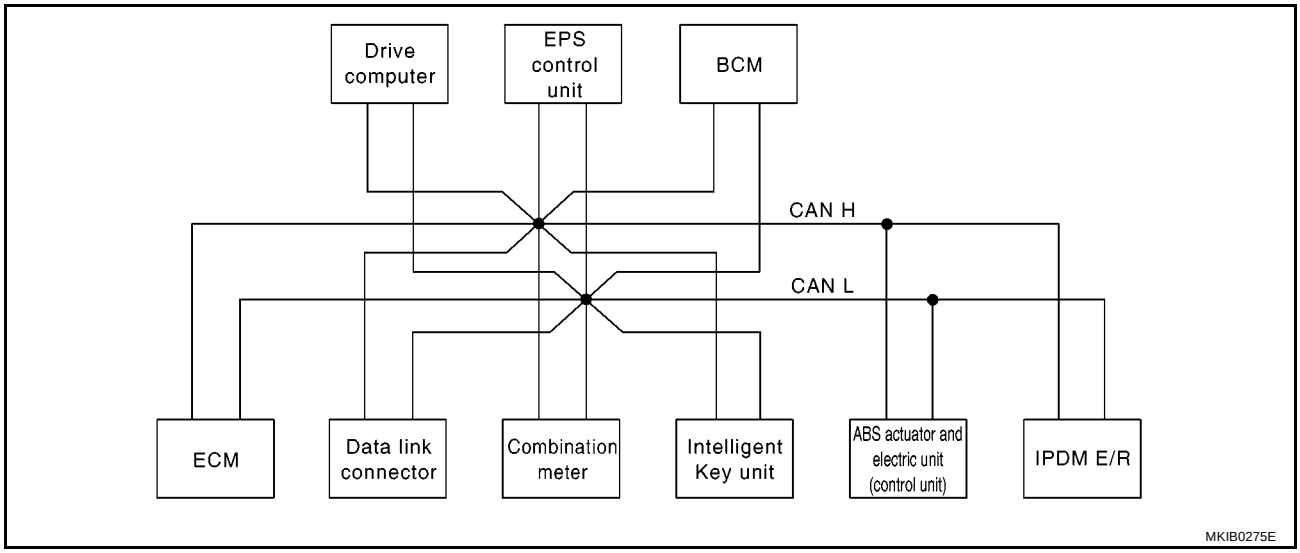
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

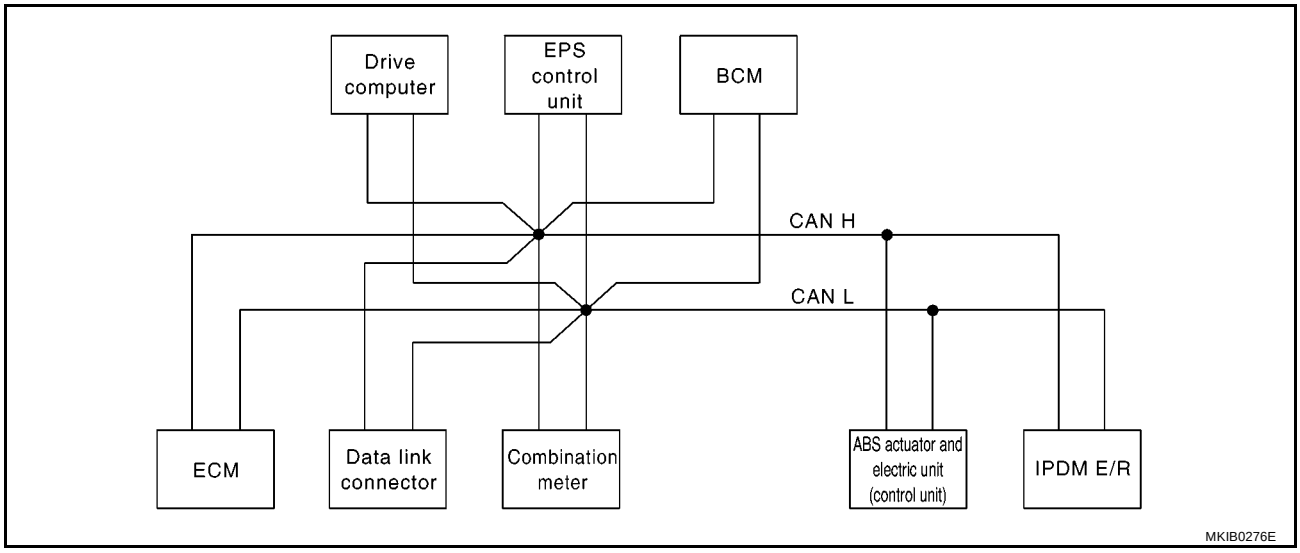
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

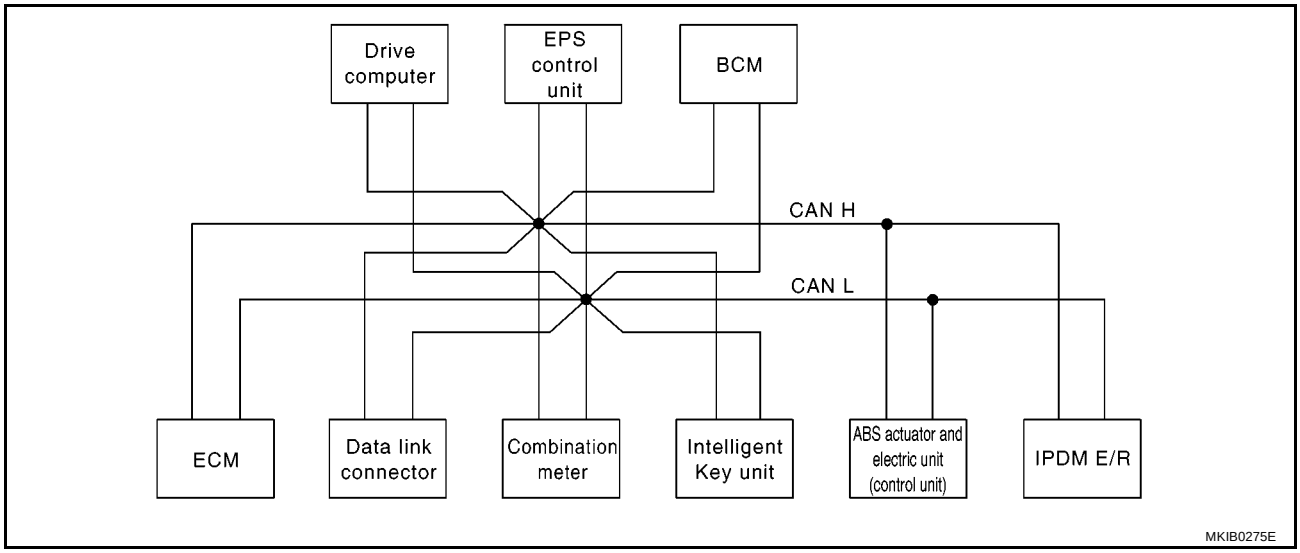
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

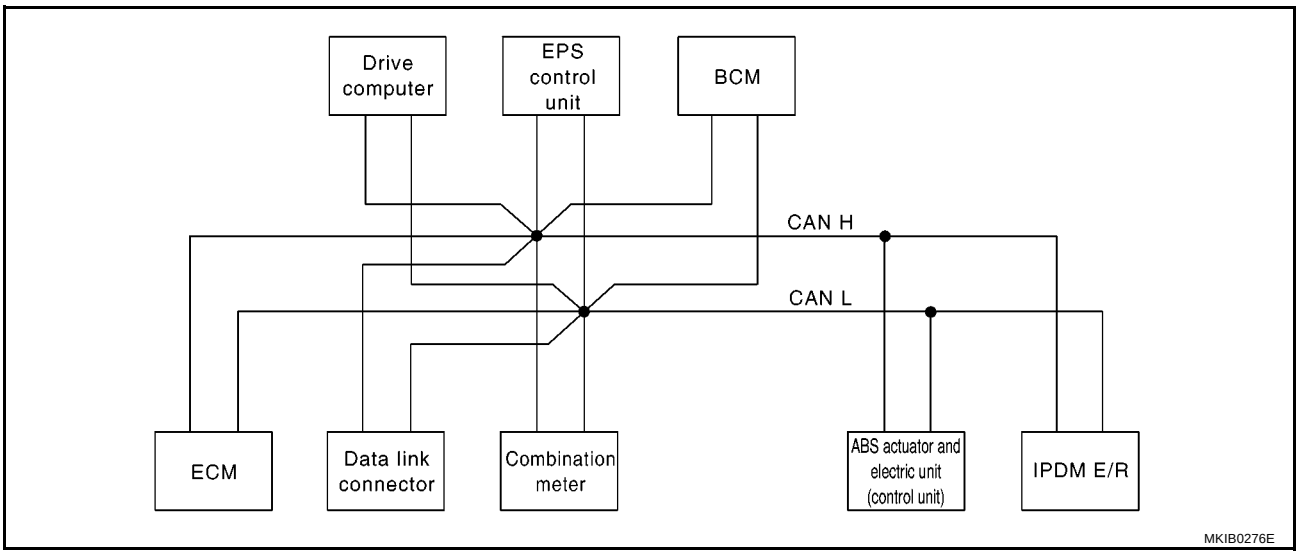
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Correct and Quick Diagnosis

EGS000JQ

CHECK THE FOLLOWING ITEMS WITH THE VEHICLE STOPPED.

- Are tire pressure and size proper? Is authorized steering wheel used? Is control unit genuine part?
- Is installation status of steering column and steering gear normal? (mounting bolt looseness, damaged rods, dust boot, and bulkhead seal, grease leakage)
- Is the wheel alignment adjusted properly?
- Has the vehicle suspension been modified? Has any modification that leads to increased vehicle weight been made?
- Is installation status of suspension links and axle normal?
- Is battery voltage proper?
- Is connection of each connector normal?

CHECK THE FOLLOWING ITEMS WITH THE VEHICLE RUNNING.

- Check conditions of failure (5W1H).
- Is the engine normal?

Basic Inspection

EGS000JR

BASIC INSPECTION 1 INSPECTION OF POWER SUPPLY SYSTEM TERMINAL LOOSENESS AND BATTERY

Check the battery for looseness on the battery positive/negative terminals and ground connection.
Check battery for low voltage.

BASIC INSPECTION 2 INSPECTION OF ELECTRIC POWER STEERING WARNING LAMP

1. Turn ignition switch ON, and make sure electric power steering warning lamp illuminates for approximately 1 second. If not, check CAN communication system. Refer to STC-29, "Inspection 9: CAN Communication System" .
   When no malfunction is found in CAN communication system, replace combination meter. Refer to DI-34, "Removal and Installation for Combination Meter" .
2. Make sure ABS warning lamp turns off after approximately a 1 second delay when ignition switch is turned ON. If it does not turn off, perform self-diagnosis.

3. After completing self-diagnosis, always erase the Self-Diagnostic Results [MEMORY]. Refer to STC-12, "SELF-DIAG RESULTS" .

Inspection 1: Battery Voltage Is Incorrect

EGS000JS

CAUTION:
Before checking the following items, make sure battery voltage is normal.

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

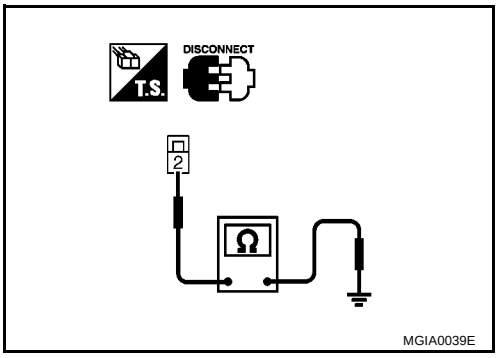
Is “Incorrect battery voltage ” displayed in self-diagnosis display?

YES >> GO TO 2.
NO >> Poor connection of connector terminal

2. INSPECTION OF CONTROL UNIT GROUND CIRCUIT

Turn ignition switch OFF, and disconnect control unit connectors. Measure continuity between control unit terminal 2 and ground.

2 (B) - Ground : Continuity should exist.



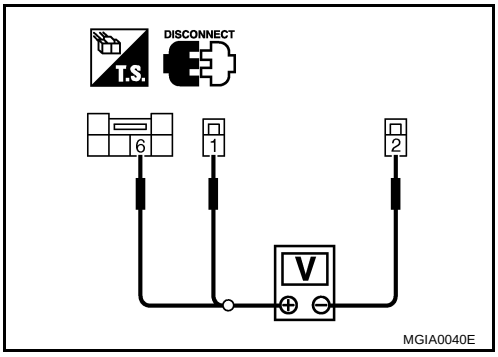
OK or NG

OK >> GO TO 3.
NG >> Ground circuit is poor. Repair or replace ground circuit.

3. INSPECTION OF CONTROL UNIT POWER SUPPLY CIRCUIT

1. Start engine.
2. Measure voltage between control unit harness terminals 1, 6 and terminal 2.

1 (R) - 2 (B) : Battery voltage should exist
6 (LG) - 2 (B) : Battery voltage should exist



OK or NG

OK >> GO TO 4.
NG >> Power supply circuit of applicable part is poor. Repair or replace the harness.

4. INSPECTION OF CONTROL UNIT

1. Turn ignition switch OFF. Connect control unit connectors, and start engine.
2. Check VOLTAGE ST on CONSULT-II DATA MONITOR.

Voltage : 10 - 16V

OK or NG

OK >> GO TO 5.
NG >> Control unit malfunction (Replace column assembly.)

5. CHECK POWER SUPPLY CIRCUIT

Turn OFF headlamp, air conditioning, blower fan, and rear window defogger. Check battery voltage on CONSULT-II data monitor while turning steering wheel until it stops.

Voltage : 10 - 16V

OK or NG

OK >> INSPECTION END
NG >> Power supply circuit is poor. Repair or replace the harness.

Inspection 2: No Setting

EGS000JT

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “No setting” displayed in self-diagnosis display?

YES >> Replace column assembly. (Initial setting of EPS has not been set.)
NO >> Poor connection of connector terminal

Inspection 3: Steering Angle Has Not Been Adjusted.

EGS000JU

Inspection Procedure

1. CHECK STEERING ANGLE SIGNAL

Monitor and check steering angle on data monitor.

Does steering angle display vary while turning steering wheel? Is steering angle 0±10° in straight-ahead position?

YES >> GO TO 2.
NO >> Adjust steering angle. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

2. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “Steering angle has not been adjusted.” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 4: Torque Sensor Malfunction

EGS000JV

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “Torque sensor malfunction” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 5: Steering Angle Sensor Malfunction

EGS000JW

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “Steering angle sensor malfunction” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 6: Motor Malfunction

EGS000JX

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “Motor malfunction” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 7: EEPROM Malfunction

EGS000JY

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “EEPROM malfunction” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 8: Control Unit Malfunction

EGS000JZ

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “Control unit malfunction” displayed in self-diagnosis display?

YES >> Replace column assembly.
NO >> Poor connection of connector terminal

Inspection 9: CAN Communication System

EGS000K0

Inspection Procedure

1. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

Is “CAN communication system” indicated in self-diagnosis display?

YES >> Go to LAN-4, "Precautions When Using CONSULT-II" .
NO >> Poor connection of connector terminal

Symptom 1: Steering Wheel Operation Is Heavy or Light

EGS000K1

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Is malfunctioning system displayed in self-diagnosis display?

YES >> GO TO 2.
NO >> GO TO 4.

2. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

OK or NG

OK >> GO TO 3.
NG >> Repair malfunctioning system, and GO TO 3.

3. SYMPTOM CHECK

Make sure that steering wheel operation is not heavy or light.

OK or NG

OK >> INSPECTION END
NG >> GO TO 4.

4. RECHECK CAN COMMUNICATION SYSTEMS

Check CAN communication systems (CAN communication system, vehicle speed signal error, engine signal error, R-range error) Refer to STC-29, "Inspection 9: CAN Communication System" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunctioning system.

5. INSPECTION OF CONTROL UNIT POWER SUPPLY SYSTEM

Check control unit power supply system. Refer to STC-27, "Inspection 1: Battery Voltage Is Incorrect" .

OK or NG

OK >> Check steering wheel. Refer to PS-5, "On Board Inspection and Service" in “Steering wheel”.
NG >> Repair power supply system.

Symptom 2: Steering Force and Steering Wheel Return Force Are Different in Right and Left. Steering Wheel Is Pulled to One Side

EGS000K2

1. STEERING SYSTEM STEERING ANGLE CHECK

Check steering angle on data monitor. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

Is check result normal?

OK >> GO TO 2.
NG >> Adjust steering angle. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Is malfunctioning system displayed in self-diagnosis display?

YES >> GO TO 3.
NO >> GO TO 5.

3. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

OK or NG

OK >> GO TO 4.
NG >> Repair malfunctioning system, and GO TO 4.

4. SYMPTOM CHECK

Check symptom.

OK or NG

OK >> INSPECTION END
NG >> GO TO 5.

5. CHECK WHEEL ALIGNMENT

Check wheel alignment. Refer to FSU-6, "Wheel Alignment" in “Front Suspension Assembly”.

OK or NG

OK >> Check steering wheel. Refer to PS-5, "On Board Inspection and Service" in “Steering wheel”.
NG >> Adjust wheel alignment. Refer to FSU-6, "Wheel Alignment" in “Front Suspension Assembly”.

Symptom 3: Steering Wheel Does Not Return Properly

EGS000K3

1. STEERING SYSTEM STEERING ANGLE CHECK

Check steering angle on data monitor. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

OK or NG

OK >> GO TO 2 “self-diagnostic results” in STC-30, "Symptom 2: Steering Force and Steering Wheel Return Force Are Different in Right and Left. Steering Wheel Is Pulled to One Side" .
NG >> Adjust steering angle. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .

Symptom 4: Steering Effort Is Uneven (Torque Variation)

EGS000K4

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Is malfunctioning system displayed in self-diagnosis display?

YES >> GO TO 2.
NO >> GO TO 4.

2. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connectors. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connectors securely, and perform self-diagnosis.

OK or NG

OK >> GO TO 3.
NG >> Repair malfunction, and GO TO 3.

3. SYMPTOM CHECK

Check symptom.

OK or NG

OK >> INSPECTION END
NG >> GO TO 4.

4. INSPECTION OF CONTROL UNIT POWER SUPPLY SYSTEM

Check power supply system in control unit. Refer to STC-27, "Inspection 1: Battery Voltage Is Incorrect" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunction.

5. INSPECTION OF STEERING INTERMEDIATE SHAFT

1. Make sure steering intermediate shaft and steering gear, and intermediate shaft and column are securely installed. Refer to PS-7, "STEERING COLUMN" .
2. Adjust steering angle. Refer to STC-4, "Steering Angle Adjustment (WORK SUPPORT)" .
3. Check steering effort for unevenness (torque variation).

OK or NG

OK >> INSPECTION END
NG >> Check steering wheel. Refer to PS-5, "On Board Inspection and Service" in “Steering wheel”.

Symptom 5: EPS Warning Lamp Keeps Illuminating

EGS000K5

1. CHECK SELF-DIAGNOSTIC RESULTS

Check the self-diagnostic results.

Is malfunctioning system displayed in self-diagnosis display?

YES >> GO TO 2.
NO >> GO TO 4.

2. INSPECTION OF CONTROL UNIT CONNECTOR

1. Turn ignition switch OFF and disconnect control unit connector. Check terminals for deformation, disconnection, and looseness. If there is any non-standard condition, repair or replace it.
2. Reconnect connector securely, and perform self-diagnosis.

OK or NG

OK >> GO TO 3.
NG >> Repair malfunctioning system, and GO TO 3.

3. SYMPTOM CHECK

Check symptom.

OK or NG

OK >> INSPECTION END
NG >> GO TO 4.

4. INSPECTION OF CONTROL UNIT POWER SUPPLY SYSTEM

Check control unit power supply system. Refer to STC-27, "Inspection 1: Battery Voltage Is Incorrect" .

OK or NG

OK >> GO TO 5.
NG >> Repair malfunctioning part.

5. INSPECTION OF STEERING EFFORT

Check there is assistance power by electric power steering while steering wheel is turned. Refer to PS-5, "On Board Inspection and Service" in “Steering wheel”.

OK or NG

OK >> Check CAN communication systems. Refer to STC-29, "Inspection 9: CAN Communication System" .
NG >> Replace steering column assembly.

SECTION WT
ROAD WHEELS & TYRES

CONTENTS

PRECAUTIONS 2
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 2
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 3
NVH Troubleshooting Chart 3
ROAD WHEEL 4
Inspection 4
ALUMINUM WHEEL 4
STEEL WHEEL 4
ROAD WHEEL AND TYRE ASSEMBLY 5
Balancing Wheels (Bonding Weight Type) 5
REMOVAL 5
WHEEL BALANCE ADJUSTMENT 5
Balancing Wheels (Drive-in Weight Type) 6
WHEEL BALANCE ADJUSTMENT 6
Rotation 7
SERVICE DATA 8
Road Wheel 8
Tyre 8
FOR CR ENGINES: 8
FOR K9K ENGINES: 8

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EES000ZD

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EES000ZE

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			Refer to WT-4, "ROAD WHEEL"							NVH in MT, AT and CVT section.	NVH in FAX and FSU sections.	NVH in RAX and RSU sections.	Refer to TYRES in this chart.	Refer to ROAD WHEEL in this chart.	NVH in FAX section.	NVH in BR section.	NVH in PS section.
Possible cause and SUSPECTED PARTS			Out-of-round	Imbalance	Incorrect tyre pressure	Uneven tyre wear	Deformation or damage	Non-uniformity	Incorrect tyre size	DIFFERENTIAL	FRONT AXLE AND FRONT SUSPENSION	REAR AXLE AND REAR SUSPENSION	TYRES	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	TYRES	Noise	×	×	×	×	×	×		×	×	×		×	×	×	×
		Shake	×	×	×	×	×		×		×	×		×	×	×	×
		Vibration			×				×		×	×			×		×
		Shimmy	×	×	×	×	×	×	×		×	×		×		×	×
		Judder	×	×	×	×	×		×		×	×		×		×	×
		Poor quality ride or handling	×	×	×	×	×		×		×	×		×			
	ROAD WHEEL	Noise	×	×			×			×	×	×	×		×	×	×
		Shake	×	×			×				×	×	×		×	×	×
		Shimmy, judder	×	×			×				×	×	×			×	×
		Poor quality ride or handling	×	×			×				×	×	×				

×: Applicable

ROAD WHEEL

PFP:40300

Inspection

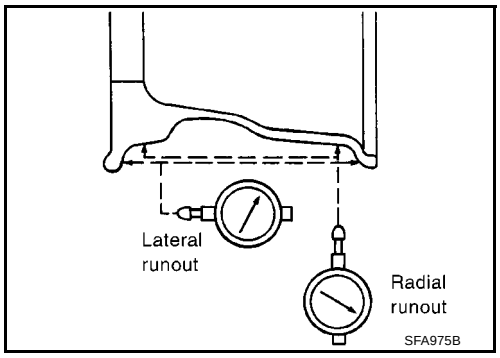
EES000ZF

ALUMINUM WHEEL

1. Check tyres for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

a. Remove tyre from aluminum wheel and mount on a tyre balance machine.

b. Set dial indicator as shown in the illustration.



Wheel runout (Dial indicator value):

Refer to WT-8, "SERVICE DATA"

STEEL WHEEL

1. Check tyres for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.

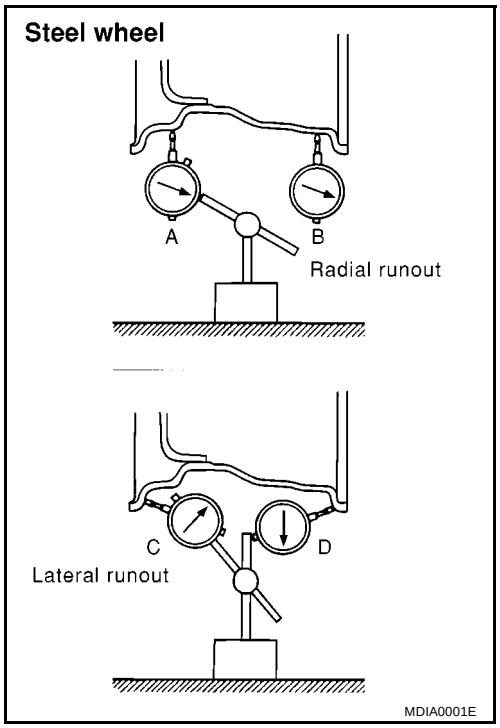
a. Remove tyre from steel wheel and mount wheel on a tyre balance machine.

b. Set two dial indicators as shown in the illustration.

c. Set each dial indicator to 0.

d. Rotate wheel and check dial indicators at several points around the circumference of the wheel.

e. Calculate runout at each point as shown below.



Radial runout = (A + B)/2 : 0.5 mm (0.020 in)

Lateral runout = (C + D)/2 : 0.8 mm (0.031 in)

f. Select maximum positive runout value and the maximum negative value.
Add the two values to determine total runout.
In case a positive or negative value is not available, use the maximum value (negative or positive) for total runout.
If the total runout value exceeds the limit, replace steel wheel.

Wheel runout:

Refer to WT-8, "SERVICE DATA"

ROAD WHEEL AND TYRE ASSEMBLY

PFP:40312

Balancing Wheels (Bonding Weight Type)

EES000ZG

REMOVAL

1. Remove inner and outer balance weights from the road wheel.

CAUTION:

Be careful not to scratch the road wheel during removal procedures.

2. Using releasing agent, remove double-faced adhesive tape from the road wheel.

CAUTION:

Be careful not to scratch the road wheel during removal.

- After removing double-faced adhesive tape, wipe clean traces of releasing agent from the road wheel.

WHEEL BALANCE ADJUSTMENT

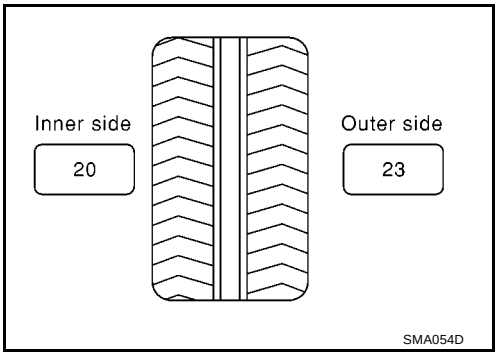
- If a tyre balance machine has adhesion balance weight mode settings and drive-in weight mode setting, select and adjust a drive-in weight mode suitable for road wheels.

1. Set road wheel on wheel balancer using the center hole as a guide. Start the tyre balance machine.
2. When inner and outer unbalance values are shown on the wheel balancer indicator, multiply outer unbalance value by 5/3 to determine balance weight that should be used. Select the outer balance weight with a value closest to the calculated value above and install it to the designated outer position of, or at the designated angle in relation to the road wheel.

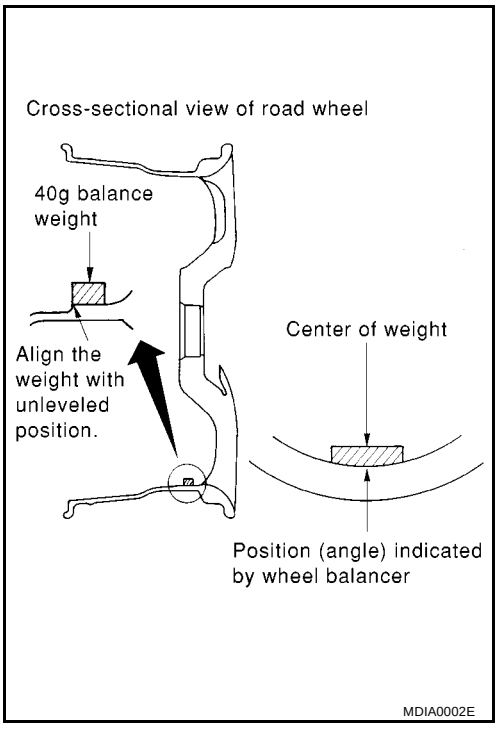
CAUTION:

- **Do not install the inner balance weight before installing the outer balance weight.**
- **Before installing the balance weight, be sure to clean the mating surface of the road wheel.**

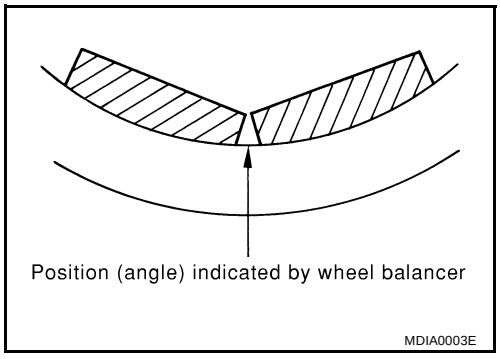
Indicated unbalance value × 5/3 = balance weight to be installed
Calculation example:
23 g (0.81 oz) × 5/3 = 38.33 g (1.35 oz) = 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
Note that balance weight value must be closer to the calculated balance weight value.
Example:
37.4 = 35 g (1.23 oz)
37.5 = 40 g (1.41 oz)



- Attach weight as shown in figure.
- When attaching weight to road wheel, align it with step on rear surface of wheel, as shown in figure. Attach so that center of weight and position (angle) of wheel balancer indicator are aligned.
- Do not attach more than 2 adhesive weights.



- If calculated value exceeds 50 g (1.76 oz), attach two weights side by side, as shown in figure.



CAUTION:
When attaching two weights, do not attach them one on top of the other.

3. Start the wheel balancer again.
4. As before, attach drive-in weight to inner side of road wheel, according to amount and position (angle) of imbalance indicated by wheel balancer.
5. Start wheel balancer. Check that residual imbalance amount is 10 g (0.35 oz) or less for both outer and inner sides.

- If residual imbalance exceeds 10 g (0.35 oz), then repeat procedure from start.

Permissible amount of residual imbalance

Dynamic (at lug)	**: 10 g (0.35 oz) or less (one side)**
Static (at lug)	**: 20 g (0.71 oz) or less**
Maximum balance weight correction	**: 100 g (3.53 oz)**

Balancing Wheels (Drive-in Weight Type)

EES000ZH

WHEEL BALANCE ADJUSTMENT

1. Remove wheel from vehicle.
2. Set road wheel on wheel balancer and start balancer machine.

- Set with top/bottom reversed from vehicle installation position. After setting wheel on wheel balancer, make mark on top surface of wheel.
- Adjust wheel balance using a wheel balancer with straight cone attachment. Be sure cone contacts reverse side of wheel.
- If a general-purpose taper cone must be used to adjust wheel balance, place cone against reverse side of wheel and support it.
- Resin hammer must be used to drive in balance weights.

CAUTION:
Do not reuse balance weights after they are removed. Be sure to use new Nissan genuine weights designed for use with steel wheels.

Permissible amount of residual imbalance

Dynamic (at lug)	**: 10 g (0.35 oz) or less (one side)**
Static (at lug)	**: 20 g (0.71 oz) or less**
Maximum balance weight correction	**: 60 g (2.12 oz)**

3. Remove wheel from wheel balancer.
4. Install wheel to vehicle, with mark on lower side.

- Minimize imbalance by keeping same relative positions between hub-wheel contact points when installing to vehicle as when adjusting wheel balance.

CAUTION:
So as not to deform wheel, install by tightening at opposite angles, in 2 - 3 steps.

Tightening torque of wheel nut : 90 - 120 N·m (9.2 - 12.2 kg-m, 67 - 88 ft-lb)

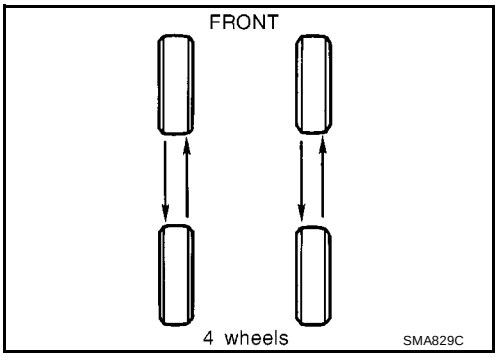
Rotation

EES000ZI

- After rotating the tyres, adjust the tyre pressure.
- Retighten the wheel nuts when the vehicle has been driven for 1,000 km (600 miles) (also in cases of a flat tyre, etc).
- Do not include the T-type spare tyre when rotating the tyres.

CAUTION:
When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.

Tightening torque of wheel nut : 90 - 120 N·m (9.2 - 12.2 kg-m, 67 - 88 ft-lb)



SERVICE DATA

PFP:00030

Road Wheel

EES000ZJ

Kind of wheel		Aluminum	Steel
Deflection limit	Lateral deflection	Less than 0.3 mm (0.012 in)	Less than 0.5 mm (0.020 in)
	Vertical deflection	Less than 0.3 mm (0.012 in)	Less than 0.8 mm (0.031 in)
Allowable quantity of residual unbalance	Dynamic (On the ear part)	Less than 10 g (0.35 oz) (per side)	
	Static (On the ear part)	Less than 20 g (0.70 oz)	

Tyre

EES000ZK

FOR CR ENGINES:

Unit: kPa (kg/cm^2 , psi)

Tyre size	Air pressure		
	Front wheel	Rear wheel	
		3D	5D
165/70R14 175/60R15	226 (2.3, 33)	206 (2.1, 30)	245 (2.5, 36)
T0105/70D14	412 (4.2, 60)		

FOR K9K ENGINES:

Unit: kPa (kg/cm^2 , psi)

Tyre size	Air pressure		
	Front wheel	Rear wheel	
		Normal condition	Full load
175/65R15	226 (2.3, 34)	206 (2.1, 31)	275 (2.8, 41)
T125/70D14	420 (4.2, 60)		

SECTION WW
WIPER, WASHER & HORN

CONTENTS

PRECAUTIONS 4
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 4
Wiper and Washer System 4
FRONT WIPER AND WASHER SYSTEM 5
Components Parts and Harness Connector Location 5
System Description 5
WIPER OPERATION 6
WASHER OPERATION 7
FAIL-SAFE FUNCTION 7
BCM WIPER SWITCH READING FUNCTION 8
CAN Communication 10
SYSTEM DESCRIPTION 10
CAN Communication Unit 10
TYPE 1/TYPE 2 11
TYPE 3/TYPE 4 14
TYPE 5/TYPE 6 16
TYPE 7/TYPE 8 19
TYPE 9/TYPE 10 21
Schematic 24
Wiring Diagram — WIPER — 25
Terminals and Reference Values for BCM 28
Terminals and Reference Values for IPDM E/R 29
How to Proceed With Trouble Diagnosis 29
Preliminary Inspection 29
CHECK POWER SUPPLY AND GROUND CIRCUIT 29
CONSULT-II Function (BCM) 31
CONSULT-II BASIC OPERATION 31
WORK SUPPORT 32
DATA MONITOR 32
ACTIVE TEST 33
CONSULT-II Function (IPDM E/R) 33
CONSULT-II BASIC OPERATION 33
DATA MONITOR 34
ACTIVE TEST 35
Front Wiper Does Not Operate 35
Front Wiper Does Not Return to Stop Position 37
Front Wiper Low Speed Operation Does Not Operate 38
Front Wiper High Speed Operation Does Not Operate 39
Front Wiper INT Does Not Operate 40
Front Wiper Interval Time Is Not Controlled by Vehicle Speed 40
After Front Wipers Operate for 10 Seconds, They Stop for 20 Seconds 41
Front Wipers Do Not Stop 42
Removal and Installation of Front Wiper Arm 42
REMOVAL 42
INSTALLATION 42
Adjustment of Front Wiper Arm Stop Position 42
Removal and Installation of Front Wiper Motor and Link 43
REMOVAL 43
INSTALLATION 43
Adjustment of Spray Positions of Front Washer Nozzle 44
Washer Hose Routing 45
Removal and Installation of Front Washer Nozzle 45
REMOVAL 45
CHECK VALVE INSPECTION 45
INSTALLATION 45
Inspection of Front Wiper and Washer Switch Circuit 46
Removal and Installation of Front Wiper and Washer Switch 46
Removal and Installation of Front Wiper and Washer Tank 46
REMOVAL 46
INSTALLATION 46
Removal and Installation of Front Wiper and Washer Pump 46
REMOVAL 46
INSTALLATION 47
FRONT WIPER AND WASHER SYSTEM (WITH RAIN SENSOR) 48
Components Parts and Harness Connector Location 48

System Description 48
WIPER OPERATION 49
WASHER OPERATION 50
FAIL-SAFE FUNCTION 50
BCM WIPER SWITCH READING FUNCTION ... 51
CAN Communication 53
SYSTEM DESCRIPTION 53
CAN Communication Unit 53
TYPE 1/TYPE 2 54
TYPE 3/TYPE 4 57
TYPE 5/TYPE 6 59
TYPE 7/TYPE 8 62
TYPE 9/TYPE 10 64
Schematic 67
Wiring Diagram — A/WIP — 68
Terminals and Reference Values for BCM 71
Terminals and Reference Values for IPDM E/R 72
How to Proceed With Trouble Diagnosis 72
Preliminary Inspection 72
CHECK POWER SUPPLY AND GROUND CIRCUIT 72
CONSULT-II Function (BCM) 73
CONSULT-II Function (IPDM E/R) 74
Front Wiper Does Not Operate 74
Front Wiper Does Not Return to Stop Position 74
Front Wiper Low Speed Operation Does Not Operate. 74
Front Wiper High Speed Operation Does Not Operate 74
Front Wiper INT Does Not Operate 74
Auto Wiper Does Not Operate Properly 74
After Front Wipers Operate for 10 Seconds, They Stop for 20 Seconds 76
Front Wipers Do Not Stop 76
Removal and Installation of Front Wiper Arm 76
REMOVAL 76
INSTALLATION 76
Adjustment of Front Wiper Arm Stop Position 76
Removal and Installation of Front Wiper Motor and Link 77
REMOVAL 77
INSTALLATION 77
Adjustment of Spray Positions of Front Washer Nozzle 78
Washer Hose Routing 79
Removal and Installation of Front Washer Nozzle... 79
REMOVAL 79
CHECK VALVE INSPECTION 79
INSTALLATION 79
Inspection of Front Wiper and Washer Switch Circuit.. 80
Removal and Installation of Front Wiper and Washer Switch 80
Removal and Installation of Front Wiper and Washer Tank 80
REMOVAL 80
INSTALLATION 80
Removal and Installation of Front Wiper and Washer Pump 80
REMOVAL 80
INSTALLATION 81
Removal and Installation of Rain Sensor 81
REMOVAL 81
INSTALLATION 81
REAR WIPER AND WASHER SYSTEM 82
Components Parts and Harness Connector Location 82
System Description 82
WIPER OPERATION 82
INTERMITTENT OPERATION 83
WASHER OPERATION 83
BCM WIPER SWITCH READING FUNCTION ... 83
CAN Communication 85
SYSTEM DESCRIPTION 85
CAN Communication Unit 85
TYPE 1/TYPE 2 87
TYPE 3/TYPE 4 90
TYPE 5/TYPE 6 92
TYPE 7/TYPE 8 95
TYPE 9/TYPE 10 97
Wiring Diagram — WIP/R — 100
Terminals and Reference Values for BCM 102
How to Proceed With Trouble Diagnosis 102
Preliminary Check 103
CHECK POWER SUPPLY AND GROUND CIRCUIT 103
CONSULT-II Function (BCM) 103
Rear Wiper Does Not Operate 104
Rear Wiper Stop Position Is Not Restored 105
Only Rear Wiper INT Does Not Operate 106
Removal and Installation of Rear Wiper Arm 106
REMOVAL 106
INSTALLATION 106
Adjusting Rear Wiper Arm Stop Position 107
Removal and Installation of Rear Wiper Motor 107
REMOVAL 107
INSTALLATION 107
Rear Wiper Blade 108
REMOVAL AND INSTALLATION 108
Adjusting Rear Washer Nozzle Spray Position 108
Rear Washer Hose Circuit 108
Removal and Installation of Rear Washer Nozzle. 108
REMOVAL 108
CHECK VALVE INSPECTION 109
INSTALLATION 109
Rear Wiper and Washer Switch Circuit Inspection. 109
Removal and Installation of Rear Wiper and Washer Switch 109
Removal and Installation of Rear Wiper and Washer Tank 109
Removal and Installation of Rear Wiper and Washer Pump 109
HEADLAMP WASHER 110
System Description 110
HEADLAMP WASHER OPERATION 110
Wiring Diagram —HLC— 111
CONSULT-II Function (BCM) 113
CONSULT-II Function (IPDM E/R) 113
Removal and Installation for Washer Nozzle 113

REMOVAL 113
INSTALLATION 113
Removal and Installation for Washer Tank 113
Removal and Installation for Washer Pump 113
Washer Tube Layout 113
HORN 114
Wiring Diagram —HORN— 114
Removal and Installation 115
REMOVAL 115
INSTALLATION 115
POWER SOCKET 116
Wiring Diagram —CIGAR— 116
Removal and Installation 117
REMOVAL 117
INSTALLATION 117

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EKS00860

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

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

Wiper and Washer System

EKS007AW

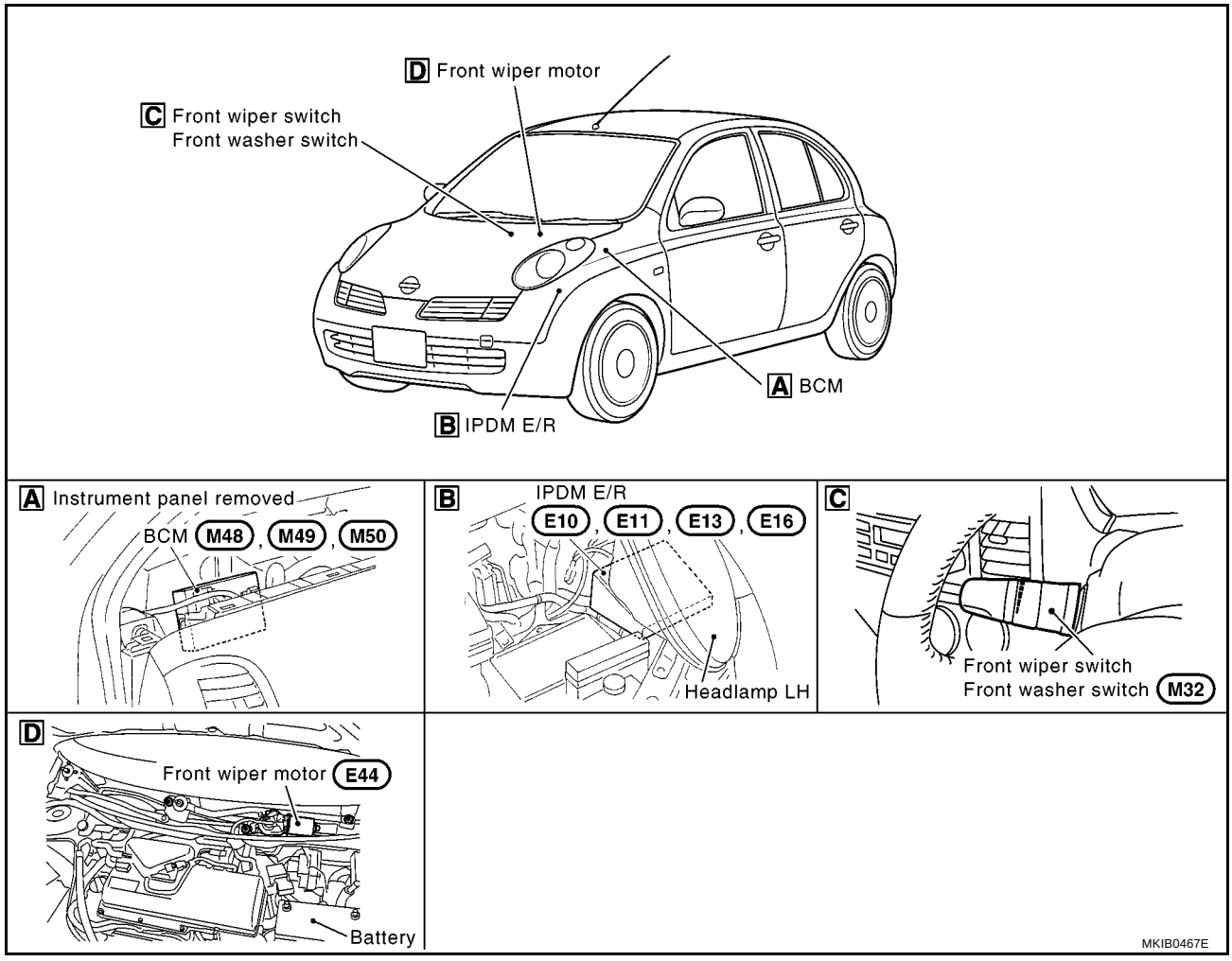
- If snow or other obstacle stops wipers from moving while front wipers are operating, wipers will stop moving to protect motor. In this case, turn the switch OFF and remove obstacle. Wait at least 20 seconds before turning the switch ON again to start front wipers.
- If rear wiper operation is stopped 5 seconds or more due to snow or other reason, the BCM stops rear wiper operation to protect motor. At this time, after removing cause of stoppage, turn rear wiper switch to OFF, wait at least 1 min, then turn wiper switch to ON or INT to restart wiper.
- The hood may be scratched if opened while front wipers are locked back.
- If there is unevenness or peeling of windshield glass wax, other oil films, or glass coating, wipers may not wipe correctly (juddering or other non-standard conditions may occur).
- Washer pump may malfunction if operated continuously for 1 minute or longer.

FRONT WIPER AND WASHER SYSTEM

PFP:28810

Components Parts and Harness Connector Location

EKS00861



System Description

EKS00862

- Front wiper HI/LO relay and front wiper main relay are built into IPDM E/R.
- Wiper switch (combination switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM when switch is turned ON.
- BCM controls front wiper LO, HI, and INT (intermittent) operation.
- IPDM E/R operates wiper motor according to CAN communication signals from BCM.

Power is supplied at all times

- through 20A fuse (NO.38, located in the IPDM E/R)
- to front wiper main relay.
- through 20A fuse (NO.52, located in the IPDM E/R)
- to IPDM E/R (CPU).
- through 40A fusible link (letter J, located in fuse and fusible link box)
- to BCM terminals 74 and 79.

When ignition switch ON or START position, power is supplied

- through 10A fuse [NO.4, located in fuse block (J/B)]
- to BCM terminal 24,
- through 15A fuse [NO.1, located in fuse block (J/B)]
- to combination switch terminal 11, and
- to front wiper HI/LO relay, front wiper main relay and IPDM E/R (CPU)

Ground is supplied

- through body grounds E25 (CR engine models), E26 and E40
- to front wiper motor terminal 1 and,
- to IPDM E/R terminals 3 and 54, and
- through body grounds M19 and M20
- to combination switch terminal 12 and
- to BCM terminals 2 and 70

WIPER OPERATION

Low Speed Wiper Operation

When front wiper switch is placed in LO position, BCM read combination switch condition (Refer to WW-8, "BCM WIPER SWITCH READING FUNCTION"). And BCM sent front wiper request signal (LO) to IPDM E/R with CAN communication line. When IPDM E/R receives front wiper request signal (LO), it turns ON front wiper main relay (built into IPDM E/R).
Power is supplied

- to front wiper motor terminal 3,
- through front wiper main relay and front wiper HI/LO relay and
- through IPDM E/R terminal 23.

Ground is supplied

- to front wiper motor terminal 1,
- through body grounds E25 (CR engine models), E26 and E40.

With power and ground are supplied, the front wiper motor operates at low speed.

High Speed Wiper Operation

When front wiper switch is placed in HI position, BCM read combination switch condition (Refer toWW-8, "BCM WIPER SWITCH READING FUNCTION").And BCM sent front wiper request signal (HI) to IPDM E/R with CAN communication line.When IPDM E/R receives front wiper request signal (HI), it turns ON front wiper HI/LO relay and front wiper main relay (built into IPDM E/R).
Power is supplied

- to front wiper motor terminal 2,
- through front wiper main relay and front wiper HI/LO relay and,
- through IPDM E/R terminal 24.

Ground is supplied

- to front wiper motor terminal 1
- through body grounds E25, E26 and E40.

With power and ground are supplied, the front wiper motor operates at high speed.

Intermittent Operation

When front wiper switch is placed in INT position, BCM read combination switch condition (refer to WW-8, "BCM WIPER SWITCH READING FUNCTION") and it operates as follows.

- BCM reads combination switch condition of V/INT 1, 2 and 3, it determines INT volume.(Refer to WW-8, "BCM WIPER SWITCH READING FUNCTION")
- BCM receives vehicle speed signal from combination meter with CAN communication line.
- BCM calculates intermittent interval from INT volume and vehicle speed signal.
- BCM sends front wiper request signal to IPDM E/R for every intermittent interval via CAN communication line.

Power is supplied

- to front wiper motor terminal 3,
- through front wiper main relay and front wiper HI/LO relay and
- through IPDM E/R terminal 23.

Ground is supplied

- to front wiper motor terminal 1,
- through body grounds E25 (CR engine models), E26 and E40.

With power and ground are supplied, the front wiper motor operates.

Auto Stop Operation

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach stop position.
When wiper arms are not located at stop position with wiper switch OFF, power is supplied

- from terminal 23 of the IPDM E/R
- to front wiper motor terminal 3, in order to continue wiper motor operation at low speed.

Ground is supplied

- to front wiper motor terminal 1
- through body grounds E25 (CR engine models), E26 and E40.

When wiper arms reach stop position, front wiper motor terminals 1 and 4 are connected.
Then the IPDM E/R sends auto stop operation signal to BCM with CAN communication line.
When BCM receives auto-stop operation signal, BCM sends wiper stop signal to IPDM E/R with CAN communication line.
IPDM E/R stops wiper motor. Wiper motor will then stop wiper arms at the STOP position.

Mist Operation

When the wiper switch is placed in the mist position, wiper operate ones. The wiper operation is the same as the front wiper low speed operation. If the switch is held in the mist position, front wiper low speed operation continues.

WASHER OPERATION

When front wiper switch is pulled to washer position, power is supplied

- through combination switch terminal 13
- to washer motor terminal 1.

Ground is supplied

- to washer motor terminal 2
- through combination switch terminals 12 and 14, and
- through body grounds M19 and M20.

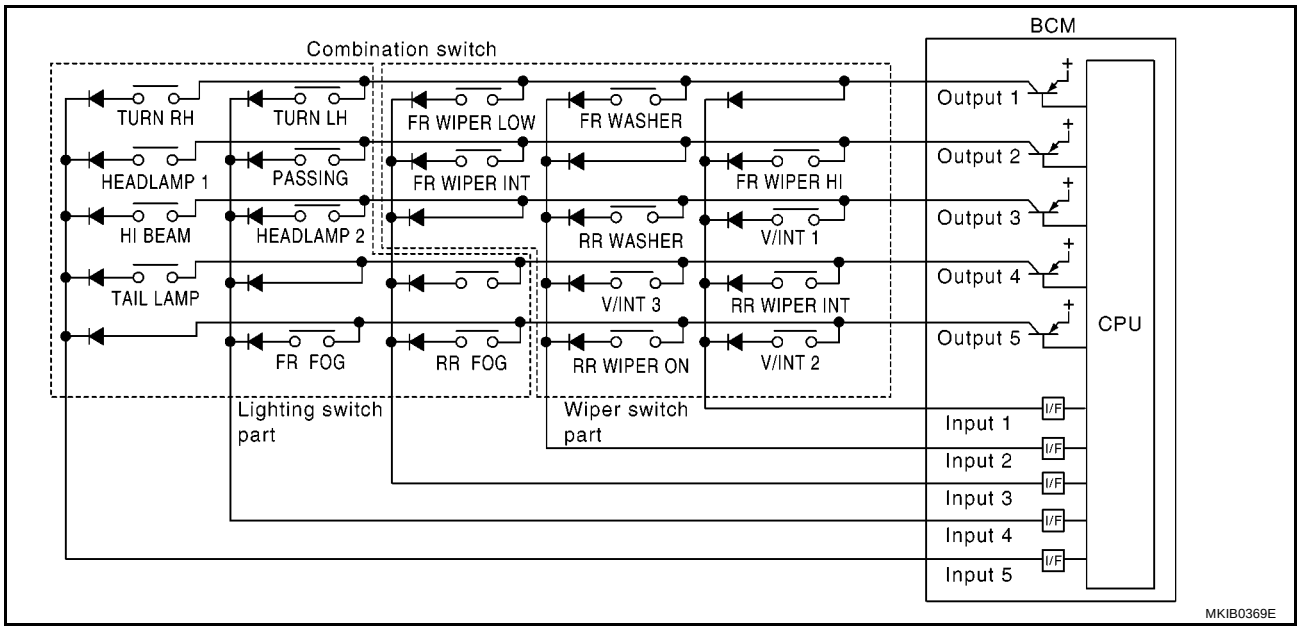
With power and ground supplied, the washer motor operates, and at the same time,
When the wiper switch is pulled to the WASH position for 1 second or more. BCM sends front wiper request signal (low) to IPDM E/R with CAN communication line. And the front wiper motor operates at low speed for approximately 3 times to clean wind shield

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, front wiper low speed operates when the ignition switch is turned from OFF to ON or ACC and front wiper are stopped when the ignition switch is turn from ON or ACC to OFF. If the fail-safe system is operating, front wiper does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control. (Refer to PG-19, "FAIL-SAFE FUNCTION"
)

BCM WIPER SWITCH READING FUNCTION

BCM reads combination switch (wiper switch) status, and controls front wipers based on the results.
BCM is a combination of 5 output terminals (output 1 - 5) and 5 input terminals (input 1 - 5). It reads 20 types of switch data and 5 types of diagnosis data.



Operation Description

- BCM operates output terminal (output 1 to 5) transistor at a set period and turns ON the current in order.
- When any (or multiple) switches are turned ON, a circuit is formed between the output terminals (output 1 to 5) and input terminals (input 1 to 5).
- At this time, when output terminals (output 1 to 5) operate transistors and carry current. If voltage of corresponding input terminal (input 1 to 5) changes, interface in BCM detects this state and judges that switch is ON.

Table Of BCM - Combination Switch Operations

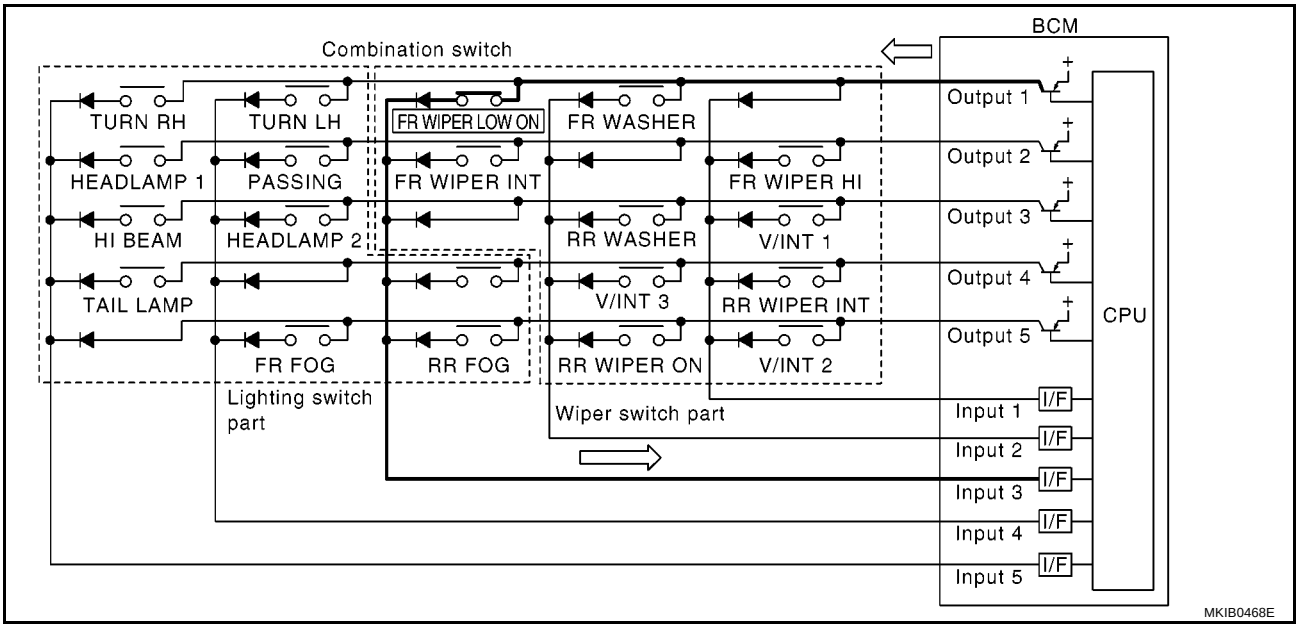
BCM reads operation status of combination switch using combinations shown in table below.

	Combination SW INPUT 1		Combination SW INPUT 2		Combination SW INPUT 3		Combination SW INPUT 4		Combination SW INPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Combination SW OUTPUT 1	—	—	FR WIPER HI ON	FR WIPER HI OFF	V/INT 1 ON	V/INT 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	V/INT 2 ON	V/INT 2 OFF
Combination SW OUTPUT 2	FR WASHER ON	FR WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	V/INT 3 ON	V/INT 3 OFF	RR WIPER ON	RR WIPER OFF
Combination SW OUTPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	—	—	RR FOG ON	RR FOG OFF
Combination SW OUTPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEADLAMP 2 ON	HEADLAMP 2 OFF	—	—	FR FOG ON	FR FOG OFF
Combination SW OUTPUT 5	TURN RH ON	TURN RH OFF	HEADLAMP 1 ON	HEADLAMP 1 OFF	HI BEAM ON	HI BEAM OFF	TAIL LAMP ON	TAIL LAMP OFF	—	—

MKIB0370E

Example: (Wiper Switch Placed In LO Position)

- If front wiper switch is placed in LO position, the contact of front wiper LO in combination switch is turned ON. At this time, when output 1 transistor operates, driver control unit detects that voltage has been changed at input 3.
- When output 1 transistor is ON and BCM detects current changes at input 3, BCM determines that wiper switch is at LO. BCM uses CAN communication and sends front wiper signals to IPDM E/R.
- When output 1 transistor operates again and BCM detects voltage change at input 3, BCM recognizes that front wiper LO operation is continuing.



NOTE:
Each output terminal transistor operates at 20 ms intervals. Therefore, after a switch is turned ON, the electrical loads are activate with a time delay, However, this delay is too small to be detected.

Intermittent Operation

Wiper intermittent operation delay interval is determined from a combination of 3 switches (V/INT 1, V/INT 2, and V/INT 3) and vehicle speed signal.
During each intermittent operation delay interval, BCM sends front wiper request signal to IPDM E/R.

Wiper Volume Position Setting

Wiper dial position	Intermittent interval	Combination switch		
		V/INT 1	V/INT 2	V/INT 3
Wiper volume position 1	Small	ON	ON	ON
Wiper volume position 2		ON	ON	OFF
Wiper volume position 3		ON	OFF	OFF
Wiper volume position 4	↓	OFF	OFF	OFF
Wiper volume position 5		OFF	OFF	ON
Wiper volume position 6		OFF	ON	ON
Wiper volume position 7	Large	OFF	ON	OFF

Example: For wiper volume position 1...
Using combination switch reading function, BCM reads ON/OFF status of V/INT 1, 2, and 3.
When combination switch status is as listed below, BCM determines that it is wiper volume position 1.

- V/INT 1: ON (input 1 and output 3 are performing.)
- V/INT 2: ON (input 1 and output 5 are performing.)
- V/INT 3: ON (input 2 and output 4 are performing.)

BCM determines front wiper intermittent interval from wiper volume 1 and vehicle speed, and sends wiper request signal (INT) to IPDM E/R for every intermittent interval via CAN communication line.

CAN Communication

EKS00K7O

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K7P

Go to CAN system, when selecting your car model from the following table.

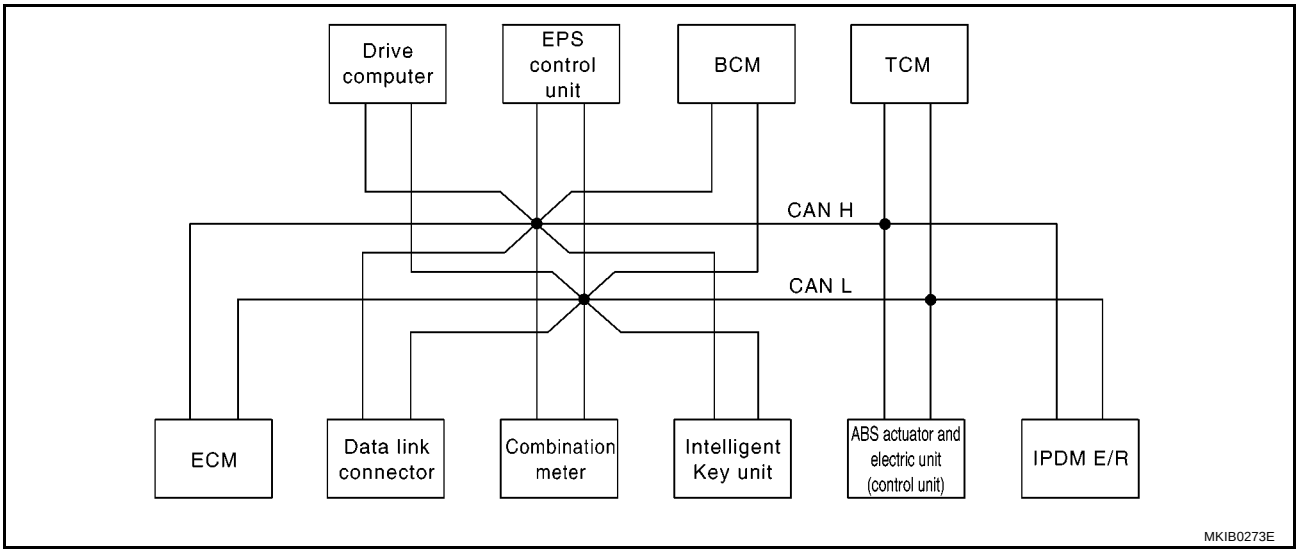
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	WW-11, "TYPE 1/TYPE 2"				WW-14, "TYPE 3/TYPE 4"				WW-16, "TYPE 5/TYPE 6"				WW-19, "TYPE 7/TYPE 8"				WW-21, "TYPE 9/TYPE 10"			

×: Applicable

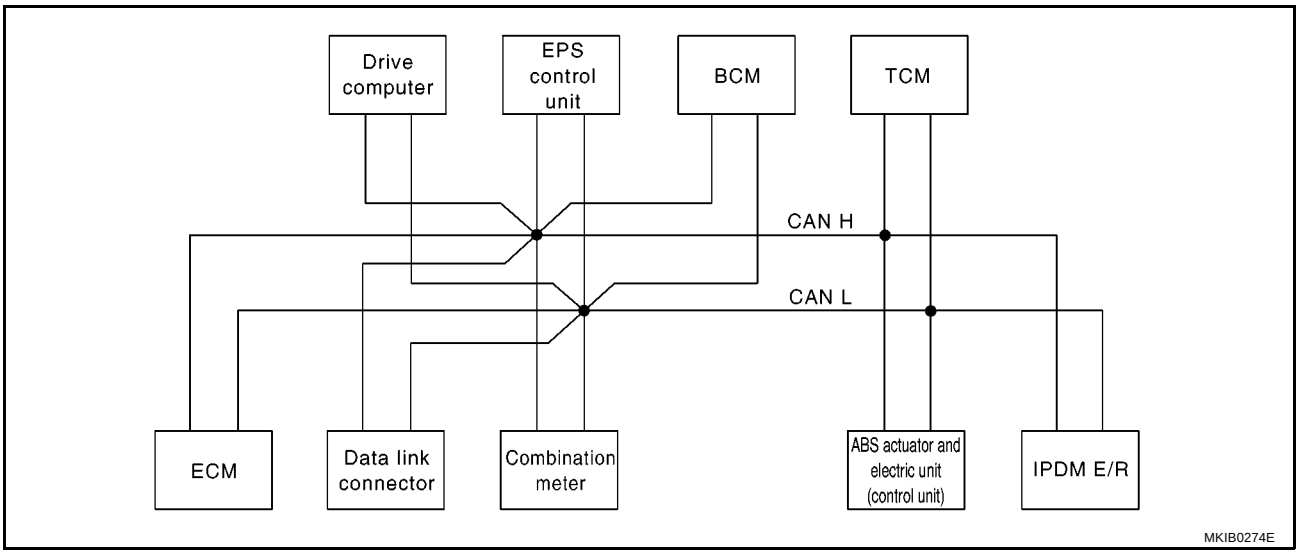
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

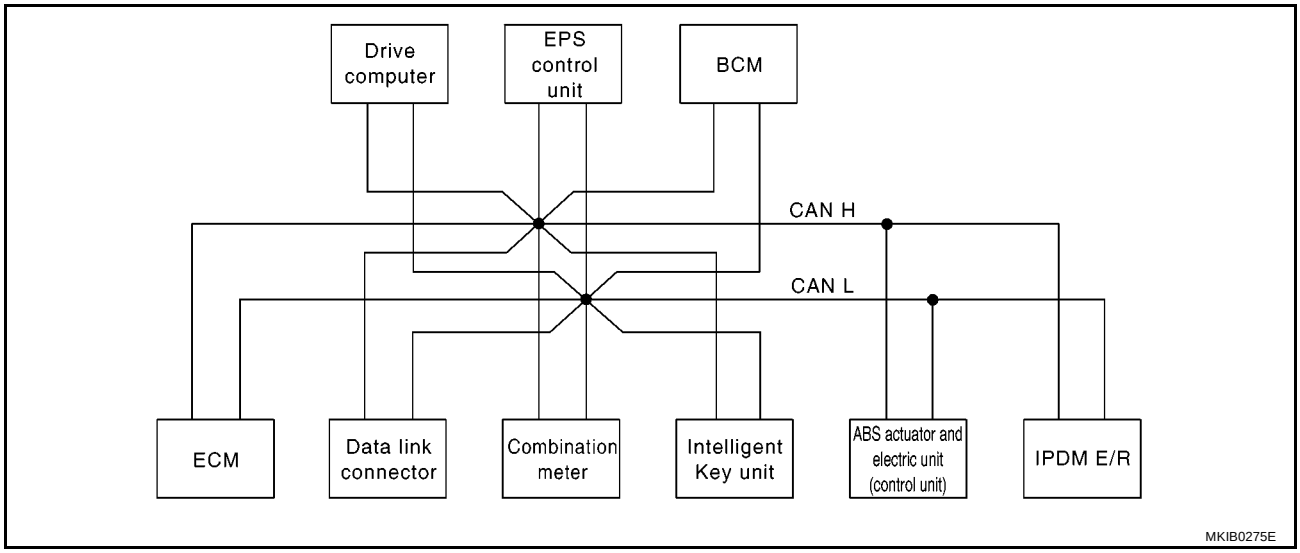
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

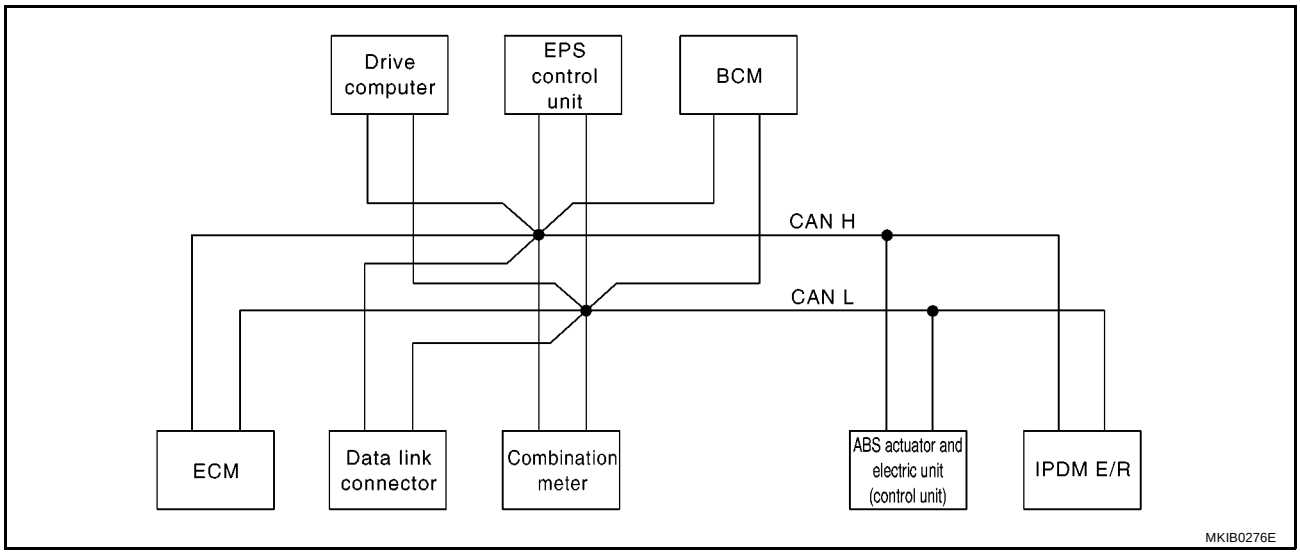
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

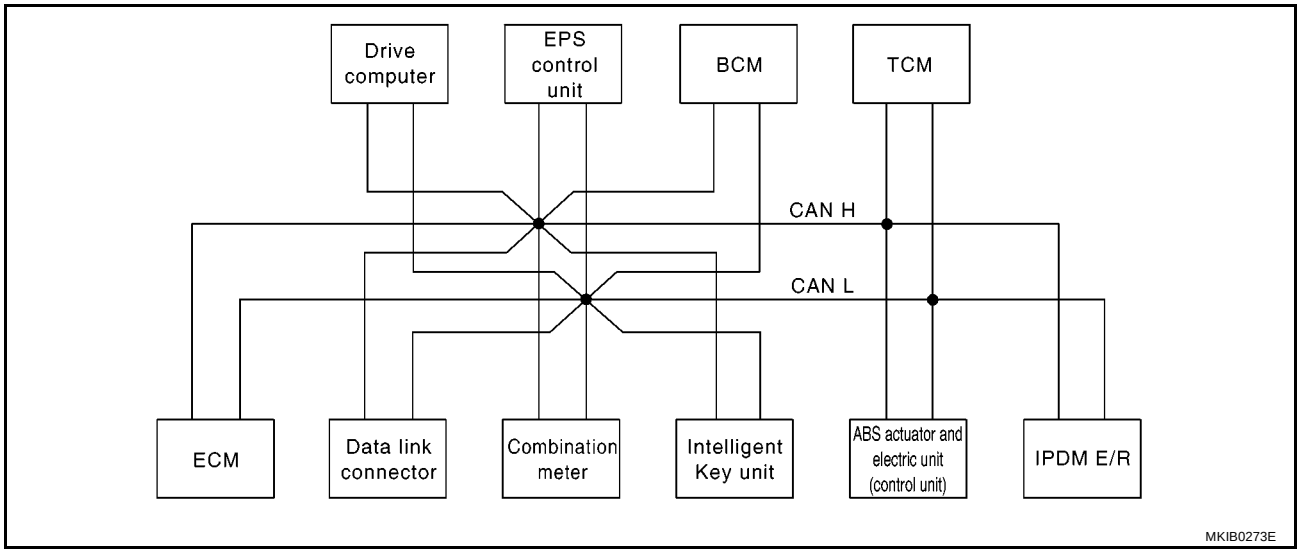
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

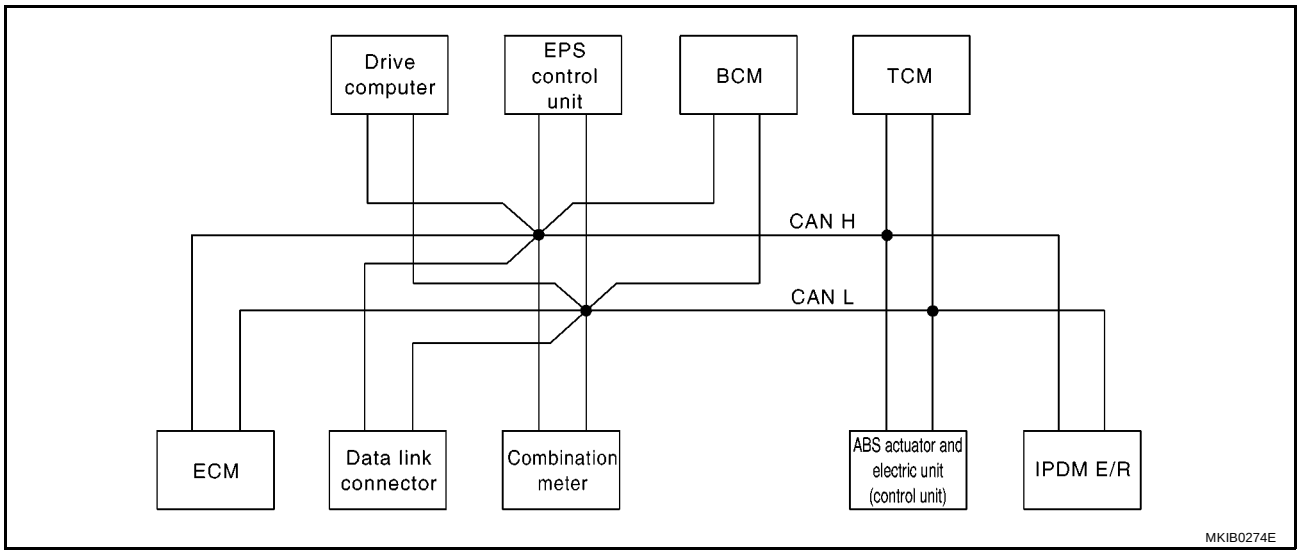
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

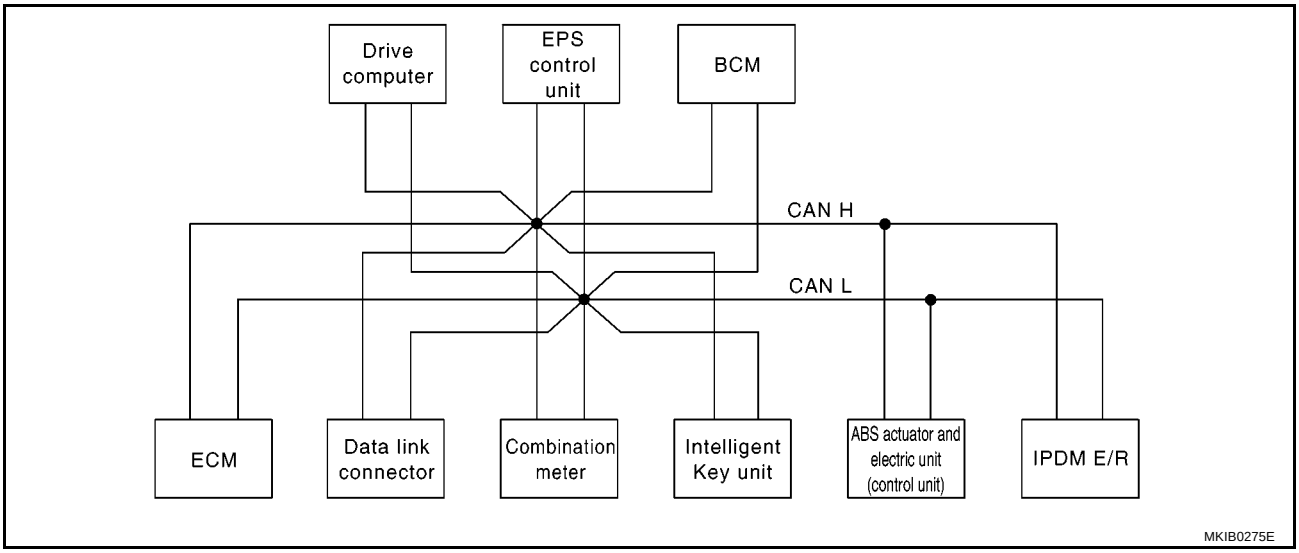
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

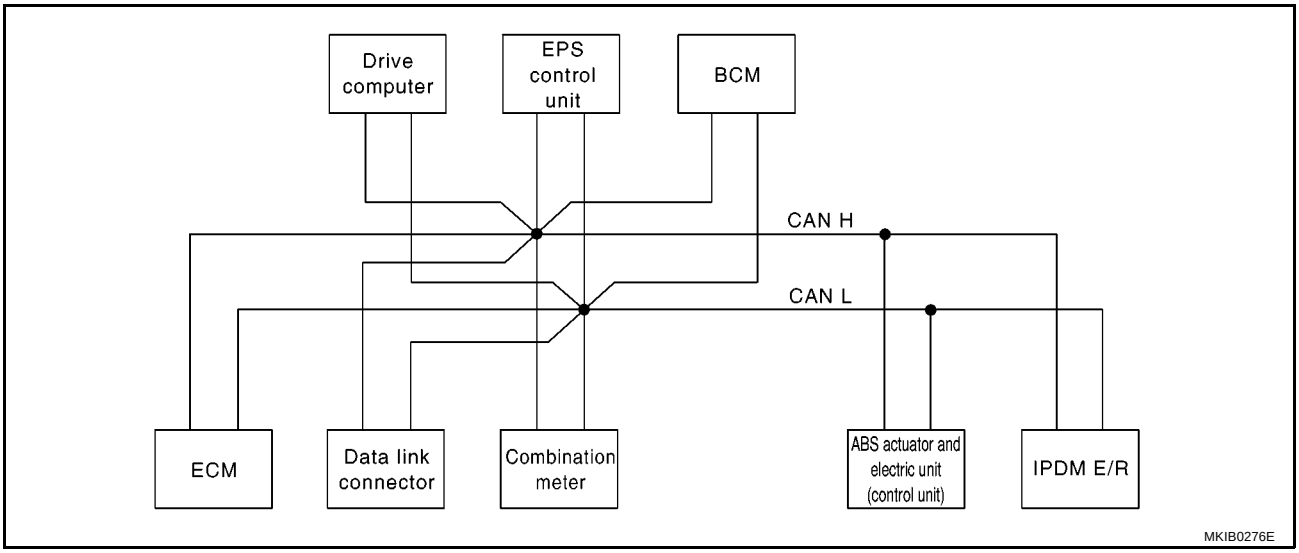
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

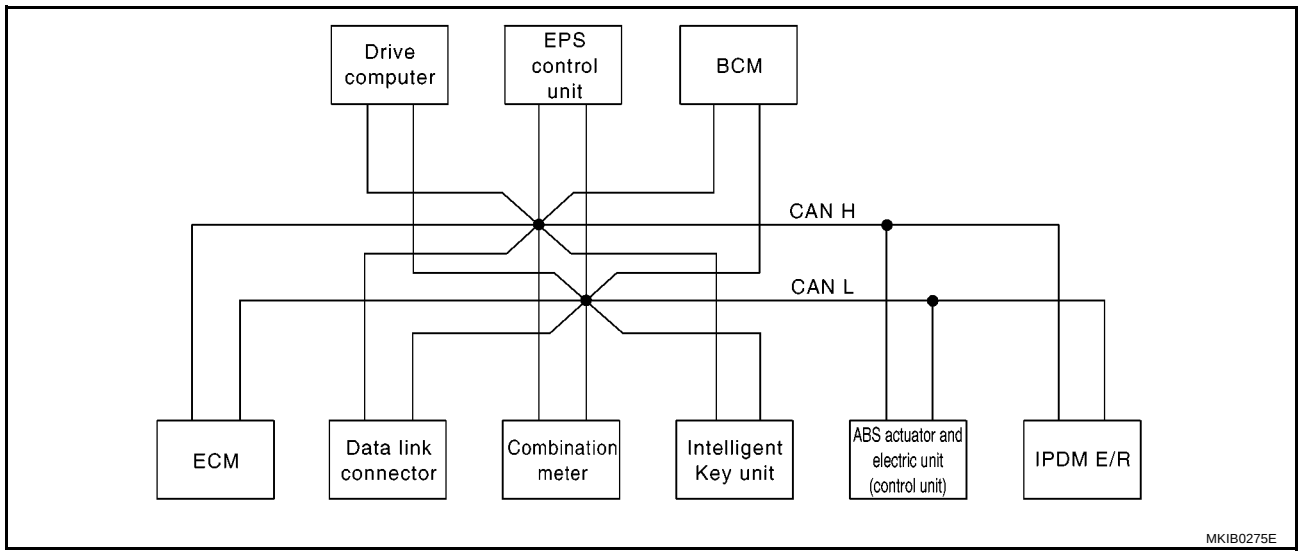
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

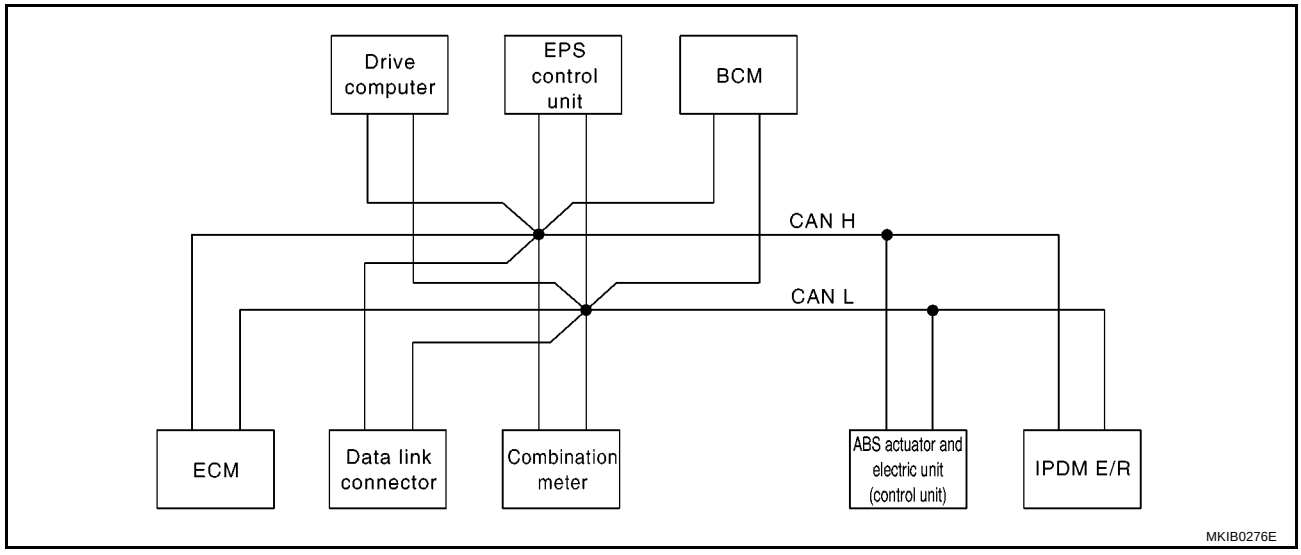
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

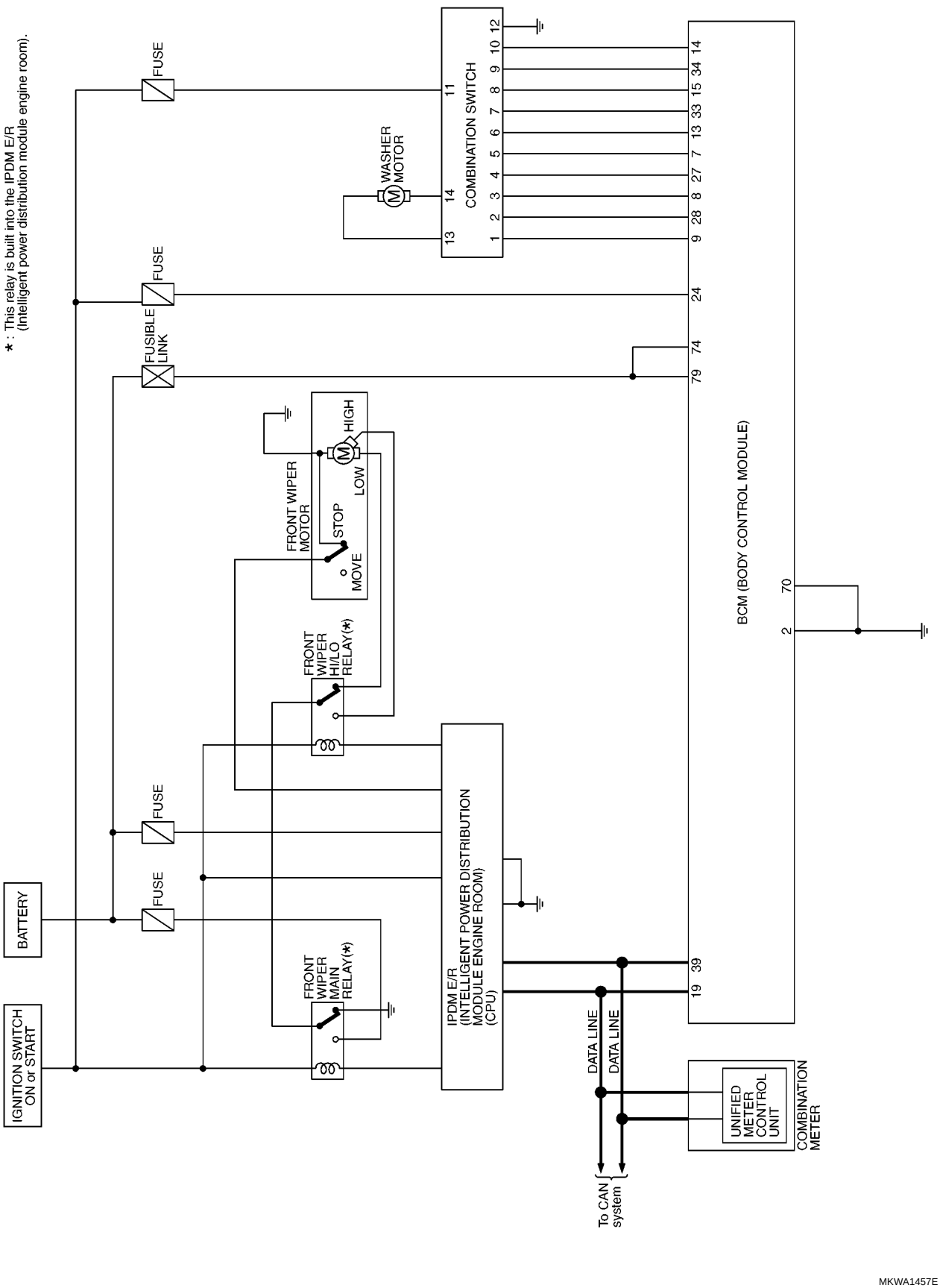
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Schematic

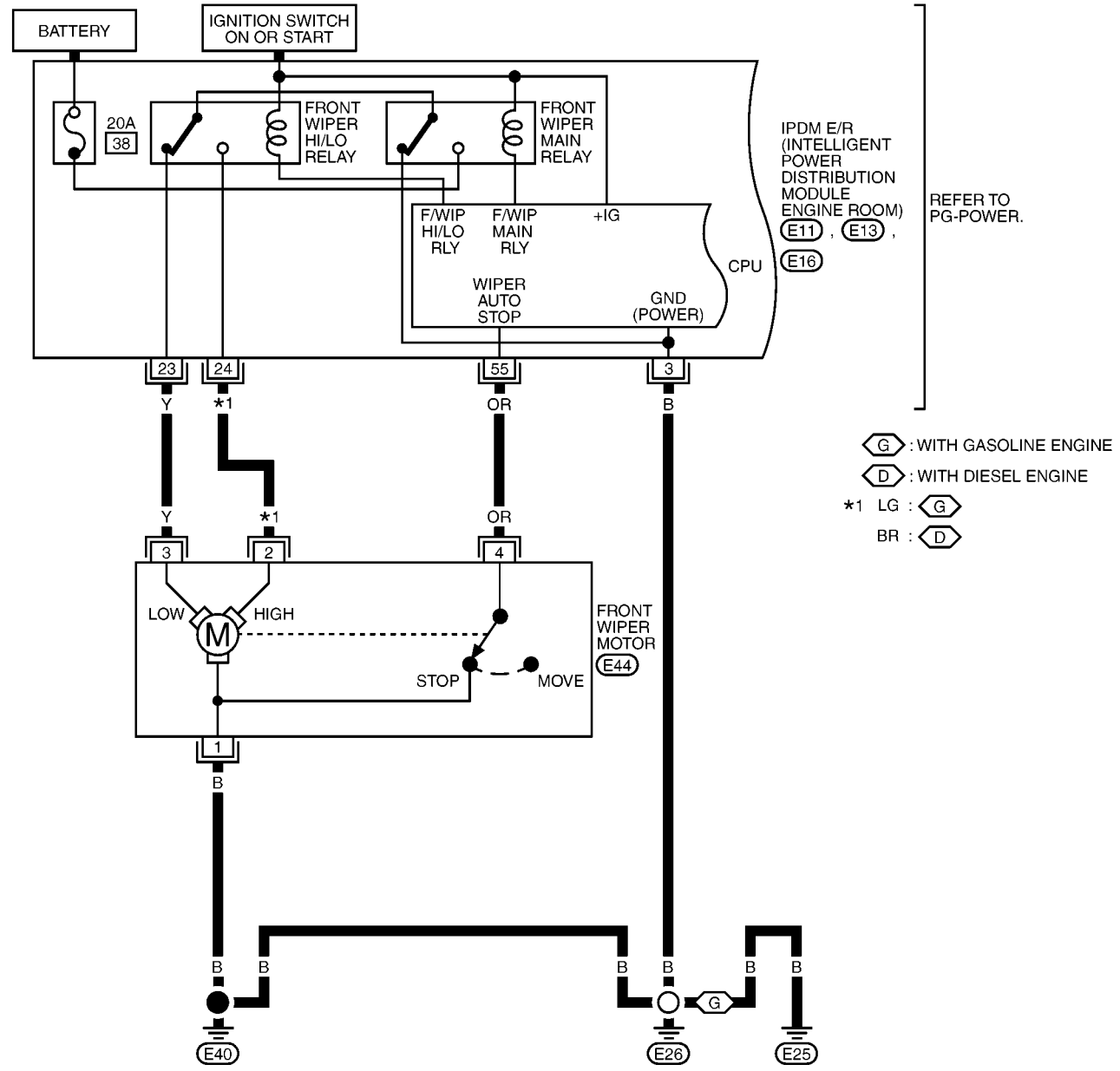
EKS00863



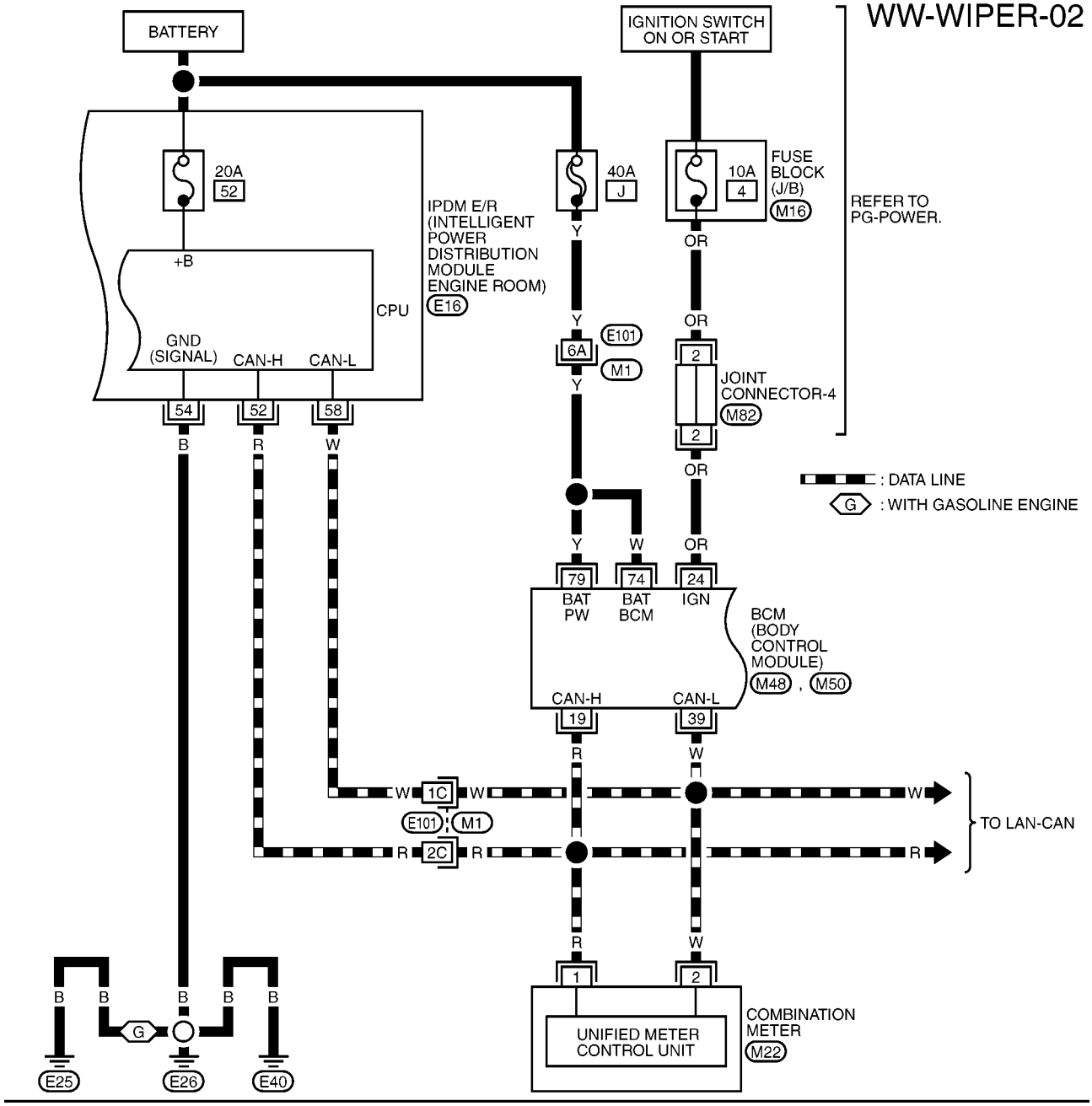
Wiring Diagram — WIPER —

EKS00864

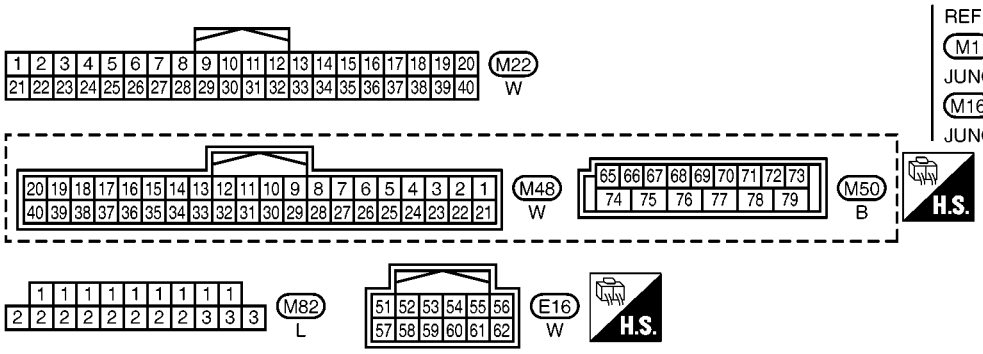
WW-WIPER-01



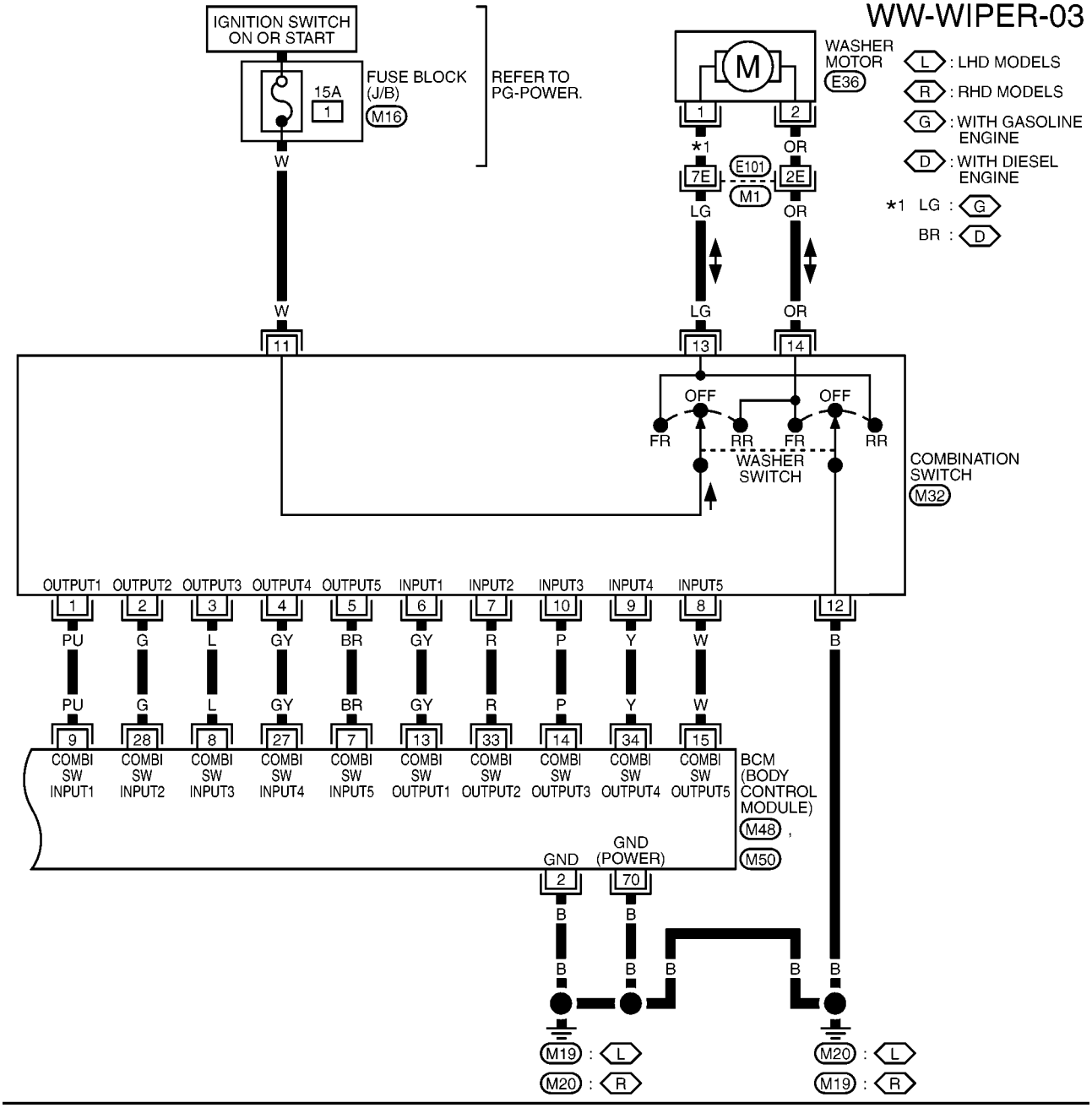
MKWA1458E

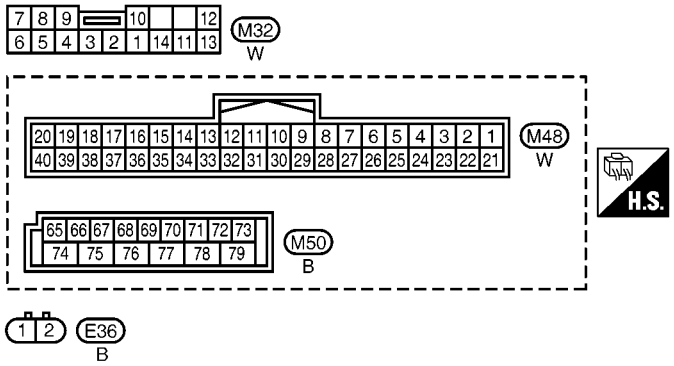


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)



MKWA1459E



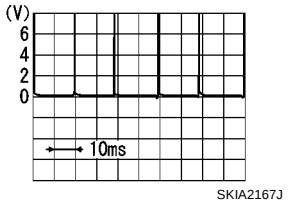
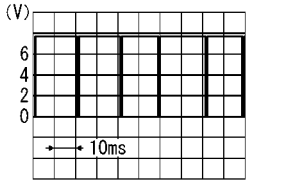
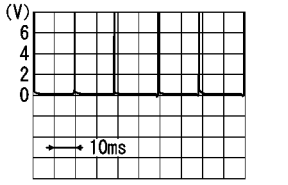


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1460E

Terminals and Reference Values for BCM

EKS00865

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	OFF	—	Approx. 12
79	Y	Battery power supply	OFF	—	Approx. 12

Terminals and Reference Values for IPDM E/R

EKS00866

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
23	Y	Low speed power source	ON	Wiper switch	OFF	Approx. 0
					LO	Battery voltage
24	*1	High speed power source	ON	Wiper switch	OFF	Approx. 0
					HI	Battery voltage
52	R	CAN H	—	—		—
54	B	Ground	—	—		Approx. 0
55	OR	Wiper auto stop signal	ON	Wiper operating		Battery voltage
				Wiper stopped		Approx. 0
58	W	CAN L	—	—		—

*1: CR engine models (LG), K9K engine models (BR)

How to Proceed With Trouble Diagnosis

EKS00867

1. Confirm the symptoms and customer complaint.
2. Understand operation description and function description. Refer to WW-5, "System Description" .
3. Carry out the Preliminary check. Refer to WW-29, "Preliminary Inspection" .
4. Confirm front wiper does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION" .
5. Check symptom and repair or replace the cause of malfunction.
6. Does the front wiper operate normally? Yes: GO TO 7. No: GO TO 5.
7. Inspection end.

Preliminary Inspection

EKS00868

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSE

- Check fuse and fusible link for blown-out.

Unit	Power source	Fuse No.
Front washer motor	Ignition ON or START	1
Front wiper main relay	Battery	38
BCM	Battery	J
	Ignition switch ON or START position	4

Refer to WW-25, "Wiring Diagram — WIPER —"

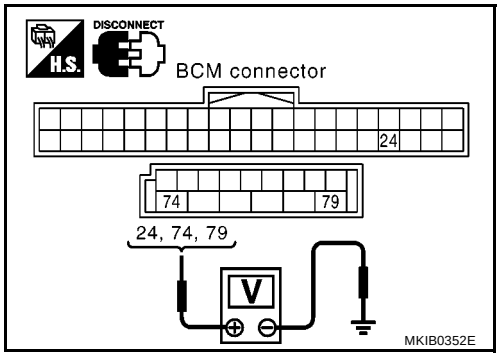
OK or NG

OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse, Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



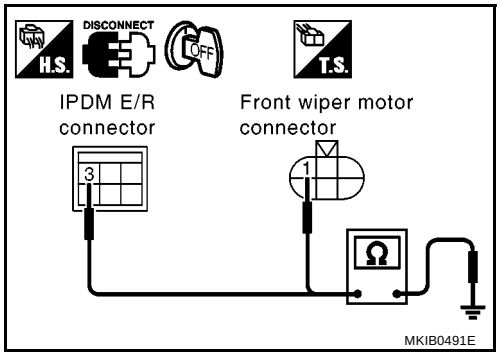
Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse.

3. CHECK GROUND CIRCUIT

1. Disconnect IPDN E/R harness connector and front wiper motor harness connector.
2. Check continuity between IPDM E/R harness connector, front wiper motor harness connector and ground.



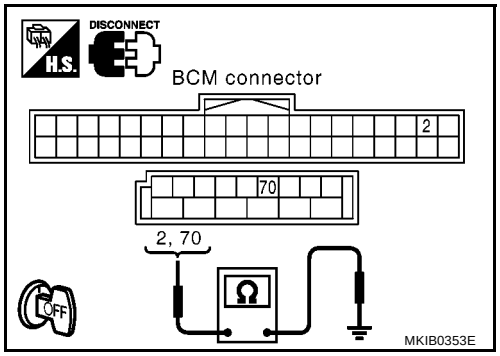
Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
E11	3 (B)	Ground	Yes
E44	1 (B)		

OK or NG

OK >> GO TO 4.
NG >> Harness for open ground circuit.

4. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.



Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70(B)	Ground	Yes

OK or NG

OK >> INSPECTION END.
NG >> Check harness ground circuit.

CONSULT-II Function (BCM)

EKS007B0

CONSULT-II can display each diagnostic item using the diagnostic modes shown following. Data is recieved and transmitted via the control module communication line.

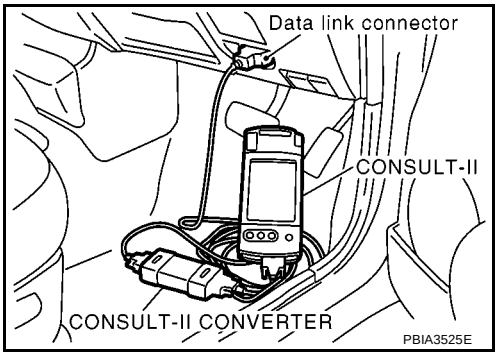
BCM trouble diagnosis item	Inspection Item, Diagnosis Mode	Description
Wiper	Data monitor	Displays BCM input data in real time.
	Active test	Device operation can be checked by applying a drive signal to device.

CONSULT-II BASIC OPERATION

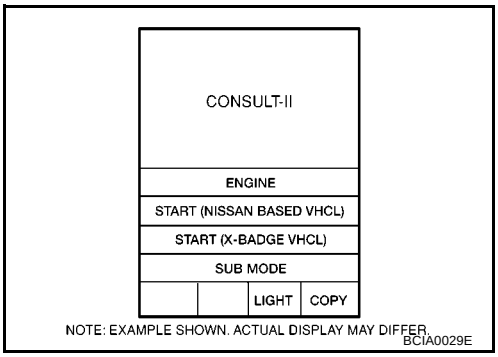
CAUTION:

If CONSULT-II is used without CONSULT-II CONVERTER connected, malfunction may be detected by self-diagnosis in control units that use CAN Communication.

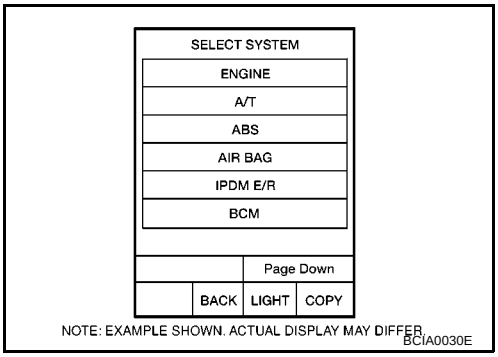
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector.
3. Turn ignition switch ON.



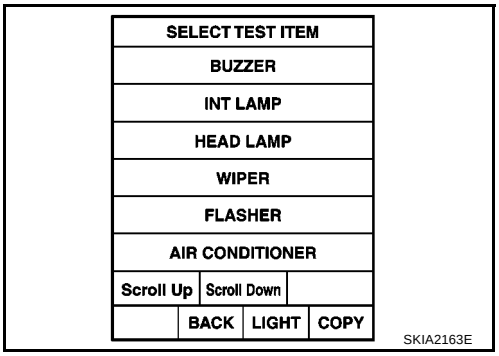
4. Touch “START (NISSAN BASED VHCL)”.



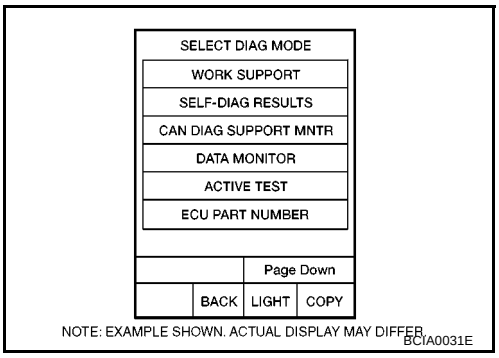
5. Touch “BCM” on the “SELECT SYSTEM” screen.
   If “BCM” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Touch “WIPER” on the “SELECT TEST ITEM” screen.



7. Touch “WORK SUPPORT”, “DATA MONITOR”, or “ACTIVE TEST” on “SELECT DIAG MODE”.



WORK SUPPORT

Supported item	Description
RR WIP RVRS	Rear wiper reverse range operation setting can be changed.

DATA MONITOR

Operation Procedure

1. Touch “WIPER” on the “SELECT TEST ITEM” screen.
2. Touch “DATA MONITOR” on “SELECT DIAG MODE” screen.
3. Touch either “ALL SIGNALS” or “SELET FROM MENU” on the “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
SELECT FROM MENU	Selects and monitors individual items.

4. Touch “START”.
5. When “SELECT FROM MENU” is selected, touched items to be monitored. If “ALL SIGNALS” is selected, all items will be monitored.
6. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

Display Item List

Monitor item “UNIT”		Contents
IGN ON SW	[ON/OFF]	Displays “ignition switch ON (ON)/Other OFF or ACC (OFF)” status as judged from ignition switch signal.
FR WIPER HI	[ON/OFF]	Displays “Front Wiper HI (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WIPER LOW	[ON/OFF]	Displays “Front Wiper LOW (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WIPER INT	[ON/OFF]	Displays “Front Wiper INT (ON)/Others (OFF)” status as judged from wiper switch signal.
FR WASHER SW	[ON/OFF]	Displays “Front Washer Switch (ON)/Others (OFF)” status as judged from wiper switch signal.
INT VOLUME	[1 - 7]	Displays intermittent operation dial position setting (1 - 7) as judged from wiper switch signal.
FR WIPER STOP	[ON/OFF]	Displays “Stopped (ON)/Operating (OFF)” status as judged from the auto-stop signal.

Monitor item “UNIT”		Contents
VEHICLE SPEED	[km/h]	Displays vehicle speed status as judged from vehicle speed signal.
H/L WASHER SW	[ON/OFF]	Displays (Headlamp washer switch: ON/Others: OFF) as judged from headlamp washer switch signal
H/L SW POS	[ON/OFF]	Displays (Headlamp switch: ON/Others: OFF) as judged from lighting switch signal
RR WIPER ON	[ON/OFF]	Displays “Rear Wiper ON (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WIPER INT	[ON/OFF]	Displays “Rear Wiper INT (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WASHER SW	[ON/OFF]	Displays “Rear Washer Switch (ON)/Others (OFF)” status as judged from wiper switch signal.
RR WIPER STOP	[ON/OFF]	Displays “Rear Wiper Stop (ON)/Others (OFF)” status as judged from wiper switch signal.
REVERSE SW CAN	[ON/OFF]	Displays “Reverse position (ON)/Others (OFF)” status as judged from reverse signal.
R/WIP MTR SIG	[ON/OFF]	Displays “Rear wiper motor signal (ON)/Others (OFF)” status as judged to rear wiper motor output signal.

ACTIVE TEST

Operation Procedure

1. Touch “WIPER” on the “SELECT TEST ITEM” screen.
2. Touch “ACTIVE TEST” on the “SELECT DIAG MODE” screen.
3. Touch item to be tested, and check operation.
4. During operation check, touching “BACK” deactivates operation.

Display Item List

Test item	Indication CONSULT-II display	Description
Front wiper output	FR WIPER	Front wiper can be operated by any ON–OFF operation.
Rear wiper output	RR WIPER	Rear wiper can be operated by any ON-OFF operation.
Head lamp washer output	HEAD LAMP WASHER	Head lamp washer can be operated by any ON-OFF operation.

CONSULT-II Function (IPDM E/R)

EKS007B1

CONSULT-II can display each diagnostic item using the diagnostic modes shown following. Data is recieved and transmitted via the control module communication line.

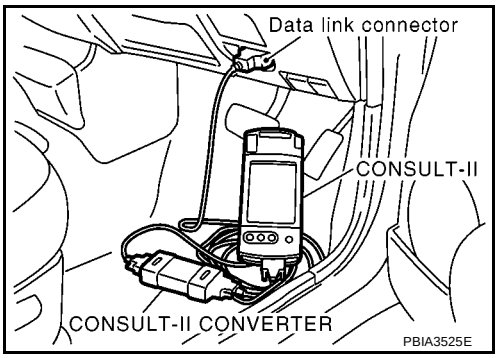
Inspection Item, Diagnosis Mode	Description
SELF-DIAG RESULTS	Refer to PG-34, "SELF-DIAG RESULTS" .
DATA MONITOR	Displays input/output data of IPDM E/R in real time.
ACTIVE TEST	IPDM E/R sends a drive signal to components for electric load operation check.

CONSULT-II BASIC OPERATION

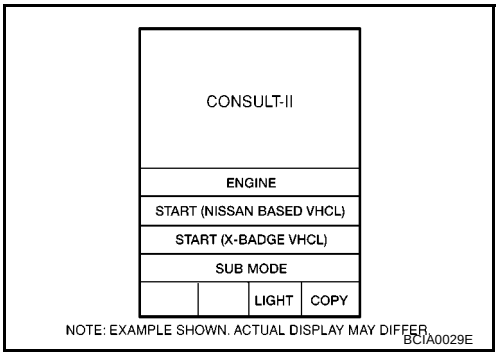
CAUTION:

If CONSULT-II is used without CONSULT-II CONVERTER connected, malfunction may be detected by self-diagnosis in control units that use CAN Communications.

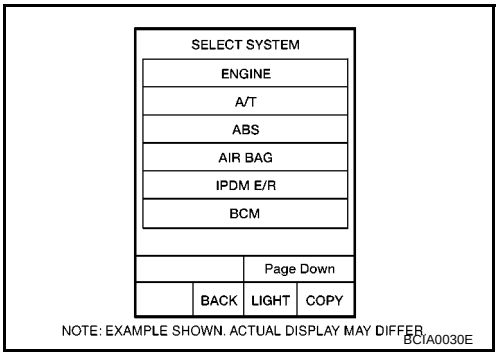
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” and “CONSULT-II CONVERTER” to data link connector.
3. Turn ignition switch ON.



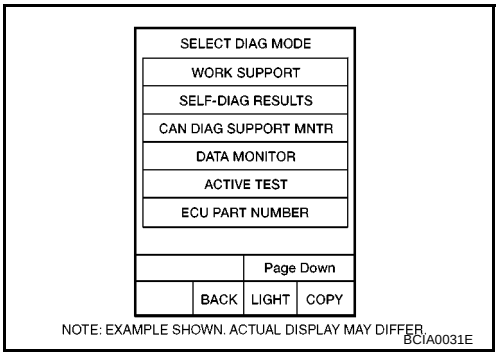
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “IPDM E/R” on “SELECT SYSTEM” screen.
If “IPDM E/R” is not indicated, go to GI-36, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Select required diagnosis mode on “SELECT DIAG MODE”.



DATA MONITOR

Operation Procedure

1. Touch “DATA MONITOR” on “SELECT DIAG MODE” screen.
2. Touch either of “ALL SIGNALS”, “MAIN SIGNALS”, or “SELECT FROM MENU” on “DATA MONITOR” screen.

ALL SIGNALS	All items will be monitored.
MAIN SIGNALS	Monitors preselected items.
CAN DIAG SUPPORT MNTR	Monitors CAN communication status.
SELECT FROM MENU	Monitors items optionally selected.

3. Touch “START”.
4. When “SELECT FROM MENU” is selected, touch items to be monitored. When “ALL SIGNALS” is selected, all items are monitored. When “MAIN SIGNALS” is selected, only preselected items are monitored.
5. Touch “RECORD” while monitoring to record the status of the item being monitored. To stop recording, touch “STOP”.

All Signals, Main Signals, Select From Menu

Item name	Display or unit	Monitor item selection			Description
		All signals	Main signal	Select from menu	
HEADLAMP WASHER REQUEST	ON/OFF	×		×	Signal status input from BCM
FR WIPER REQUEST	OFF/LO/HI	×	×	×	Signal status input from BCM
WIPER AUTO STOP	ON/OFF	×	×	×	IPDM E/R output status
WIPER PROTECTION	OFF/LS/HS/Block	×		×	IPDM E/R control status (LS: low speed operation/ HS: high speed operation/ BLOCK: wiper arm is locked)

CAUTION:

- **Perform IPDM E/R data monitor with ignition switch ON. Monitoring with ignition switch in ACC position may cause an improper display.**

ACTIVE TEST

Operation Procedure

1. Touch “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Touch item to be tested, and check operation.
3. Touch “START”.
4. Touch “STOP” during a test to stop the operation.

Test item	Indication on CONSULT-II display	Description
front wiper	FRONT WIPER	Front wiper relay (HI/LO, main) can be operated by switching (OFF, High speed ON and Low speed ON) optionally.
Headlamp washer	HEADLAMP WASHER	Headlamp washer relay can be operated by switching (ON and OFF) optionally.

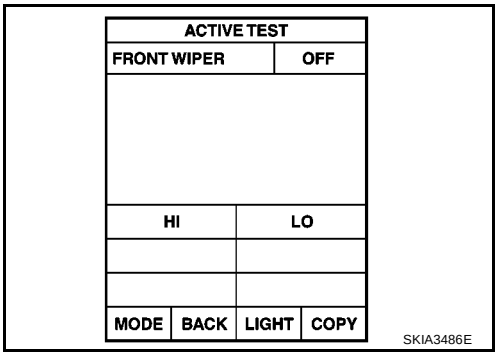
Front Wiper Does Not Operate

EKS00872

1. CHECK FRONT WIPER OPERATION

With CONSULT-II

1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Make sure that front wipers operate normally.



Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that front wipers operate normally.

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK FUSE

Check 20A fuse (#38) (No.38, located in IPDM E/R).

OK or NG

OK >> GO TO 3.
NG >> Replace fuse.

3. IPDM E/R INSPECTION

With CONSULT-II

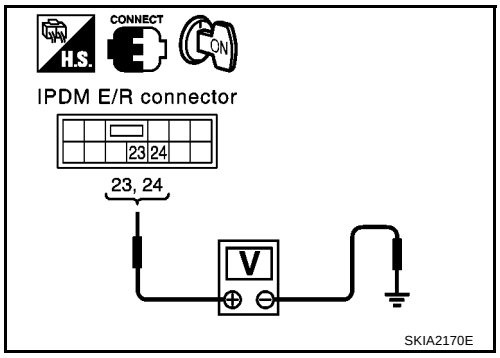
Using active test, check voltage between IPDM E/R connector terminals 23, 24 and ground while front wiper relay (main, HI/LO) is operating.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .

Without CONSULT-II

Start up auto active test, and check voltage between IPDM E/R connector terminals 23, 24 and ground while front wiper relay (main, HI/LO) is operating.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .



Connector terminal			Measuring condition	Voltage
IPDM E/R		(–)		
Connector	Terminal (Wire color)			
E13	23 (Y)	Ground	Stopped	Approx. 0
			LO operation	Battery voltage
	24 (*1)		Stopped	Approx. 0
			HI operation	Battery voltage

*1: CR engine models (LG), K9K engine models (BR)

OK or NG

OK >> GO TO 4.
NG >> Replace IPDM E/R.

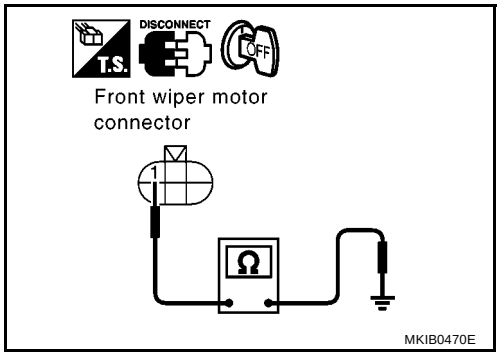
4. FRONT WIPER TO GROUND INSPECTION

1. Turn ignition switch OFF.
2. Disconnect front wiper motor harness connector.
3. Check continuity between front wiper motor harness connector E44 terminal 1(B) and ground.

Continuity should exist.

OK or NG

OK >> Replace wiper motor.
NG >> Repair harness or connector.



5. CHECK CAN COMMUNICATION CIRCUIT

Select “IPDM” by CONSULT-II, and perform self-diagnosis for “IPDM”.

Are self-diagnosis results displayed?

NO DTC>>GO TO 6.
CAN COMM CIRCUIT>>Check CAN communication line. GO TO BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .

SELF-DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED	

LKIA0073E

6. CHECK COMBINATION SWITCH OPERATION

With CONSULT-II

Select “BCM” on CONSULT-II. With “WIPER” data monitor, confirm that “FR WIPER INT”, “FR WIPER LOW”, and “FR WIPER HI” turn ON-OFF according to wiper switch operation.

Without CONSULT-II

Refer to LT-196, "Check Combination Switch" .

OK or NG

OK >> Replace BCM.
NG >> Refer to LT-196, "Check Combination Switch" .

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER HI	OFF
FR WIPER LOW	OFF
FR WIPER INT	OFF
FR WASHER SW	OFF
INT VOLUME	1
FR WIPER STOP	ON
RR WIPER ON	OFF
RR WIPER INT	OFF
	Page Down
	RECORD
MODE / BACK / LIGHT / COPY	

SKIA2175E

Front Wiper Does Not Return to Stop Position

EKS00873

1. CHECK AUTO STOP INPUT SIGNAL

With CONSULT-II

Select IPDM on CONSULT-II.Check (“FR WIPER STOP”) in “DATA MONITOR” mode with CONSULT-II.

When front wiper is operating : FR WIPER STOP OFF
When front wiper is stopped : FR WIPER STOP ON

Without CONSULT-II

GO TO 2.

OK or NG

OK >> Replace IPDM E/R.
NG >> GO TO 2.

DATA MONITOR	
MONITOR	
IGN ON SW	ON
FR WIPER HI	OFF
FR WIPER LOW	OFF
FR WIPER INT	OFF
FR WASHER SW	OFF
INT VOLUME	1
FR WIPER STOP	ON
RR WIPER ON	OFF
RR WIPER INT	OFF
	Page Down
	RECORD
MODE / BACK / LIGHT / COPY	

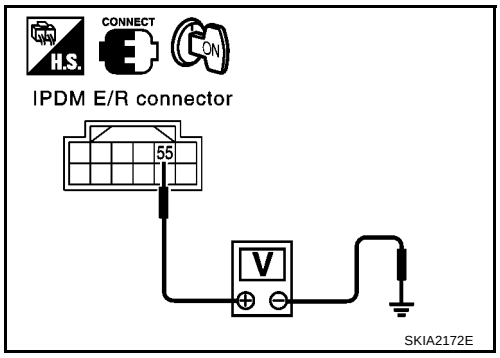
SKIA2175E

2. CHECK IPDM E/R OUTPUT SIGNAL

Check voltage between IPDM E/R harness connector E16 terminal 55(OR) and ground while front wiper motor is stopped and while it is operating.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .

Terminals			Condition	Voltage [V]
(+)		(-)		
Connector	Terminal (Wire color)			
E16	55 (OR)	Ground	Wiper operating	Battery voltage
			Wiper stopped	Approx. 0



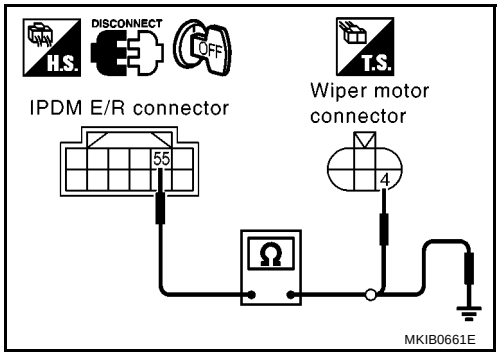
OK or NG

OK >> GO TO 3.
NG >> Replace front wiper motor.

3. CHECK AUTO STOP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector E16 terminal 55(OR) and front wiper motor harness connector E44 terminal 4(OR).
4. Check continuity between IPDM E/R harness connector E16 terminal 55 (OR) and ground

55 (OR) – 4 (OR) :Continuity should exist.
55 (OR) – Ground :Continuity should not exist.



OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness or connector.

Front Wiper Low Speed Operation Does Not Operate

EKS00874

1. CHECK FRONT WIPER MOTOR LOW SPEED OPERATION

With CONSULT-II

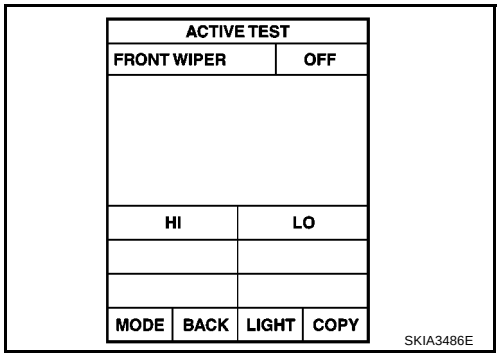
1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Make sure that front wiper (low speed) operates normally.

Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that front wiper (low speed) operates normally.

OK or NG

OK >> GO TO LT-196, "Check Combination Switch" .
NG >> GO TO 2.

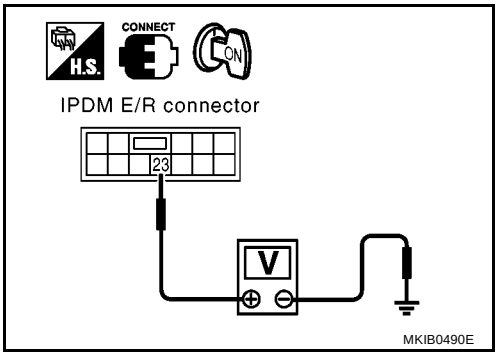


2. CHECK IPDM E/R OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Front wiper switch turn to LO position.
3. Check voltage between IPDM E/R harness connector E13 terminal 23(Y) and ground.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .

Battery voltage should exist



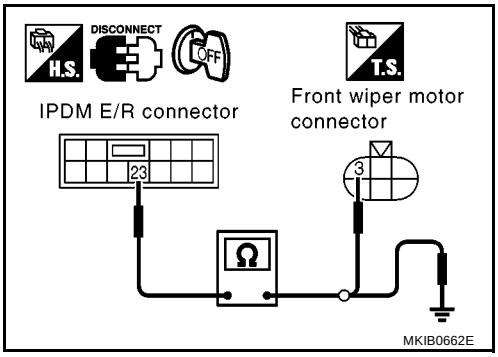
OK or NG

OK >> GO TO 3.
NG >> Replace IPDM E/R.

3. CHECK FRONT WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector E13 terminal 23(Y) and front wiper motor harness connector E44 terminal 3(Y).
4. Check continuity between IPDM E/R harness connector E13 terminal 23 (Y) and gound.

23 (Y) – 3 (Y) :Continuity should exist.
23 (Y) – Ground :Continuity should not exist.



OK or NG

OK >> Replace front wiper motor.
NG >> Repair harness or connector.

Front Wiper High Speed Operation Does Not Operate

EKS00875

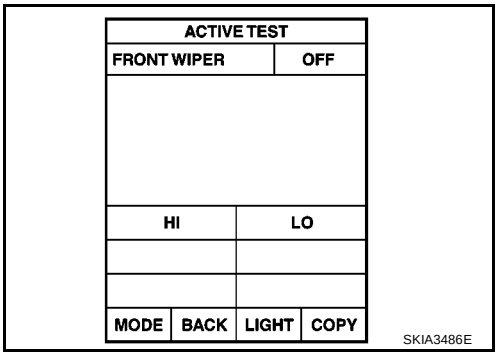
1. CHECK FRONT WIPER MOTOR HIGH SPEED OPERATION

With CONSULT-II

1. Select “IPDM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “FRONT WIPER” on “SELECT TEST ITEM” screen.
3. Make sure that front wiper (high speed) operates normally.

Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that front wiper (high speed) operates normally.



OK or NG

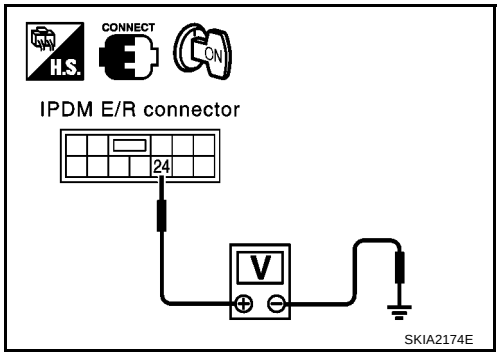
OK >> GO TO LT-196, "Check Combination Switch" .
NG >> GO TO 2.

2. CHECK IPDM E/R OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Front wiper switch turn to HI position.
3. Check voltage between IPDM E/R harness connector E13 terminal 24(LG or BR) and ground.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .

Battery voltage should exist



OK or NG

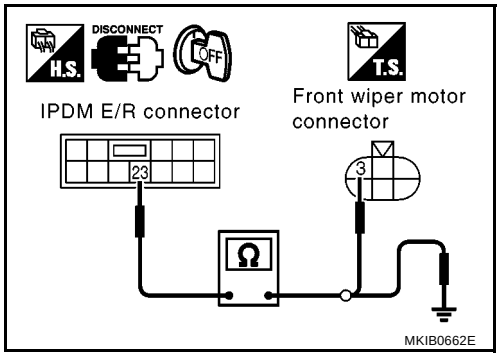
OK >> GO TO 3.
NG >> Replace IPDM E/R.

3. CHECK FRONT WIPER MOTOR CURCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector E13 terminal 24(LG or BR) and front wiper motor harness connector E44 terminal 2(LG or BR).
4. Check continuity between IPDM E/R harness connector E13 terminal 24(LG or BR) and ground.

24 (LG or BR) – 3 (LG or BR) :Continuity should exist.

24 (LG or BR) – Ground :Continuity should not exist.



OK or NG

OK >> Replace front wiper motor.
NG >> Repair harness or connector.

Front Wiper INT Does Not Operate

EKS00876

Refer to LT-196, "Check Combination Switch" .

Front Wiper Interval Time Is Not Controlled by Vehicle Speed

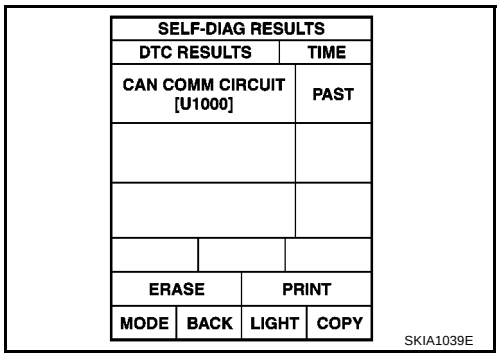
EKS00879

1. CHECK CAN COMMUNICATION LINE

Select “BCM” by CONSULT-II, and perform self-diagnosis for “BCM”.

Are self-diagnosis results displayed?

NO DTC>>GO TO 2
CAN COMM CIRCUIT>>Check CAN communication line of BCM. GO TO BCS-31, "CAN Communication Inspection With CONSULT-II (Self-Diagnosis)" .



2. CHECK COMBINATION METER

Confirm that speedometer operates normally.

OK or NG

OK >> Replace BCM.
NG >> Combination meter vehicle speed system malfunction. GO TO DI-31, "Inspection/Vehicle Speed Signal" .

After Front Wipers Operate for 10 Seconds, They Stop for 20 Seconds

EKS0087A

CAUTION:

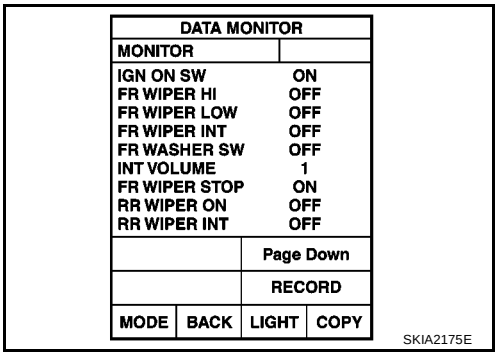
- **When auto-stop signal has not varied for 10 seconds or longer while IPDM E/R is operating front wipers, IPDM E/R considers that front wipers are locked, and stops wiper output. That causes this symptom.**
- **This status can be checked by IPDM E/R DATA MONITOR on which “WIPER PROTECTION” item shows “Block”.**

1. CHECK IPDM E/R INPUT SIGNAL

With CONSULT-II

Select IPDM on CONSULT-II.Check (“FR WIPER STOP”) in “DATA MONITOR” mode with CONSULT-II.

When front wiper is operating : FR WIPER STOP OFF
When front wiper is stopped : FR WIPER STOP ON



Without CONSULT-II

GO TO 2.

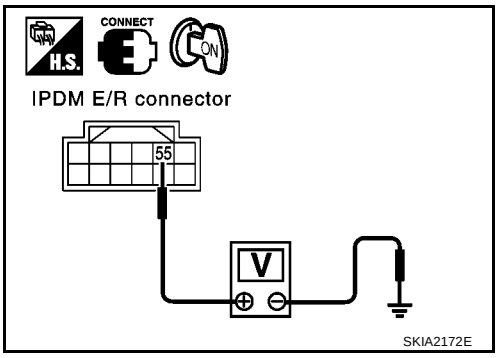
OK or NG

OK >> Replace IPDM E/R.
NG >> GO TO 2.

2. CHECK IPDM E/R OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Front wiper switch turn to INT position.
3. Check voltage between IPDM E/R harness connector E16 terminal 55(OR) and ground.

- For IPDM E/R terminal inspection method, refer to PG-49, "IPDM E/R Terminal Inspection" .



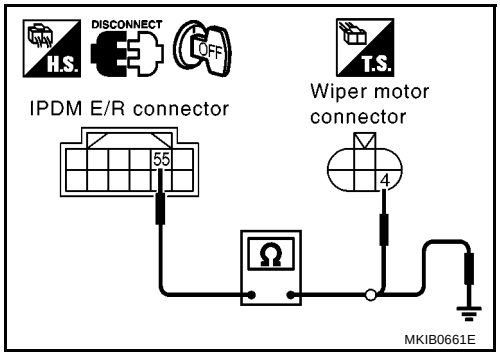
Connector terminal			Condition	Voltage [V]
(+)		(-)		
Connector	Terminal (Wire color)			
E16	55 (OR)	Ground	Wiper operating	Battery voltage
			Wiper stopped	Approx. 0

OK or NG

OK >> GO TO 3.
NG >> Replace front wiper motor.

3. CHECK FRONT WIPER MOTOR CURCUIT

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and front wiper motor connector.
3. Check continuity between IPDM E/R harness connector E16 terminal 55 (OR) and front wiper motor harness connector E44 terminal 4 (OR).
4. Check continuity between IPDM E/R harness connector E16 terminal 55 (OR) and ground.



55 (OR) – 4 (OR) :Continuity should exist.

55 (OR) – Ground :Continuity should not exist.

OK or NG

OK >> Replace IPDM E/R.
NG >> Repair harness or connector.

Front Wipers Do Not Stop

EKS0087B

Refer to PG-51, "Diagnosis of IPDM E/R Integrated Relay" .

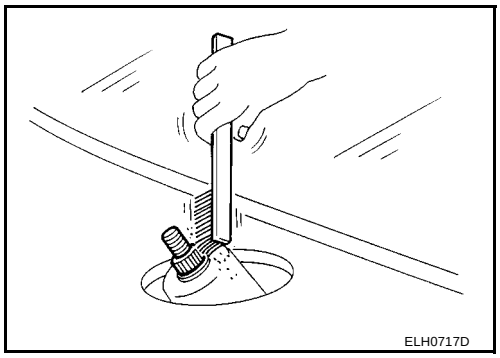
Removal and Installation of Front Wiper Arm

EKS007B3

REMOVAL

1. Turn the wiper switch ON to operate the wiper motor, then turn it OFF (auto stop).
2. Open hood, remove nut cover, and remove wiper arm nut.
3. Lift up driver wiper arm and remove wiper arm from vehicle.
4. Close hood, lift up passenger wiper arm, and remove wiper arm from vehicle.

Before attaching the front wiper arm, clean the arm mount shown in the figure to prevent nuts from being loosened.



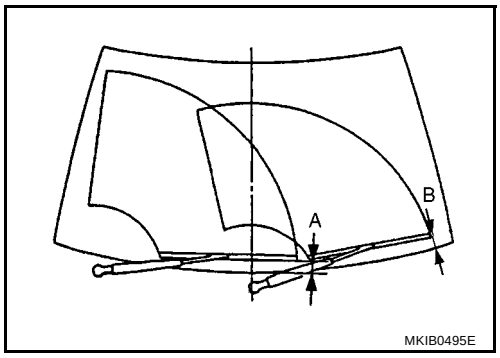
INSTALLATION

1. Lower wiper blade to glass so that center end of blade comes to the position shown in diagram. Align blade end with marking set within blade set position black print.)
2. Tighten wiper arm nuts.

Wiper arm nut:

: 20.6 - 26.5 N·m (2.1 - 2.7 kg-m, 15 - 20 ft-lb)

3. Spray washer fluid. Turn wiper switch ON to operate wiper motor, then turn it OFF (auto stop).
4. Make sure wiper blade stops at the position shown in the figure.



Stop position A : 33.7 - 48.7 mm (1.327 - 1.917 in)

Stop position B : 33.7 - 48.7 mm (1.327 - 1.917 in)

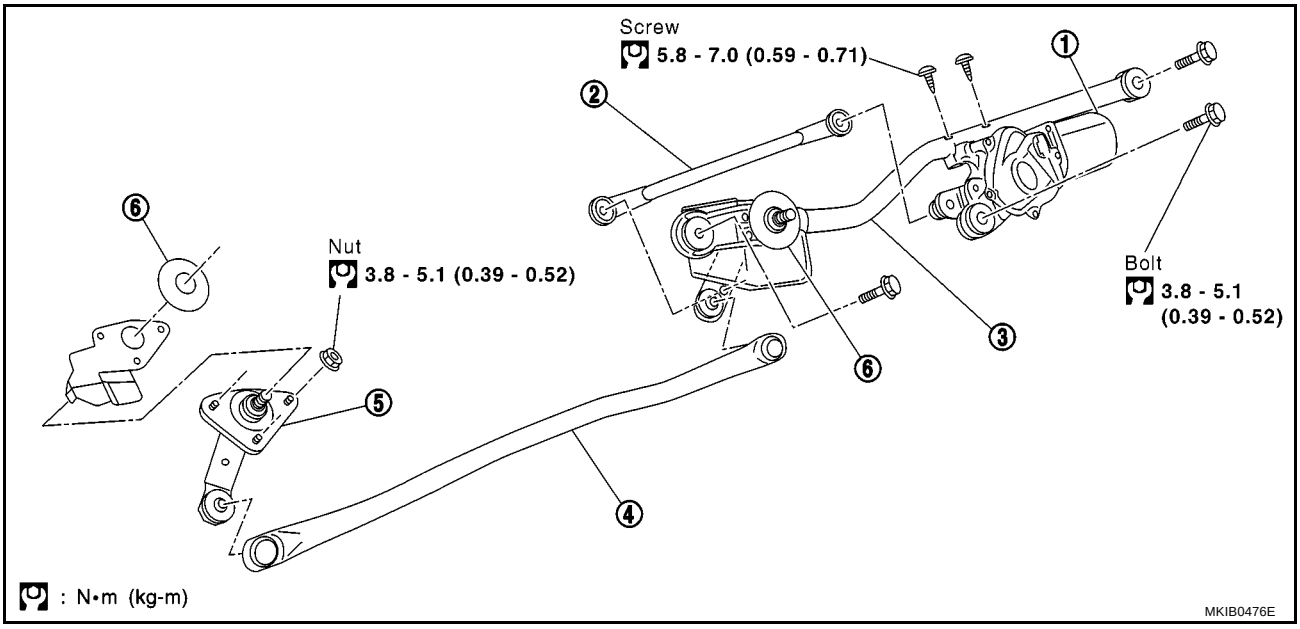
Adjustment of Front Wiper Arm Stop Position

EKS007B4

Refer to WW-42, "Removal and Installation of Front Wiper Arm" .

Removal and Installation of Front Wiper Motor and Link

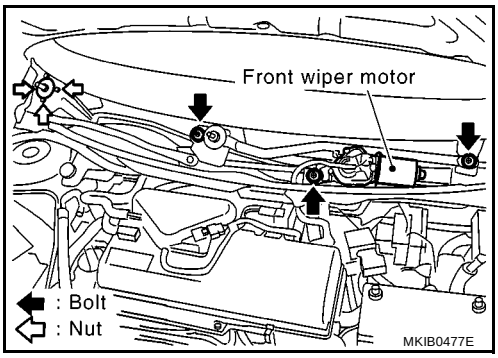
EKS007B5



1. Wiper motor
2. Wiper link
3. Wiper frame
4. Wiper link
5. Pivot
6. Shaft seal

REMOVAL

1. Operate the wiper motor, and stop it at the auto stop position.
2. Remove wiper arm nuts, and remove wiper arm from vehicle.
3. Remove cowl top cover. Refer to EI-10, "COWL TOP" .
4. Remove wiper motor connector.
5. Remove shaft seal
6. Remove wiper motor assembly bolts and driver pivot nuts, and then remove wiper motor assembly from vehicle.
7. Remove the wiper link from the wiper frame and the motor arm.
8. Remove wiper motor screws, and then remove wiper motor from wiper frame.



INSTALLATION

1. Connect the wiper motor to the vehicle-side connector. Turn the wiper switch ON to operate the wiper motor, then turn the wiper switch OFF (auto stop).
2. Disconnect wiper motor connector.
3. Install wiper motor to wiper frame.

Wiper motor screw

: 5.8 - 7.0 N·m (0.59 - 0.71 kg-m, 51 - 62 in-lb)

4. Install wiper link to wiper frame and motor arm.
5. Connect wiper motor assembly to the connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
6. Install the wiper motor assembly to the vehicle.

Wiper motor assembly bolt

: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

Pivot nut

: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

7. Install shaft seal
8. Install cowl top cover. Refer to EI-10, "COWL TOP" .
9. Attach wiper arms.

CAUTION:

- **Do not drop the wiper motor or cause it to contact other parts.**
- **Check the grease conditions of the motor arm and wiper link joint (at retainer). Apply grease if necessary.**
  NISSAN MP special grease No. 2 (KRB0012025)

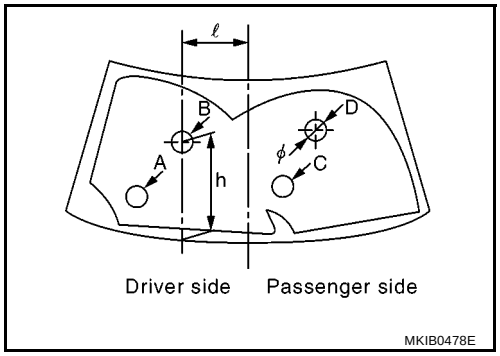
Adjustment of Spray Positions of Front Washer Nozzle

EKS007B6

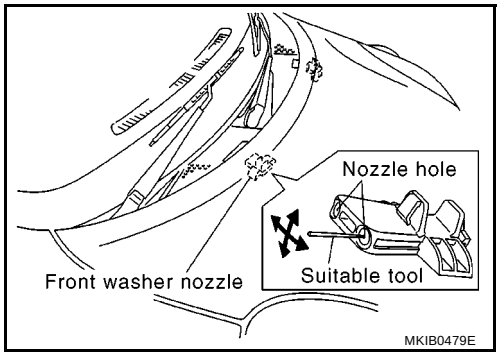
Adjust spray positions to match the positions listed below.

Unit: mm (in)

Spray position	h	l (width)	ϕ (spray point area)
A	165 (6.50)	375 (14.76)	80 (3.15)
B	342 (13.46)	157 (6.18)	80 (3.15)
C	253 (9.96)	109 (4.29)	80 (3.15)
D	347 (13.66)	299 (11.77)	80 (3.15)

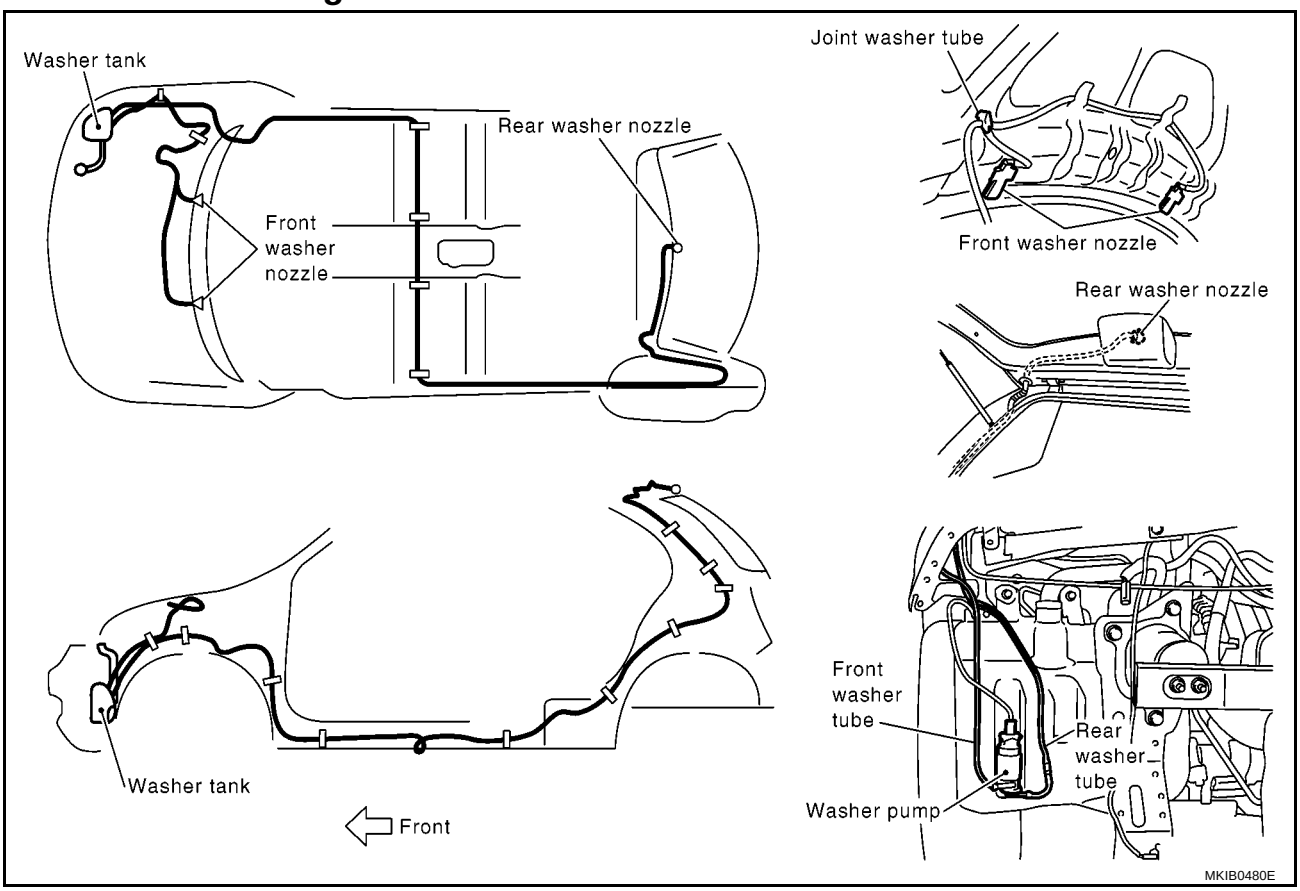


To adjust the spray position, insert a needle or similar object into the spray opening and move up/down and left/right.



Washer Hose Routing

EKS007B7

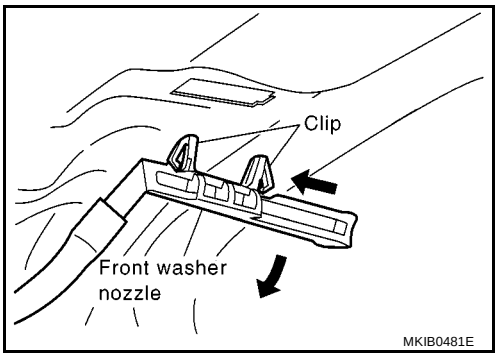


Removal and Installation of Front Washer Nozzle

EKS007B8

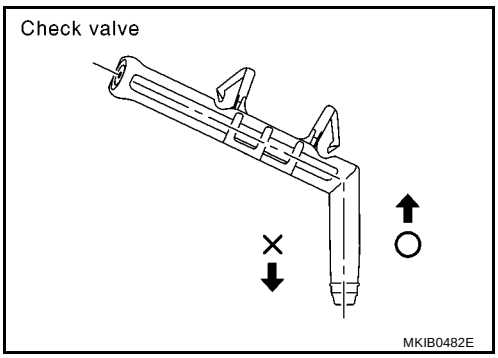
REMOVAL

1. Open hood.
2. While pushing nozzle spray point side along body, use the nozzle stop point as the support point and rotate nozzle to remove it from body.
3. Remove washer tube.



CHECK VALVE INSPECTION

Make sure air can pass through the hose by blowing forward (toward the nozzle) and air cannot pass through by sucking.



INSTALLATION

1. Install washer tube in nozzle.
2. Install nozzle to body.

3. Adjust nozzle spray location.

CAUTION:
The spray points differ, so be sure to install left and right nozzles correctly.

Inspection of Front Wiper and Washer Switch Circuit

EKS007B9

Refer to LT-196, "Check Combination Switch" .

Removal and Installation of Front Wiper and Washer Switch

EKS007BA

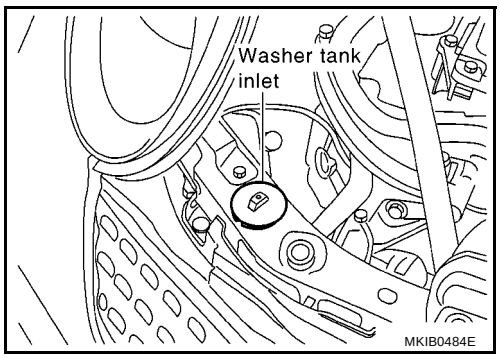
Refer to LT-199, "Removal and Installation" .

Removal and Installation of Front Wiper and Washer Tank

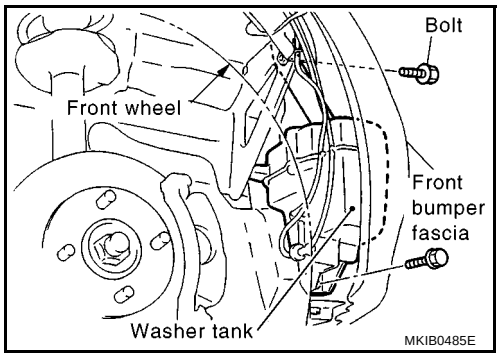
EKS007BB

REMOVAL

1. Remove cap, with pushing down fill opening, remove washer tank inlet from radiator core support upper.



2. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
3. Remove washer pump connector.
4. Remove washer tank bolts.



5. Remove the washer hose, and remove the washer tank from the vehicle.

INSTALLATION

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

CAUTION:
After installing, add water up to the top of the inlet washer tank. Make sure there is no leakage.

Washer tank mounting screw

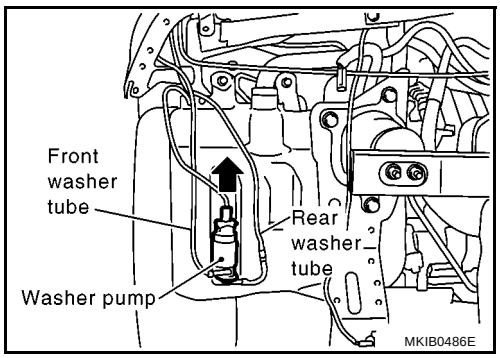
: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

Removal and Installation of Front Wiper and Washer Pump

EKS007BC

REMOVAL

1. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
2. Remove washer pump connector and hose.
3. Pull out the washer pump in the direction shown by the arrow, and remove the washer pump from the washer tank.



INSTALLATION

Paying attention to the items listed below, install in the reverse order of removal.

CAUTION:

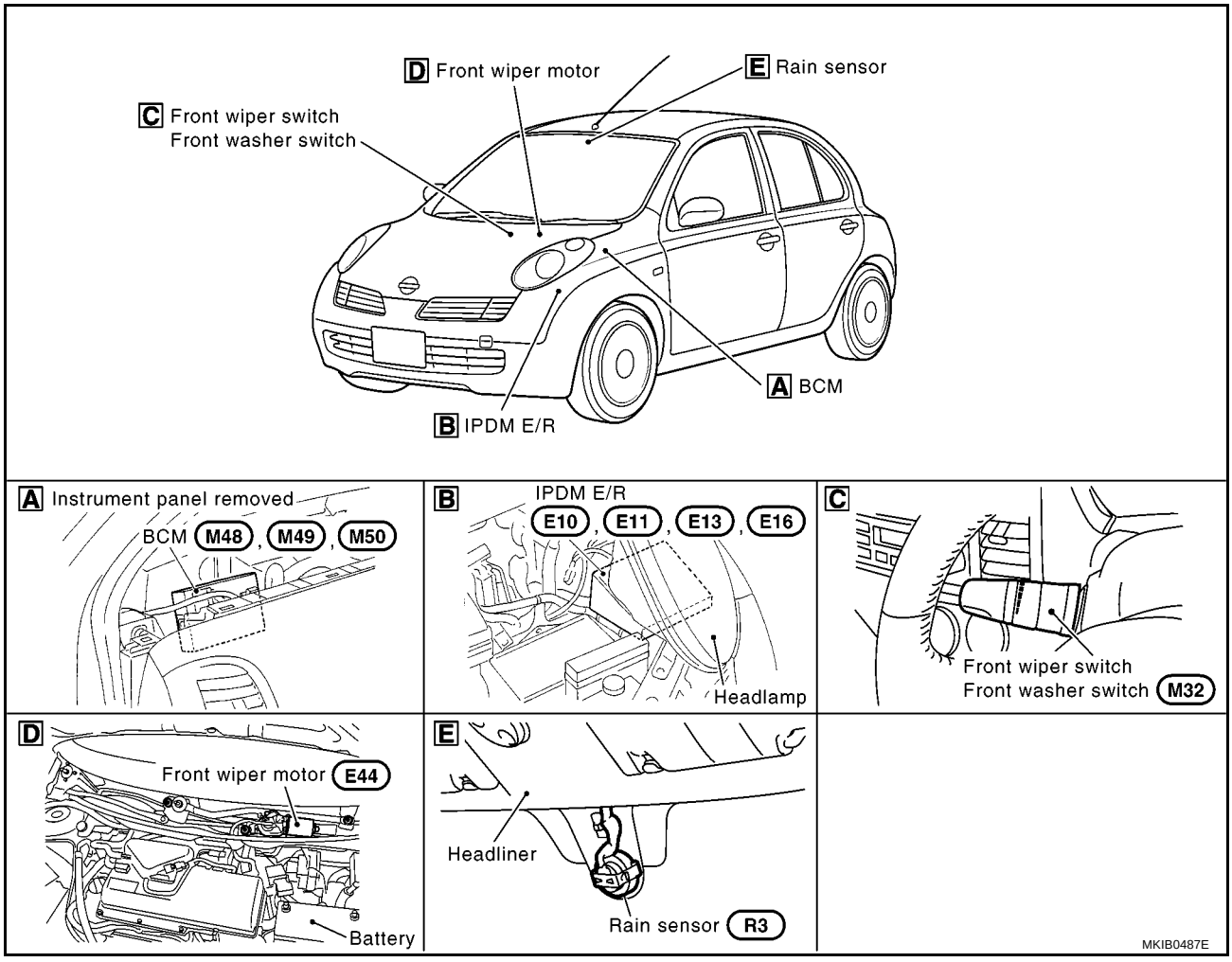
When installing the washer pump, there must be no twisting or other unusual stress on the packing.

FRONT WIPER AND WASHER SYSTEM (WITH RAIN SENSOR)

PFP:28536

Components Parts and Harness Connector Location

EKS0087Y



System Description

EKS008WD

- Front wiper HI/LO relay and front wiper main relay are built into IPDM E/R.
- Wiper switch (combination switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM when switch is turned ON.
- BCM controls front wiper LO, HI, and INT (intermittent) operation.
- IPDM E/R operates wiper motor according to CAN communication signals from BCM.

Power is supplied at all times

- through 20A fuse (NO.38, located in the IPDM E/R)
- to front wiper main relay.
- through 20A fuse (NO.52, located in the IPDM E/R)
- to IPDM E/R (CPU).
- through 40A fusible link (letter J, located in fuse and fusible link box)
- to BCM terminals 74 and 79.

When ignition switch ON or START position, power is supplied

- through 10A fuse [NO.4, located in fuse block (J/B)]
- to BCM terminal 24, and
- to rain sensor terminal 1.
- through 15A fuse [NO.1, located in fuse block (J/B)]
- to combination switch terminal 11, and
- to front wiper HI/LO relay, front wiper main relay and IPDM E/R (CPU)

Ground is supplied

- through body grounds E25 (CR engine models), E26 and E40
- to front wiper motor terminal 1 and,
- to IPDM E/R terminals 3 and 54, and
- through body grounds M19 and M20
- to combination switch terminal 12
- to rain sensor terminal 3, and
- to BCM terminals 2 and 70

WIPER OPERATION

Low Speed Wiper Operation

When front wiper switch is placed in LO position, BCM read combination switch condition (Refer toWW-51, "BCM WIPER SWITCH READING FUNCTION"). And BCM sent front wiper request signal (LO) to IPDM E/R with CAN communication line. When IPDM E/R receives front wiper request signal (LO), it turns ON front wiper main relay (built into IPDM E/R).
Power is supplied

- to front wiper motor terminal 3,
- through front wiper main relay and front wiper HI/LO relay and
- through IPDM E/R terminal 23.

Ground is supplied

- to front wiper motor terminal 1,
- through body grounds E25 (CR engine models), E26 and E40.

With power and ground are supplied, the front wiper motor operates at low speed.

High Speed Wiper Operation

When front wiper switch is placed in HI position, BCM read combination switch condition (Refer toWW-51, "BCM WIPER SWITCH READING FUNCTION"). And BCM sent front wiper request signal (HI) to IPDM E/R with CAN communication line. When IPDM E/R receives front wiper request signal (HI), it turns ON front wiper HI/LO relay and front wiper main relay (built into IPDM E/R).
Power is supplied

- to front wiper motor terminal 2,
- through front wiper main relay and front wiper HI/LO relay and,
- through IPDM E/R terminal 24.

Ground is supplied

- to front wiper motor terminal 1
- through body grounds E25 (CR engine models), E26 and E40.

With power and ground are supplied, the front wiper motor operates at high speed.

Auto Wiper Operation

When the wiper switch is placed in the INT position, the wiper does not operate until rain sensor perceives rain.
When rain sensor detection of rain drop, rain sensor send rain signal to BCM

- from rain sensor terminal 2
- to BCM terminal 63.

BCM send wiper request signal to IPDM E/R with CAN communication line. IPDM E/R operate front wiper. Change the wiper speed by rainfall.
The rain sensor sensitivity is controlled by the wiper volume switch combined with front wiper and washer switch and BCM.

Auto Stop Operation

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach stop position.
When wiper arms are not located at stop position with wiper switch OFF, power is supplied

- from terminal 23 of the IPDM E/R
- to front wiper motor terminal 3, in order to continue wiper motor operation at low speed.

Ground is supplied

- to front wiper motor terminal 1
- through body grounds E25 (CR engine models), E26 and E40.

When wiper arms reach stop position, front wiper motor terminals 1 and 4 are disconnected.
Then the IPDM E/R sends auto stop operation signal to BCM with CAN communication line.
When BCM receives auto-stop operation signal, BCM sends wiper stop signal to IPDM E/R with CAN communication line.
IPDM E/R stops wiper motor. Wiper motor will then stop wiper arms at the STOP position.

Mist Operation

When the wiper switch is placed in the mist position, wiper operate ones.The wiper operation is the same as the front wiper low speed operation.If the switch is held in the mist position, front wiper low speed operation continues.

WASHER OPERATION

When front wiper switch is pulled to washer position, power is supplied

- through combination switch terminal 13
- to washer motor terminal 1.

Ground is supplied

- to washer motor terminal 2
- through combination switch terminals 12 and 14, and
- through body times M19 and M20.

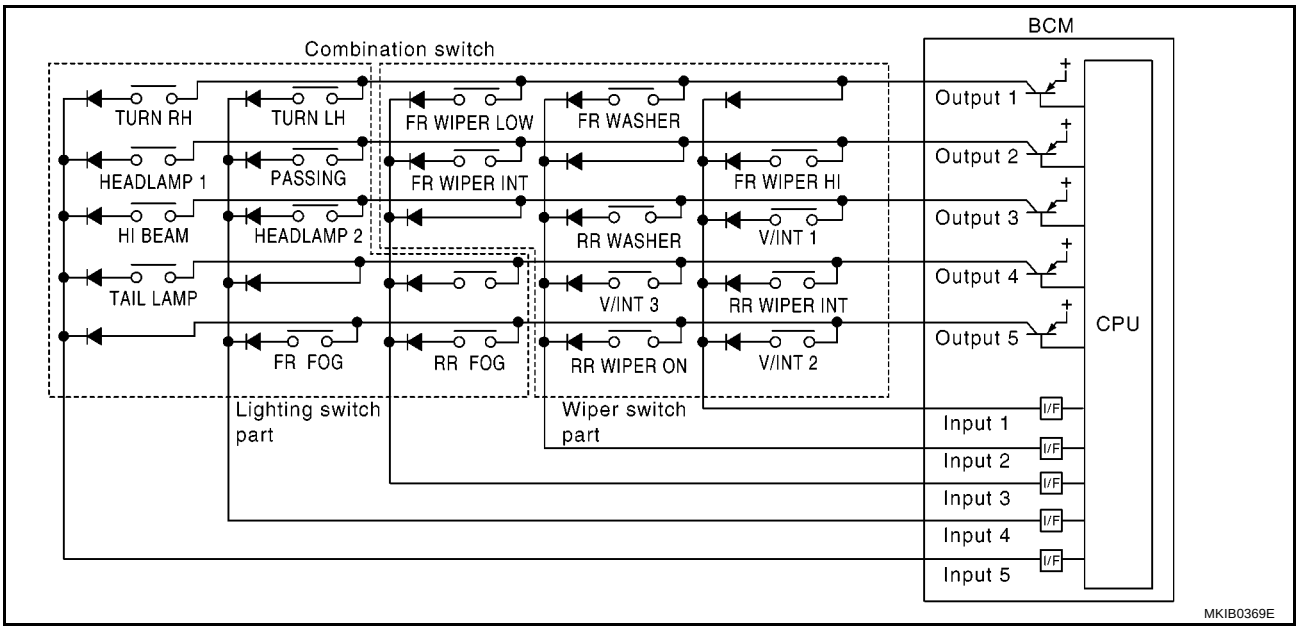
With power and ground supplied, the washer motor operates, and at the same time,
When the wiper switch is pulled to the WASH position for 1 second or more. BCM sends front wiper request signal (low) to IPDM E/R with CAN communication line. And the front wiper motor operates at low speed for approximately 3 times to clean wind shield

FAIL-SAFE FUNCTION

When CAN communication with other control units is impossible, IPDM E/R performs fail-safe control. If the fail-safe system is operating, front wiper low speed operates when the ignition switch is turned from OFF to ON or ACC and front wiper are stopped when the ignition switch is turn from ON or ACC to OFF. If the fail-safe system is operating, front wiper does not operate when the combination switch is in any position. After CAN communication recovers normally, it also returns to normal control.(Refer to PG-19, "FAIL-SAFE FUNCTION")

BCM WIPER SWITCH READING FUNCTION

BCM reads combination switch (wiper switch) status, and controls front wipers based on the results.
BCM is a combination of 5 output terminals (output 1 - 5) and 5 input terminals (input 1 - 5). It reads 20 types of switch data and 5 types of diagnosis data.



Operation Description

- BCM operates output terminal (output 1 to 5) transistor at a set period and turns ON the current in order.
- When any (or multiple) switches are turned ON, a circuit is formed between the output terminals (output 1 to 5) and input terminals (input 1 to 5).
- At this time, when output terminals (output 1 to 5) operate transistors and carry current. If voltage of corresponding input terminal (input 1 to 5) changes, interface in BCM detects this state and judges that switch is ON.

Table Of BCM - Combination Switch Operations

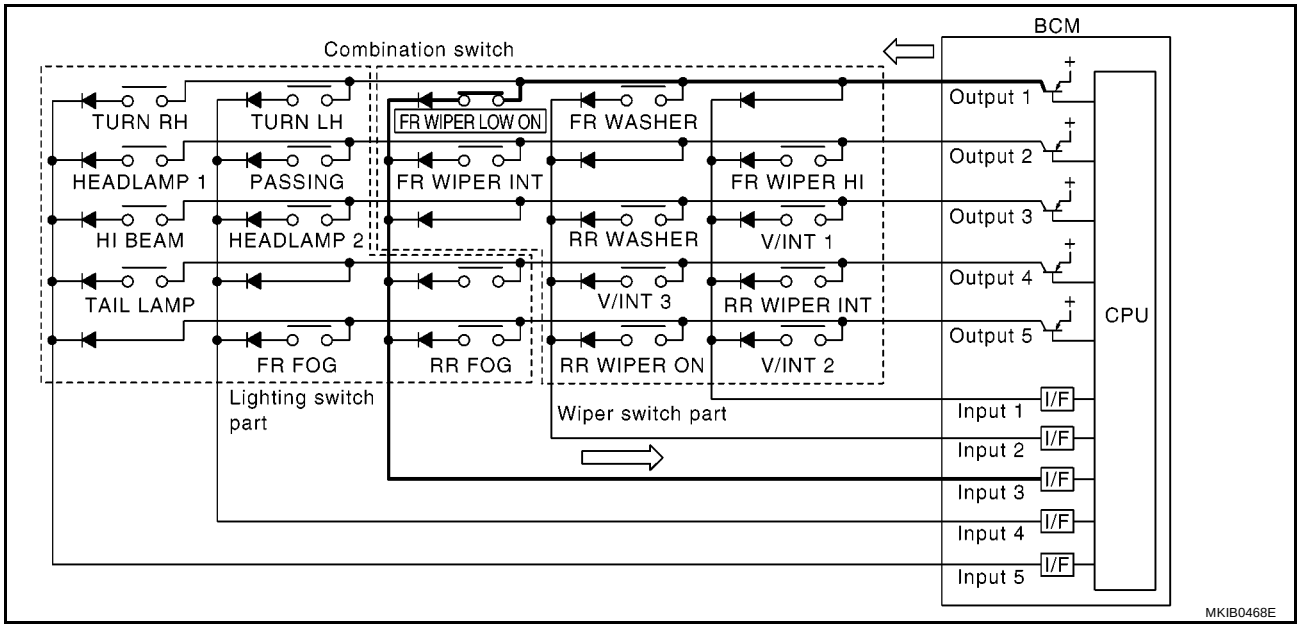
BCM reads operation status of combination switch using combinations shown in table below.

	Combination SW INPUT 1		Combination SW INPUT 2		Combination SW INPUT 3		Combination SW INPUT 4		Combination SW INPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Combination SW OUTPUT 1	—	—	FR WIPER HI ON	FR WIPER HI OFF	V/INT 1 ON	V/INT 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	V/INT 2 ON	V/INT 2 OFF
Combination SW OUTPUT 2	FR WASHER ON	FR WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	V/INT 3 ON	V/INT 3 OFF	RR WIPER ON	RR WIPER OFF
Combination SW OUTPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	—	—	RR FOG ON	RR FOG OFF
Combination SW OUTPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEADLAMP 2 ON	HEADLAMP 2 OFF	—	—	FR FOG ON	FR FOG OFF
Combination SW OUTPUT 5	TURN RH ON	TURN RH OFF	HEADLAMP 1 ON	HEADLAMP 1 OFF	HI BEAM ON	HI BEAM OFF	TAIL LAMP ON	TAIL LAMP OFF	—	—

MKIB0370E

Example: (Wiper Switch Placed In LO Position)

- If front wiper switch is placed in LO position, the contact of front wiper LO in combination switch is turned ON. At this time, when output 1 transistor operates, driver control unit detects that voltage has been changed at input 3.
- When output 1 transistor is ON and BCM detects current changes at input 3, BCM determines that wiper switch is at LO. BCM uses CAN communication and sends front wiper signals to IPDM E/R.
- When output 1 transistor operates again and BCM detects voltage change at input 3, BCM recognizes that front wiper LO operation is continuing.



NOTE:
Each output terminal transistor operates at 20 ms intervals. Therefore, a delay occurs between the switch becoming ON and operation of the electric load. However, this delay is too small to be detected.

Intermittent Operation

Wiper intermittent operation delay interval is determined from a combination of 3 switches (V/INT 1, V/INT 2, and V/INT 3) and vehicle speed signal.
During each intermittent operation delay interval, BCM sends front wiper request signal to IPDM E/R.

Wiper Volume Position Setting

Wiper dial position	Intermittent interval	Combination switch		
		V/INT 1	V/INT 2	V/INT 3
Wiper volume position 1	Small	ON	ON	ON
Wiper volume position 2		ON	ON	OFF
Wiper volume position 3		ON	OFF	OFF
Wiper volume position 4	↓	OFF	OFF	OFF
Wiper volume position 5		OFF	OFF	ON
Wiper volume position 6		OFF	ON	ON
Wiper volume position 7	Large	OFF	ON	OFF

Example: For wiper volume position 1.
Using combination switch reading function, BCM reads ON/OFF status of V/INT 1, 2, and 3.
When combination switch status is as listed below, BCM determines that it is wiper volume position 1.

- V/INT 1: ON (input 1 and output 3 are conducting.)
- V/INT 2: ON (input 1 and output 5 are conducting.)
- V/INT 3: ON (input 2 and output 4 are conducting.)

BCM determines front wiper intermittent interval from wiper volume 1 and vehicle speed, and sends wiper request signal (INT) to IPDM E/R for every intermittent interval via CAN communication line.

CAN Communication

EKS00K7Q

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K7R

Go to CAN system, when selecting your car model from the following table.

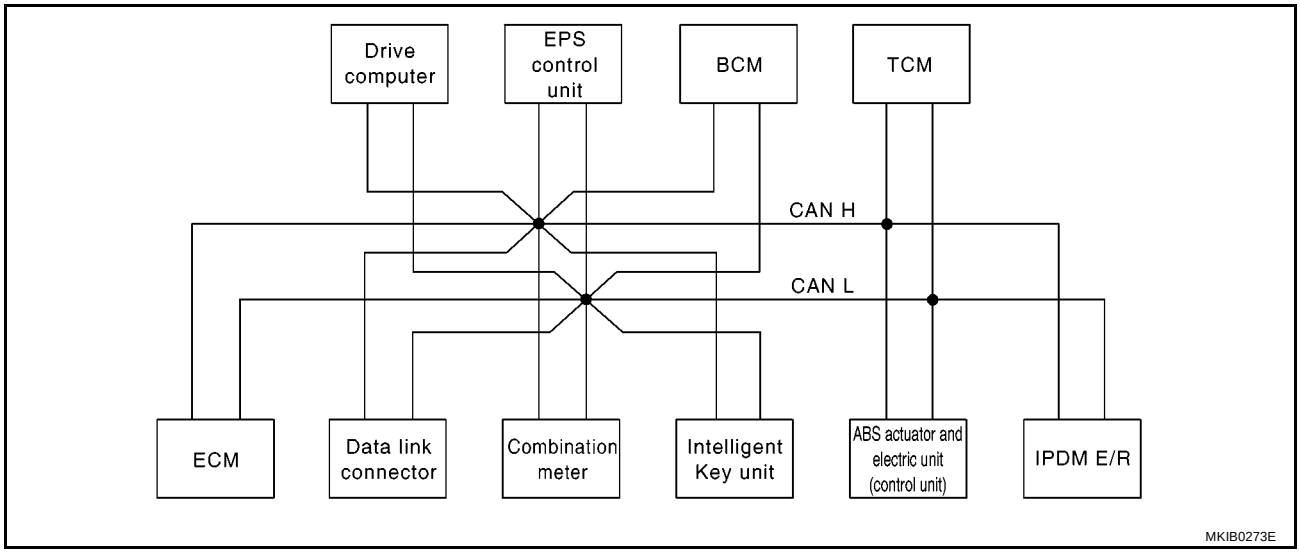
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable		Applicable		Not applicable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	WW-54, "TYPE 1/TYPE 2"				WW-57, "TYPE 3/TYPE 4"				WW-59, "TYPE 5/TYPE 6"				WW-62, "TYPE 7/TYPE 8"				WW-64, "TYPE 9/TYPE 10"			

×: Applicable

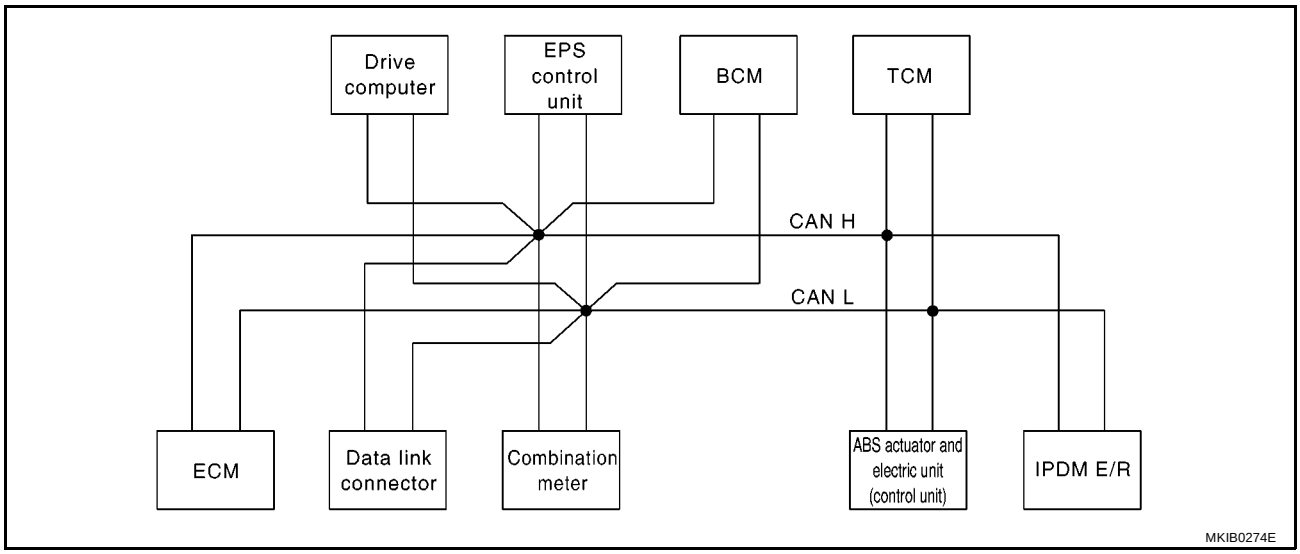
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

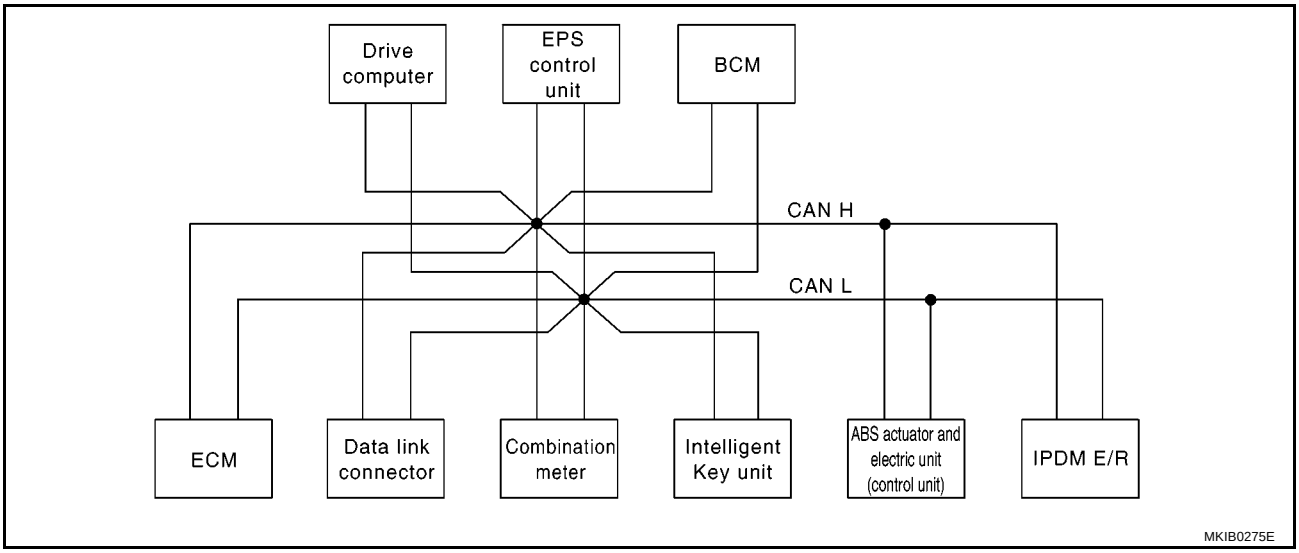
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

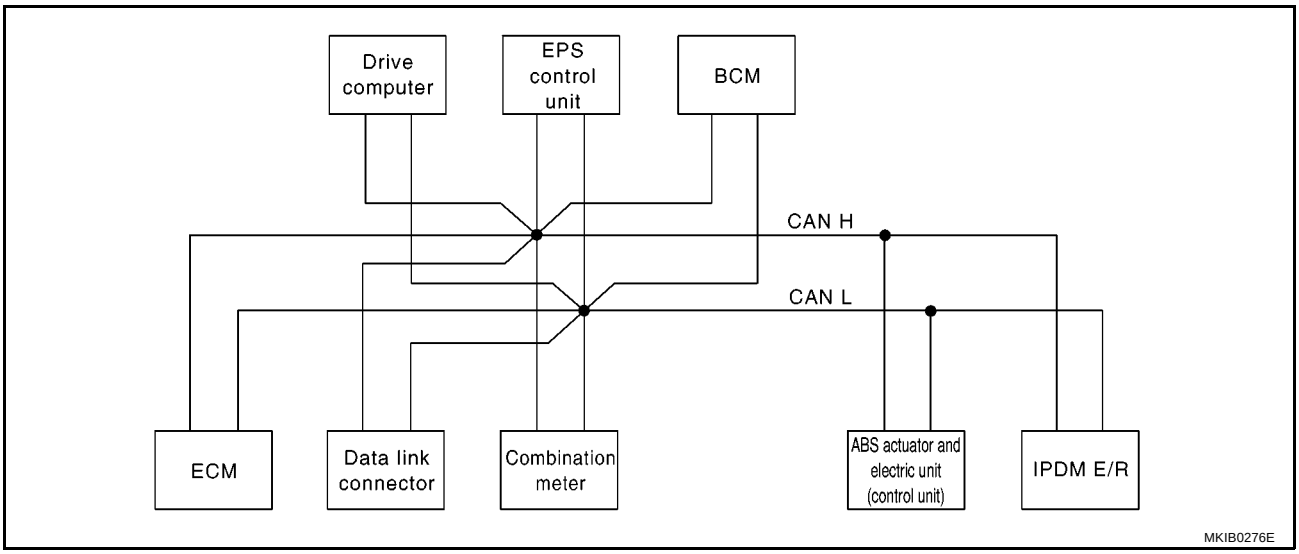
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

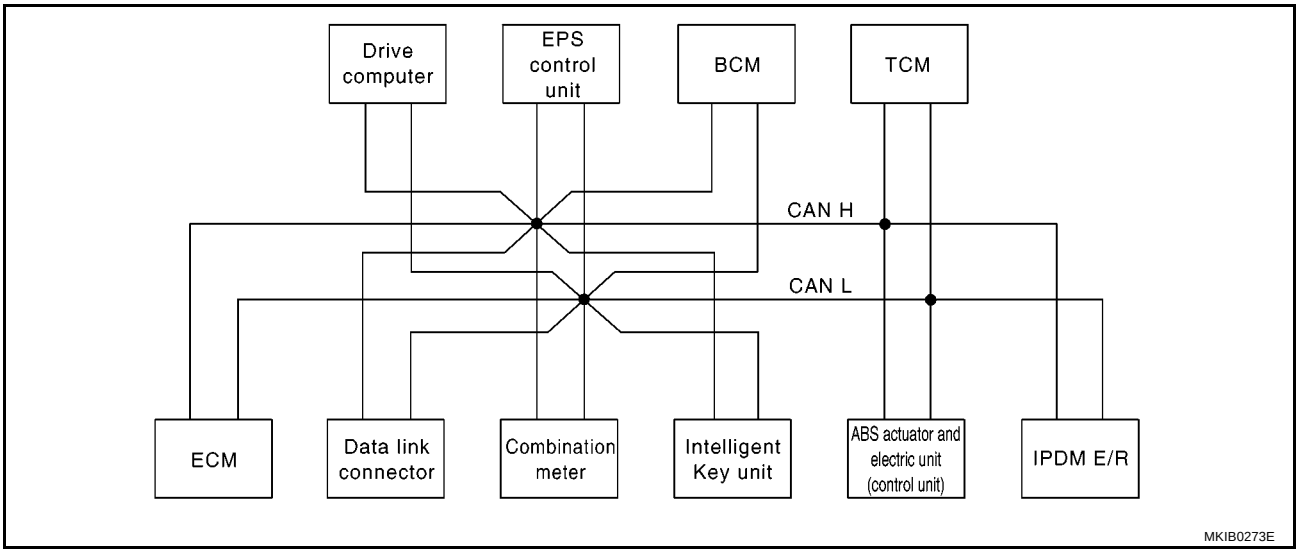
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

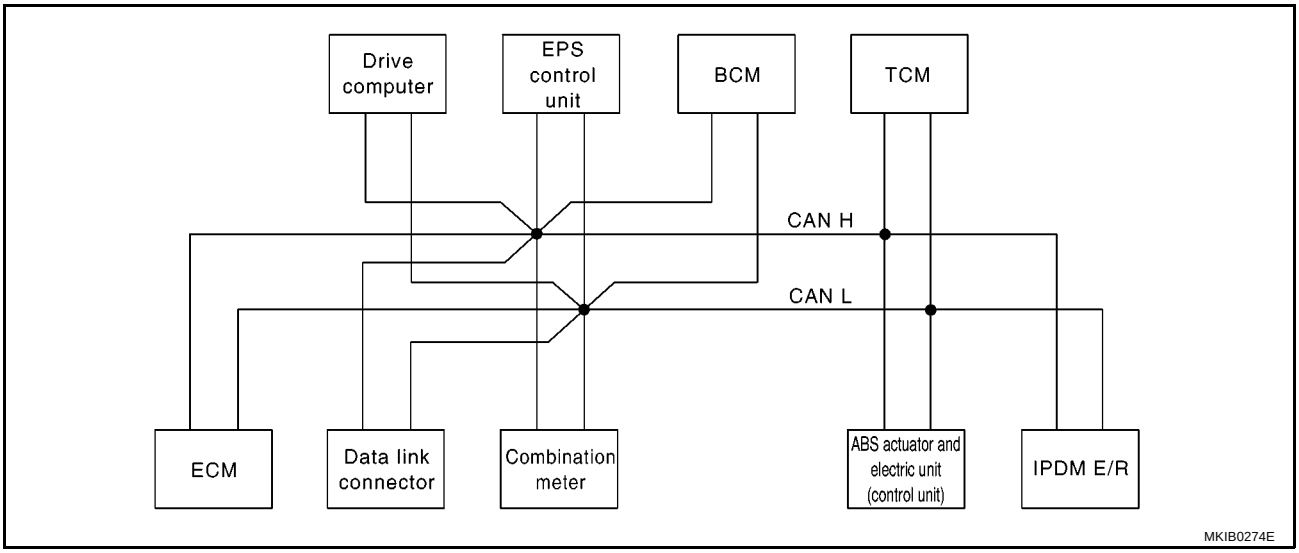
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature signal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position signal	T						R	R	

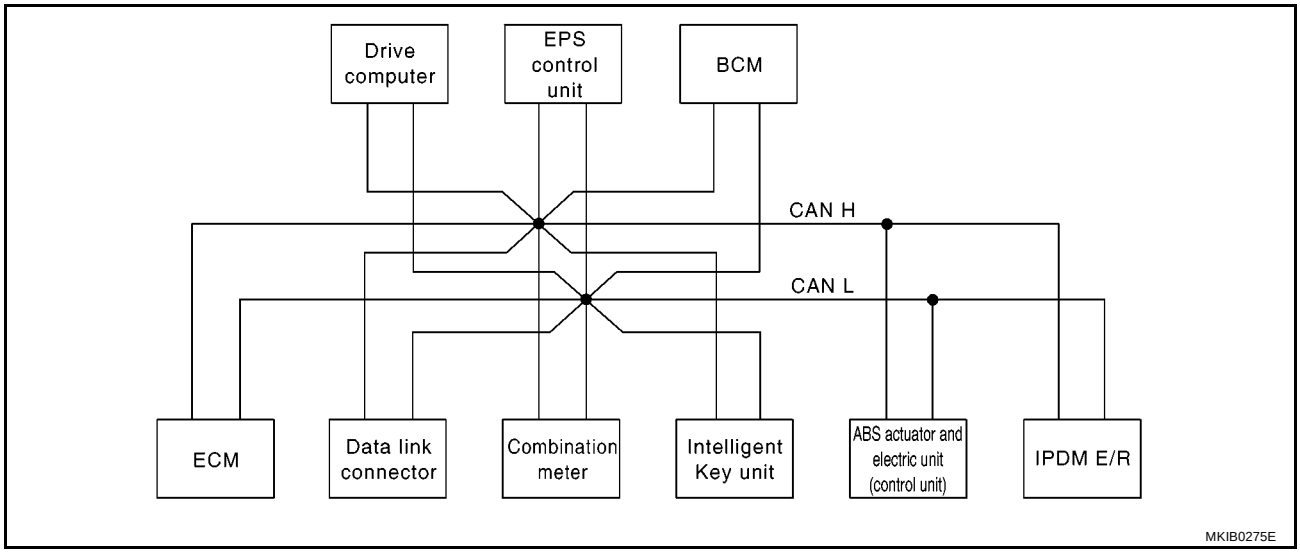
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

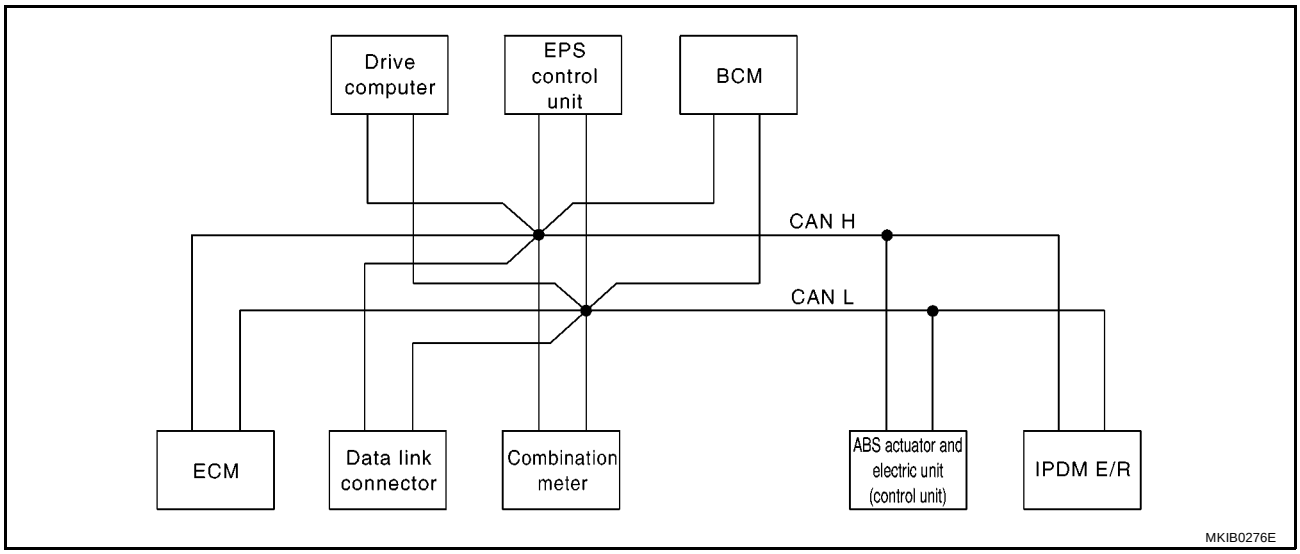
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

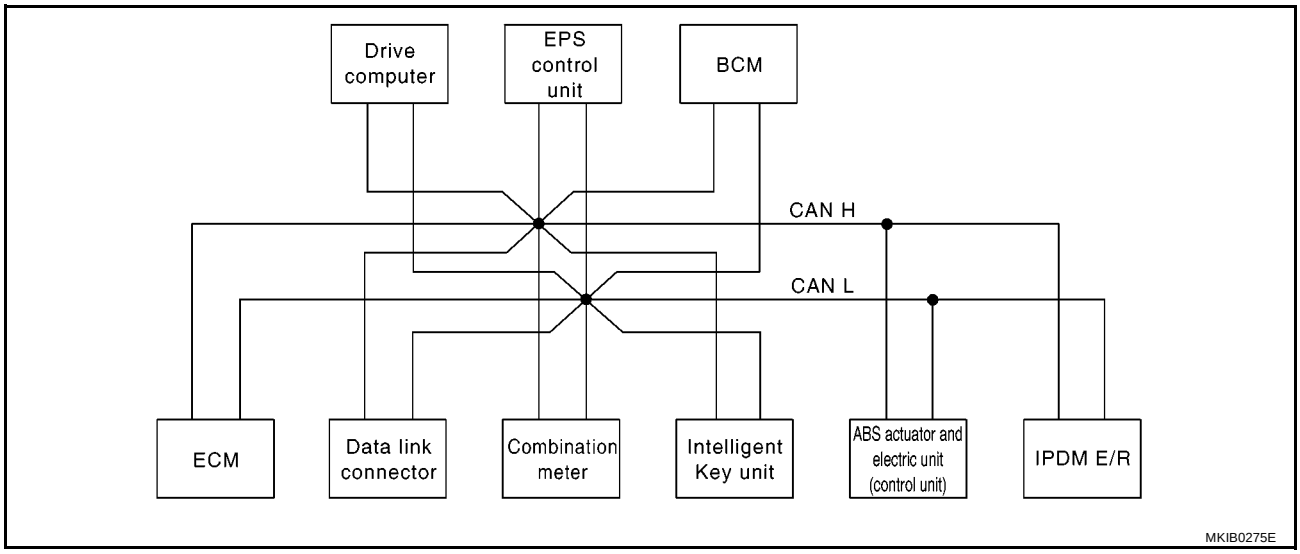
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

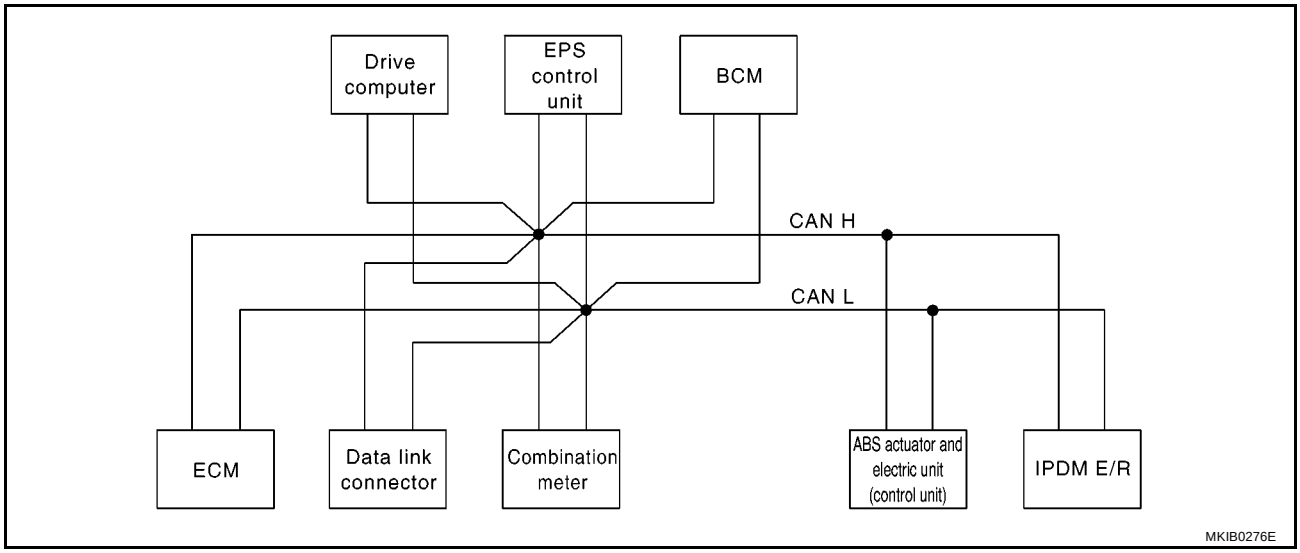
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

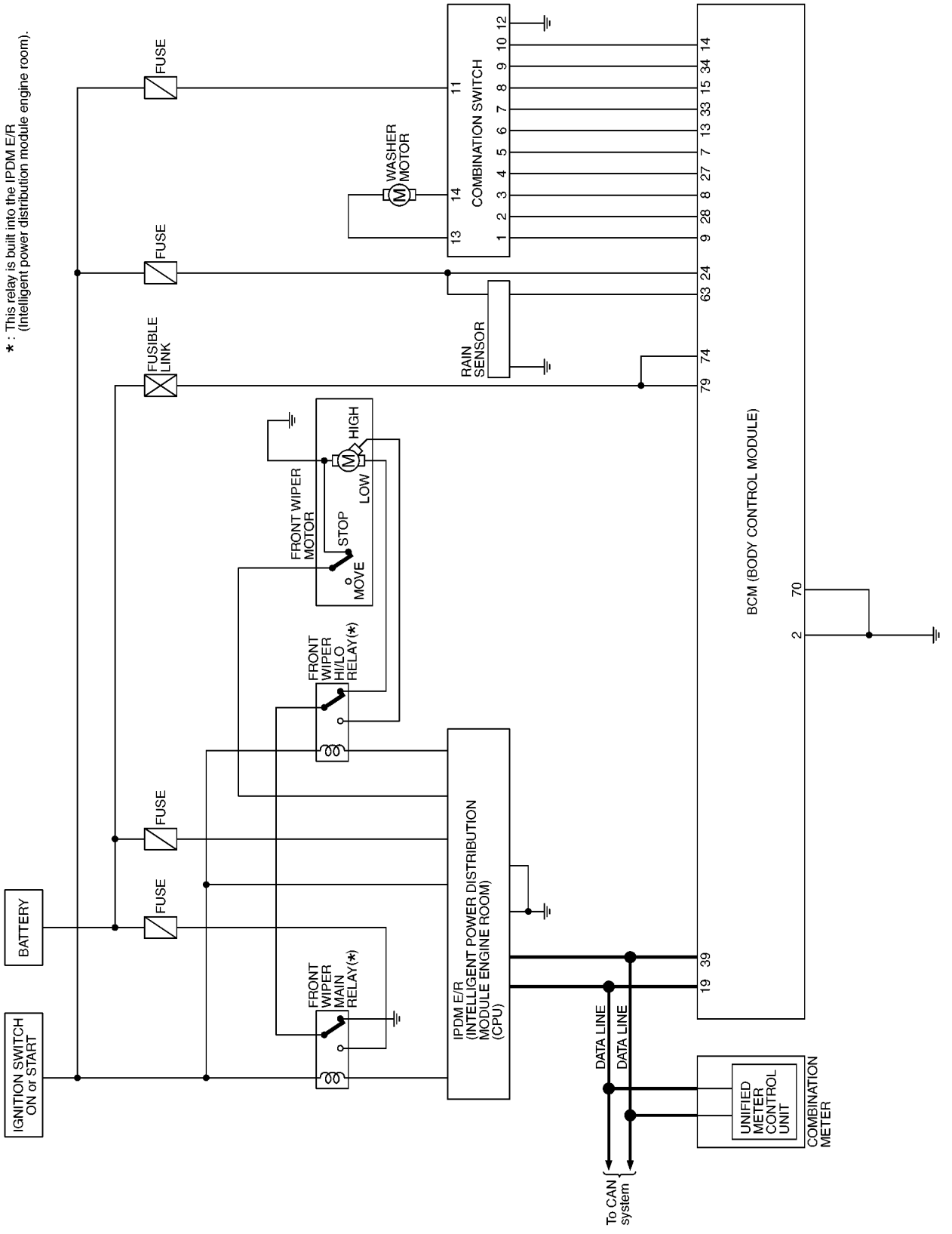
T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

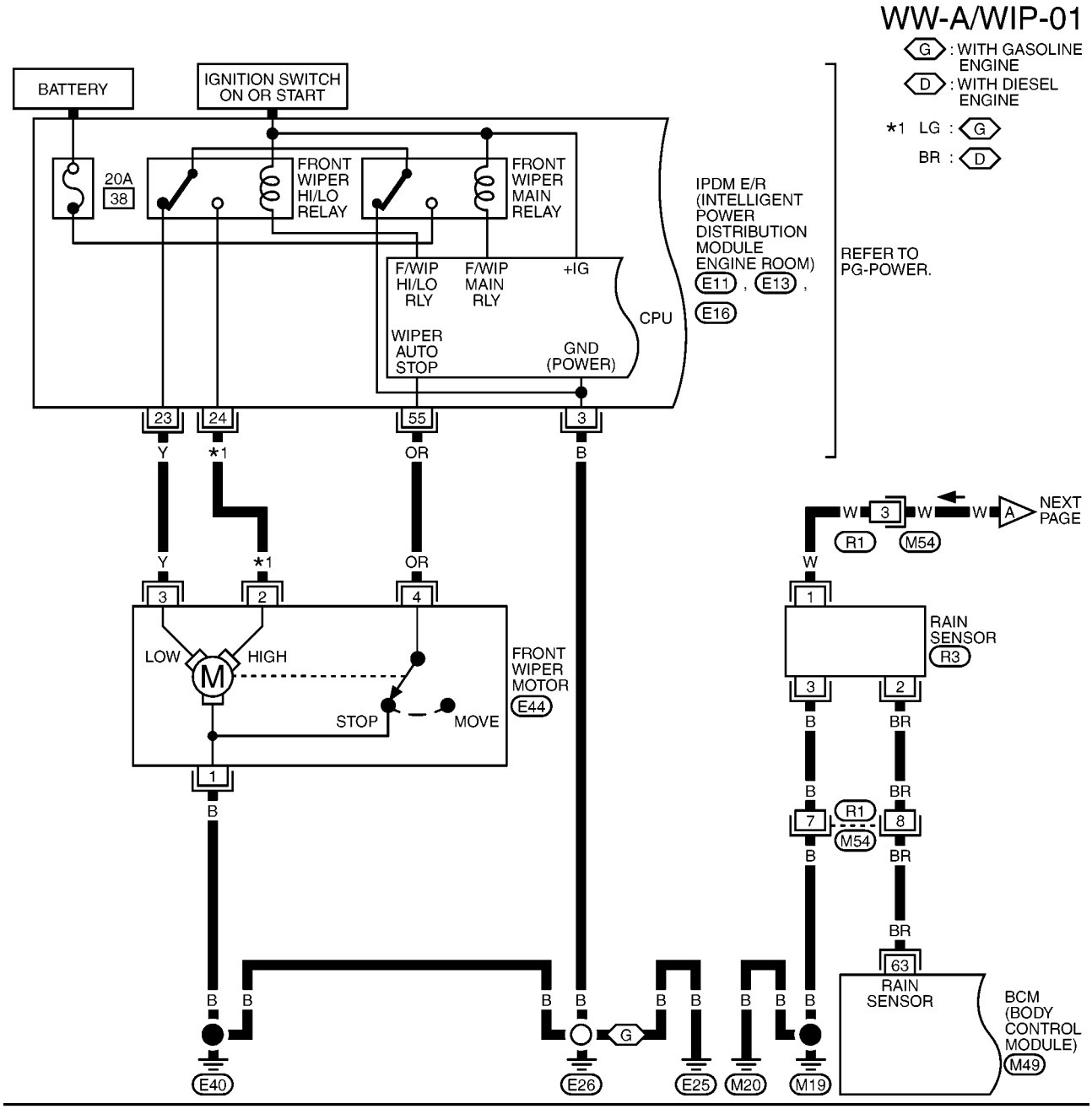
Schematic

EKS00880

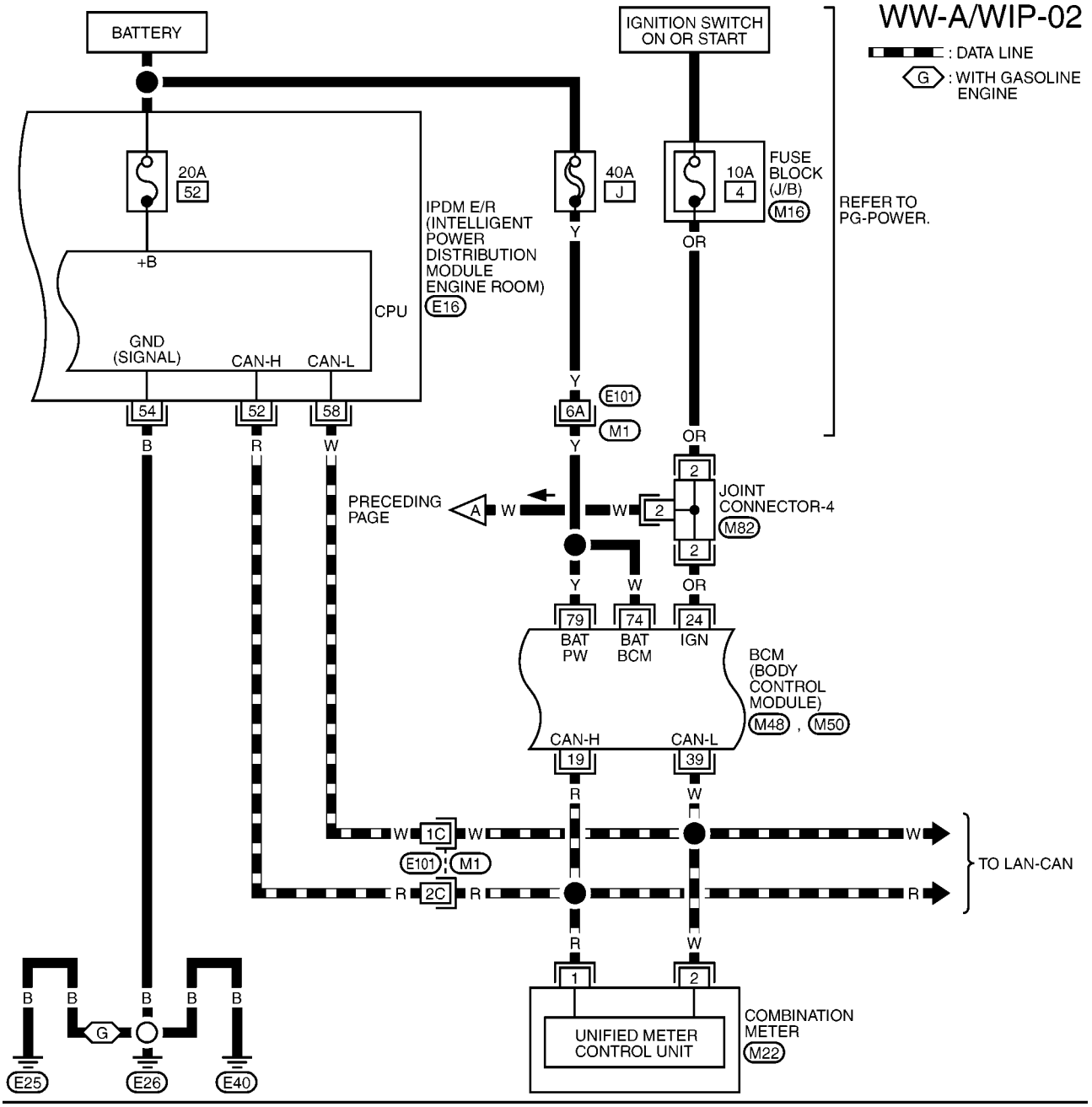


Wiring Diagram — A/WIP —

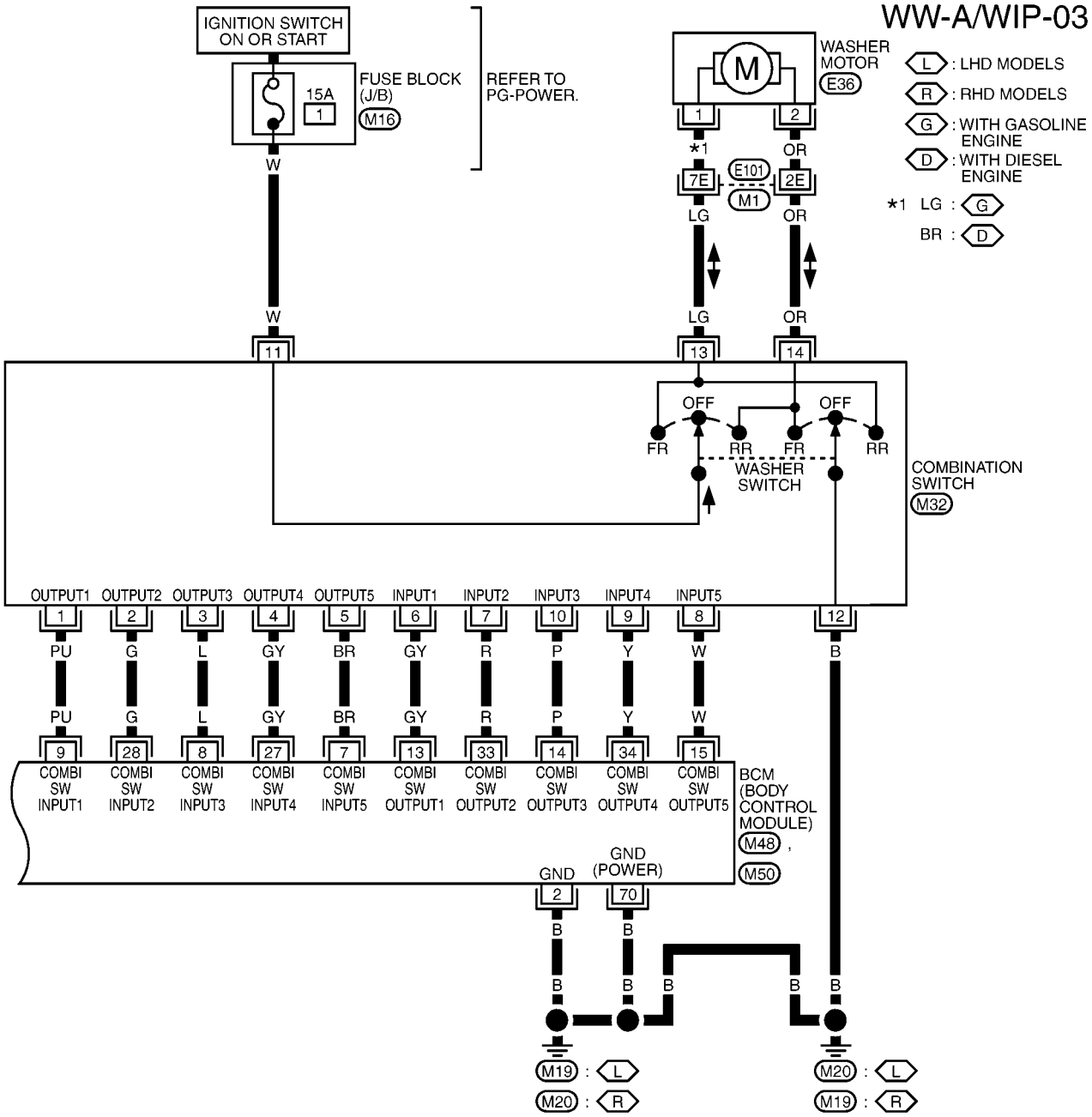
EKS00881

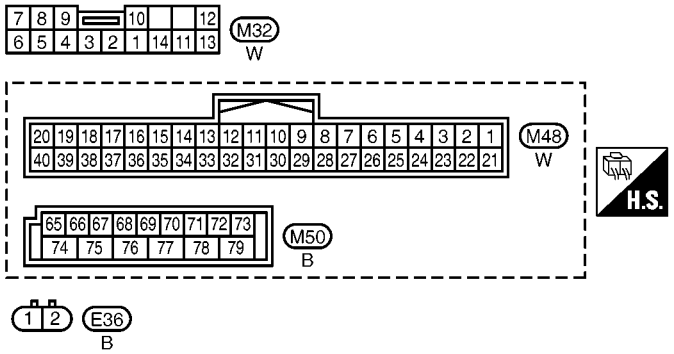


MKWA1462E


WW-A/WIP-02
: DATA LINE
G : WITH GASOLINE ENGINE
BATTERY
IGNITION SWITCH ON OR START
20A 52
40A J
10A 4
FUSE BLOCK (J/B) M16
REFER TO PG-POWER.
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E16
+B
CPU
GND (SIGNAL)
CAN-H
CAN-L
54
52
58
B
R
W
Y
OR
E101
6A
M1
PRECEDING PAGE
A
JOINT CONNECTOR-4 M82
2
79
74
24
BAT PW
BAT BCM
IGN
BCM (BODY CONTROL MODULE) M48 , M50
19
39
1C
2C
TO LAN-CAN
1
2
COMBINATION METER M22
UNIFIED METER CONTROL UNIT
G
E25
E26
E40
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK- JUNCTION BOX (J/B)
M22
M48
M50
M82
E16
H.S.

MKWA1463E



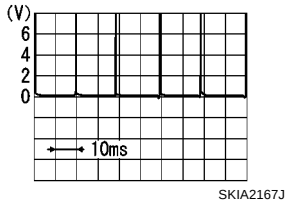
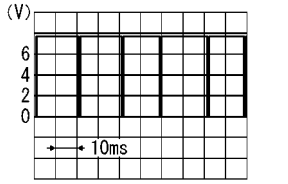
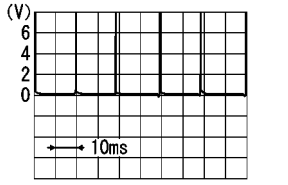
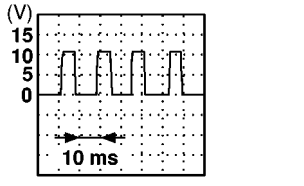
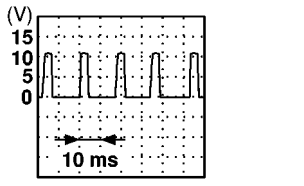


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1464E

Terminals and Reference Values for BCM

EKS00882

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
19	R	CAN H	—	—	—
24	OR	Ignition power supply	ON	—	Approx. 12
39	W	CAN L	—	—	—
63	BR	Rain sensor signal	ON	Wiper switch AUTO (INT) position — Wiper is stopped	 MKIB0173E
				Wiper switch AUTO (INT) position — Wiper is moving (Apply a few drops of water to detection attachment)	 MKIB0174E
70	B	Ground	ON	—	Approx. 0
74	W	Battery power supply	OFF	—	Approx. 12
79	Y	Battery power supply	OFF	—	Approx. 12

Terminals and Reference Values for IPDM E/R

EKS00883

Terminal No.	Wire color	Signal designation	Measuring condition			Reference value (V)
			Ignition switch	Operation or condition		
3	B	Ground	ON	—		Approx. 0
23	Y	Low speed power source	ON	Wiper switch	OFF	Approx. 0
					LO	Battery voltage
24	*1	High speed power source	ON	Wiper switch	OFF	Approx. 0
					HI	Battery voltage
52	R	CAN H	—	—		—
54	B	Ground	—	—		Approx. 0
55	OR	Wiper auto stop signal	ON	Wiper operating		Battery voltage
				Wiper stopped		Approx. 0
58	W	CAN L	—	—		—

*1: CR engine models (LG), K9K engine models (BR)

How to Proceed With Trouble Diagnosis

EKS00884

1. Confirm the symptoms and customer complaint.
2. Understand operation description and function description. Refer toWW-48, "System Description" .
3. Carry out the Preliminary check. Refer to WW-72, "Preliminary Inspection" .
4. Confirm front wiper does not operate by fail-safe control of IPDM E/R. Refer to PG-19, "FAIL-SAFE FUNCTION" .
5. Check symptom and repair or replace the cause of malfunction.
6. Does the front wiper operate normally? Yes: GO TO 7. No: GO TO 5.
7. INSPECTION END.

Preliminary Inspection

EKS008WE

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSE

- Check fuse and fusible link for blown-out.

Unit	Power source	Fuse No.
Front washer motor	Ignition ON or START	1
Front wiper main relay	Battery	38
BCM	Battery	J
	Ignition switch ON or START position	4

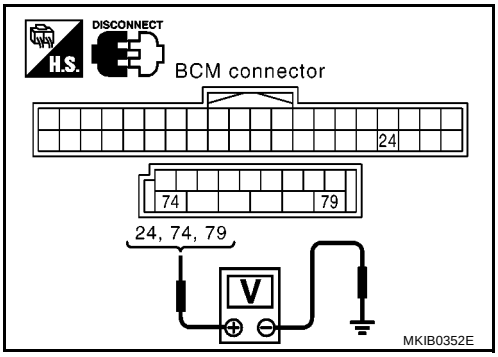
Refer to WW-68, "Wiring Diagram — A/WIP —"

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of problem before installing new fuse, Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



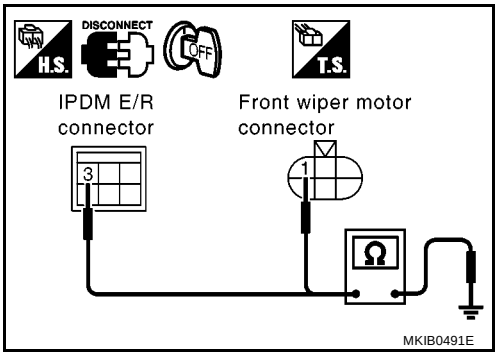
Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check harness for open or short between BCM and fuse.

3. CHECK GROUND CIRCUIT

1. Disconnect IPDM E/R harness connector and front wiper motor harness connector.
2. Check continuity between IPDM E/R harness connector, front wiper motor harness connector and ground.



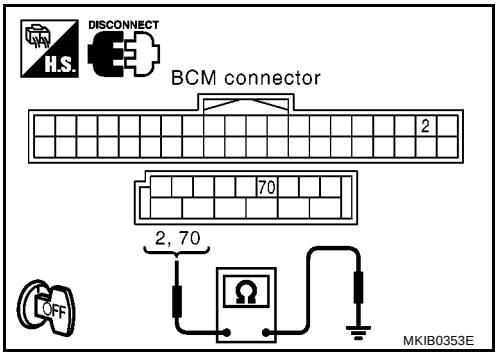
Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
E11	3 (B)	Ground	Yes
E44	1 (B)		

OK or NG

OK >> GO TO 4.
NG >> Harness for open ground circuit.

4. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.



Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70(B)	Ground	Yes

OK or NG

OK >> INSPECTION END.
NG >> Check harness ground circuit.

CONSULT-II Function (BCM)

EKS00886

Refer to WW-31, "CONSULT-II Function (BCM)" .

CONSULT-II Function (IPDM E/R)

EKS008W1

Refer to WW-33, "CONSULT-II Function (IPDM E/R)" .

Front Wiper Does Not Operate

EKS00889

Refer to WW-35, "Front Wiper Does Not Operate"

Front Wiper Does Not Return to Stop Position

EKS0088A

Refer to WW-37, "Front Wiper Does Not Return to Stop Position"

Front Wiper Low Speed Operation Does Not Operate.

EKS0088B

Refer to WW-38, "Front Wiper Low Speed Operation Does Not Operate"

Front Wiper High Speed Operation Does Not Operate

EKS0088C

Refer to WW-39, "Front Wiper High Speed Operation Does Not Operate"

Front Wiper INT Does Not Operate

EKS0088D

Refer to LT-196, "Check Combination Switch" .

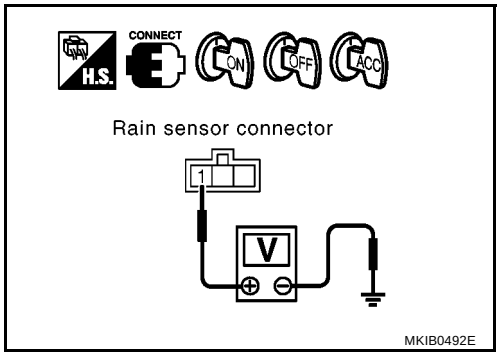
Auto Wiper Does Not Operate Properly

EKS0088T

1. CHECK RAIN SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between rain sensor and ground.

Connector	Terminal (wire color)		Ignition switch position		
	(+)	(-)	OFF	ACC	ON
R3	1 (W)	Ground	0	0	Battery voltage



OK or NG

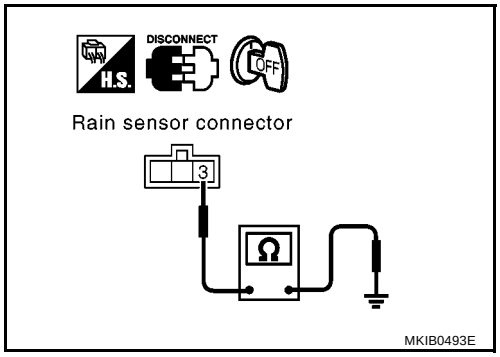
OK >> GO TO 2.
NG >> Check the following.

- 10A fuse [No.4, located in fuse block (J/B)].
- Harness for open or short between rain sensor and fuse.

2. CHECK RAIN SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rain sensor connector.
3. Check continuity between rain sensor harness connector R3 terminal 3 (B) and ground.

Continuity should exist.



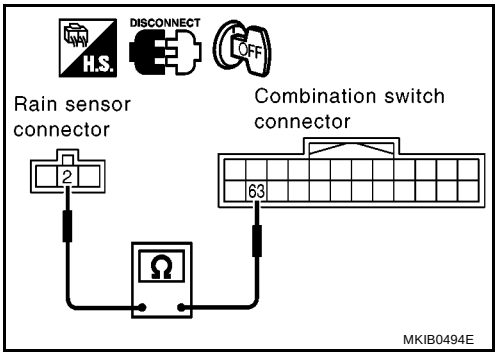
OK or NG

OK >> GO TO 3.
NG >> Repair harness ground circuit.

3. CHECK RAIN SENSOR INPUT SIGNAL CIRCUIT

1. Disconnect BCM connector.
2. Check continuity between BCM harness connector M49 terminal 63 (BR) and rain sensor harness connector R3 terminal 2 (BR).

Continuity should exist.

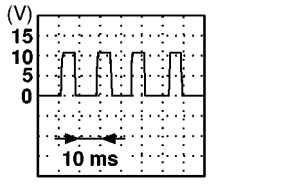
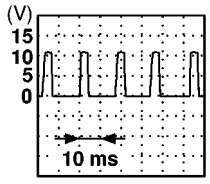


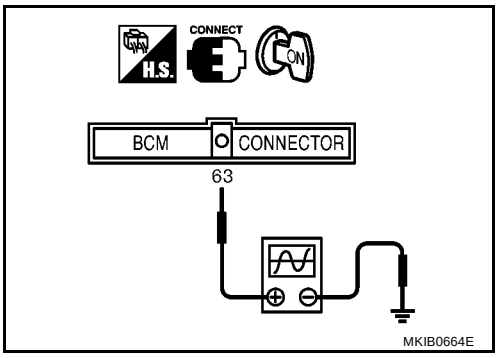
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK RAIN SENSOR INPUT SIGNAL

1. Connect BCM connector and rain sensor connector.
2. Turn ignition switch ON
3. Check voltage signal between BCM harness connector M49 terminal 63 (BR) and ground.

Wiper is stopped	Wiper is operate (Apply a few drops of water to detection attachment)
 MKIB0173E	 MKIB0174E



OK or NG

OK >> Replace BCM.
NG >> Replace rain sensor.

After Front Wipers Operate for 10 Seconds, They Stop for 20 Seconds

EKS0088F

Refer to WW-41, "After Front Wipers Operate for 10 Seconds, They Stop for 20 Seconds"

Front Wipers Do Not Stop

EKS0088G

Refer to PG-49, "IPDM E/R Terminal Inspection" .

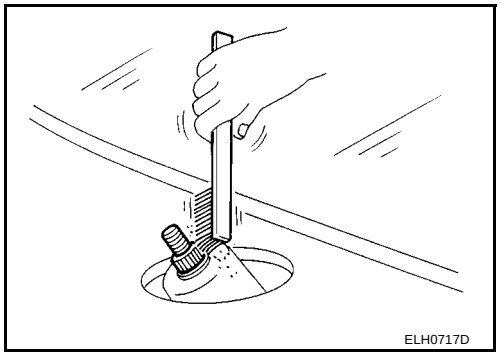
Removal and Installation of Front Wiper Arm

EKS008WF

REMOVAL

1. Turn the wiper switch ON to operate the wiper motor, then turn it OFF (auto stop).
2. Open hood, remove nut cover, and remove wiper arm nut.
3. Lift up driver wiper arm and remove wiper arm from vehicle.
4. Close hood, lift up passenger wiper arm, and remove wiper arm from vehicle.

Before attaching the front wiper arm, clean the arm mount shown in the figure to prevent nuts from being loosened.


ELH0717D

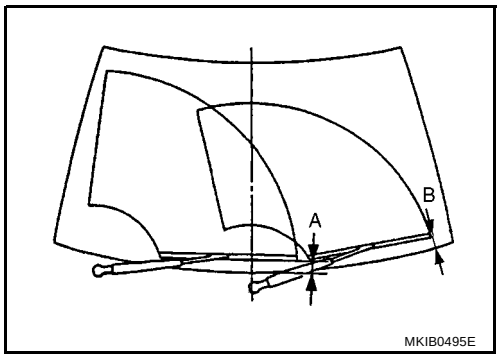
INSTALLATION

1. Lower wiper blade to glass so that center end of blade comes to the position shown in diagram. Align blade end with marking set within blade set position black print.)
2. Tighten wiper arm nuts.

Wiper arm nut:

: 20.6 - 26.5 N·m (2.1 - 2.7 kg-m, 15- 20 ft-lb)

3. Spray washer fluid. Turn wiper switch ON to operate wiper motor, then turn it OFF (auto stop).
4. Make sure wiper blade stops at the position shown in the figure.



MKIB0495E

Stop position A : 33.7 - 48.7 mm (1.327 - 1.917 in)

Stop position B : 33.7 - 48.7 mm (1.327 - 1.917 in)

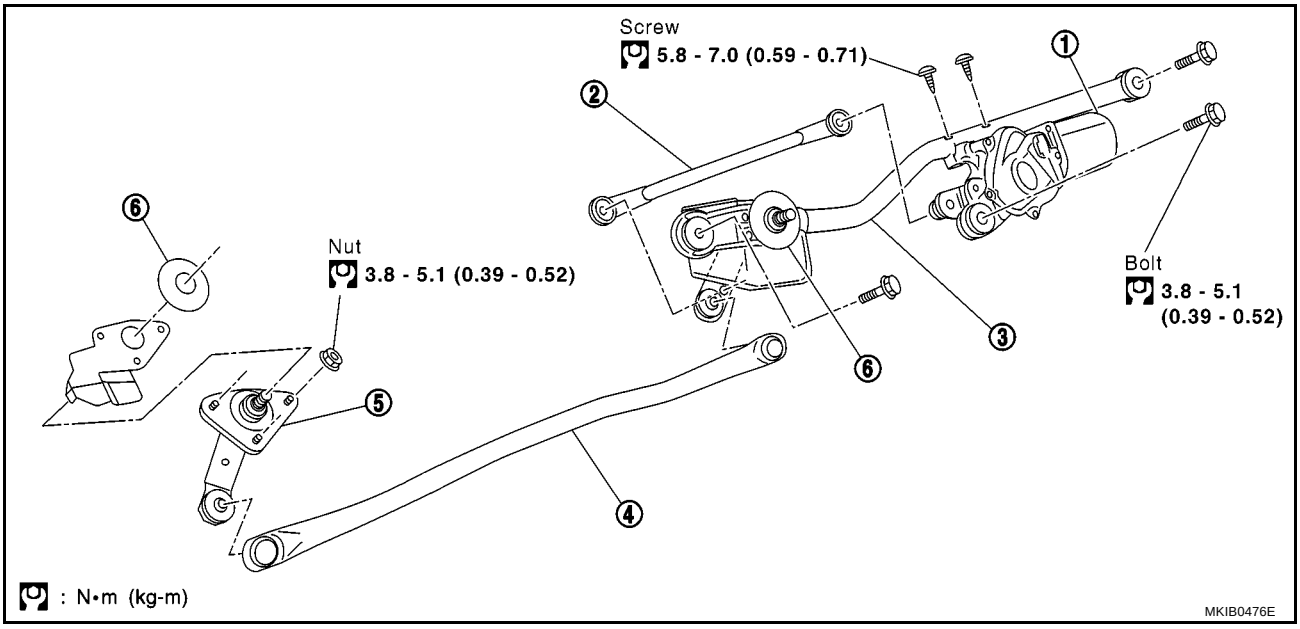
Adjustment of Front Wiper Arm Stop Position

EKS0088I

Refer to WW-76, "Removal and Installation of Front Wiper Arm" .

Removal and Installation of Front Wiper Motor and Link

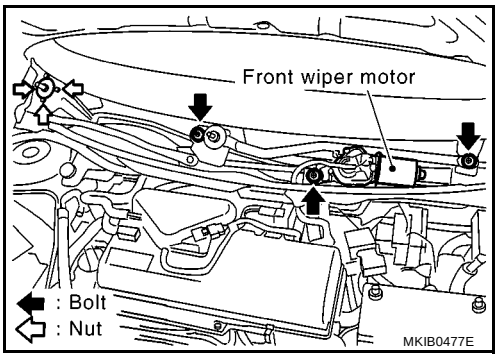
EKS0088J



1. Wiper motor
2. Wiper link
3. Wiper frame
4. Wiper link
5. Pivot
6. Shaft seal

REMOVAL

1. Operate the wiper motor, and stop it at the auto stop position.
2. Remove wiper arm nuts, and remove wiper arm from vehicle.
3. Remove cowl top cover. Refer to EI-10, "COWL TOP" .
4. Remove wiper motor connector.
5. Remove shaft seal
6. Remove wiper motor assembly bolts and driver pivot nuts, and then remove wiper motor assembly from vehicle.
7. Remove the wiper link from the wiper frame and the motor arm.
8. Remove wiper motor screws, and then remove wiper motor from wiper frame.



INSTALLATION

1. Connect the wiper motor to the vehicle-side connector. Turn the wiper switch ON to operate the wiper motor, then turn the wiper switch OFF (auto stop).
2. Disconnect wiper motor connector.
3. Install wiper motor to wiper frame.

Wiper motor screw

: 5.8 - 7.0 N·m (0.59 - 0.71 kg-m, 51 - 62 in-lb)

4. Install wiper link to wiper frame and motor arm.
5. Connect wiper motor assembly to the connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
6. Install the wiper motor assembly to the vehicle.

Wiper motor assembly bolt

: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

Pivot nut

: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

7. Install shaft seal
8. Install cowl top cover. Refer to EI-10, "COWL TOP" .
9. Attach wiper arms.

CAUTION:

- **Do not drop the wiper motor or cause it to contact other parts.**
- **Check the grease conditions of the motor arm and wiper link joint (at retainer). Apply grease if necessary.**
  NISSAN MP special grease No. 2 (KRB0012025)

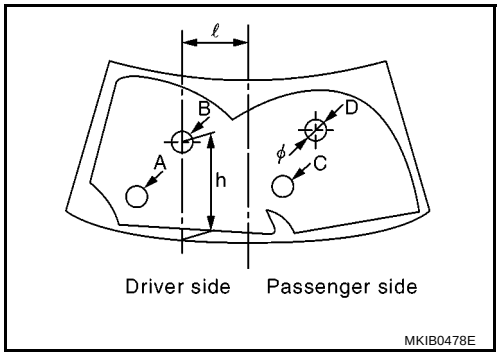
Adjustment of Spray Positions of Front Washer Nozzle

EKS0088K

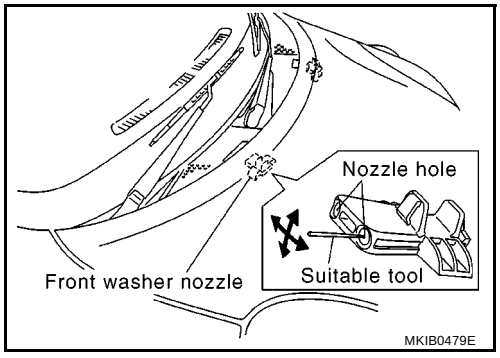
Adjust spray positions to match the positions listed below.

Unit: mm (in)

Spray position	h	l (width)	ϕ (spray point area)
A	165 (6.50)	375 (14.76)	80 (3.15)
B	342 (13.46)	157 (6.18)	80 (3.15)
C	253 (9.96)	109 (4.29)	80 (3.15)
D	347 (13.66)	299 (11.77)	80 (3.15)

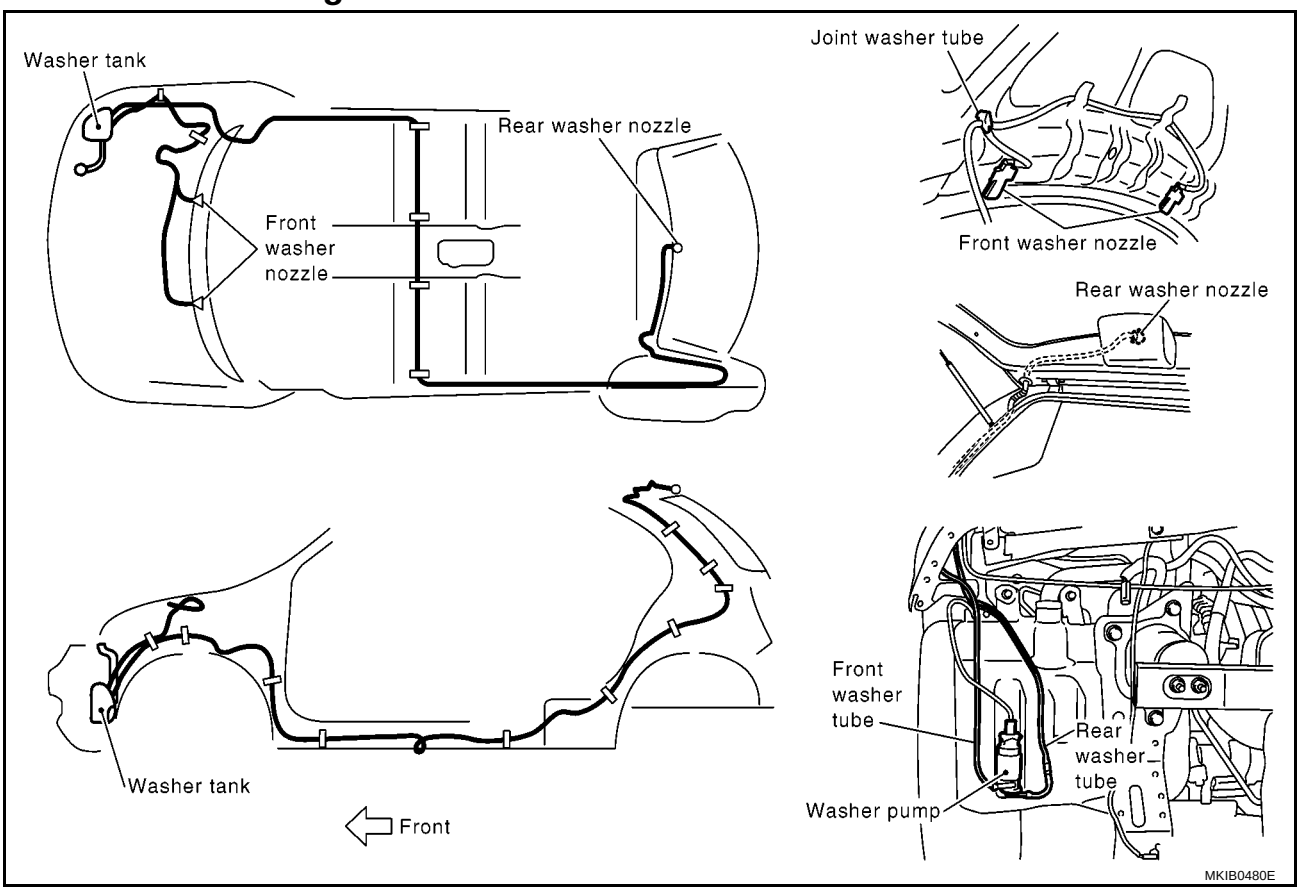


To adjust the spray position, insert a needle or similar object into the spray opening and move up/down and left/right.



Washer Hose Routing

EKS0088L

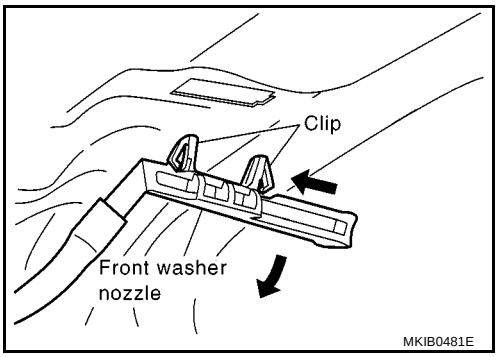


Removal and Installation of Front Washer Nozzle

EKS0088M

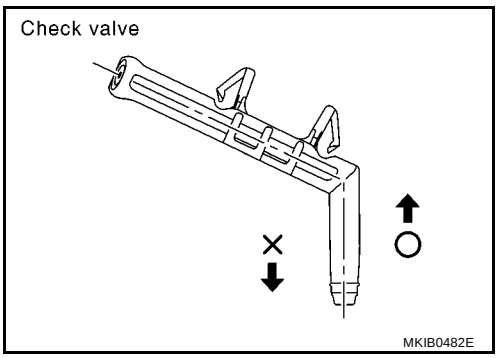
REMOVAL

1. Open hood.
2. While pushing nozzle spray point side along body, use the nozzle stop point as the support point and rotate nozzle to remove it from body.
3. Remove washer tube.



CHECK VALVE INSPECTION

Make sure air can pass through the hose by blowing forward (toward the nozzle) and air cannot pass through by sucking.



INSTALLATION

1. Install washer tube in nozzle.
2. Install nozzle to body.

3. Adjust nozzle spray location.

CAUTION:
The spray points differ, so be sure to install left and right nozzles correctly.

Inspection of Front Wiper and Washer Switch Circuit

EKS0088N

Refer to LT-196, "Check Combination Switch" .

Removal and Installation of Front Wiper and Washer Switch

EKS0088O

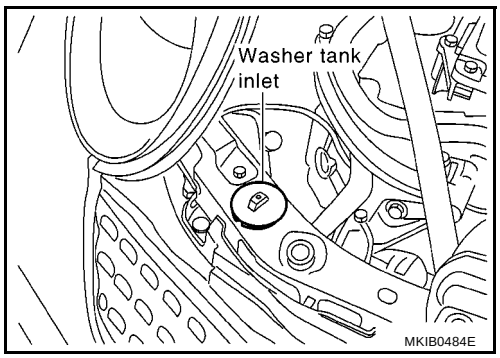
Refer to LT-199, "Removal and Installation" .

Removal and Installation of Front Wiper and Washer Tank

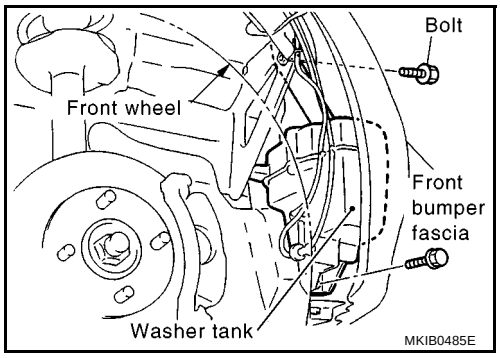
EKS0088P

REMOVAL

1. Remove cap, and while pushing down fill opening, remove washer tank inlet from radiator core support upper.



2. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
3. Remove washer pump connector.
4. Remove washer tank bolts.



5. Remove the washer hose, and remove the washer tank from the vehicle.

INSTALLATION

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

CAUTION:
After installing, add water up to the top of the inlet washer tank. Make sure there is no leakage.

Washer tank mounting screw

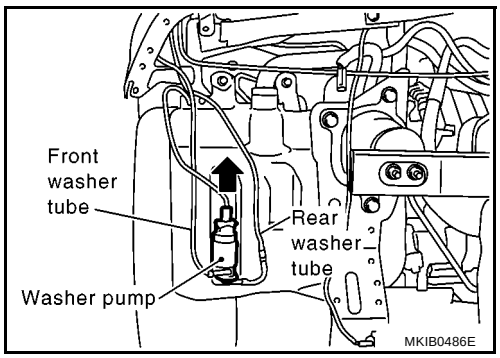
: 3.8 - 5.1 N·m (0.39 - 0.52 kg-m, 34 - 45 in-lb)

Removal and Installation of Front Wiper and Washer Pump

EKS0088Q

REMOVAL

1. Remove fender protector. Refer to EI-11, "FENDER PROTECTOR" .
2. Remove washer pump connector and hose.
3. Pull out the washer pump in the direction shown by the arrow, and remove the washer pump from the washer tank.



INSTALLATION

Paying attention to the items listed below, install in the reverse order of removal.

CAUTION:

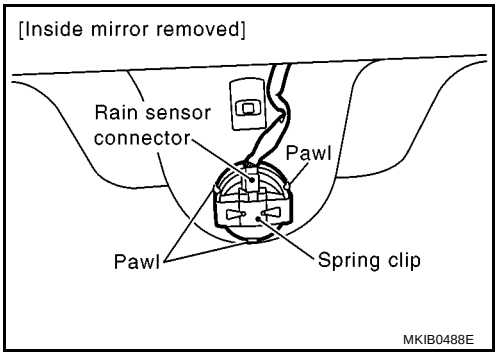
When installing the washer pump, there must be no twisting or other unusual stress on the packing.

Removal and Installation of Rain Sensor

EKS0088V

REMOVAL

1. Remove inside mirror. Refer to GW-80, "INSIDE MIRROR" .
2. Remove clip and pawl.
3. Pull out the rain sensor.
4. Remove rain sensor harness connector.



SMA for VIN >SJNxxAK12U1000000

INSTALLATION

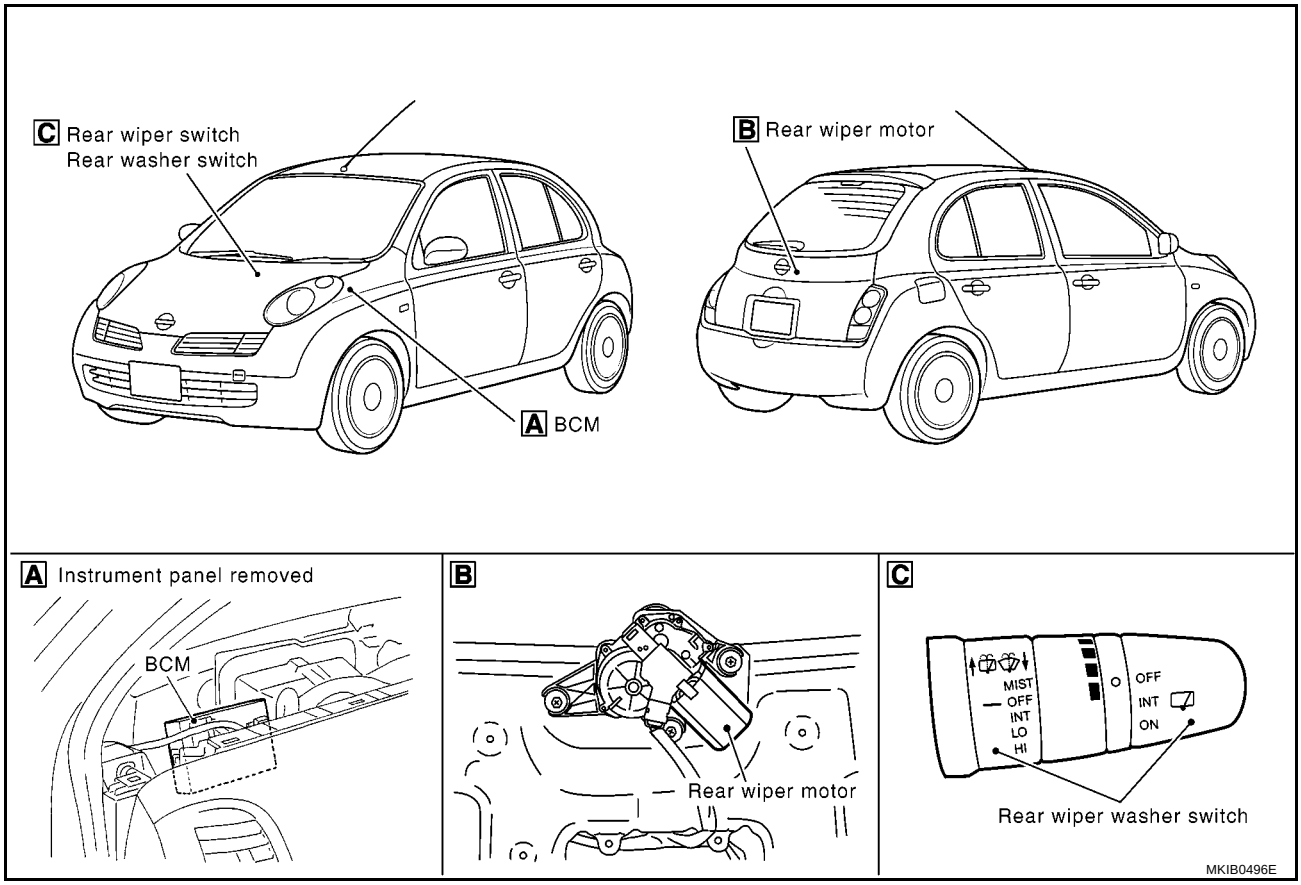
Install in the reverse order of removal.

REAR WIPER AND WASHER SYSTEM

PFP:28710

Components Parts and Harness Connector Location

EKS0087E



System Description

EKS0087F

- Wiper switch (combination switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM when switch is turned ON.
- BCM controls rear wiper and INT (intermittent) operation.

Power is supplied at all times

- through 40A fusible link (letter J, located in fuse and fusible link box)
- to BCM terminals 74 and 79.

When ignition switch turned ON or START position, power is supplied

- through 10A fuse [No. 4 located in the fuse block (J/B)]
- to BCM terminal 24.
- through 15A fuse [No. 1 located in the fuse block (J/B)]
- to combination switch terminal 11.

Ground is supplied

- through body grounds M19 and M20
- to BCM terminals 2 and 70, and
- to combination switch terminal 12.
- through body ground B17, B23, B44 and B51
- to rear wiper motor terminal 3.

WIPER OPERATION

BCM read combination switch condition (Refer to WW-83, "BCM WIPER SWITCH READING FUNCTION"), Power is supplied

- through BCM terminal 71
- to rear wiper motor terminal 1.

Ground is supplied

- to rear wiper motor terminal 3
- through body grounds B17, B23, B44 and B51.

With power and ground supplied, the rear wiper motor operates.

INTERMITTENT OPERATION

The rear wiper motor operates the wiper arms at low speed of approximately every 7 seconds. This feature is controlled by the BCM.
When rear wiper switch is placed in INT position, BCM read combination switch condition (Refer to WW-83, "BCM WIPER SWITCH READING FUNCTION"), power is supplied.

- through BCM terminal 71.
- to rear wiper motor terminal 1

Ground is supplied.

- to rear wiper motor terminal 3
- through body ground B17, B23, B44 and B51.

The wiper motor operates at intermittent.

WASHER OPERATION

When rear wiper switch is pushed to WASH position,
Power is supplied.

- through combination switch terminal 14
- to washer motor terminal 2.

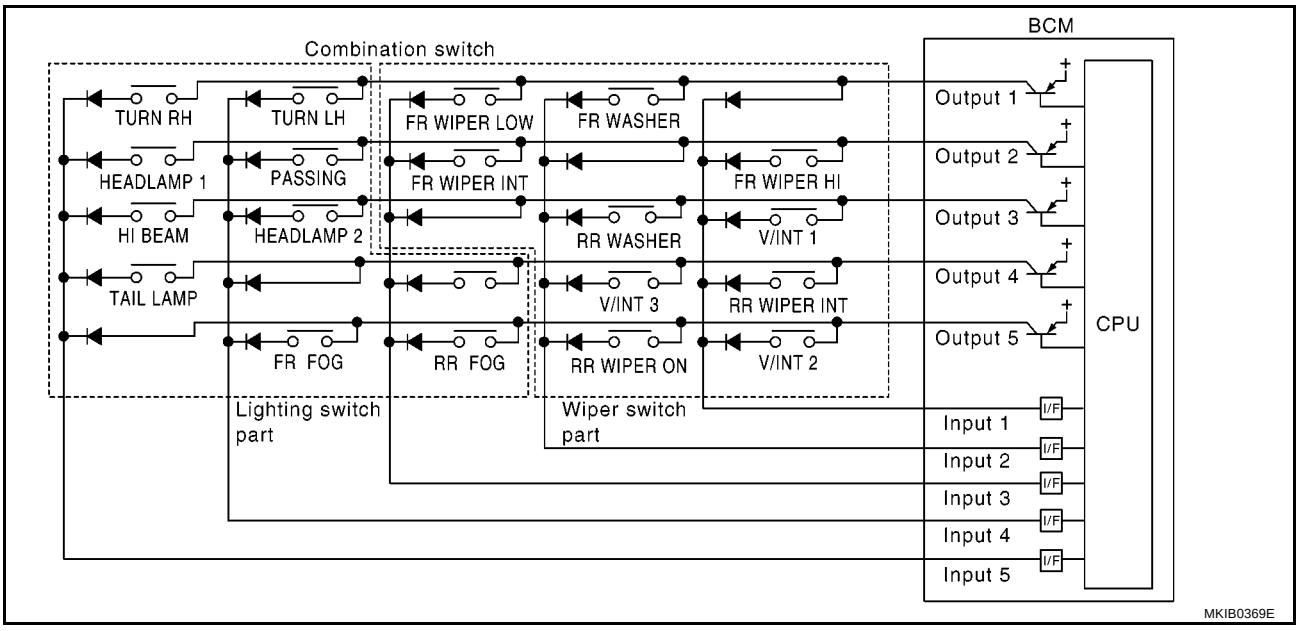
Ground is supplied

- to washer motor terminal 1
- to combination switch terminals 12 and 13, and
- through grounds M19 and M20.

With power and ground supplied, the rear washer motor is operated, and at the same time,
When the wiper switch is pushed to the WASH position for 1 second or more, BCM reads combination switch condition (Refer to WW-83, "BCM WIPER SWITCH READING FUNCTION"), rear wiper motor is operated by BCM, and the rear wiper motor operates approximately 3 times after wiper switch is released.

BCM WIPER SWITCH READING FUNCTION

BCM reads combination switch (wiper switch) status, and controls rear wipers based on the results.
BCM is a combination of 5 output terminals (output 1 - 5) and 5 input terminals (input 1 - 5). It reads 20 types of switch data and 5 types of diagnosis data.



Operation Description

- BCM operates output terminal (output 1 to 5) transistor at a set period and turns ON the current in order.
- When any (or multiple) switches are turned ON, a circuit is formed between the output terminals (output 1 to 5) and input terminals (input 1 to 5).
- At this time, when output terminals (output 1 to 5) operate transistors and carry current. If voltage of corresponding input terminal (input 1 to 5) changes, interface in BCM detects this state and judges that switch is ON.

Table of BCM - Combination Switch Operations

BCM reads operation status of combination switch using combinations shown in table below.

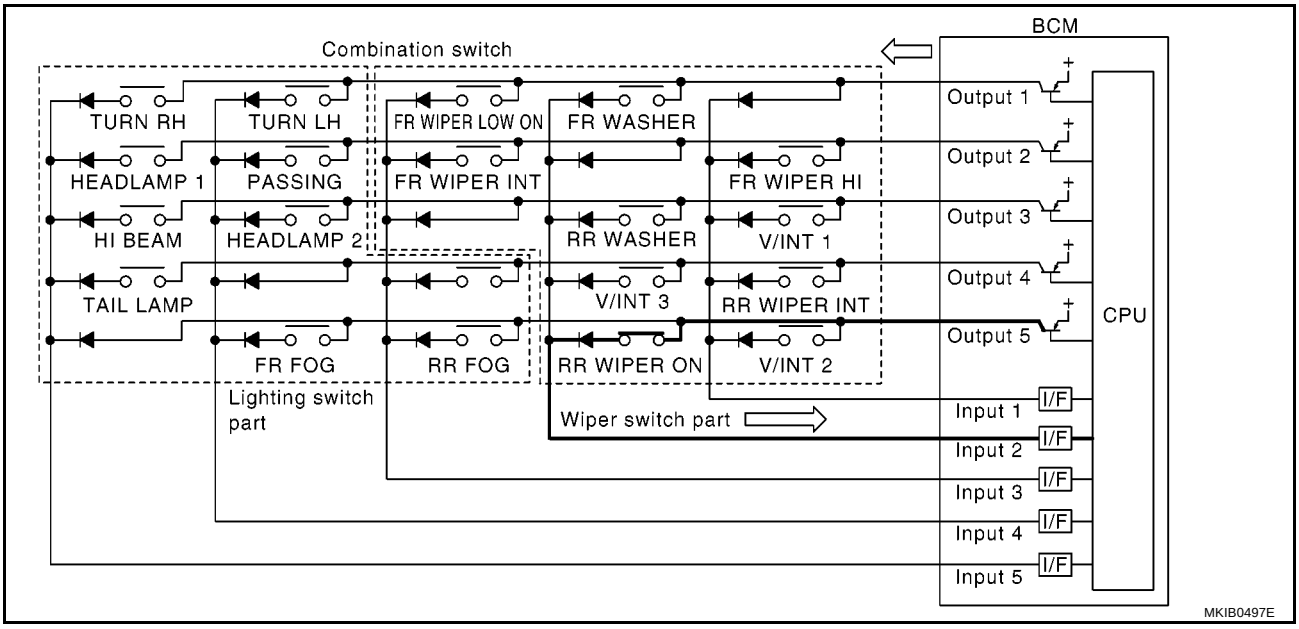
	Combination SW INPUT 1		Combination SW INPUT 2		Combination SW INPUT 3		Combination SW INPUT 4		Combination SW INPUT 5	
	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Combination SW OUTPUT 1	—	—	FR WIPER HI ON	FR WIPER HI OFF	V/INT 1 ON	V/INT 1 OFF	RR WIPER INT ON	RR WIPER INT OFF	V/INT 2 ON	V/INT 2 OFF
Combination SW OUTPUT 2	FR WASHER ON	FR WASHER OFF	—	—	RR WASHER ON	RR WASHER OFF	V/INT 3 ON	V/INT 3 OFF	RR WIPER ON	RR WIPER OFF
Combination SW OUTPUT 3	FR WIPER LOW ON	FR WIPER LOW OFF	FR WIPER INT ON	FR WIPER INT OFF	—	—	—	—	RR FOG ON	RR FOG OFF
Combination SW OUTPUT 4	TURN LH ON	TURN LH OFF	PASSING ON	PASSING OFF	HEADLAMP 2 ON	HEADLAMP 2 OFF	—	—	FR FOG ON	FR FOG OFF
Combination SW OUTPUT 5	TURN RH ON	TURN RH OFF	HEADLAMP 1 ON	HEADLAMP 1 OFF	HI BEAM ON	HI BEAM OFF	TAIL LAMP ON	TAIL LAMP OFF	—	—

MKIB0370E

Sample Operation: (Rear Wiper Switch Placed In LO Position)

- If rear wiper switch is turned to ON position, the contact of rear wiper ON in combination switch is turned ON. At this time, when output 5 transistor operates, driver control unit detects that voltage has been changed at input 2.
- When output 5 transistor is ON and BCM detects current changes at input 2, BCM determines that wiper switch is at ON.

- When output 5 transistor operates again and BCM detects voltage change at input 2, BCM recognizes that rear wiper ON operation is continuing.



NOTE:
Each OUTPUT terminal transistor is activate at 20 ms intervals. Therefore, after a switch is turned ON, electrical loads are activated with a time delay, However, this delay is so small it is undetectable.

CAN Communication

EKS00K7S

SYSTEM DESCRIPTION

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

CAN Communication Unit

EKS00K7T

Go to CAN system, when selecting your car model from the following table.

Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable	
CAN communication unit																				
ECM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Data link connector	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Intelligent Key unit	×	×			×	×			×	×			×	×			×	×		
Drive computer	×		×		×		×		×		×		×		×		×		×	
EPS control unit	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
BCM	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

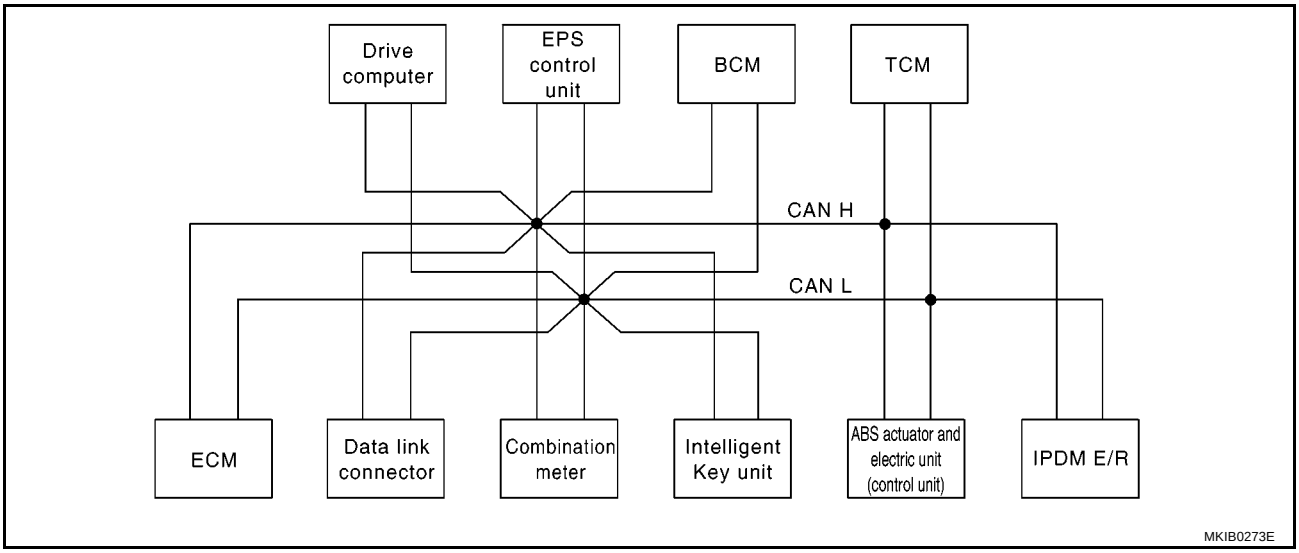
Body type	3door/5door																			
Axle	2WD																			
Engine	CR10DE/CR12DE/CR14DE								CR12DE/CR14DE								K9K			
Handle	LHD/RHD																			
Brake control	ABS system								ESP system								ABS			
Transmission	A/T				M/T				A/T				M/T				M/T			
Intelligent Key system	Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable		Appli-cable		Not appli-cable	
CAN communication unit																				
ABS actuator and electric unit (control unit)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
TCM	×	×	×	×					×	×	×	×								
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
CAN communication type	WW-87, "TYPE 1/TYPE 2"				WW-90, "TYPE 3/TYPE 4"				WW-92, "TYPE 5/TYPE 6"				WW-95, "TYPE 7/TYPE 8"				WW-97, "TYPE 9/TYPE 10"			

×: Applicable

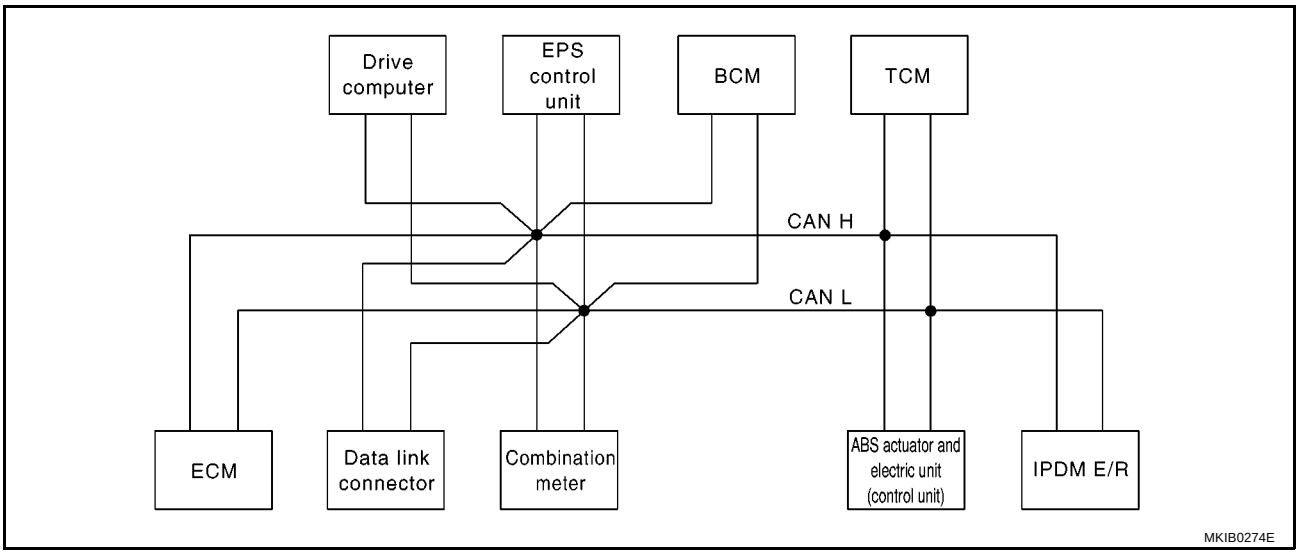
TYPE 1/TYPE 2

System diagram

- Type 1



- Type 2



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R				
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T							R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T							R	

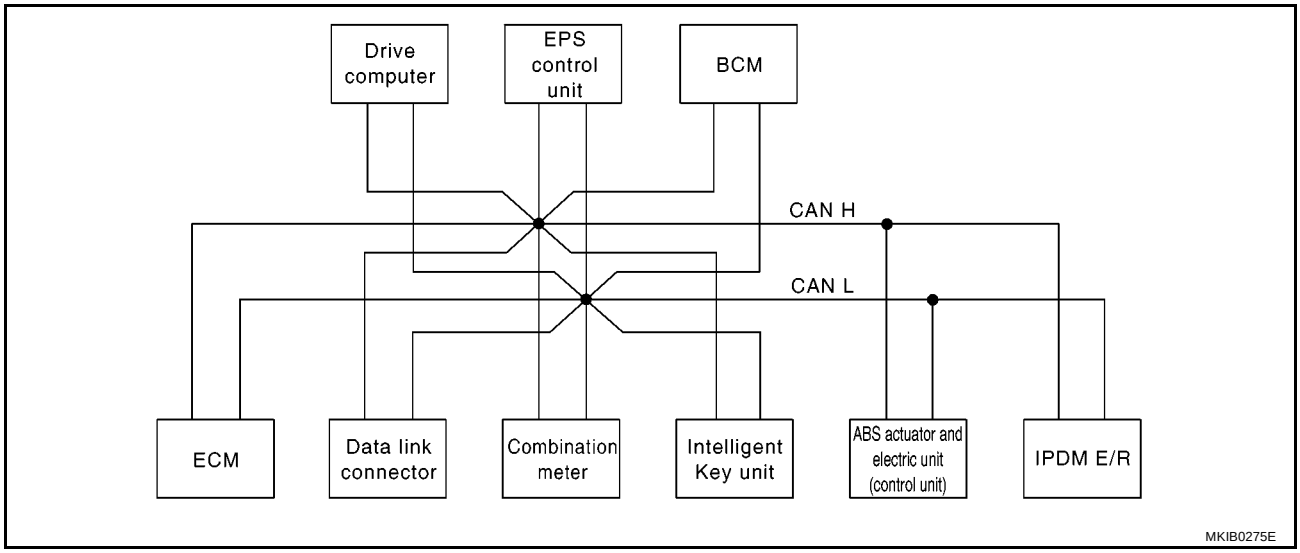
Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ABS operation signal	R						T		
Brake warning lamp signal		R		R			T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

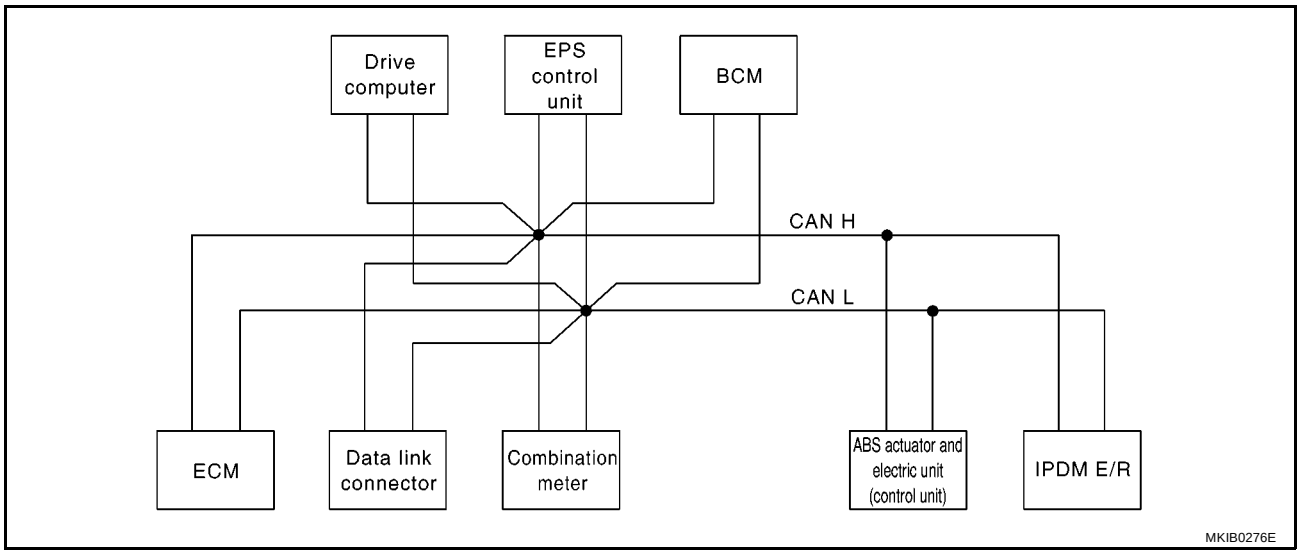
TYPE 3/TYPE 4

System diagram

- Type 3



- Type 4



Input/output signal chart

T: Transmit R: Receive

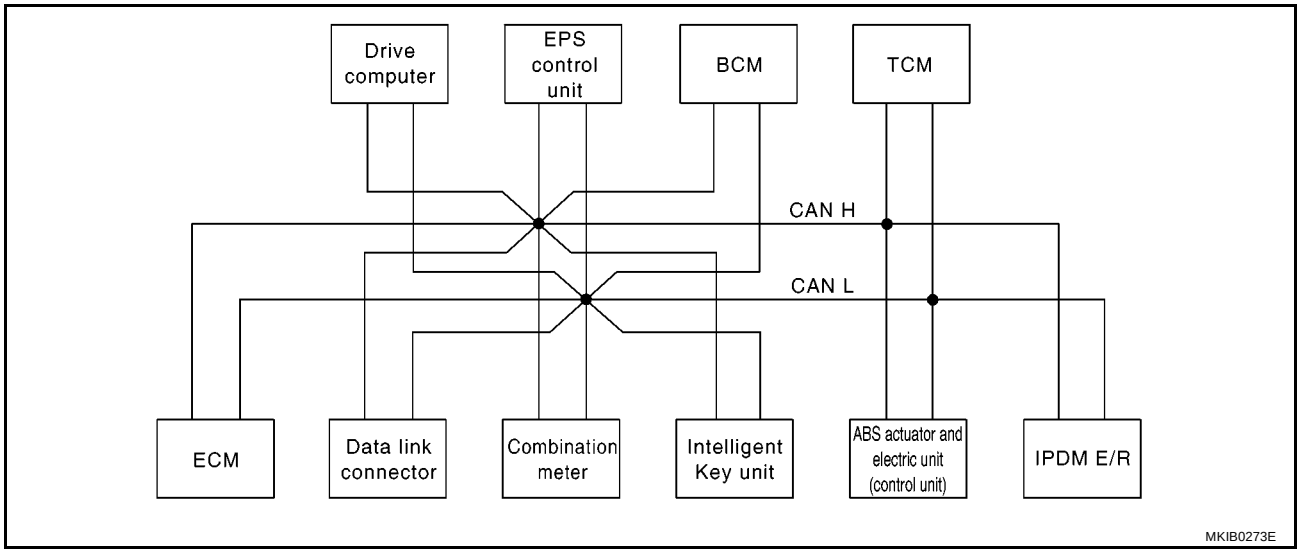
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal	R			R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

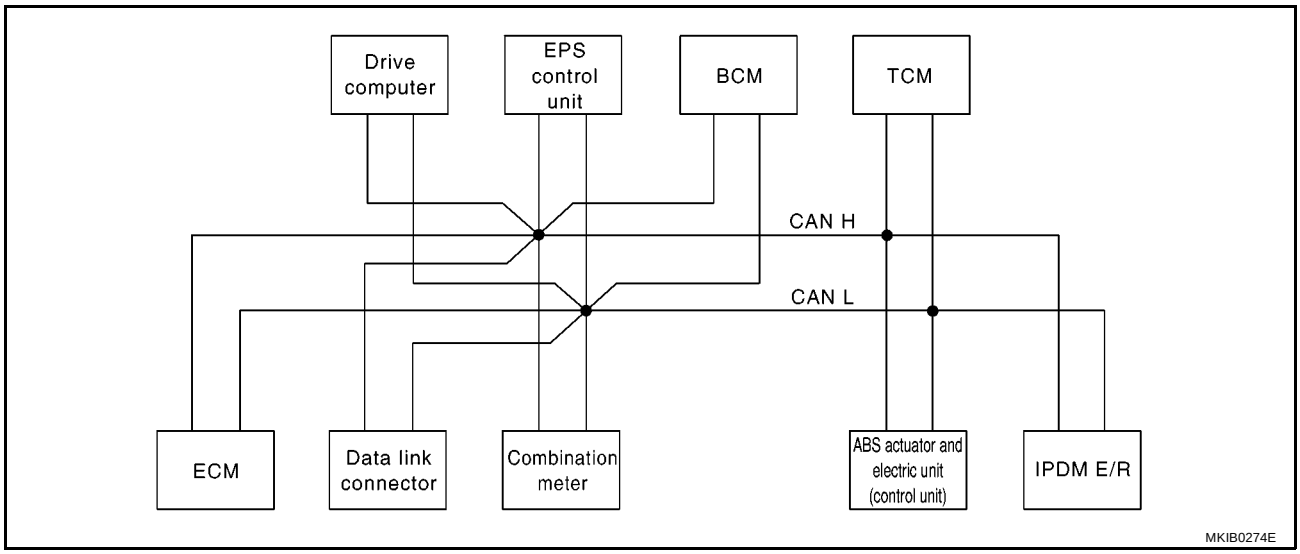
TYPE 5/TYPE 6

System diagram

- Type 5



- Type 6



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
Engine speed signal	T	R		R	R		R		
Engine coolant temperature sig-nal	T	R							
A/T self-diagnosis signal	R							T	
Output shaft revolution signal	R							T	
Accelerator pedal position signal	T						R	R	
Closed throttle position signal	T							R	
Wide open throttle position sig-nal	T						R	R	

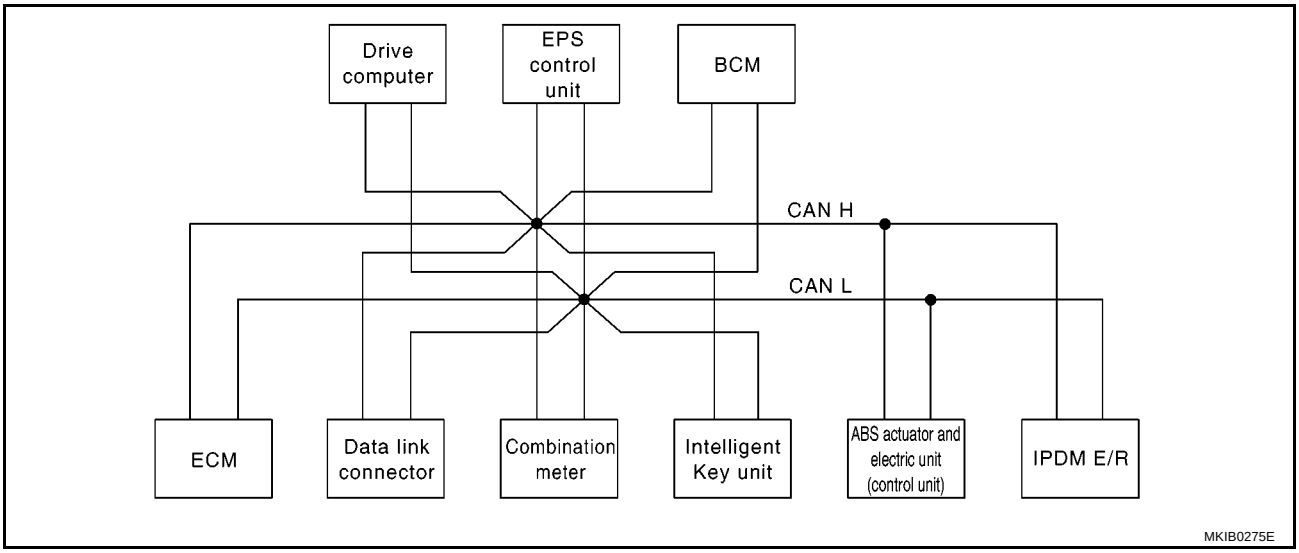
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
A/T shift position signal		R						T	
A/T shift schedule change demand signal							T	R	
Stop lamp switch signal		T						R	
O/D OFF indicator lamp signal		R						T	
Engine and A/T integrated control signal	T							R	
	R							T	
Fuel consumption monitor signal	T	R							
Oil pressure switch signal		R		R					T
A/C compressor request signal	T								R
A/C switch signal	R								T
Heater fan switch signal	R					T			
Cooling fan speed request signal	T								R
Cooling fan speed status signal	R								T
Position lights request signal		R		R		T			R
Position light status signal	R								T
Low beam request signal						T			R
Low beam status signal	R								T
High beam request signal		R				T			R
High beam status signal	R								T
Day time light request signal						T			R
Vehicle speed signal	R	R			R		T		
	R	T	R	R	R	R			
Sleep/wake up signal		R	R			T			R
Door switch signal		R	R	R		T			R
Turn indicator signal		R				T			
Buzzer output signal		R				T			
		R	T						
MI signal	T	R		R					
Front wiper request signal						T			R
Front wiper stop position signal						R			T
Rear window defogger switch signal						T			R
Rear window defogger control signal	R								T
Drive computer signal		T		R					
EPS warning lamp signal		R		R	T				
ABS warning lamp signal		R		R			T		
ESP warning lamp signal		R		R			T		
ESP OFF indicator signal		R					T		
SLIP indicator lamp signal		R					T		

Signals	ECM	Combi-nation meter.	Intelli-gent Key unit	Drive com-puter	EPS control unit	BCM	ABS actuator and electric unit (control unit)	TCM	IPDM E/R
ESP operation signal	R						T		
TCS operation signal	R						T		
ABS operation signal	R						T		
Steering angle signal					T		R		
Brake warning lamp signal		R					T		
Buck-up lamp signal					R	T			
Fuel low warning signal		T		R					
Battery charge malfunction signal		T		R					
Air bag system warning signal		T		R					
Brake fluid level warning signal		T		R					
Engine coolant temperature warning signal		T		R					
Front fog lamp request signal		R				T			R
Rear fog lamp status signal		R				T			
Headlamp washer request signal						T			R
Door lock/unlock request signal			R			T			
Door lock/unlock status signal			R			T			
KEY indicator signal		R	T						
LOCK indicator signal		R	T						

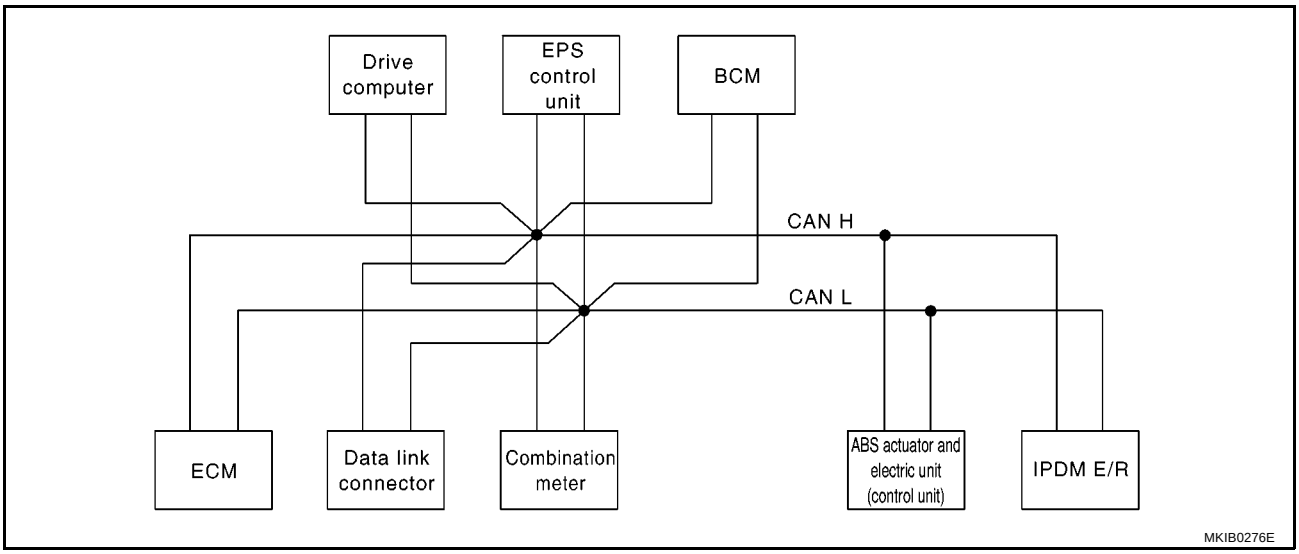
TYPE 7/TYPE 8

System diagram

- Type 7



- Type 8



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R		R	
Engine coolant temperature signal	T	R						
Fuel consumption monitor signal	T	R						
Accelerator pedal position signal	T						R	
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
A/C switch signal	R							T
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R

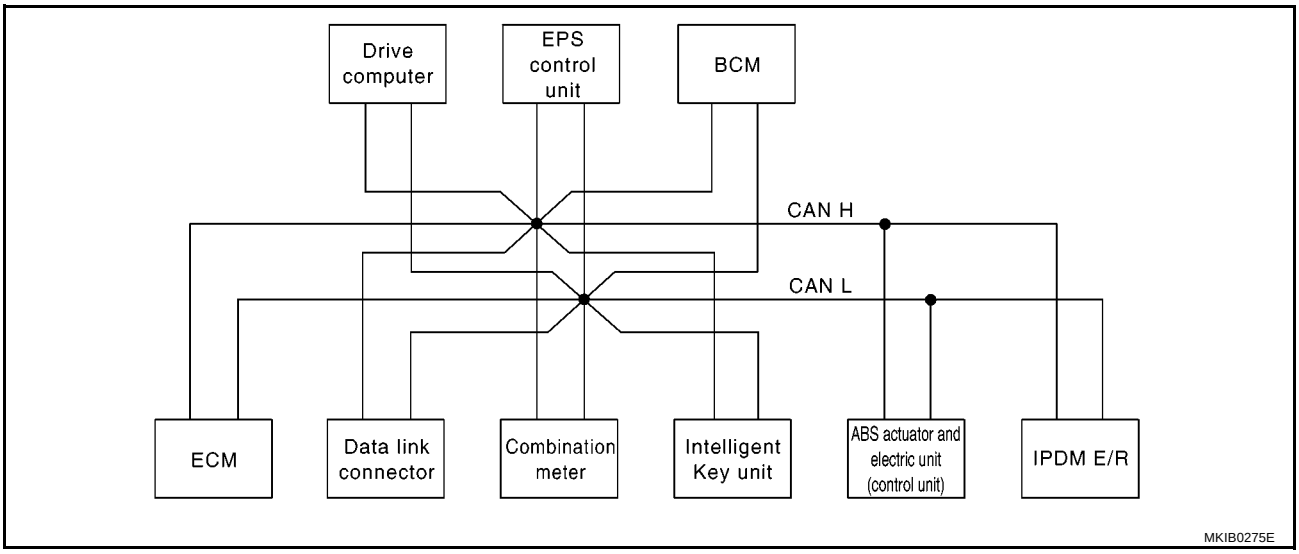
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Cooling fan speed status signal	R							T
Position lights request signal		R		R		T		R
Position light status signal	R							T
Low beam request signal						T		R
Low beam status signal	R							T
High beam request signal		R				T		R
High beam status signal	R							T
Day time light request signal						T		R
Vehicle speed signal	R	R			R		T	
	R	T	R	R	R	R		
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Rear window defogger control signal	R							T
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ESP warning lamp signal		R		R			T	
ESP OFF indicator signal		R					T	
SLIP indicator lamp signal		R					T	
ESP operation signal	R						T	
TCS operation signal	R						T	
ABS operation signal	R						T	
Steering angle signal					T		R	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Door lock/unlock request signal			R			T		
Door lock/unlock status signal			R			T		
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

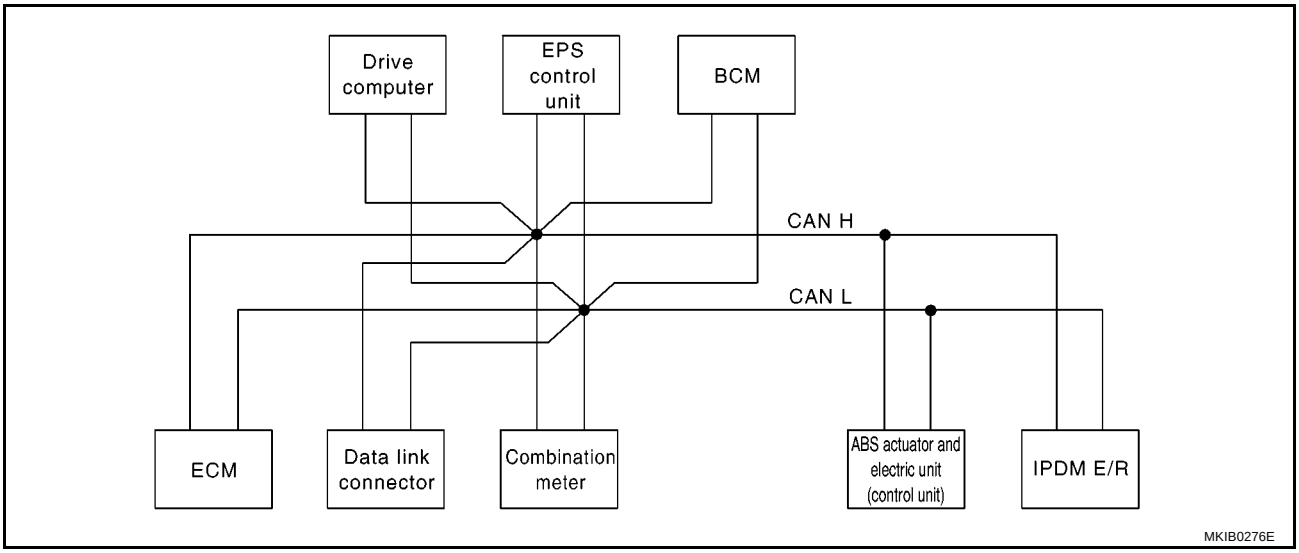
TYPE 9/TYPE 10

System diagram

- Type 9



- Type 10



Input/output signal chart

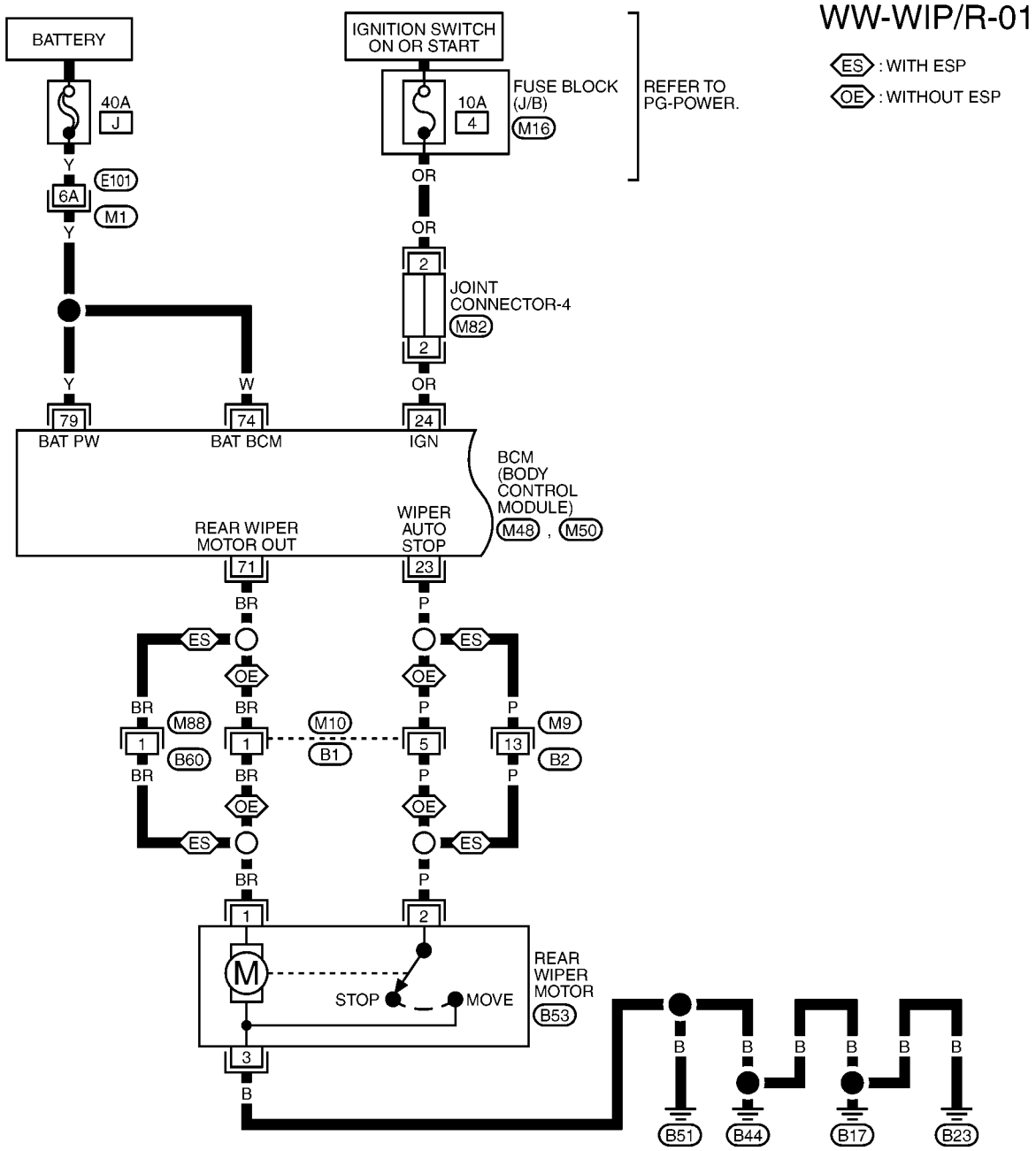
T: Transmit R: Receive

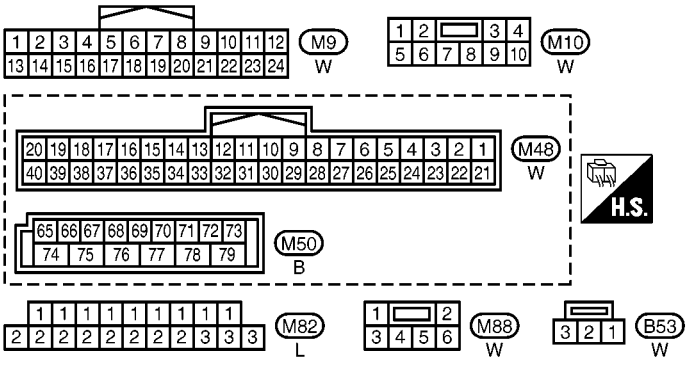
Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R		R	R			
Engine coolant temperature signal	T	R				R		
Fuel consumption monitor signal	T	R						
Oil pressure switch signal		R		R				T
A/C compressor request signal	T							R
Heater fan switch signal	R					T		
Cooling fan speed request signal	T							R
Position lights request signal		R		R		T		R
Low beam request signal						T		R
High beam request signal		R				T		R
Day time light request signal						T		R
Vehicle speed signal	R	R			R	R	T	
	R	T	R	R	R			
Sleep/wake up signal		R	R			T		R
Door switch signal		R	R	R		T		R
Turn indicator signal		R				T		
Buzzer output signal		R				T		
		R	T					
MI signal	T	R		R				
Front wiper request signal						T		R
Front wiper stop position signal						R		T
Rear window defogger switch signal						T		R
Drive computer signal		T		R				
EPS warning indicator signal		R		R	T			
ABS warning lamp signal		R		R			T	
ABS operation signal				R			T	
Brake warning lamp signal		R					T	
Buck-up lamp signal					R	T		
Fuel low warning signal		T		R				
Battery charge malfunction signal		T		R				
Air bag system warning signal		T		R				
Brake fluid level warning signal		T		R				
Engine coolant temperature warning signal		T		R				
Front fog lamp request signal		R				T		R
Rear fog lamp status signal		R				T		
Headlamp washer request signal						T		R
Door lock/unlock request signal			T			R		
Door lock/unlock status signal			R			T		

Signals	ECM	Combination meter.	Intelligent Key unit	Drive computer	EPS control unit	BCM	ABS actuator and electric unit (control unit)	IPDM E/R
KEY indicator signal		R	T					
LOCK indicator signal		R	T					

Wiring Diagram — WIP/R —

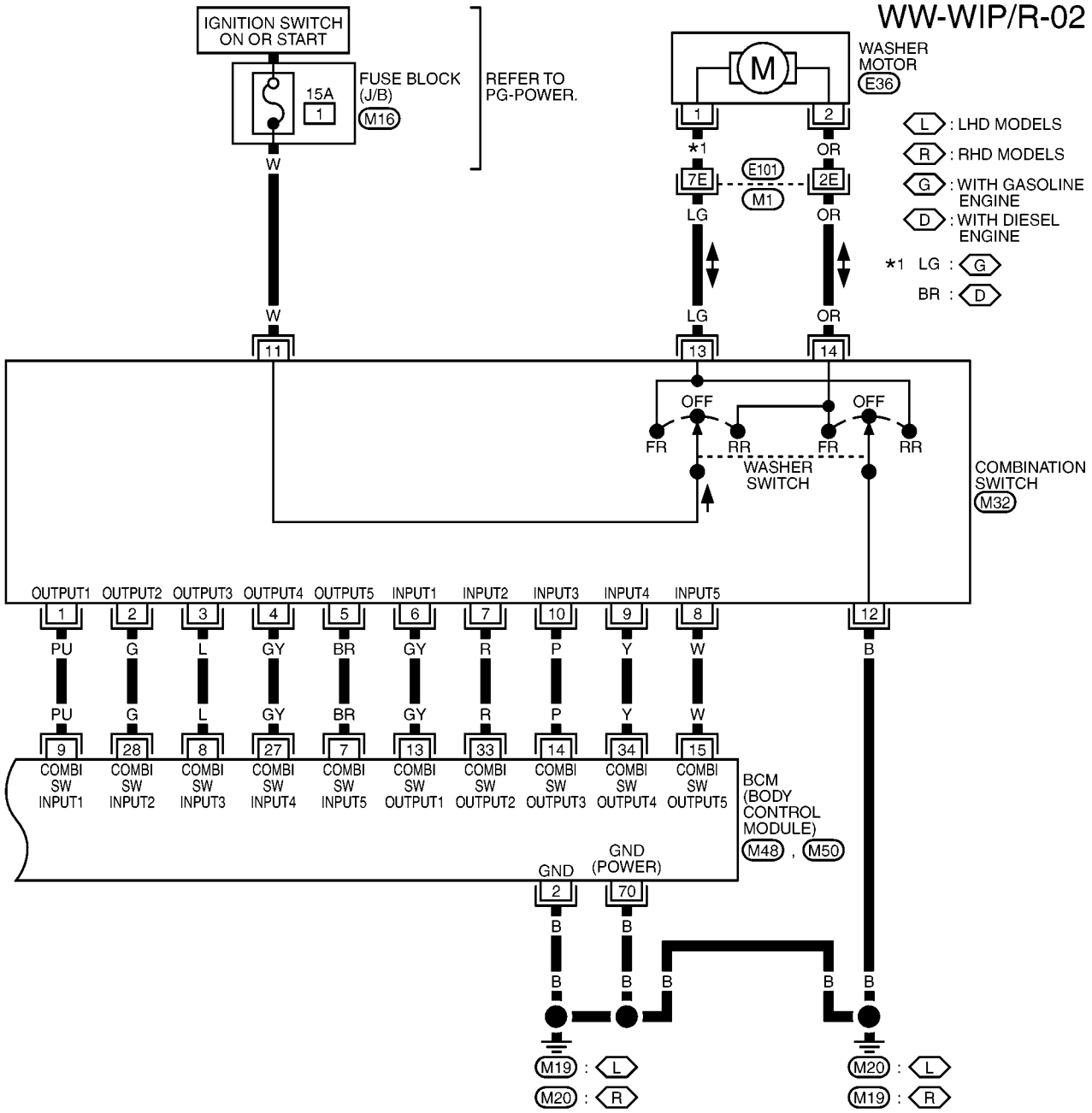
SMA for VIN >SJN**AK12U1309269 EKS0087H

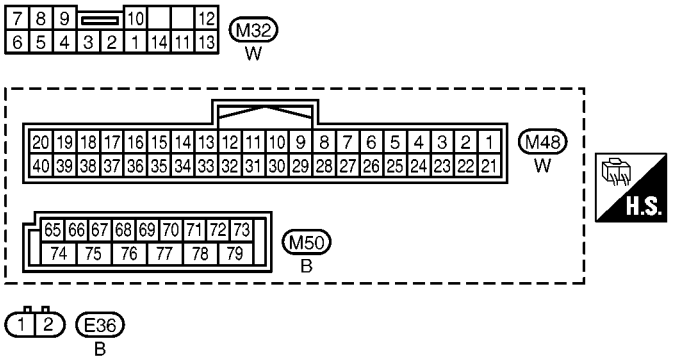




REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1816E



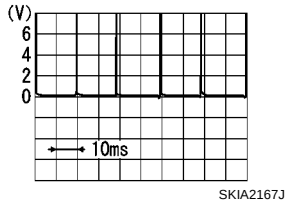
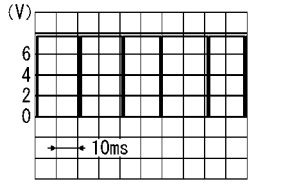
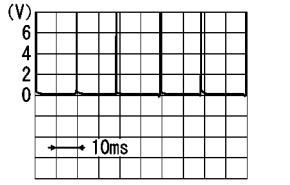


REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)

MKWA1465E

Terminals and Reference Values for BCM

EKS0087G

Terminal No.	Wire color	Signal designation	Measuring condition		Reference value (V)
			Ignition switch	Operation or condition	
2	B	Ground	ON	—	Approx. 0
7	BR	Combination switch input 5	ON	Headlamps, turn signal, wipers OFF	 SKIA2167J
8	L	Combination switch input 3			
9	PU	Combination switch input 1			
27	GY	Combination switch input 4			
28	G	Combination switch input 2			
13	GY	Combination switch output 1	ON	Headlamps, turn signal, wipers OFF (wiper volume is 1 or 7)	 SKIA2166J
14	P	Combination switch output 3			
15	W	Combination switch output 5			
33	R	Combination switch output 2		Headlamps, turn signal, wipers OFF (wiper volume is other than 1 or 7)	 SKIA2167J
34	Y	Combination switch output 4			
23	P	Rear wiper position detection signal	ON	Rear wiper operating	Approx. 0
				Rear wiper not operating	Approx. 12
24	OR	Ignition power supply	ON	—	Approx. 12
70	B	Ground	ON	—	Approx. 0
71	BR	Rear wiper operation signal	ON	Rear wiper operating	Approx. 12
				Rear wiper not operating	Approx. 0
74	W	Battery power supply	OFF	—	Approx. 12
79	Y	Battery power supply	OFF	—	Approx. 12

How to Proceed With Trouble Diagnosis

EKS0087I

1. Confirm the symptoms and customer complaint.
2. Understand operation description and function description. Refer toWW-82, "System Description" .
3. Carry out the Preliminary check. Refer to WW-103, "Preliminary Check" .
4. Check symptom and repair or replace the cause of malfunction.
5. Does the rear wiper operate normally? Yes: GO TO 6. No: GO TO 4.
6. INSPECTION END.

Preliminary Check

EKS008WI

CHECK POWER SUPPLY AND GROUND CIRCUIT

1. CHECK FUSES

- Check fuse and fusible link for blown-out.

UNIT	POWER SOURCE	FUSE No.
BCM	Battery	J
	Ignition switch ON or START position	4
Combination switch	Ignition switch (ON)	1

Refer to WW-100, "Wiring Diagram — WIP/R —" .

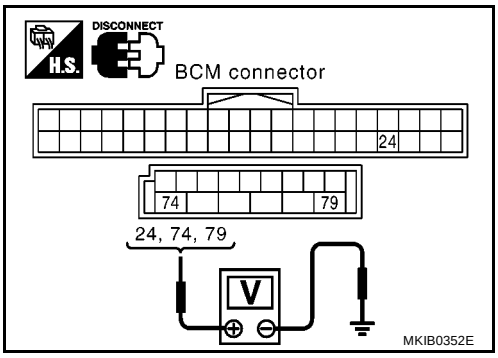
OK or NG

OK >> GO TO 2.

NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-4, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check voltage between BCM harness connector and ground.



Terminals			Ignition switch position		
(+)		(–)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M50	74 (W)	Ground	Battery voltage	Battery voltage	Battery voltage
M50	79 (Y)		Battery voltage	Battery voltage	Battery voltage
M48	24 (OR)		0V	0V	Battery voltage

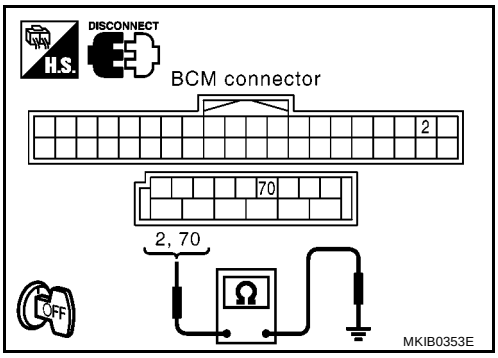
OK or NG

OK >> GO TO 3.

NG >> Check harness for open or short between BCM and fuse.

3. CHECK GROUND CIRCUIT

Check continuity between BCM harness connector and ground.



Terminals			Continuity
(+)		(–)	
Connector	Terminal (Wire color)		
M48	2 (B)	Ground	Yes
M50	70(B)	Ground	Yes

OK or NG

OK >> INSPECTION END.

NG >> Check harness ground circuit.

CONSULT-II Function (BCM)

EKS007BF

Refer to WW-31, "CONSULT-II Function (BCM)" .

Rear Wiper Does Not Operate

EKS0087K

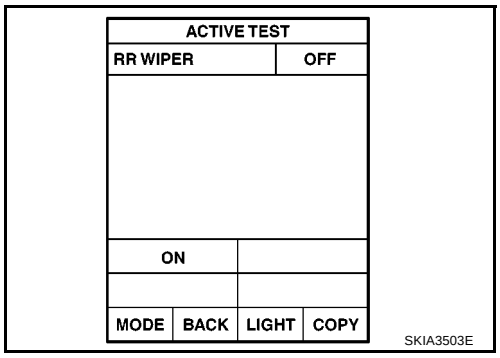
1. CHECK REAR WIPER OPREATION

With CONSULT-II

1. Select “BCM” by CONSULT-II, and select “ACTIVE TEST” on “SELECT DIAG MODE” screen.
2. Select “REAR WIPER” on “SELECT TEST ITEM” screen.
3. Make sure that rear wipers operate normally.

Without CONSULT-II

1. Start up auto active test. Refer to PG-42, "Auto Active Test" .
2. Make sure that rear wipers operate normally.



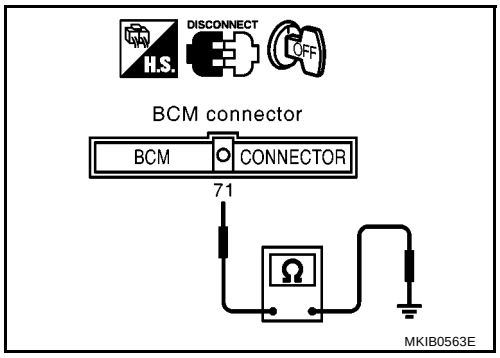
OK or NG

OK >> GO TO LT-196, "Check Combination Switch" .
NG >> GO TO 2.

2. CHECK BCM OUTPUT SIGNAL

1. Turn ignition switch to ON.
2. Rear wiper switch is in placed in ON position.
3. Check voltage between BCM harness connector M50 terminal 71(BR) and ground.

Connector terminal			Measuring condition	Voltage [V]
(+)		(-)		
Connector	Terminal (wire color)			
B53	71 (BR)	Ground	Rear wiper stopped	Approx 0
			Rear wiper operating	Battery voltage



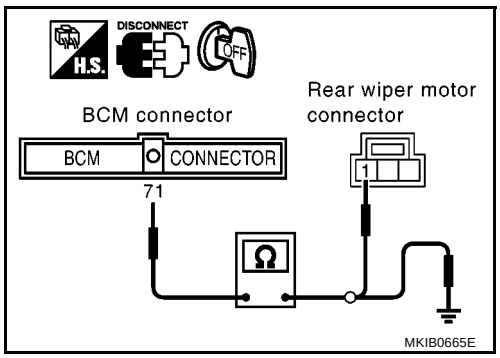
OK or NG

OK >> GO TO 3.
NG >> Replace BCM.

3. CHECK REAR WIPER MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect BCM and rear wiper connector.
3. Check continuity between BCM harness connector M50 terminal 71(BR) and rear wiper motor harness connector B53 terminal 1(BR).
4. Check continuity between BCM harness connector M50 terminal 71(BR) and ground.

71 (BR) – 1 (BR) :Continuity should exist.
71 (BR) – Ground :Continuity should not exist.



OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness.

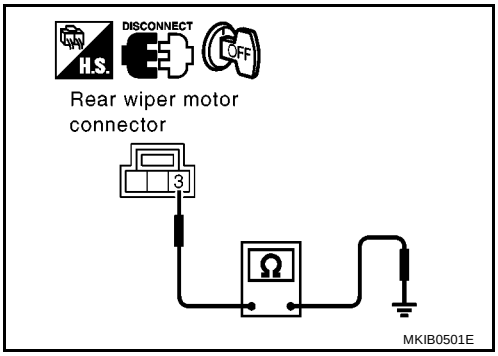
4. CHECK REAR WIPER MOTOR GROUND

Check continuity between rear wiper motor harness connector B53 terminal 3(B) and ground.

Continuity should exist.

OK or NG

OK >> Replace rear wiper motor.
NG >> Repair harness or connector.



Rear Wiper Stop Position Is Not Restored

EKS0087L

1. CHECK AUTO STOP INPUT SIGNAL

With CONSULT-II

Select BCM on CONSULT-II.Check (“RR WIPER STOP”) in “DATA MONITOR” mode with CONSULT-II.

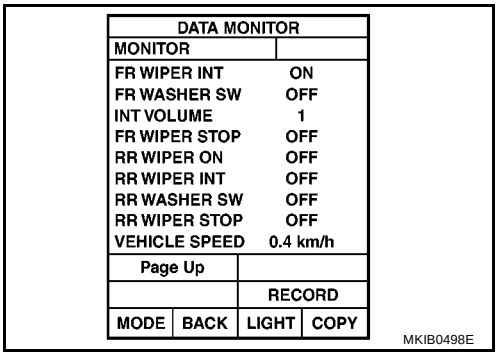
When rear wiper is operating : RR WIPER STOP OFF
When rear wiper is stopped : RR WIPER STOP ON

Without CONSULT-II

GO TO 2.

OK or NG

OK >> Replace BCM.
NG >> GO TO 2.



2. CHECK BCM OUTPUT SIGNAL

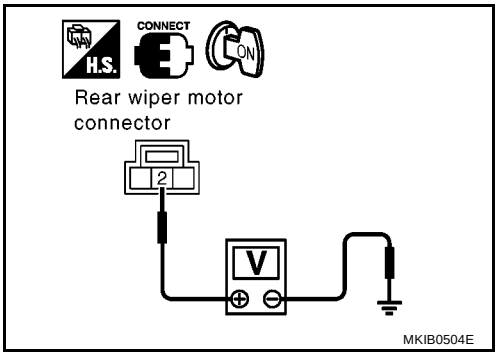
While rear wiper motor is stopped and while operating, measure voltage between rear wiper motor connector terminal 2 and ground.

1. Turn ignition switch is ON.
2. Rear wiper switch is placed in INT position.
3. Check voltage between BCM and rear wiper motor.

(+)		(-)	Condition	Voltage [V]
Connector	Terminal (wire color)			
B53	2 (P)	Ground	Wiper operating	Approx. 0
			Wiper stopped	Battery voltage

OK or NG

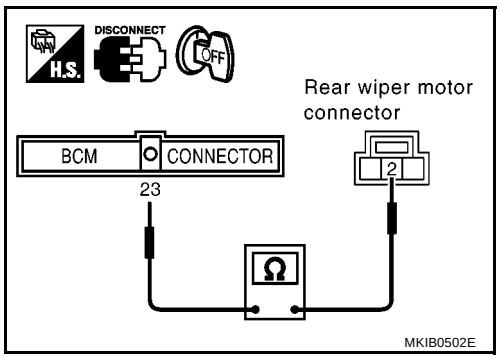
OK >> GO TO 3.
NG >> Replace BCM.



3. CHECK AUTO STOP CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the BCM connector and rear wiper motor connector.
3. Check continuity between BCM harness connector M48 terminal 23(P) and front wiper motor harness connector B53 terminal 2(P).

Continuity should exist.

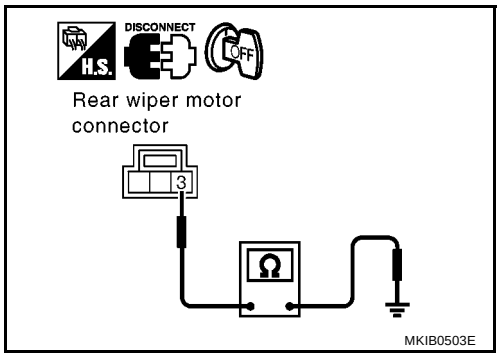


4. Check continuity between rear wiper motor harness connector B53 terminal 3(B) and ground.

Continuity should exist.

OK or NG

OK >> Replace rear wiper motor.
NG >> Repair harness or connector.



Only Rear Wiper INT Does Not Operate

EKS0087M

Refer to LT-196, "Check Combination Switch" , and check it.

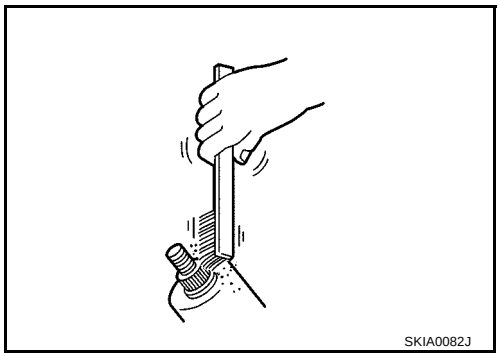
Removal and Installation of Rear Wiper Arm

EKS007BH

REMOVAL

1. Turn the wiper switch ON to operate the wiper motor, then turn it OFF (auto stop).
2. Lift up nut cover and remove nut.
3. Raise wiper arm, and remove wiper arm from the vehicle.

When attaching rear wiper arm, clean wiper installation location as shown in figure to prevent loosening of nut.



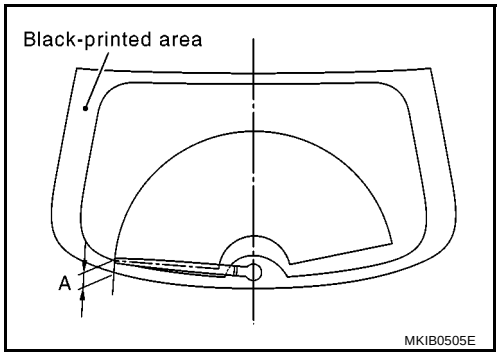
INSTALLATION

1. Lower wiper blade to glass so that center end of blade comes to the position shown in diagram.
2. Tighten the wiper arm with nuts and install the nut cover.

Wiper arm nut:

: 10.8 - 13.2 N·m (1.1 - 1.3 kg-m, 8- 10 ft-lb)

3. Spray washer fluid. Turn wiper switch ON to operate wiper, then turn it OFF (auto-stop).
4. Make sure wiper blade stops at the position shown in the figure.



Stop position A : 25.5 - 40.5 mm (1.004 - 1.594 in)

NOTE:
Installation is made easier by aligning wiper blade end to line under black printing.

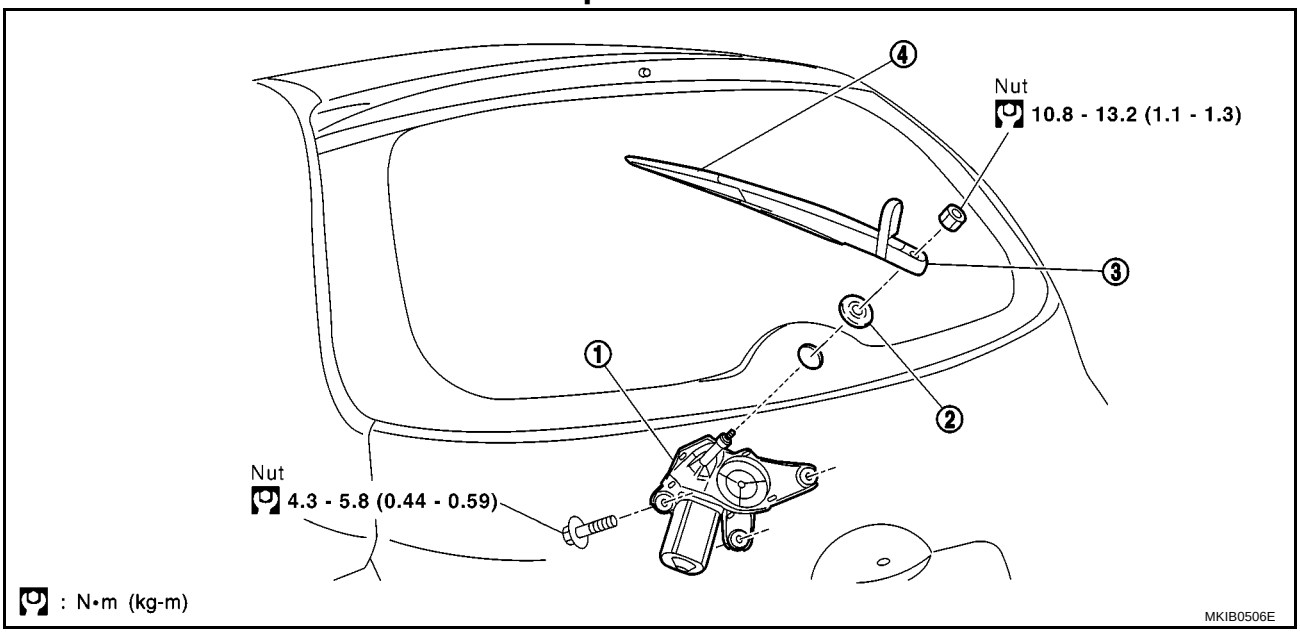
Adjusting Rear Wiper Arm Stop Position

EKS007BI

Refer to WW-106, "Removal and Installation of Rear Wiper Arm" .

Removal and Installation of Rear Wiper Motor

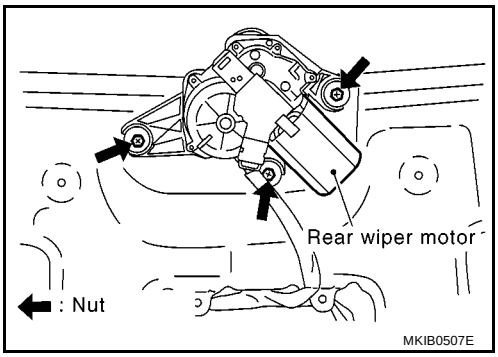
EKS007BJ



1. Rear wiper motor
2. Seal rubber
3. Rear wiper arm
4. Wiper blade

REMOVAL

1. Remove back door finisher. Refer to EI-18, "BACK DOOR TRIM" .
2. Turn wiper switch ON to operate wiper, then turn it OFF (auto-stop).
3. Disconnect wiper motor connector.
4. Lift up nut cover, remove wiper arm nut, and lift up wiper arm to remove it from vehicle.
5. Remove wiper motor screws. Remove wiper motor from vehicle.
6. Remove seal rubber from vehicle.



CAUTION:
Do not drop the wiper motor or cause it to contact other parts.

INSTALLATION

1. Remove seal rubber from vehicle.
2. Attach wiper motor to vehicle.

Wiper motor screw

: 4.3 - 5.8 N·m (0.44 - 0.59 kg-m, 38 - 51 in-lb)

3. Connect the wiper motor to the vehicle-side connector. Turn the wiper switch ON to operate the wiper motor, then turn the wiper switch OFF (auto stop).
4. Attach wiper arm to vehicle.

Wiper arm nut:

: 10.8 - 13.2 N·m (1.1 - 1.3 kg-m, 8 - 10 ft-lb)

5. Adjust wiper arm stop position.
6. Put down nut cover.
7. Install back door finisher. Refer to EI-18, "BACK DOOR TRIM" .

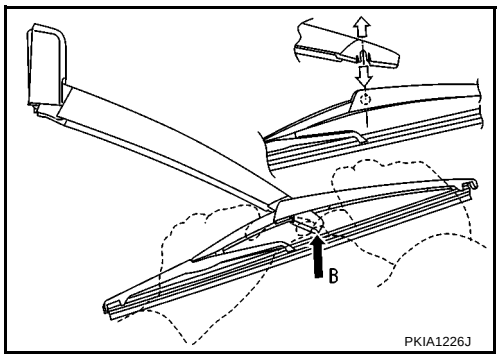
Rear Wiper Blade

EKS007BK

REMOVAL AND INSTALLATION

1. Hold the wiper blade with both hands, push arm end in arrow B direction, remove lock, and remove blade.

   CAUTION:
   To replace blade, replace blade assembly.

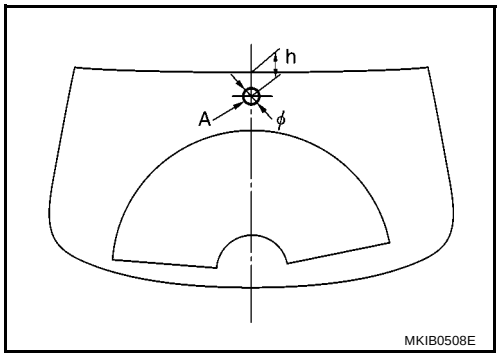


Adjusting Rear Washer Nozzle Spray Position

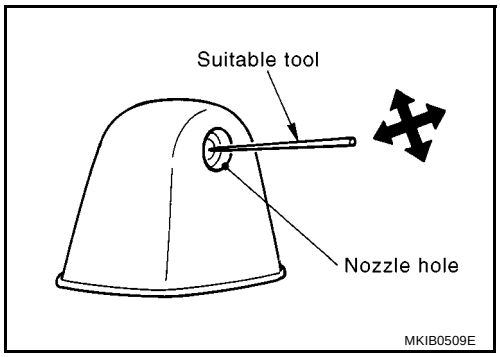
EKS007BL

Adjust spray positions to match the positions listed below.

Spray position	H (height)	ϕ (spray point area)
A	20	30



To adjust the spray position, insert a needle or similar object into the spray opening and move up/down and left/right.



Rear Washer Hose Circuit

EKS007BM

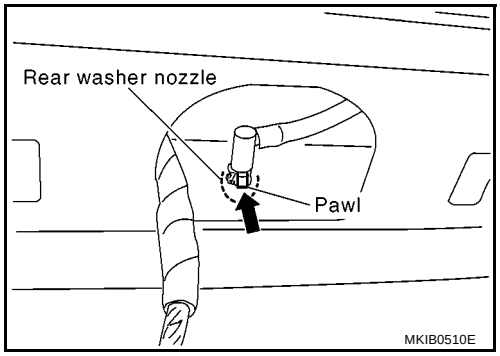
Refer to WW-45, "Washer Hose Routing" .

Removal and Installation of Rear Washer Nozzle

EKS007BN

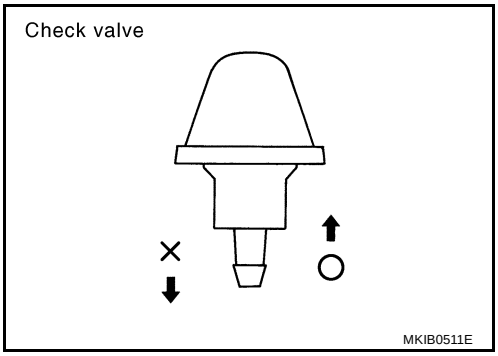
REMOVAL

1. Remove high-mount stop lamp. Refer to LT-182, "HIGH-MOUNTED STOP LAMP" .
2. Remove washer nozzle from washer hose.
3. Push outward while pushing hooks on back of nozzle.



CHECK VALVE INSPECTION

Make sure air can pass through the hose by blowing forward (toward the nozzle) and air cannot pass through by sucking.



INSTALLATION

1. Install in the reverse order of removal.
2. Nozzle spray position must be adjusted.

Rear Wiper and Washer Switch Circuit Inspection

EKS007BO

Refer to LT-196, "Check Combination Switch" .

Removal and Installation of Rear Wiper and Washer Switch

EKS007BP

Refer to LT-199, "Removal and Installation" .

Removal and Installation of Rear Wiper and Washer Tank

EKS007BQ

Refer to WW-46, "Removal and Installation of Front Wiper and Washer Tank" .

Removal and Installation of Rear Wiper and Washer Pump

EKS007BR

Refer to WW-46, "Removal and Installation of Front Wiper and Washer Pump" .

HEADLAMP WASHER

PFP:28620

System Description

EKS0087R

- Wiper switch (combination switch) is composed of a combination of 5 output terminals and 5 input terminals. Terminal combination status is read by BCM when switch is turned ON.
- BCM controls headlamp washer operation.
- IPDM E/R operates headlamp washer motor according to CAN communication signals from BCM.

Power is supplied at all times

- through 30 A fusible link (letter L, located in fuse and fusible link box).
- to headlamp washer relay terminals 1 and 3.
- through 40 A fusible link (letter J, located in fuse and fusible link box).
- to BCM terminals 74 and 79.
- through 20 A fuse (NO.52, located in IPDM E/R).
- to IPDM E/R (CPU).

When ignition switch ON or START position, power is supplied

- to IPDM E/R (CPU), and
- through 10 A fuse [NO.4, located in fuse block (J/B)]
- to BCM terminal 24.

Ground is supplied

- to IPDM E/R terminals 3 and 54, and
- to head lamp washer motor terminal 1,
- through body grounds E25 (CR engine models), E26 and E40.
- to BCM terminals 2 and 70, and
- to head lamp washer switch terminal 2,
- through body grounds M19 and M20.

HEADLAMP WASHER OPERATION

When lighting switch is placed in 1st position, BCM read combination switch condition (Refer to WW-83, "BCM WIPER SWITCH READING FUNCTION").
And headlamp washer switch ON, ground is supplied.

- to BCM terminal 62, and
- through headlamp washer switch terminal 1 and 2.
- through body grounds M19 and M20.

BCM sends headlamp washer request signal to IPDM E/R with CAN communication line.
And IPDM E/R is grounded to headlamp washer relay terminal 2 through IPDM E/R terminal 56.
Then headlamp washer relay is energized, power is supplied.

- through headlamp washer relay terminal 5
- to headlamp washer motor terminal 2.

Ground is supplied.

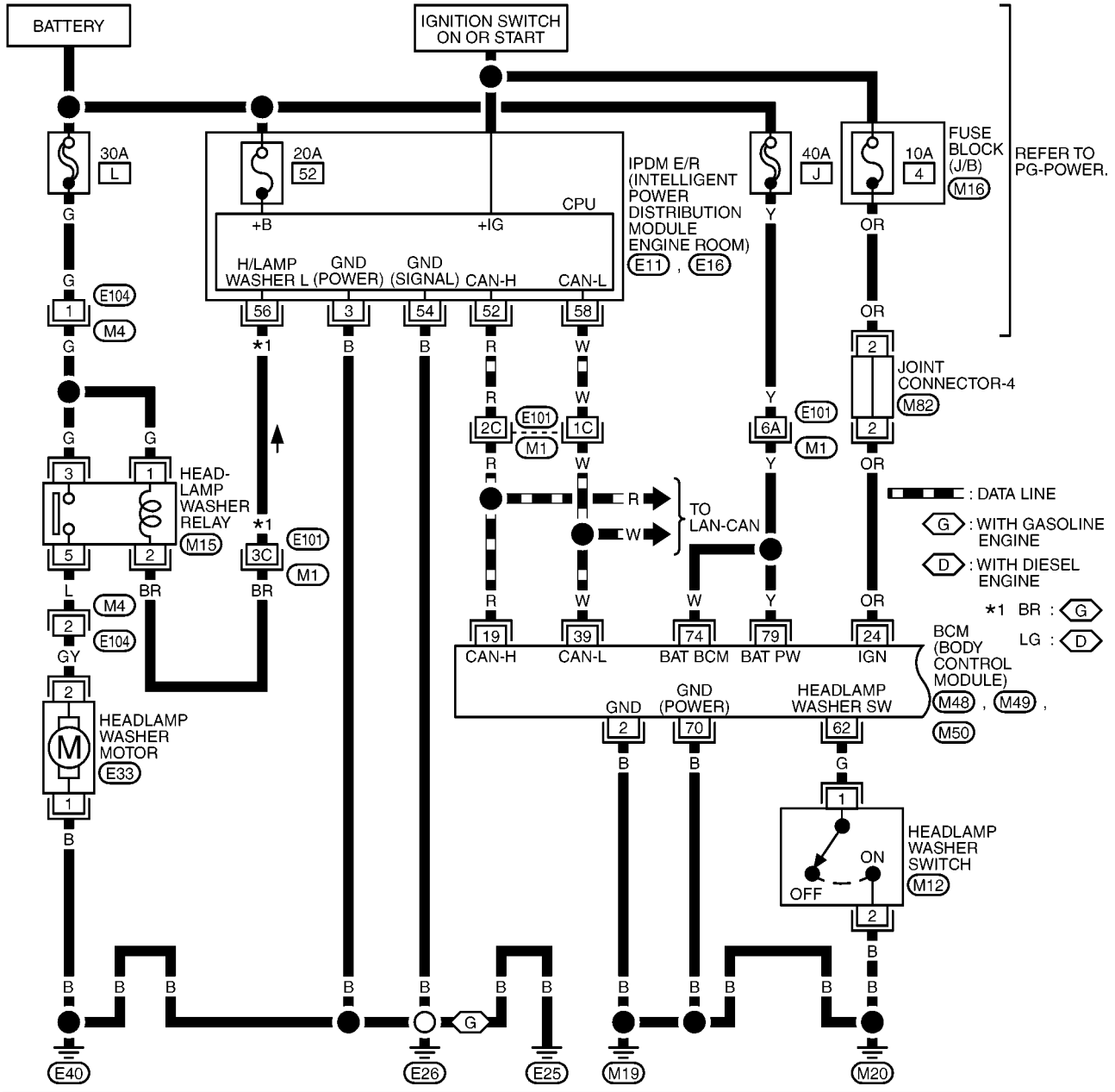
- to terminal 1 of headlamp washer motor
- through body grounds E25 (CR engine models), E26 and E40.

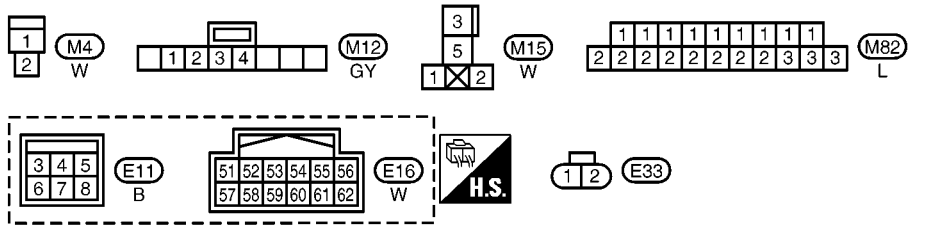
With power and ground supplied, the headlamp washer operates.

Wiring Diagram —HLC—

SMA for VIN >SJN**AK12U1133256 EKS0087S

WW-HLC-01

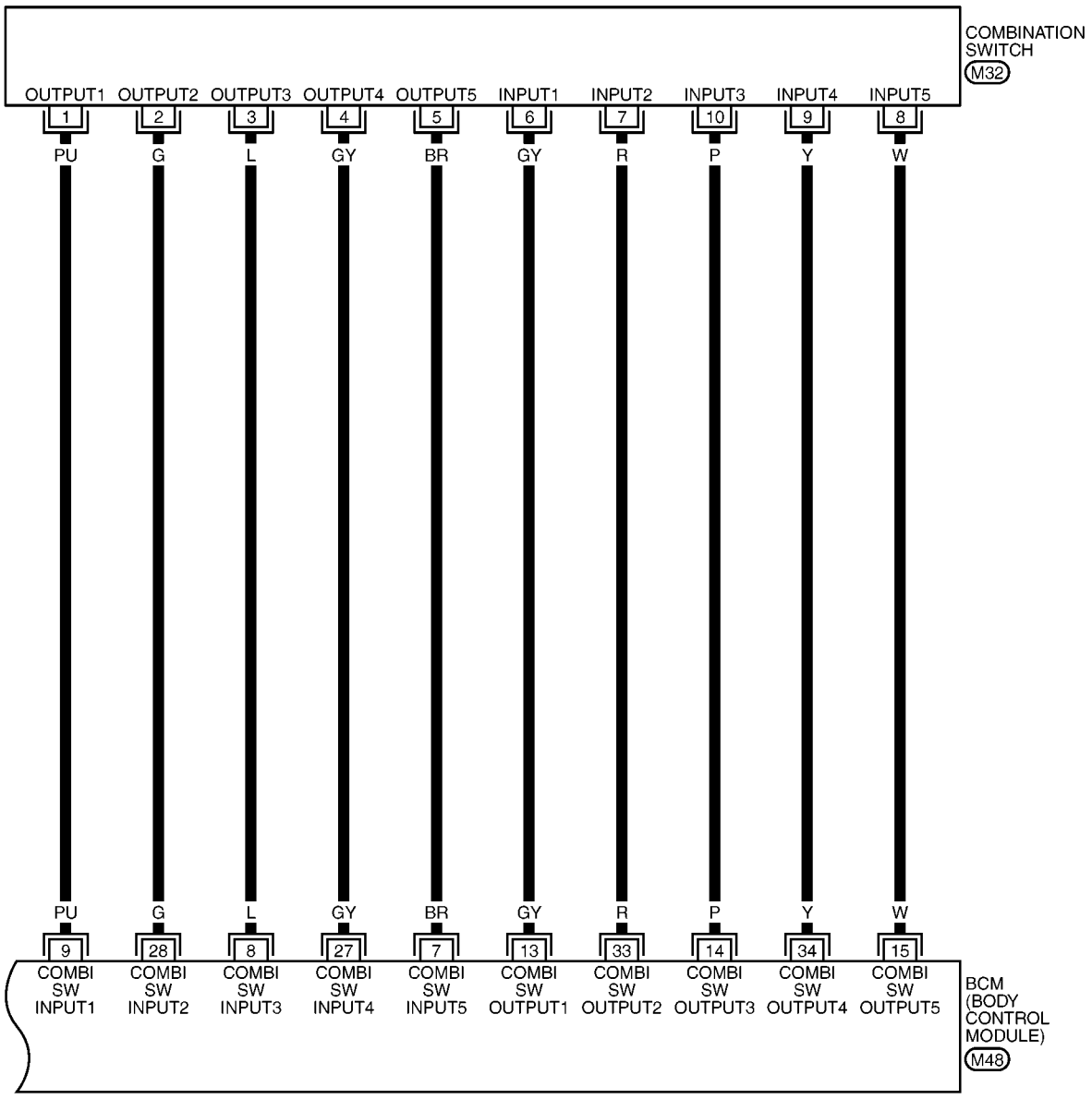


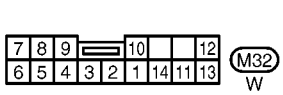


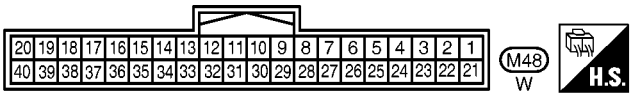
REFER TO THE FOLLOWING.
M1 -SUPER MULTIPLE JUNCTION (SMJ)
M16 -FUSE BLOCK-JUNCTION BOX (J/B)
M48, M49, M50 -ELECTRICAL UNITS

MKWA1466E

WW-HLC-02







MKWA1817E

CONSULT-II Function (BCM)

EKS008WJ

Refer to WW-31, "CONSULT-II Function (BCM)" .

CONSULT-II Function (IPDM E/R)

EKS008WK

Refer to WW-33, "CONSULT-II Function (IPDM E/R)" .

Removal and Installation for Washer Nozzle

EKS0087T

REMOVAL

1. Remove front bumper. Refer to EI-4, "FRONT BUMPER"
2. Remove washer tube.
3. Remove washer nozzle from front bumper.

INSTALLATION

Install in the reverse order of removal.

Removal and Installation for Washer Tank

EKS0087V

Refer to WW-46, "Removal and Installation of Front Wiper and Washer Tank" ,

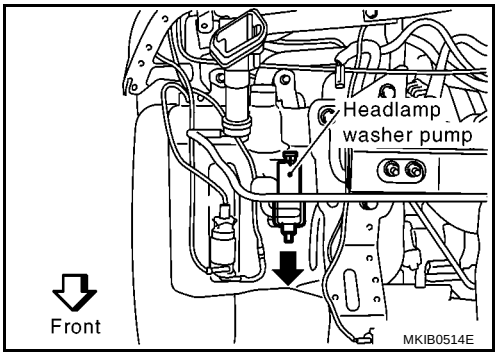
Removal and Installation for Washer Pump

EKS0087W

1. Remove front bumper. Refer to EI-4, "FRONT BUMPER"
2. Remove washer pump connector and hose.
3. Pull out washer pump in the direction of the arrow in the figure, and remove the washer pump from the washer tank.

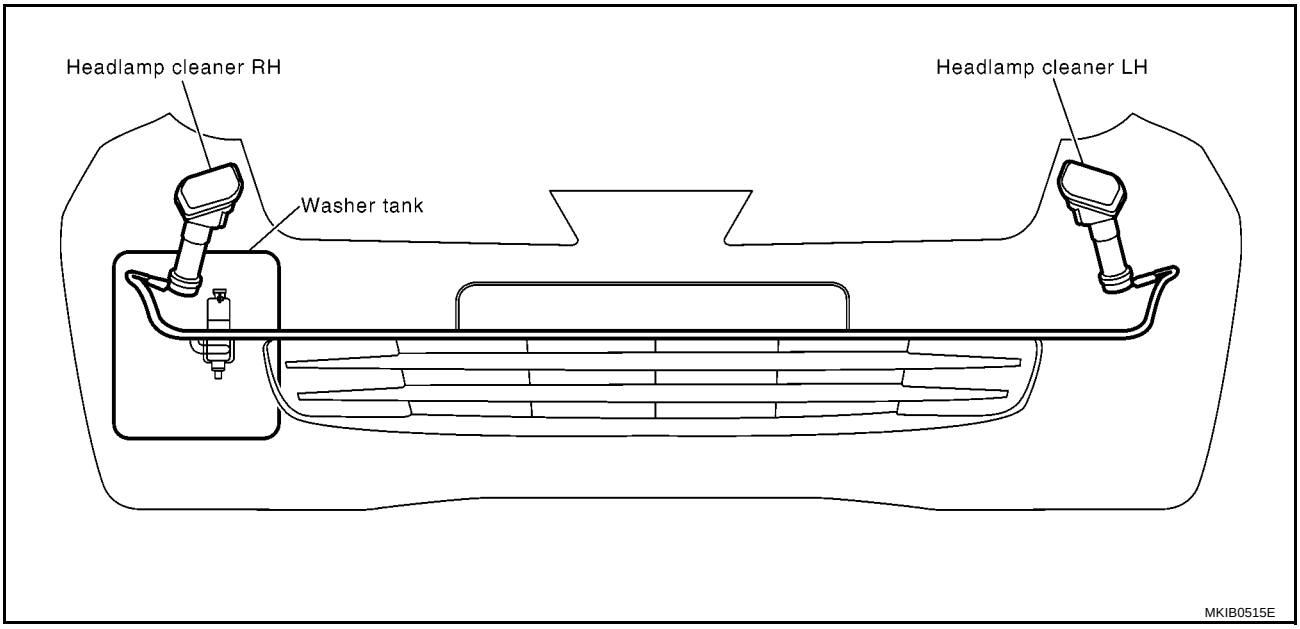
CAUTION:

When installing washer pump, there should be no packing twist, etc.



Washer Tube Layout

EKS0087X



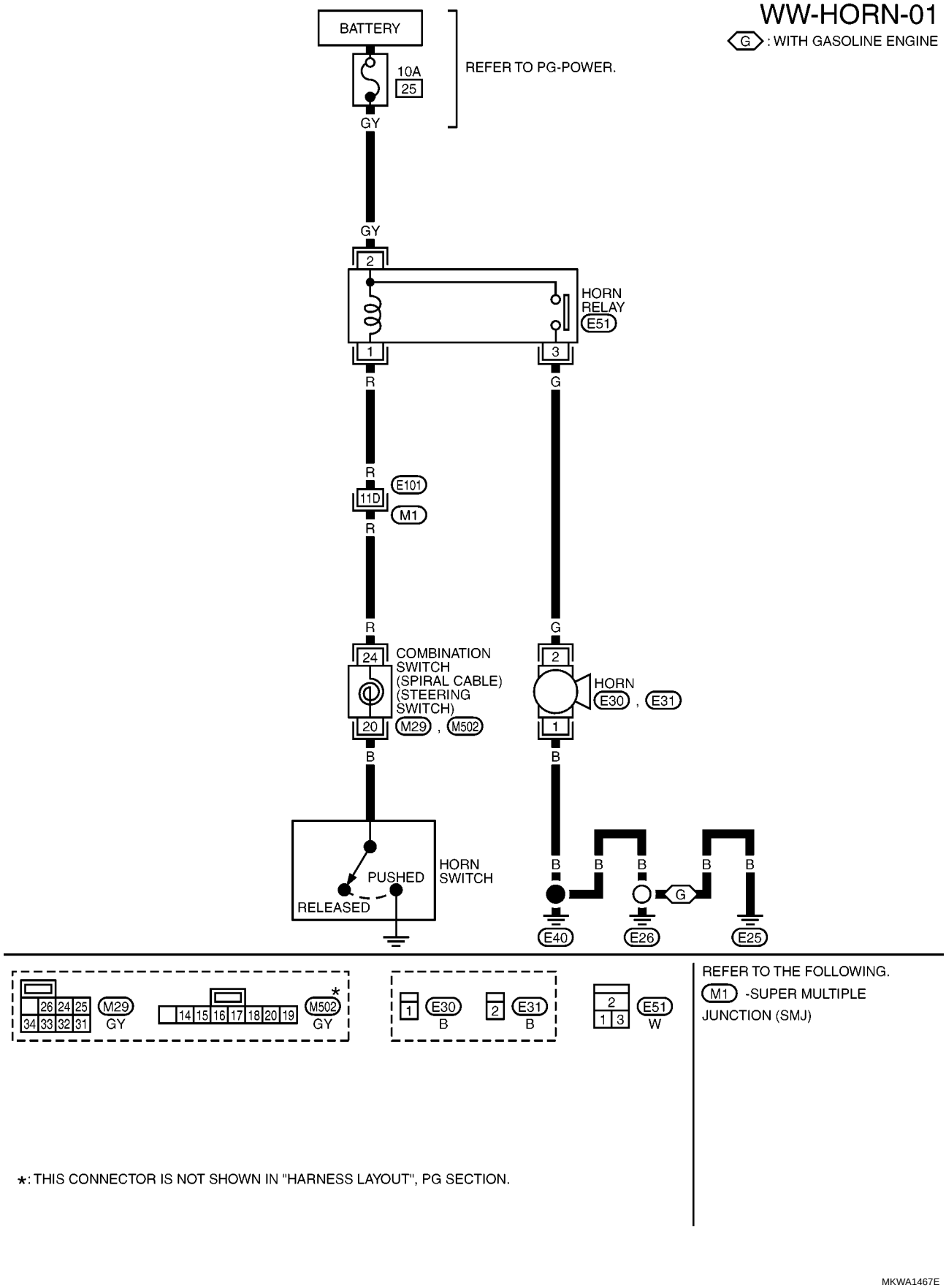
HORN

PFP:25610

Wiring Diagram —HORN—

SMA for VIN >SJN**AK12U1309269

EKS008IL



★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

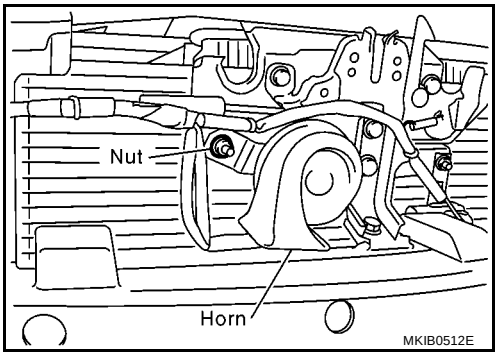
MKWA1467E

Removal and Installation

EKS007CG

REMOVAL

1. Remove front grille. Refer to EI-8, "FRONT GRILLE" .
2. Remove horn nut.
3. Disconnect horn connectors, and the remove horn from vehicle.



INSTALLATION

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

Horn nut

: 15.6 - 18.6 N·m (1.6 - 1.9 kg-m, 12 - 14 ft-lb)

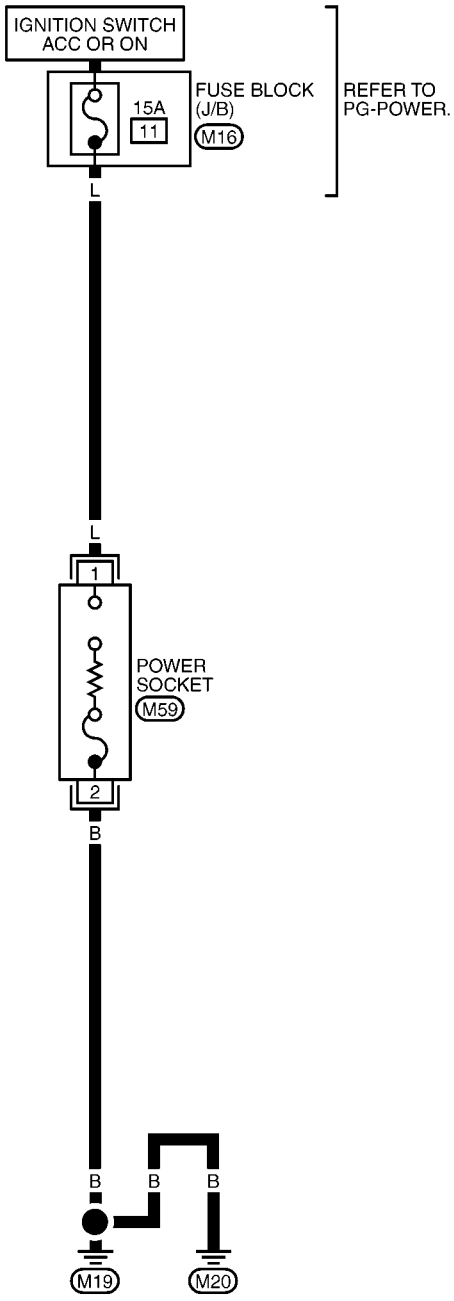
POWER SOCKET

PFP:253A2

Wiring Diagram —CIGAR—

EKS008IM

WW-CIGAR-01



2
1
M59
B

REFER TO THE FOLLOWING.
M16 -FUSE BLOCK-
JUNCTION BOX (J/B)

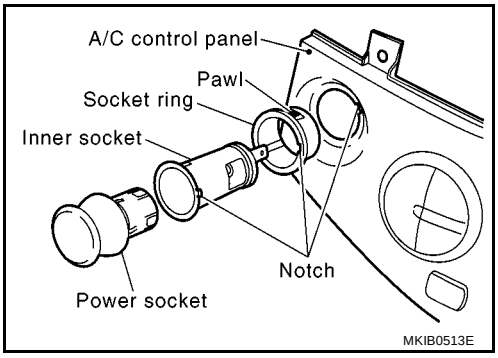
MKWA0805E

Removal and Installation

EKS007CH

REMOVAL

1. Remove air conditioner panel. Refer to IP-7, "L. Air Conditioner Finisher" .
2. Disconnect the power socket connector.
3. Remove inner socket while spreading tabs on the socket ring (2 locations).



INSTALLATION

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

CAUTION:

Align inner socket protruding area with socket ring and install.